Appendix B
B20 Line Component: Rare, Threatened, and Endangered Species Plant Survey Results Memorandum

Memorandum

To: GMP Johnson to Lowell Line Rebuild Project File

Date: October 29, 2019

Project #: 57955.00

From: Andrew J. Wood, Ecologist; Adam R. Crary, PWS, PWD

Re: B20 Line Component - Rare, Threatened, and Endangered Plant Survey Results

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At the request of Green Mountain Power ("GMP" or "co-Petitioner"), VHB conducted database reviews and field surveys for rare, threatened, and endangered ("RTE") plants in support of the rebuild and reconductoring of an approximately 18.15-mile long segment of existing GMP transmission line ("Line 133" or "B20 Line Component") within a 100-foot wide right-of-way ("ROW") corridor extending between the GMP Johnson Substation in Johnson, Vermont (Lamoille County), through the town of Eden, and ending at the GMP Lowell Substation in Lowell (Orleans County) (collectively, the "Johnson to Lowell Upgrade Project"). This technical memorandum presents the results of an evaluation of on-site natural resources pursuant to the Endangered Species criterion [10 V.S.A. § 6086 (a)(8)(A)] as applied under 30 V.SA. Section 248(b)(5) for the purpose of obtaining a Certificate of Public Good ("CPG") from the Vermont Public Utility Commission ("PUC") and as relevant under State and Federal protections for Threatened and Endangered species.

A detailed description of existing conditions of the Johnson to Lowell Upgrade Project site and a summary of its various components is presented under a separate cover, the *Section 248 Natural Resources Report: Green Mountain Power Johnson to Lowell Upgrade Project* ("Natural Resources Report") (VHB 2019), for which this technical memorandum supplements. Descriptions of VHB's methodologies and assessments, survey findings, and an evaluation of mitigation and recommended avoidance strategies contained herein is limited to RTE plants. In making assessments and recommendations, VHB has relied on B20 Line Component information provided by GMP and its engineer, including B20 Line Component site plans.

In summary, the Project would consist of rebuilding and reconductoring the existing B20 Line to replace aging infrastructure, upgrade electrical equipment along the line, and enhance reliability and safety of GMP's service area. Due to the nature of the B20 Line Component (reconstruction of an existing line), resource impacts are generally minimized; however, construction access and new pole infrastructure would disturb existing conditions in certain locations. Impacts from these actions considered and analyzed below are applicable to RTE plants. Additionally, a brief discussion of uncommon — but not rare or protected — plants is included for the purpose of characterizing on-site vegetative communities; uncommon species were not analyzed for potential B20 Line Component impacts.

Following offsite database review completed to identify target plant species and habitats for survey, field surveys for RTE plants were initially conducted in July and August of 2017 with limited follow up data collection and population stem counts in the vicinity of the Vermont Asbestos Group ("VAG") mine, located in Eden during September of 2017. In July of 2019, several additional areas under consideration for off-right-of-way ("off-ROW") access alternatives were surveyed. Results of the RTE plant survey are depicted on the *Rare, Threatened and Endangered Species Survey Target Areas and Results Map* in Attachment 1. Representative photographs of observed RTE plant populations and habitats are included in Attachment 2. VHB consulted with the Fish and Wildlife Department ("FWD") State Botanist (B. Popp), during the process of identifying target plant species and habitats for field surveys within the B20 Line Component ROW and off-ROW access locations. The list of targeted RTE plant species is included in Attachment 3. Following initial field surveys, VHB again consulted with the State Botanist during an on-site review of a subset of RTE plant observations, as described in more detail below.

SITE AND B20 LINE COMPONENT DESCRIPTION

For a complete description of the site and Project, refer to the VHB Natural Resources Report under separate cover (VHB 2019).

TARGET SPECIES AND HABITATS FOR FIELD SURVEYS

Given the diversity of habitats bisected by the B20 Line Component Study Area, during initial field assessment planning, VHB generated a set of criteria to help define the portions of the B20 Line Component Study Area providing suitable habitat for RTE plants, taking into consideration existing knowledge of RTE plant distribution in the B20 Line Component area. These criteria were reviewed with the State Botanist in late-May/early-June of 2017. Target RTE species and habitats for field surveys included:

- Protected (state-listed) plant species known within the approximate 3-mile vicinity of the B20 Line Component and with potential on-site habitats (VHB included protected plant species found during circa-2009-2010 field surveys and reported by VHB for the GMP Kingdom Community Wind Project in Lowell because those plants were not included in the records available during the 3-mile vicinity review);
- Suitable habitats for rare (Ranked as S1 or S2, but otherwise not protected) plant species known from within or immediately adjacent to the B20 Line Component;
- All portions of the B20 Line Component containing sandy soil as defined by Natural Resources Conservation Service ("NRCS") soil map units. For the B20 Line Component corridor, this included areas of mapped Adams and Croghan soils which were targeted for field surveys due to the relatively high proportion of RTE plant species known to occupy Sandplain and other sand-dominated habitats;
- All portions of the B20 Line Component area with potential Serpentine outcrops, identified by serpentine or dunnite bedrock geology as mapped by the U.S. Geologic Survey and/or the Agency of Natural Resources ("ANR");
- Areas potentially influenced by runoff from known or potential Serpentine outcrops in the B20 Line Component corridor;
- B20 Line Component areas within and adjacent to the VAG mine where dunnite and/or serpentinite rock from mining operations could be exposed (occurs in approximately 6,000 linear feet of the B20 Line Component);
- Wetlands (identified during VHB's wetland delineation fieldwork earlier in the growing season in 2017 and described in more detail in the Natural Resources Report) underlain by organic substrate that could harbor bogs, intermediate fens, and poor fens or rare flora of similar habitats; and,
- All areas in the B20 Line Component where NRCS mapped soil units consist of muck or mucky soil types and therefore could support similar RTE species or habitats as described in the previous item.

Field surveys were conducted in accordance with ANR's *Guidance for Conducting Rare, Threatened, and Endangered Plant Inventories in Connection with Section 248 Projects* (ANR 2016a). Field surveys were scheduled based on the known phenology of target species, and therefore were conducted during a time in which the characteristics necessary for identification of target species would be most readily identifiable. For a complete list of target species as well as the known habitat and general habitat preferences and select data for known occurrences, see Attachment 3. All known Element Occurrence ("EO") polygons mapped in FWD's Natural Heritage Inventory ("NHI") database within and

adjacent to the B20 Line Component Study Area, as well as NRCS soil map units and mapped surficial and bedrock geology as used in the field survey design, are depicted in Attachment 1.

FIELD SURVEYS AND RESULTS

A team of qualified VHB Botanists conducted targeted surveys of the identified potential habitat areas for RTE plant species on July 11, July 14, and July 31-August 4 of 2017. Follow up data collection and stem counts for RTE species observed in proximity to the VAG mine were conducted on September 14, 2017. During field surveys, eleven uncommon (S3) and four rare (S1 and S2) plant species were detected. All RTE plants were observed within the B20 Line ROW corridor. There were no RTE plants observed in any of the off-ROW access locations that were surveyed in 2017 or 2019. Of the RTE plant species observed, one species is listed as Threatened in Vermont, as noted in Table 1 below. All occurrences of RTE species were recorded with GPS technology capable of sub-meter accuracy and are depicted on the RTE Plant Map in Attachment 1; Uncommon (S3) species were documented by field staff, but not mapped, and are listed below for the purpose of furthering the understanding of on-site vegetative communities and habitats.

Table 1. Rare, Threatened and Endangered Plant Species and Uncommon Species - GMP Lowell to Johnson Line Upgrade: B20 Line Component.

Scientific Name[1]	Common Name	State Rank[3]	State Protection Status[3]
Adiantum aleuticum	Aleutian maidenhair fern	S1	-
Adiantum viridimontanum	Green Mountain maidenhair fern	S2	Threatened
Alnus viridis	Green alder	S3	-
Asclepias exaltata	Poke milkweed	S3	-
Botrychium multifidum	Leathery grapefern	S3	-
Carex laxiculmis	Spreading sedge	S3	-
Cypripedium parviflorum	Lady's slipper orchid	S3	-
Eleocharis ovata	Ovate spikerush	S3	-
Eriophorum tenellum	Few-nerved cottongrass	S1S2	-
Erythranthe moschata Synonym: *Mimulus moschatus*	Musky monkey-flower	S3	-
Juncus marginatus	Grass-leaved rush	S3	-
Pseudognaphalium macounii	Macoun's rabbit-tobacco	S3	-

Spiranthes casei[2]	Case's ladies'-tresses	S2?	-
Spiranthes ochroleuca[2]	Yellow ladies'-tresses	S3	-
Utricularia gibba	Creeping bladderwort	S3	-

[1.] Nomenclature follows Haines (2011).
[2.] VHB also observed *Spiranthes* with intermediate traits suggesting hybridization between *S. casei* and *S. ochroleuca*. Given the taxonomic uncertainty of these plants with intermediate traits, VHB conservatively mapped these collective occurrences of *Spiranthes* species as *S. casei,* to provide the maximum amount of protection to rare or potentially rare plants.
[3.] State rank and protection status from ANR 2018.

During a September 11, 2017 agency site visit, the State Botanist reviewed three areas with RTE plants and potential habitats. FWD confirmed the following identification and locations:

- Between existing Structures 237 and 239, within waste rock and sandy/coarse aggregate substrate north of the VAG Mine entrance: *Adiantum viridimontanum*, *Adiantum aleuticum*, *Spiranthes casei,* and *Spiranthes ochroleuca*. Additionally, FWD and VHB noted that there were plants with intermediate traits suggesting hybridization between *S. casei* and *S. ochroleuca.*
- Between existing Structure 312 to 313, within the managed ROW scrub shrub wetland 2017-58 underlain by organic substrate: *Eriophorum tenellum*.

Additionally, FWD confirmed that a rock outcrop present between Pole 338 and Pole 341 is not a serpentine outcrop that could be associated with RTE plants. A complete list of identified vascular plant species encountered during VHB's field surveys is included in Attachment 4**.**

RTE PLANT AND HABITAT AVOIDANCE DISCUSSION

In order to mitigate against potential impacts to known or potential occurrences of RTE plant species from the B20 Line Component, GMP, in consultation with VHB, has incorporated a number of general and specific resource avoidance, impact minimization, and Best Management Practices ("BMPs") into the B20 Line Component design. These measures would apply to all areas containing rare and protected plants, and other areas summarized below.

Pre-Construction Resource Demarcation and Preparation

- The B20 Line Component design of new/replacement pole structures has avoided RTE plant locations and 25-foot design buffers as depicted on the B20 Line Component site plans.
- For any growing season construction work/access within mapped RTE plant and 25-foot design buffer locations, pre-construction demarcation by a qualified botanist would occur, and work crews would be briefed on the presence of RTE plants and demarcation types and locations. B20 Line Component activities, especially by mechanized equipment, within RTE demarcation areas would be avoided to the maximum extent feasible. Rare or protected plants are known from two stations within the B20 Line Component (proposed structures 242-244, and 316-317).
- All construction equipment would be cleaned prior to entering the B20 Line Component site in order to minimize the introduction of new non-native and invasive ("NNIS") plants.

- VHB recommends conducting a site visit in a late-summer/fall timeframe to refine the equipment access route near the VAG mine entrance between proposed structures 242-244 in order to avoid all impacts to RTE plant species (or to keep unavoidable impacts below the thresholds which would trigger an RTE Takings permit and/or impact mitigation).

Seasonal Restrictions to Minimize Soil Disturbance and Compaction

- Where access or construction activity within RTE plant/buffer locations is unavoidable, all construction would take place during winter frozen ground conditions but at minimum outside the growing season (October 15-April 15) when the RTE plant species dormancy is expected, which would seasonally avoid impacting RTE plants from equipment accessing the ROW and staging to install new poles to complete reconductoring.
- If ground conditions are thawed or soft during construction or soil disturbance from access is unavoidable, then activities would take place on top of construction mats, which would be placed for no more than five consecutive days if necessary during the growing season, considered to be April 16 through October 14 (mats in place longer than five days would constitute a taking of plants, requiring permit authorization for protected plants, if applicable).
- If non-growing season construction is not possible, then no more than a 20 percent impact of any RTE plant occurrence within the ROW would result from the B20 Line Component and, if it is determined that an impact greater than 20 percent is anticipated for any S2 plants, 10 percent for S1 plants, and 0 percent for protected plants (*Adiantum viridimontanum*), pre-construction consultation with ANR would occur to determine appropriate mitigation measures to be implemented.
- GMP would employ BMPs for ROW access, such as the use of tracked or low-ground pressure equipment, or no mechanized entry in the vicinity of RTE plants.

Pole Replacement Techniques

- In locations where ground disturbance is required for pole replacement and the presence of RTE plants has been identified in the vicinity, the B20 Line Component would avoid impacts to RTE plants by flush cutting the existing pole, and installing the new pole only where there is no RTE plants within the approximately 5 foot diameter area of soil disturbance that is generally required for a new pole. Existing poles which would require a specific RTE avoidance measure are identified in the bulleted list of BMPs below. During the B20 Line Component planning process and based on input from ANR during site visits in 2017 and prefiling meetings in 2019, GMP has adjusted proposed new pole locations within the general RTE plant area to avoid individual RTE plants or clumps of plants so that there would be no impact to RTE plants as the result of pole placement.
- Pole removal and replacement construction will utilize vertical extraction and augered installation wherever possible and follow ANR's BMPs for pole removal (ANR 2016b). If vertical extraction or augered installation of a replacement pole is not possible, then GMP will minimize the amount of ground disturbance from excavation to the greatest extent possible, and excavated soil will not be stored within demarcated areas of RTE plants.
- Based on detailed surveys, existing structure 238 is located within a dense area of RTE plants, and as such would be flush cut with no mechanized entry if possible (i.e., no ground disturbance for pole removal) during construction.
- Based on VHB's surveys, the area within wetland 2017-58 between proposed structure 316 and 317 contains a population of RTE plants. GMP crews would access pole 317 from the north and pole 313 from the south, ensuring that no equipment would traverse the area between where the RTE plants occur.

With adherence to the measures outlined above, the B20 Line Component should not result in impacts to the state-protected Green Mountain maidenhair fern (*Adiantum viridimontanum*) during B20 Line Component construction, nor other rare plants. As such, the B20 Line Component would not require a Vermont Endangered and Threatened Species Takings Permit ("Takings Permit") or adverse impacts to RTE plants.

SUMMARY

VHB conducted detailed plant surveys during the summers of 2017 and 2019, during which time RTE plants, including the state-Threatened Green Mountain maidenhair fern (*Adiantum viridimontanum*), were observed. RTE plants were delineated in the field, and field reviewed by the State Botanist, during which time impact avoidance and minimization measures were discussed. Additional coordination with ANR in 2019 was conducted to review B20 Line Component plans to avoid and minimize impacts to RTE plants. Those measures are outlined above and also summarized on B20 Line Component site plans prepared by SGC Engineering. With adherence to the outlined pre-construction, soil disturbance avoidance, and pole removal measures outlined above, the B20 Line Component would not result in a take of protected plants and hence no Vermont Endangered and Threatened Species Takings Permit would be required for the B20 Line Component. Further, no impact to rare, but otherwise not protected plant occurrences within the B20 Line Component ROW is anticipated.

ATTACHMENTS

1. Rare, Threatened and Endangered Species Survey Target Areas and Results Map
2. Target Rare, Threatened, and Endangered Plant Survey Species List
3. Lowell to Johnson Line Upgrade – B20 Line Rare, Threatened, and Endangered Plant Assessment Photographs
4. Species Checklist – Rare, Threatened, and Endangered Plant Survey

REFERENCES

Agency of Natural Resources (ANR). 2018. *Rare and Uncommon Native Vascular Plants of Vermont*. Natural Heritage Inventory, Fish and Wildlife Department. Effective August 9, 2018.

— 2016a. *Guidance for Conducting Rare, Threatened, and Endangered Plant Inventories in Connection with Section 248 Projects*. Effective October 5, 2016.

— 2016b. *Pentachlorophenol Report. Response to PSB Docket #8310*. Filed April 26, 2016.

Haines, A. 2011. *Flora Novae Angliae: A Manual for the Identification of Native and Naturalized Higher Vascular Plants of New England*. New England Wildflower Society and Yale University Press. New Haven, CT.

Vanasse Hangen Brustlin, Inc. (VHB). 2019. *Section 248 Natural Resources Report: Green Mountain Power Johnson to Lowell Upgrade Project: B20 Line, B22 Line, and Lowell Substation Rebuild, Towns of Johnson, Eden, Lowell, Morristown, and Hyde Park; Orleans and Lamoille Counties, Vermont.*

ATTACHMENT 1

GREEN MOUNTAIN POWER

vhb

October 10, 2019

1 0.5 0 1 Miles

Map Sheet (VHB)
Utility Pole (GMP)
Utility Pole (Other)
Town Boundary (VOGP)
County Boundary (VOGP)
Road (VTrans)

Lowell to Johnson Line Upgrade Project: B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
Lamoille and Orleans Counties, Vermont

Rare, Threatened and Endangered Species Survey
Target Area and Results
Index Map

Sources:
Background Imagery by VCGI (Collected in Spring, 2011)
VOGP (Vermont Open Geodata Portal - Various Dates)
ANR (Vermont Agency of Natural Resources - Various Dates)
GMP (Green Mountain Power - 2016-2017)
VTrans (Vermont Agency of Transportation - 2017)

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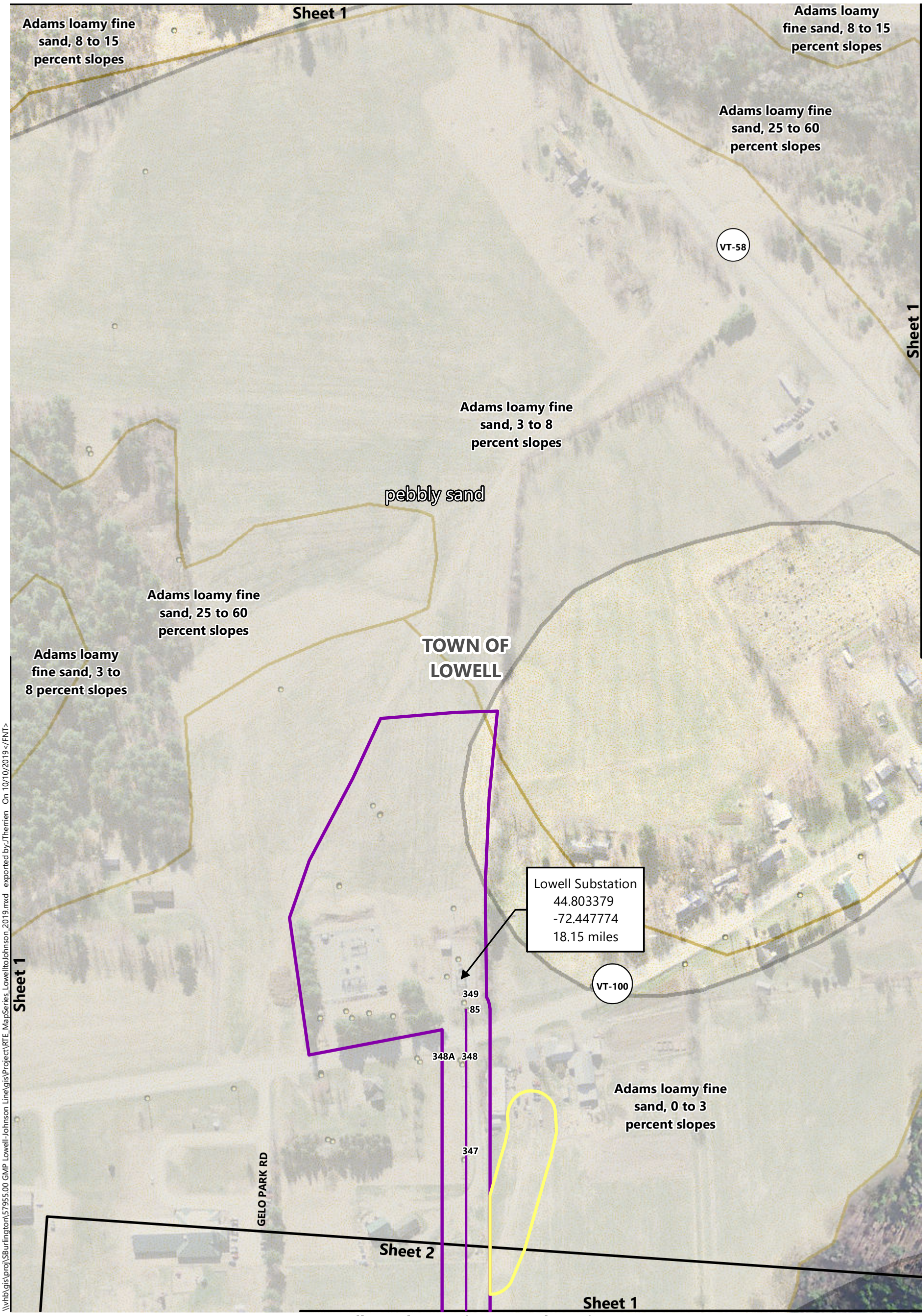
GREEN MOUNTAIN POWER

vhb October 10, 2019



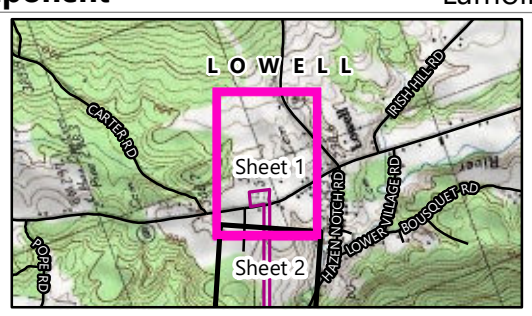
200 100 0 200 Feet

- Prior Study Corridor (VHB)
- 2019 off-ROW Access Study Areas (VHB)
- RTE Plant Location - Rare and Protected (VHB)
- RTE Plant Location - Rare (VHB)
- RTE Plant Area (VHB)
- RTE Plant Buffer (VHB)
- Surficial Geology Sands (VCGI)
- Organic Soils (VCGI)
- Sands (VCGI)
- Part Sandy (VCGI)
- Serpentine-type Bedrock (VCGI)
- Calcareous-type Bedrock (VCGI)*
- NHI Element Occurance (FWD)
- Uncommon Species (FWD)
- Line 133/B20 Line (GMP)
- Utility Pole (GMP)
- Utility Pole (Other)
- Delineated Stream (VHB)
- Delineated Wetland (VHB)
- Presumed Class II Wetland Buffer (VHB)
- Riparian Buffer (VHB)
- Proposed River Corridor (VHB)
- Confirmed Vernal Pool (ANR*
- Unconfirmed Vernal Pool (ANR)*
- Town Boundary (VCGI)

* Feature not present in map extent

Lowell to Johnson Line Upgrade Project: B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
Lamoille and Orleans Counties, Vermont



Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 1 of 38

Sources:
Background Imagery by VCGI (Collected in Spring, 2011)
ANR (Vermont Agency of Natural Resources - Various Dates)
FWD (Vermont Department of Fish and Wildlife - Various Dates)
GMP (Green Mountain Power - 2016-2017).
VOGP (Vermont Open Geodata Portal - Various Dates)
SGC (2019)
VHB (2017-19)

GREEN MOUNTAIN POWER

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Sheet 2

Sheet 1

GELO PARK RD

346

Adams loamy fine sand, 0 to 3 percent slopes

345

344

343

pebbly sand

2017-70 Presumed Class II

TOWN OF LOWELL

State Rank = S2
Global Rank = G5
State Status = -
EO ID = 420
Type = Vascular Plant

State Rank = S2
Global Rank = G5
State Status = -
EO ID = 3813
Type = Vascular Plant

342

State Rank = S1
Global Rank = G2?
State Status = -
EO ID = 5646
Type = Terrestrial Natural Community

2017-69 Presumed Class II

State Rank = S2
Global Rank = G3
State Status = T
EO ID = 5632
Type = Vascular Plant

341

State Rank = S1
Global Rank = G2?
State Status = -
EO ID = 2524
Type = Terrestrial Natural Community

340

HAZEN NOTCH RD

Sheet 2

339

alluvium

2017-68 Presumed Class III

dunite; peridotite

338

VALLEY RD

State Rank = S1
Global Rank = G5?
State Status = -
EO ID = 4406
Type = Vascular Plant

State Rank = S2
Global Rank = G3
State Status = T
EO ID = 5424
Type = Vascular Plant

337

Sheet 3

State Rank = S3S4
Global Rank = G4
SF ID = 17420
Type = Invertebrate Animal

lake sand

2017-67 Presumed Class II

2017-71 Presumed Class II

Sheet 2

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Lowell to Johnson Line Upgrade Project: B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
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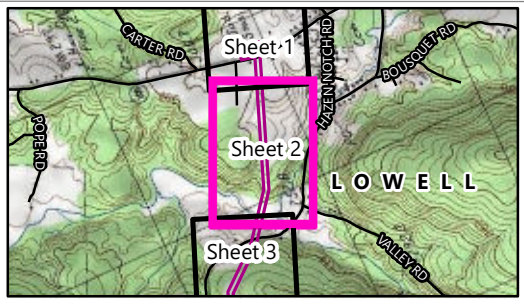
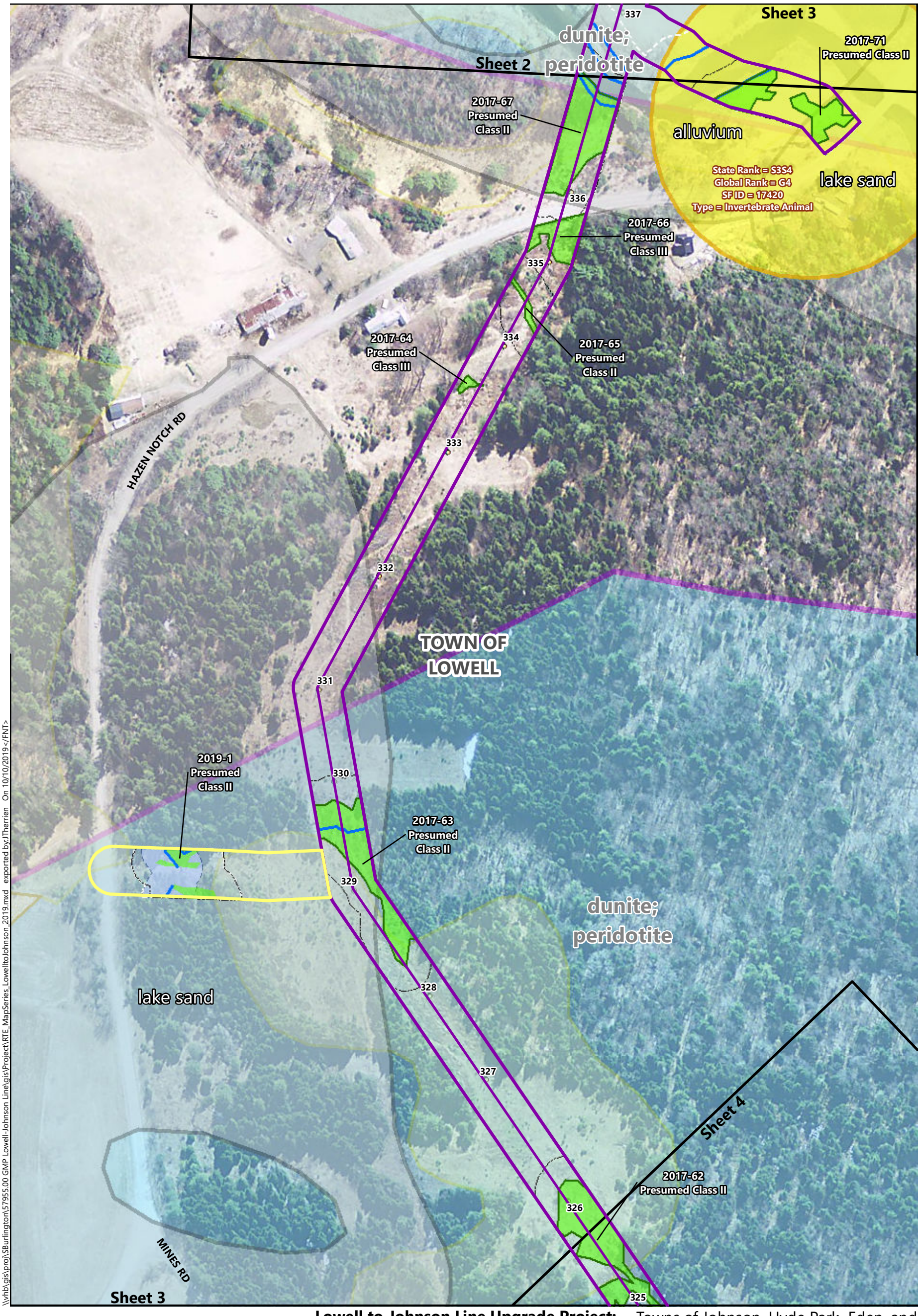


Rare, Threatened and Endangered Species Survey Target Area and Results Sheet 2 of 38

Sources:
Background Imagery by VCGI (Collected in Spring, 2011)
ANR (Vermont Agency of Natural Resources - Various Dates)
FWD (Vermont Department of Fish and Wildlife - Various Dates)
GMP (Green Mountain Power - 2016-2017).
VOGP (Vermont Open Geodata Portal - Various Dates)
SGC (2019)
VHB (2017-19)

GREEN MOUNTAIN POWER

vhb October 10, 2019



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Lowell to Johnson Line Upgrade Project:
B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
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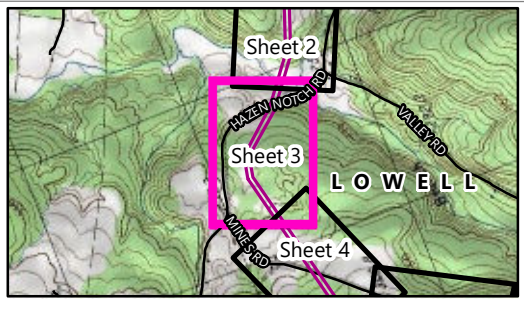

Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 3 of 38

Sources:
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ANR (Vermont Agency of Natural Resources - Various Dates)
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GMP (Green Mountain Power - 2016-2017).
VOGP (Vermont Open Geodata Portal - Various Dates)
SGC (2019)
VHB (2017-19)

GREEN MOUNTAIN POWER

vhb October 10, 2019

Sheet 4

2017-62 Presumed Class II

325

324

323

322

321

320

319

318

317

316

Sheet 3

Sheet 4

dunite; peridotite

2017-61 Presumed Class II

2017-60 Presumed Class III

MINES RD

TOWN OF LOWELL

2017-59 Presumed Class II

Sheet 5

BARAW RD

Sheet 4

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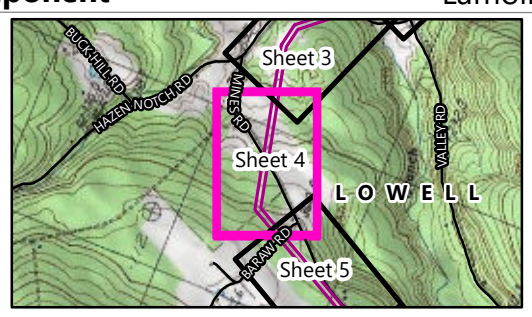

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Sheet 4 of 38

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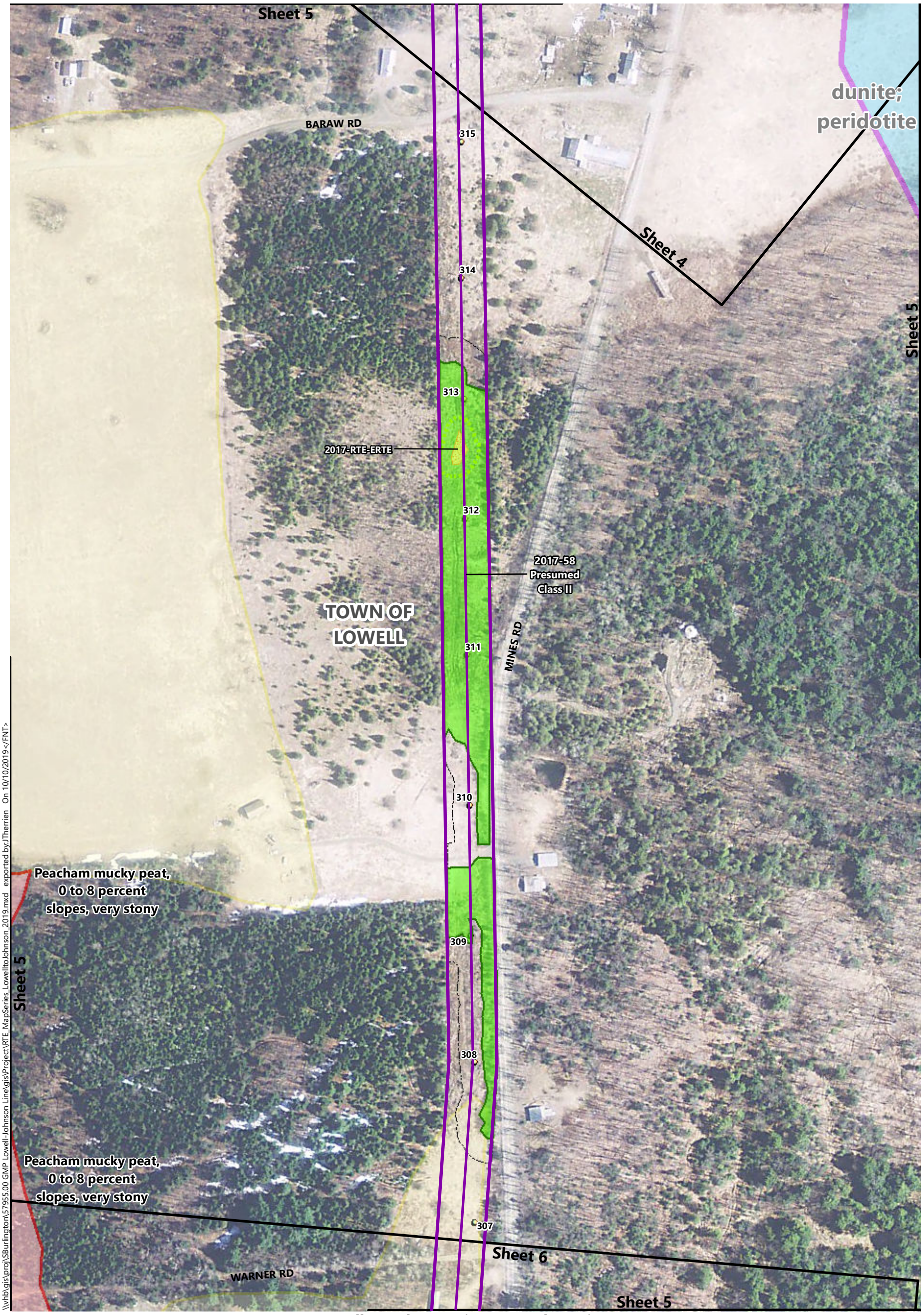
SGC (2019)
VHB (2017-19)



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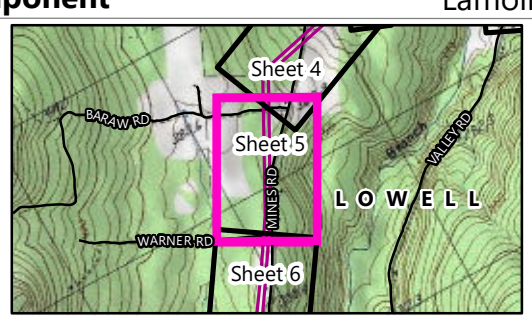
200 100 0 200 Feet

- Prior Study Corridor (VHB)
- 2019 off-ROW Access Study Areas (VHB)
- RTE Plant Location - Rare and Protected (VHB)
- RTE Plant Location - Rare (VHB)
- RTE Plant Area (VHB)
- RTE Plant Buffer (VHB)
- Surficial Geology Sands (VCGI)
- Organic Soils (VCGI)
- Sands (VCGI)
- Part Sandy (VCGI)
- Serpentine-type Bedrock (VCGI)
- Calcareous-type Bedrock (VCGI)*
- NHI Element Occurance (FWD)
- Uncommon Species (FWD)
- Line 133/B20 Line (GMP)
- Utility Pole (GMP)
- Utility Pole (Other)
- Delineated Stream (VHB)
- Delineated Wetland (VHB)
- Presumed Class II Wetland Buffer (VHB)
- Riparian Buffer (VHB)
- Proposed River Corridor (VHB)
- Confirmed Vernal Pool (ANR*
- Unconfirmed Vernal Pool (ANR)*
- Town Boundary (VCGI)

* Feature not present in map extent

Lowell to Johnson Line Upgrade Project:
B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
Lamoille and Orleans Counties, Vermont



Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 5 of 38

Sources:
Background Imagery by VCGI (Collected in Spring, 2011)
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SGC (2019)
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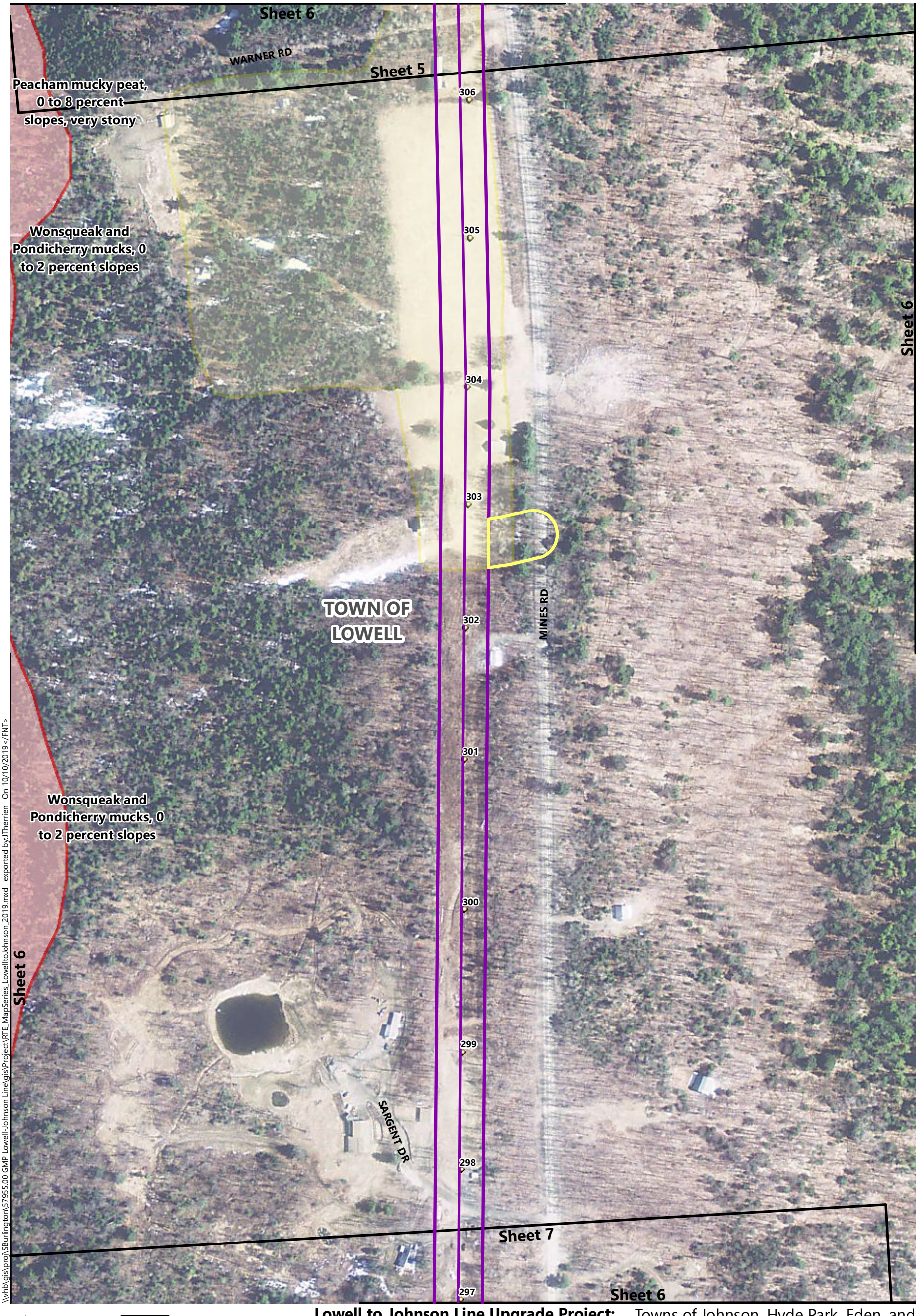

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Lowell to Johnson Line Upgrade Project:
B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
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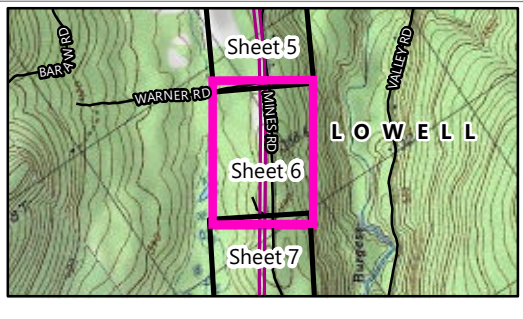

Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 6 of 38

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SGC (2019)
VHB (2017-19)

GREEN MOUNTAIN POWER

vhb October 10, 2019

Sheet 7

Sheet 6

297

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295

294

293

292

291

290

289

288

MINES RD

Sheet 7

Wonsqueak and Pondicherry mucks, 0 to 2 percent slopes

TOWN OF LOWELL

Medomak mucky silt loam, 0 to 2 percent slopes, frequently flooded

2019-2 Presumed Class II

Nasmith loamy fine sand, 0 to 3 percent slopes

Sheet 8

2017-410 Presumed Class II

2017-409 Presumed Class II

POTTER RD

Sheet 7

Sheet 7

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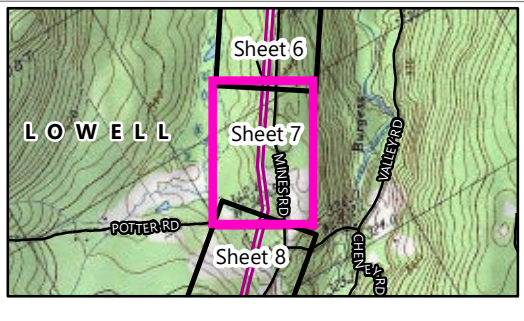
Lowell to Johnson Line Upgrade Project: B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
Lamoille and Orleans Counties, Vermont



Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 7 of 38

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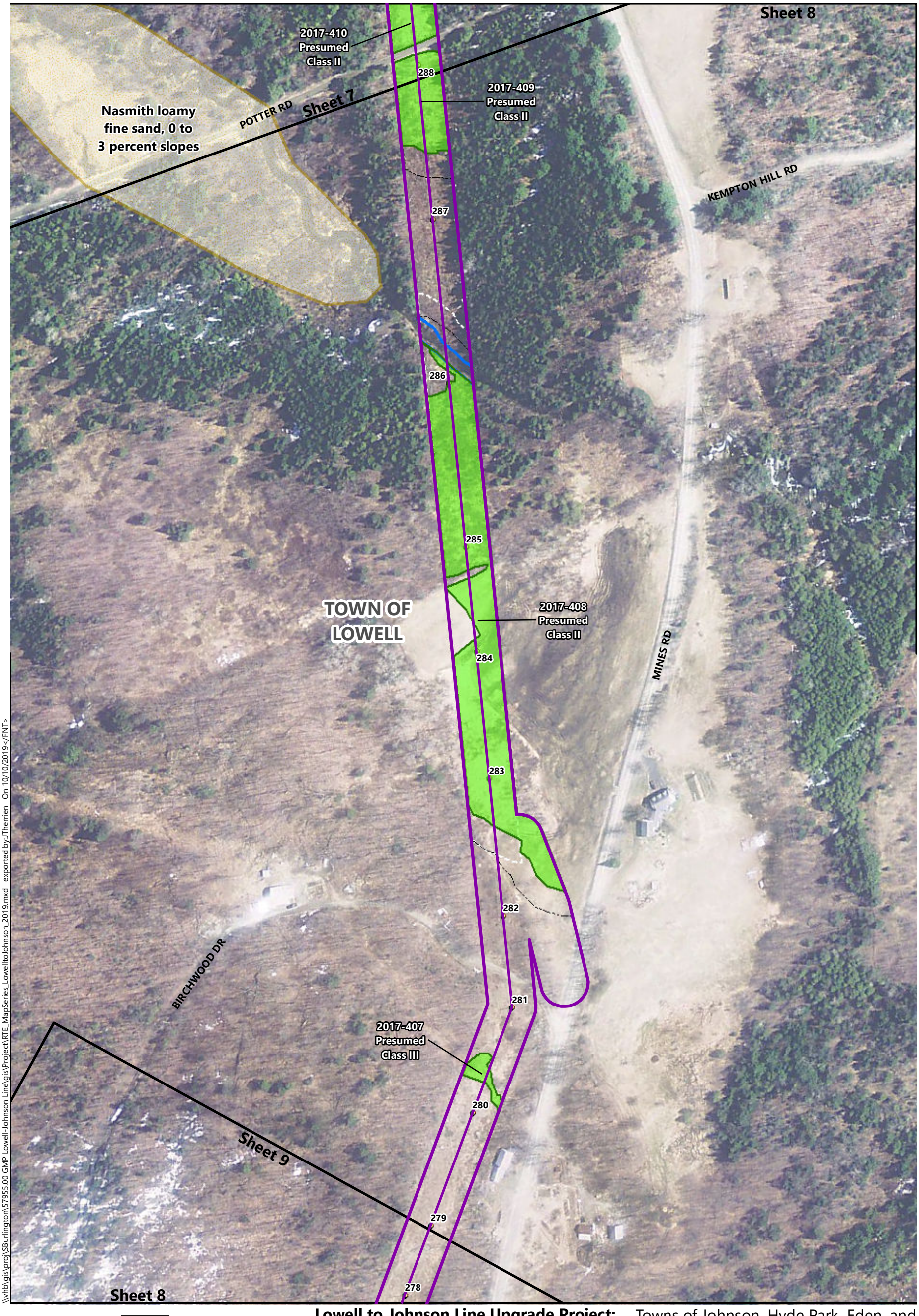
SGC (2019)
VHB (2017-19)

GREEN MOUNTAIN POWER

vhb October 10, 2019



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Lowell to Johnson Line Upgrade Project:
B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
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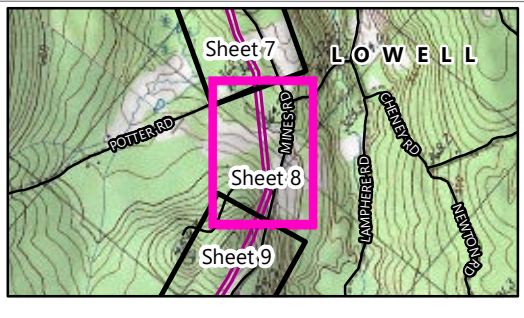

Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 8 of 38

Sources:
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SGC (2019)
VHB (2017-19)

GREEN MOUNTAIN POWER

vhb October 10, 2019

Sheet 9

278

Sheet 8

277

BIRCHWOOD DR

276

Sheet 9

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TOWN OF LOWELL

273

MINES RD

272

271

270

serpentinite; intrusive carbonatite

2017-406 Presumed Class II

Sheet 10

269

Wonsqueak and Pondicherry mucks, 0 to 2 percent slopes

Sheet 9

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200 100 0 200 Feet

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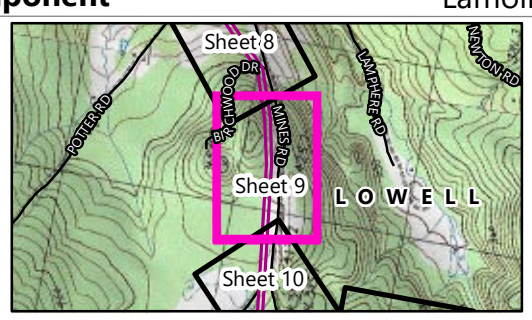
* Feature not present in map extent

Lowell to Johnson Line Upgrade Project:
B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
Lamoille and Orleans Counties, Vermont



Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 9 of 38

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VOGP (Vermont Open Geodata Portal - Various Dates)
SGC (2019)
VHB (2017-19)

Sheet 10

Wonsqueak and Pondicherry mucks, 0 to 2 percent slopes

Nasmith loamy fine sand, 0 to 3 percent slopes

2017-406 Presumed Class II

2017-57 Presumed Class II

2017-55 Presumed Class II

2017-56 Presumed Class II

2017-72 Presumed Class II

2017-73 Presumed Class III

2019-3 Presumed Class II

2017-54 Presumed Class II

2017-53 Presumed Class II

2017-52 Presumed Class II

2017-50 Presumed Class II

269 268 267 266 265 264 263 262 261 260 259 258 257 256

TILLOTSON RD

MINES RD

MAPLE RIDGE DR

TOWN OF LOWELL

Sheet 11

Sheet 10

200 100 0 200 Feet

- Prior Study Corridor (VHB)
- 2019 off-ROW Access Study Areas (VHB)
- RTE Plant Location - Rare and Protected (VHB)
- RTE Plant Location - Rare (VHB)
- RTE Plant Area (VHB)
- RTE Plant Buffer (VHB)
- Surficial Geology Sands (VCGI)
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- Sands (VCGI)
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- NHI Element Occurance (FWD)
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- Line 133/B20 Line (GMP)
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- Delineated Wetland (VHB)
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- Unconfirmed Vernal Pool (ANR)*
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* Feature not present in map extent

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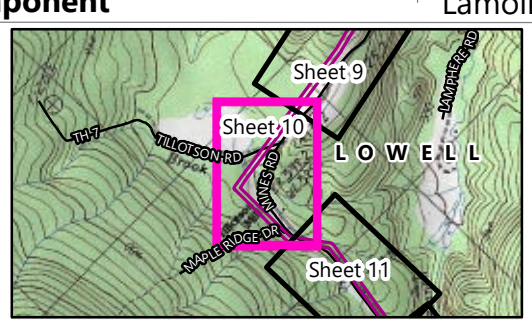
Lowell to Johnson Line Upgrade Project: B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
Lamoille and Orleans Counties, Vermont



Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 10 of 38

Sources:
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VOGP (Vermont Open Geodata Portal - Various Dates)
SGC (2019)
VHB (2017-19)

GREEN MOUNTAIN POWER

vhb October 10, 2019

Sheet 11

256

2017-50 Presumed Class II

Sheet 10

255

254

2017-49 Presumed Class II

253

2017-48 Presumed Class II

252

TOWN OF LOWELL

MINES RD

2017-47 Presumed Class II

251

250

2017-46 Presumed Class III

249

248

Sheet 12

2017-45 Presumed Class II

Wonsqueak and Pondicherry mucks, 0 to 2 percent slopes

Sheet 11

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200 100 0 200 Feet

- Prior Study Corridor (VHB)
- 2019 off-ROW Access Study Areas (VHB)
- RTE Plant Location - Rare and Protected (VHB)
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- RTE Plant Buffer (VHB)
- Surficial Geology Sands (VCGI)
- Organic Soils (VCGI)
- Sands (VCGI)
- Part Sandy (VCGI)
- Serpentine-type Bedrock (VCGI)
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- NHI Element Occurance (FWD)
- Uncommon Species (FWD)
- Line 133/B20 Line (GMP)
- Utility Pole (GMP)
- Utility Pole (Other)
- Delineated Stream (VHB)
- Delineated Wetland (VHB)
- Presumed Class II Wetland Buffer (VHB)
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- Proposed River Corridor (VHB)
- Confirmed Vernal Pool (ANR*
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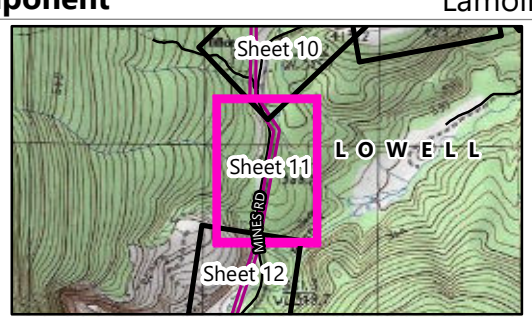
- Town Boundary (VCGI)

* Feature not present in map extent

Lowell to Johnson Line Upgrade Project: B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
Lamoille and Orleans Counties, Vermont



Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 11 of 38

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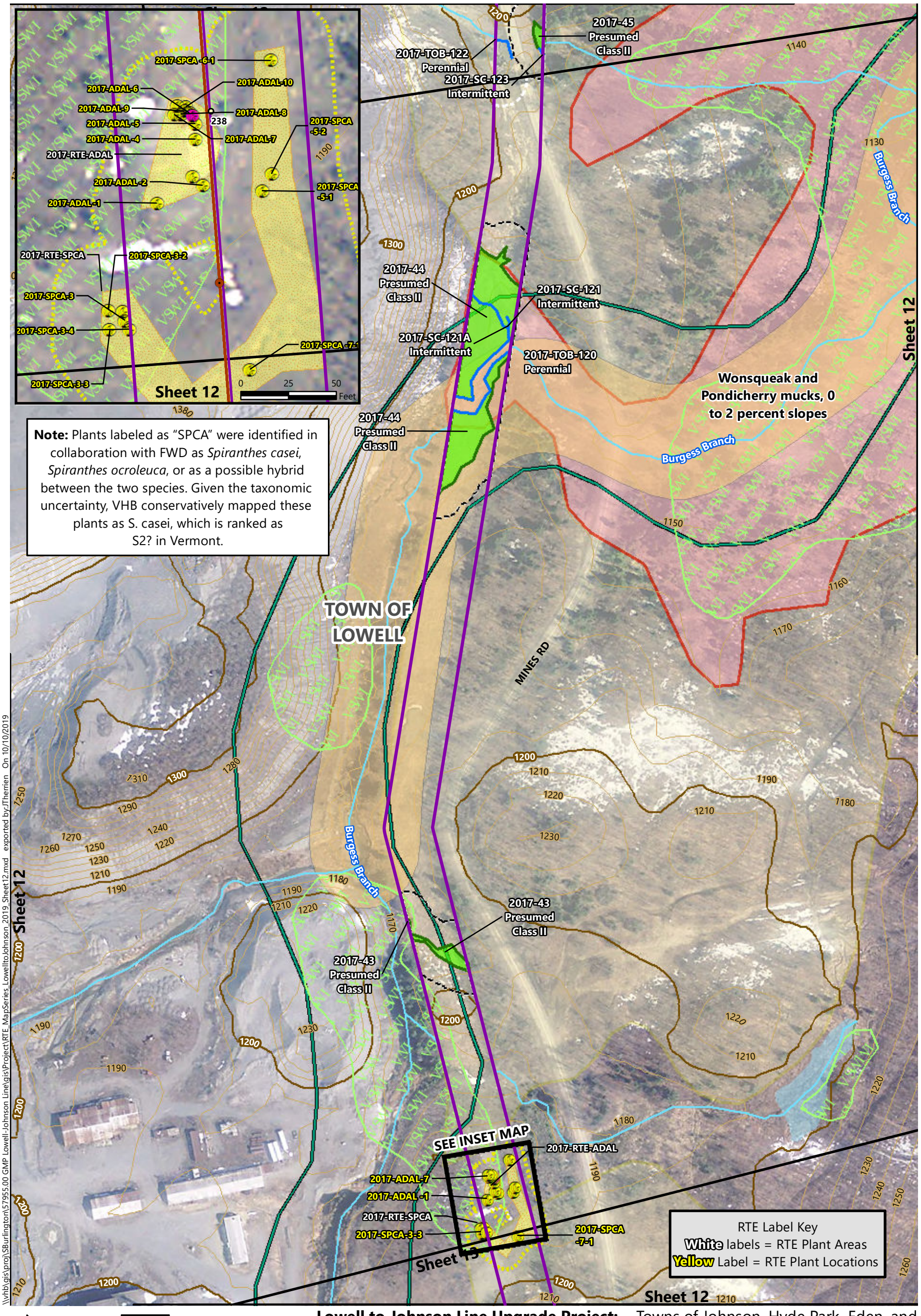
VHB (2017-19)

GREEN MOUNTAIN POWER

vhb

October 10, 2019



Note: Plants labeled as "SPCA" were identified in collaboration with FWD as *Spiranthes casei*, *Spiranthes ocroleuca*, or as a possible hybrid between the two species. Given the taxonomic uncertainty, VHB conservatively mapped these plants as S. casei, which is ranked as S2? in Vermont.

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Lowell to Johnson Line Upgrade Project:
B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
Lamoille and Orleans Counties, Vermont

- Prior Study Corridor (VHB)
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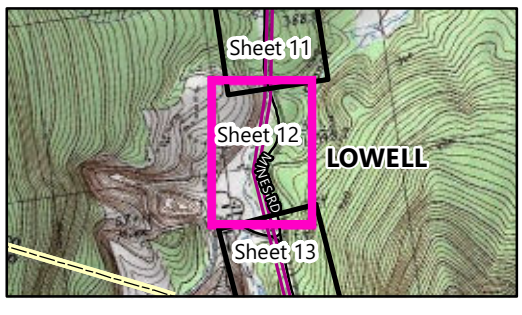
- Surficial Geology Sands (VCGI)
- Organic Soils (VCGI)
- Sands (VCGI)
- Part Sandy (VCGI)
- Serpentine-type Bedrock (VCGI)
- Calcareous-type Bedrock (VCGI)*
- Delineated Wetland (VHB)
- Open Water (VHB)
- Delineated Stream (VHB)
- Proposed Class II Wetland Buffer (VHB)
- Proposed River Corridor (VHB)
- Riparian Buffer (VHB)
- RTE Plant Location - Rare and Protected (VHB)
- RTE Plant Location - Rare (VHB)
- RTE Plant Area (VHB)
- RTE Plant Buffer (VHB)
- Public Well (ANR)
- Private Well (ANR)
- Ground Water Protection Area (ANR)
- Surface Water Protection Area (ANR)*
- VSWI Wetland (ANR)
- VHD Stream (VOGP)
- River Corridor (ANR)
- VHD Waterbody (VOGP)
- FEMA 100 Year Flood Zone (VOGP/VHB)
- Bear Crossing (FWD)
- Proposed DWA (VHB)
- Deer Wintering Area (ANR)
- NHI Element Occurance (FWD)
- Uncommon Species (FWD)
- Town Boundary (VOGP)
- 10 ft. Contour
- 100 ft. Contour



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Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 12 of 38

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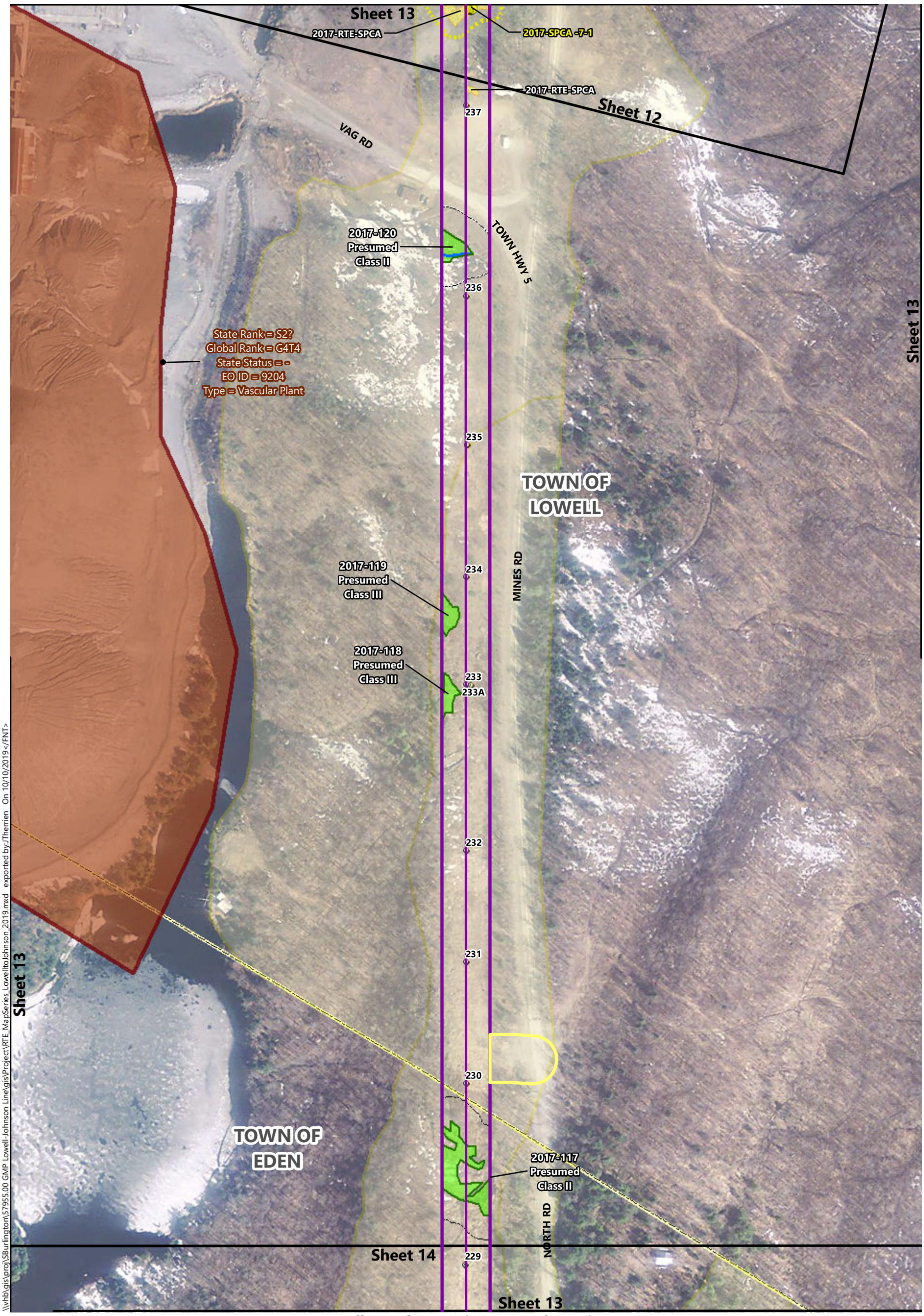

200 100 0 200 Feet

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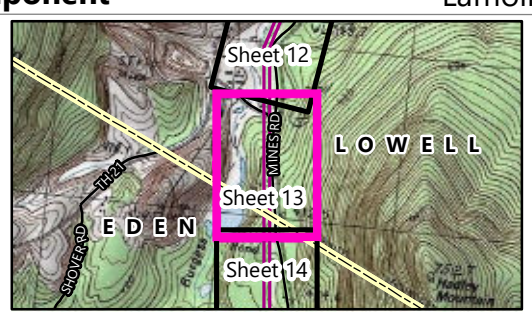
Lowell to Johnson Line Upgrade Project:
B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
Lamoille and Orleans Counties, Vermont



Rare, Threatened and Endangered Species Survey
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Sheet 13 of 38

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SGC (2019)
VHB (2017-19)

GREEN MOUNTAIN POWER

vhb October 10, 2019

Sheet 14

Sheet 13

TOWN OF LOWELL

229

228

227

226

225

224

223

222

221

2017-116
Presumed
Class II

2017-115
Presumed
Class II

2017-114
Presumed
Class III

TOWN OF EDEN

NORTH RD

Peacham mucky peat,
0 to 8 percent
slopes, very stony

Sheet 15

Sheet 14

Sheet 14

\\vhb\gis\proj\SBurlington\57955.00 GMP Lowell-Johnson Line\gis\Project\RTE_MapSeries_LowelltoJohnson_2019.mxd exported by:JTherrien On 10/10/2019</FNT>

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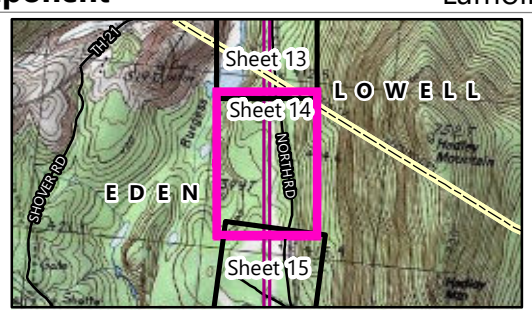
Lowell to Johnson Line Upgrade Project:
B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
Lamoille and Orleans Counties, Vermont



Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 14 of 38

Sources:
Background Imagery by VCGI (Collected in Spring, 2011)
ANR (Vermont Agency of Natural Resources - Various Dates)
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GMP (Green Mountain Power - 2016-2017).
VOGP (Vermont Open Geodata Portal - Various Dates)
SGC (2019)
VHB (2017-19)

GREEN MOUNTAIN POWER

vhb October 10, 2019

Sheet 15

Peacham mucky peat, 0 to 8 percent slopes, very stony

Sheet 14

220

2017-113 Presumed Class III

219

218

2017-112 Presumed Class II

217

STYGLES DR

NORTH RD

216

2017-42 Presumed Class III

TOWN OF EDEN

2017-41 Presumed Class II

215

214

213

Sheet 16

212

serpentinite; intrusive carbonatite

211

JONES LN

210

Sheet 15

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200 100 0 200 Feet

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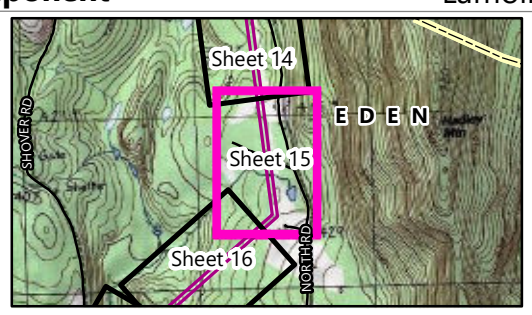
* Feature not present in map extent

Lowell to Johnson Line Upgrade Project: B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
Lamoille and Orleans Counties, Vermont



Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 15 of 38

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GREEN MOUNTAIN POWER

vhb October 10, 2019

Sheet 16

210

209

208

207

206

205

204

203

202

Sheet 15

Sheet 16

Sheet 17

TOWN OF EDEN

Adams loamy fine sand, 25 to 50 percent slopes

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Towns of Johnson, Hyde Park, Eden, and Lowell
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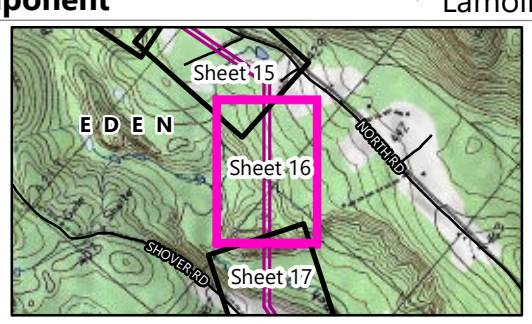

Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 16 of 38

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VHB (2017-19)

GREEN MOUNTAIN POWER

vhb October 10, 2019

Sheet 17

201

200

199

2017-40
Presumed
Class II

Sheet 17

Adams loamy
fine sand, 2 to 8
percent slopes

198

197

TOWN OF
EDEN

196

SHOVER RD

195

194

193

192

DELISLE DR

Sheet 18

Sheet 17

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Sheet 17

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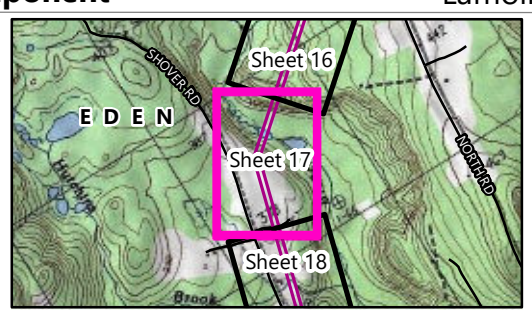

Rare, Threatened and Endangered Species Survey
Target Area and Results
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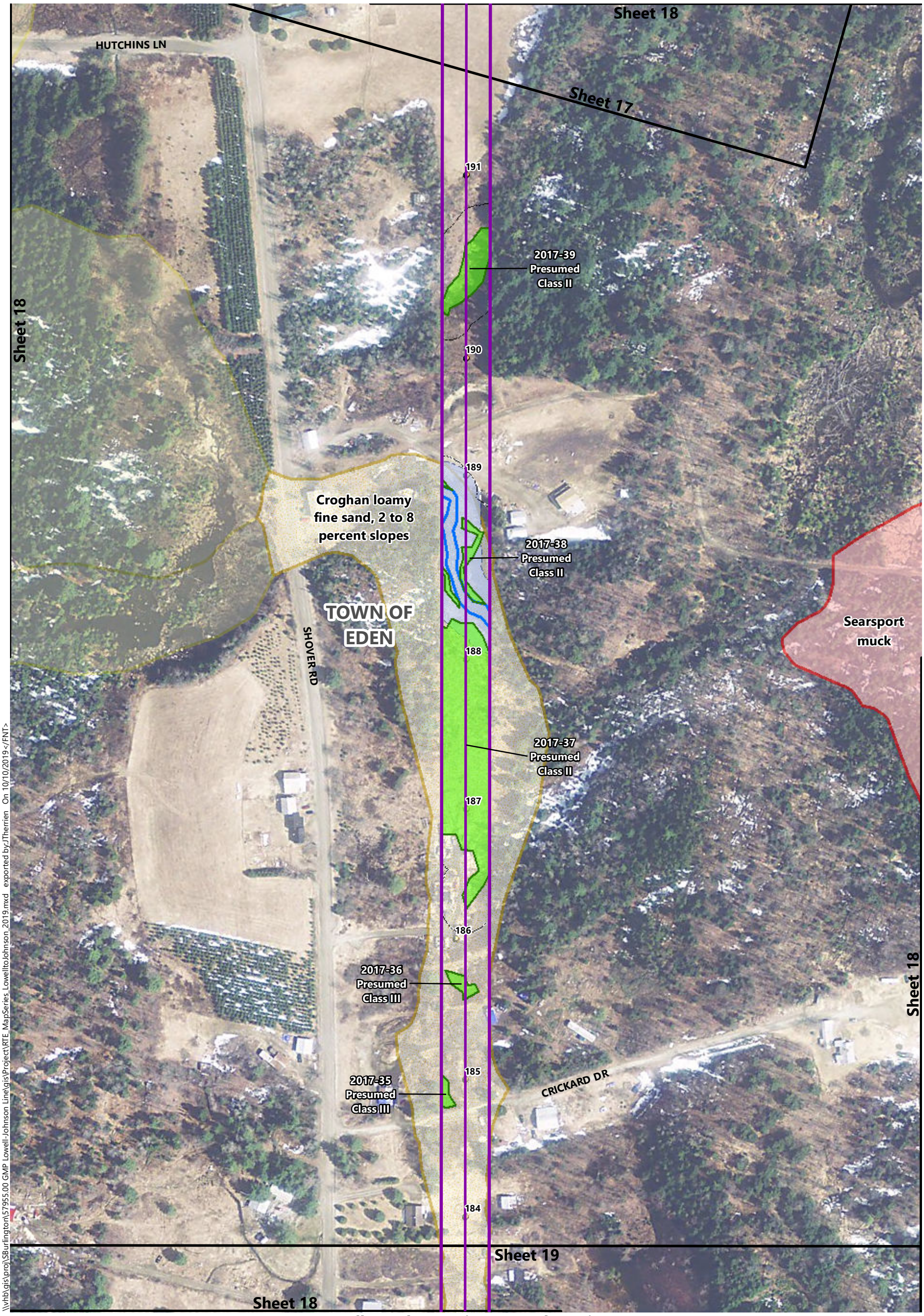

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Towns of Johnson, Hyde Park, Eden, and Lowell
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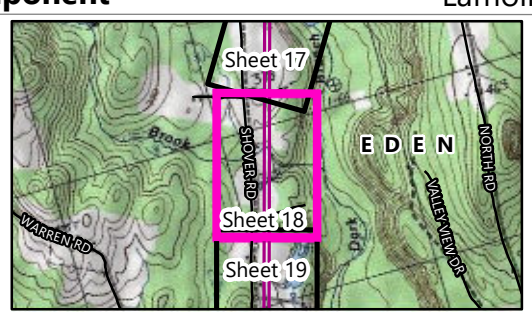

Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 18 of 38

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SGC (2019)
VHB (2017-19)

Sheet 18
Sheet 19
Sheet 19
Croghan loamy fine sand, 2 to 8 percent slopes
2017-34 Presumed Class II
SHOVER RD
TOWN OF EDEN
DOLAN FARM RD
Sheet 20
2017-121 Presumed Class II
2017-111 Presumed Class III
Sheet 19
183
182
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200 100 0 200 Feet

Lowell to Johnson Line Upgrade Project:
B20 Line Component

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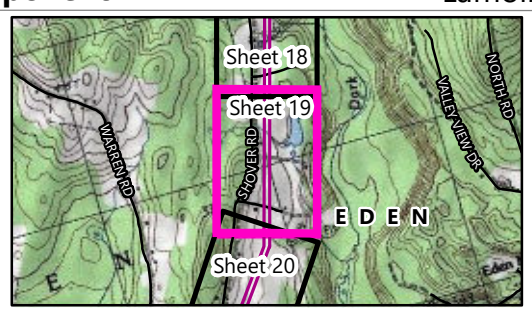

Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 19 of 38

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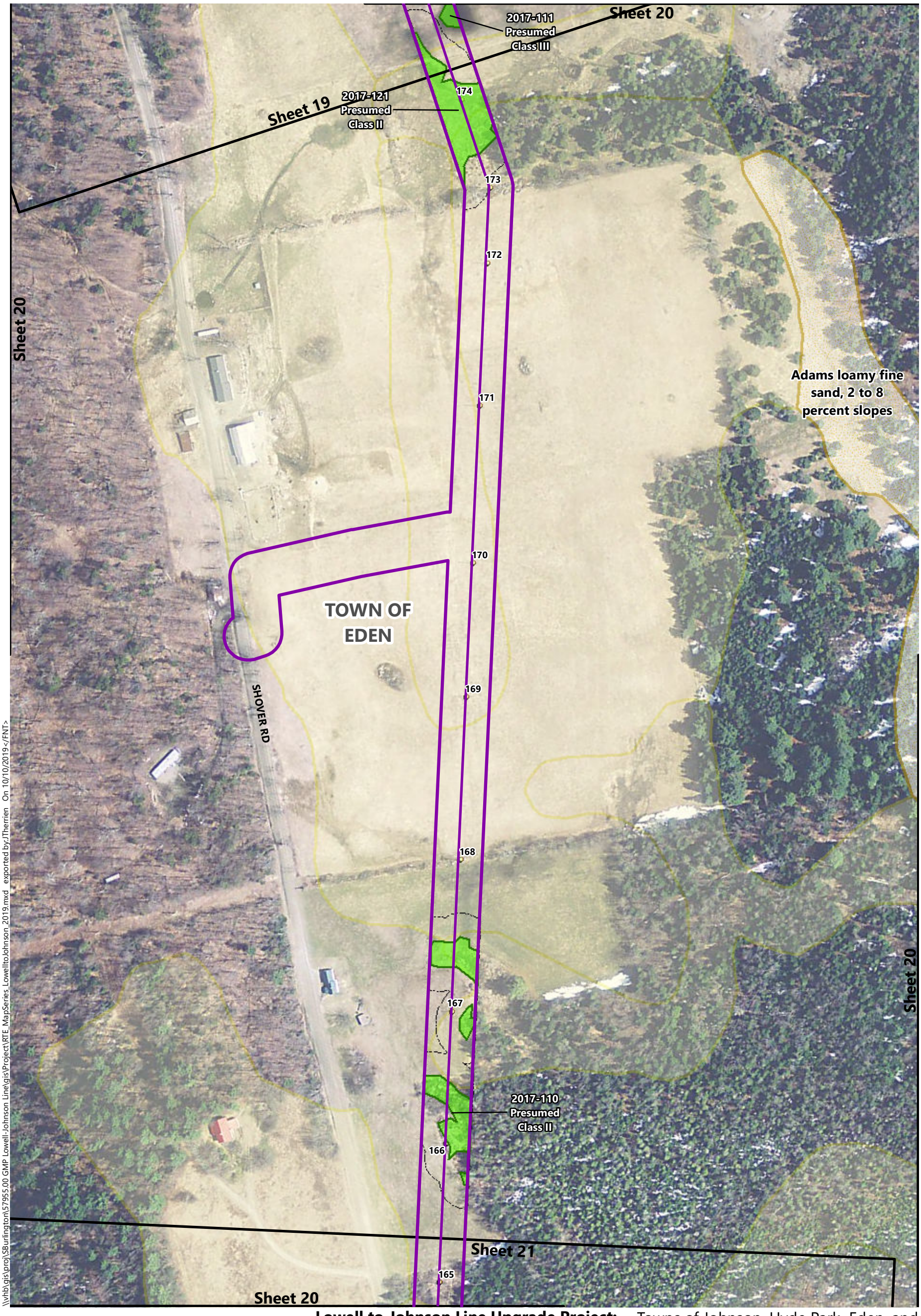

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Lowell to Johnson Line Upgrade Project:
B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
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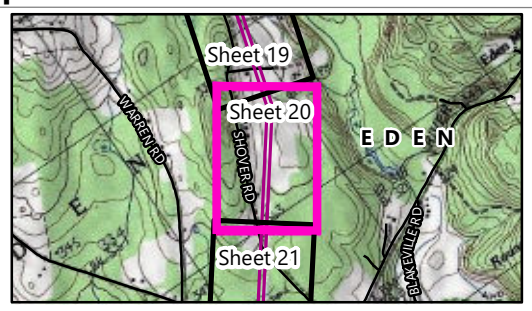

Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 20 of 38

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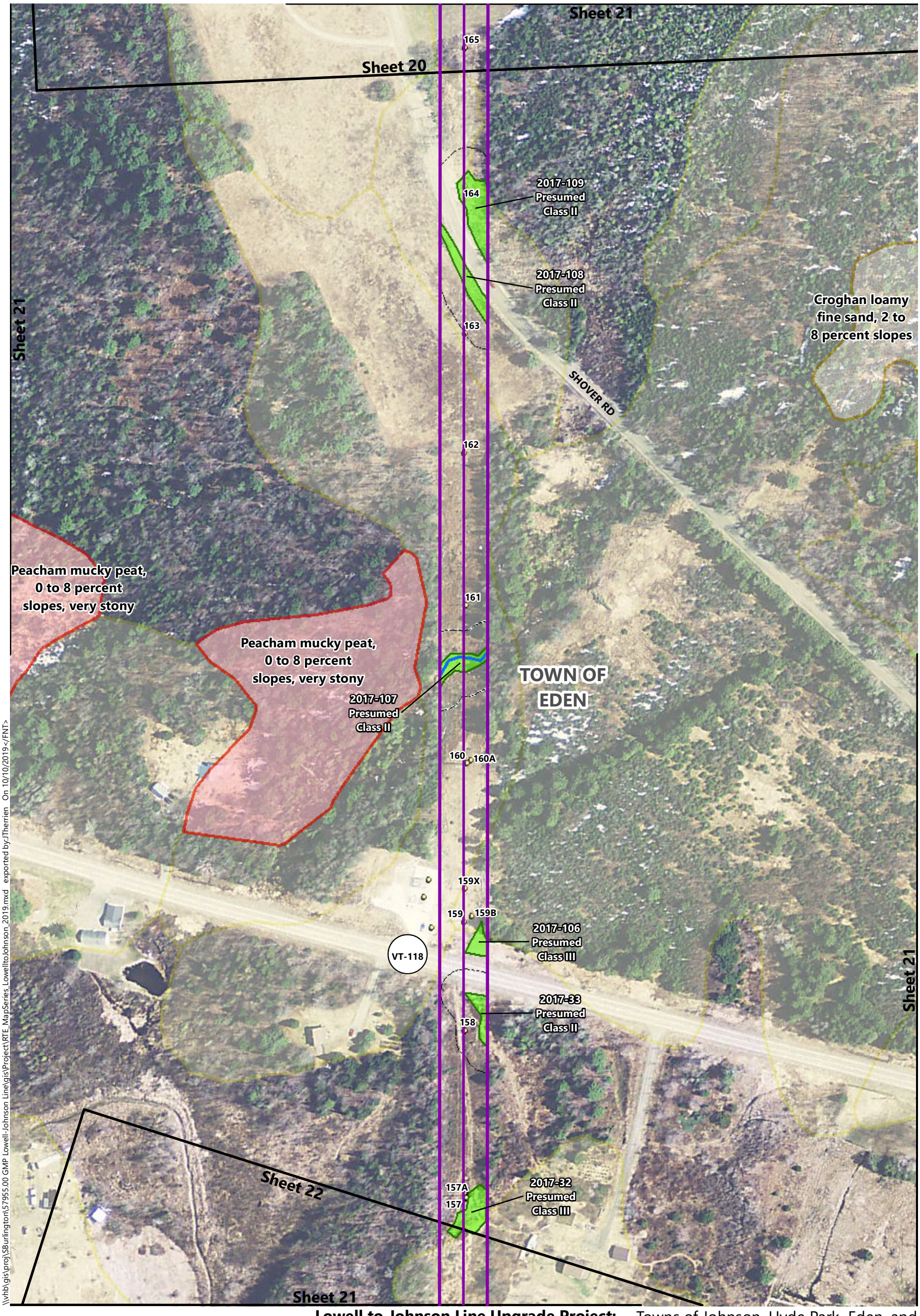

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Lowell to Johnson Line Upgrade Project:
B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
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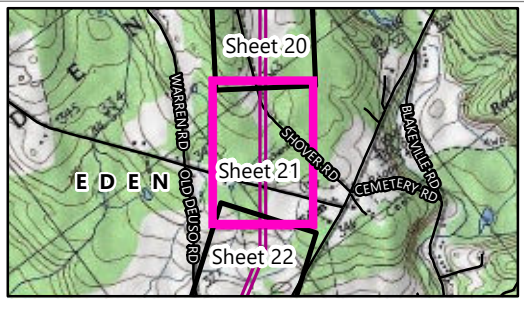

Rare, Threatened and Endangered Species Survey Target Area and Results Sheet 21 of 38

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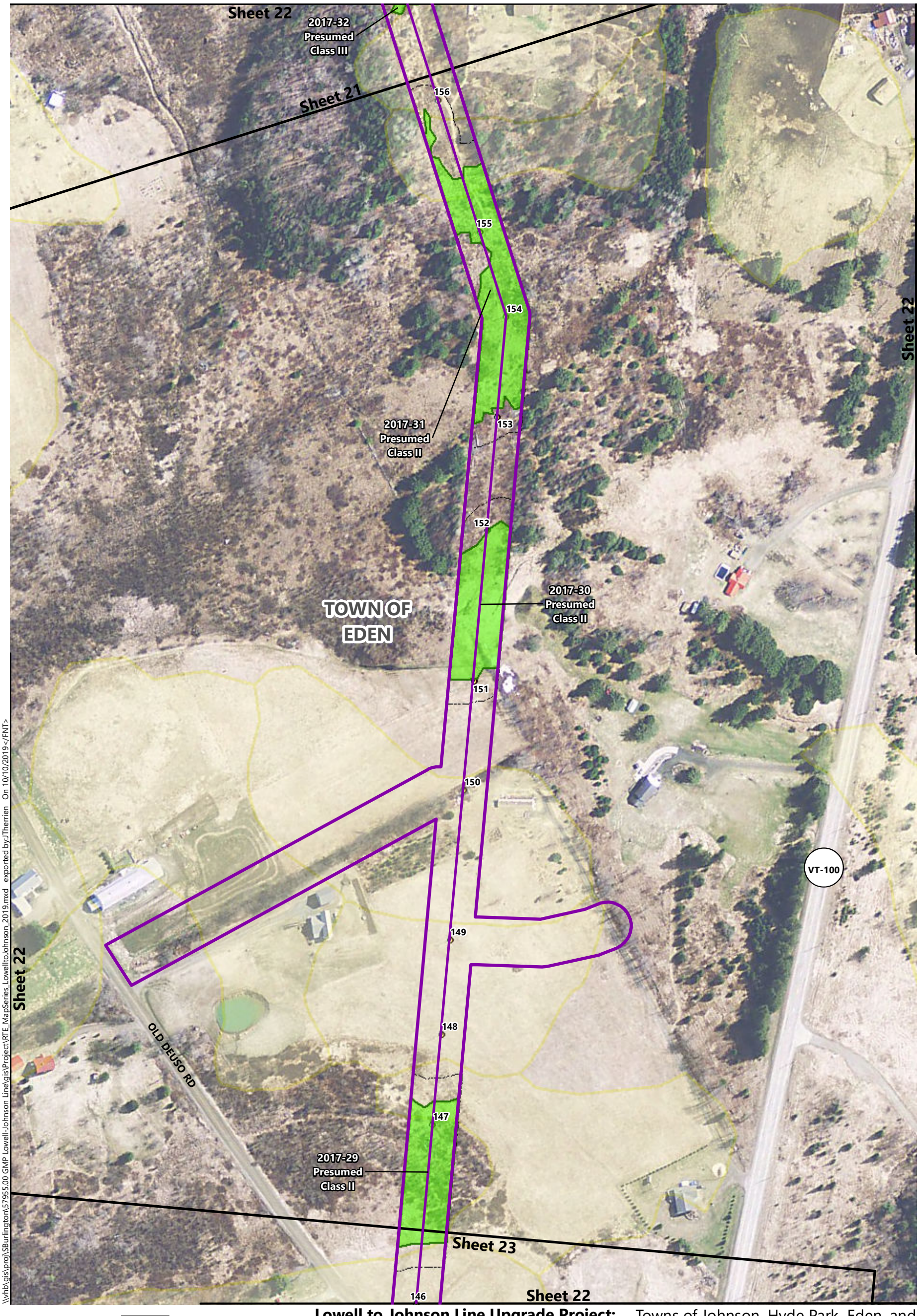

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Lowell to Johnson Line Upgrade Project:
B20 Line Component

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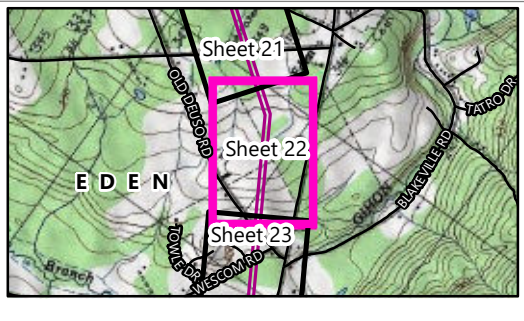

Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 22 of 38

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GREEN MOUNTAIN POWER

vhb October 10, 2019

Sheet 23

2017-29 Presumed Class II

Sheet 22

146

145

144

143

142

141

140

139

138

137

OLD DEUSO RD

Croghan loamy fine sand, 2 to 8 percent slopes

VT-100

CEDAR LN

HILLTOP DR

BLAKEVILLE RD

Sheet 23

WESCOM RD

TOWN OF EDEN

alluvium

NANCY LN

KNOWLES FLAT RD

Sheet 23

pebbly sand

WINTER LN

VT-100

2017-28 Presumed Class II

Sheet 24

alluvium

Sheet 23

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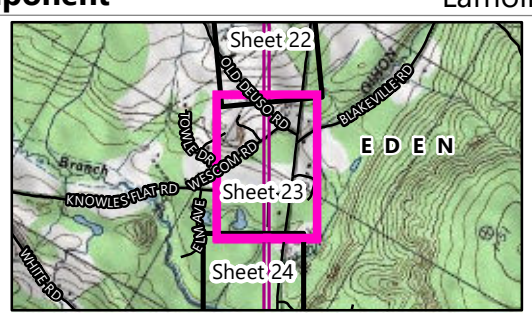

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GREEN MOUNTAIN POWER

vhb October 10, 2019

pebbly sand

Sheet 24

Sheet 23

2017-28
Presumed
Class II

136

135

134

Sheet 24

2017-105
Presumed
Class II

133

alluvium

TOWN OF
EDEN

132

CHERRY LN

Adams loamy fine
sand, 25 to 50
percent slopes

131

pebbly sand

130

VT-100

2017-104
Presumed
Class II

129

128

2017-103
Presumed
Class II

CLIFFORD THOMPSON RD

Sheet 25

Sheet 24

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Sheet 24

200 100 0 200 Feet

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B20 Line Component

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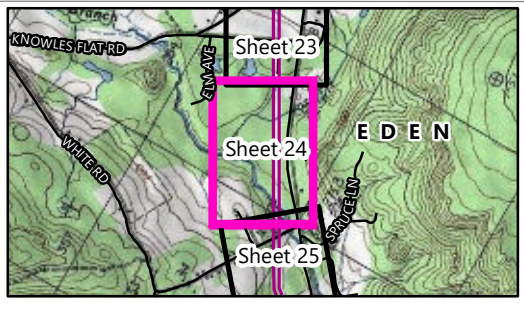
* Feature not present in map extent



Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 24 of 38

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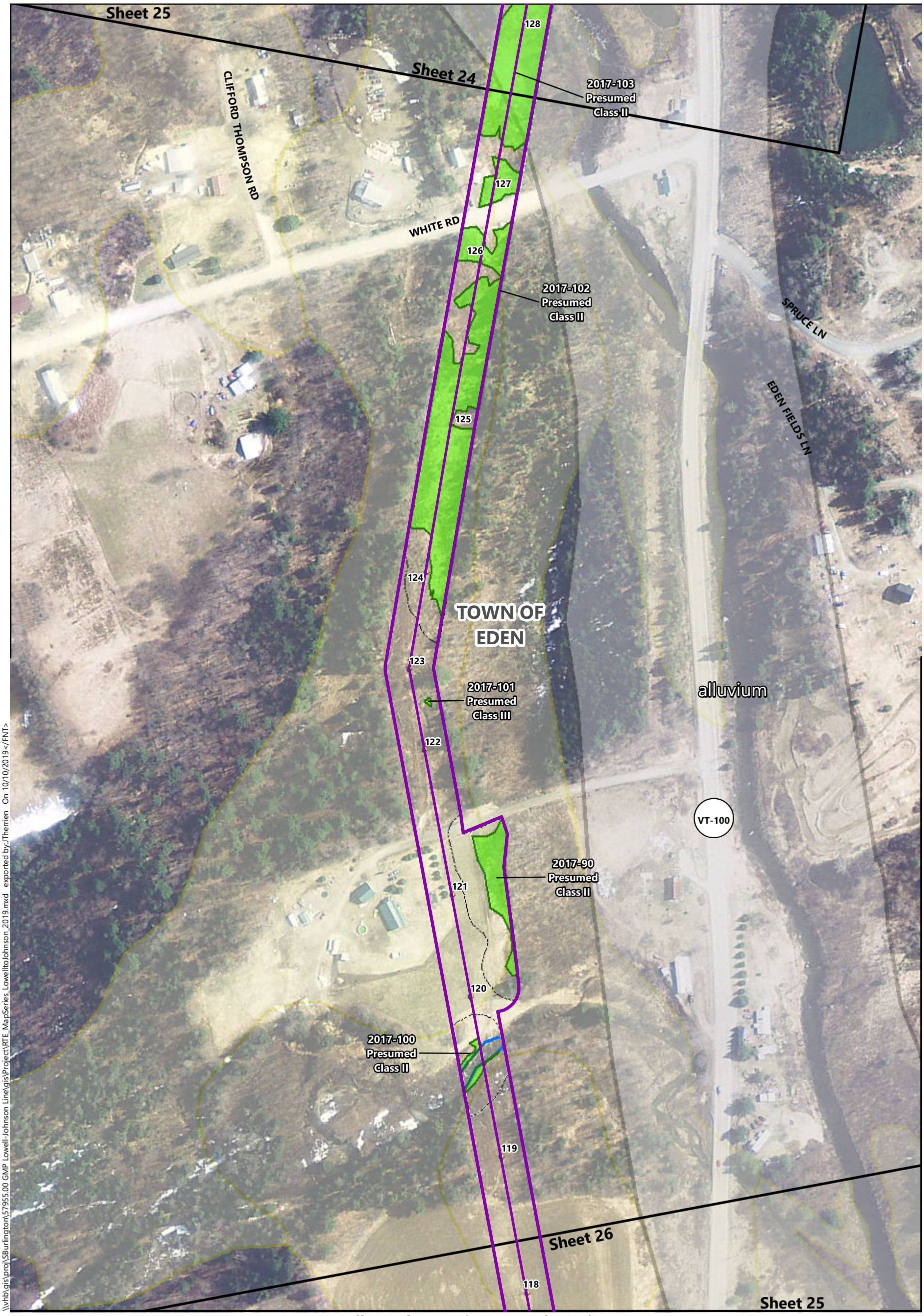
GREEN MOUNTAIN POWER

vhb October 10, 2019



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200 100 0 200 Feet

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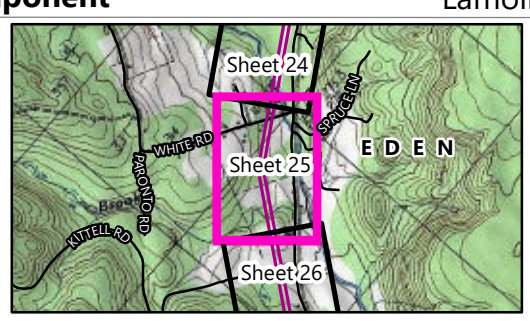
Lowell to Johnson Line Upgrade Project: B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
Lamoille and Orleans Counties, Vermont



Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 25 of 38

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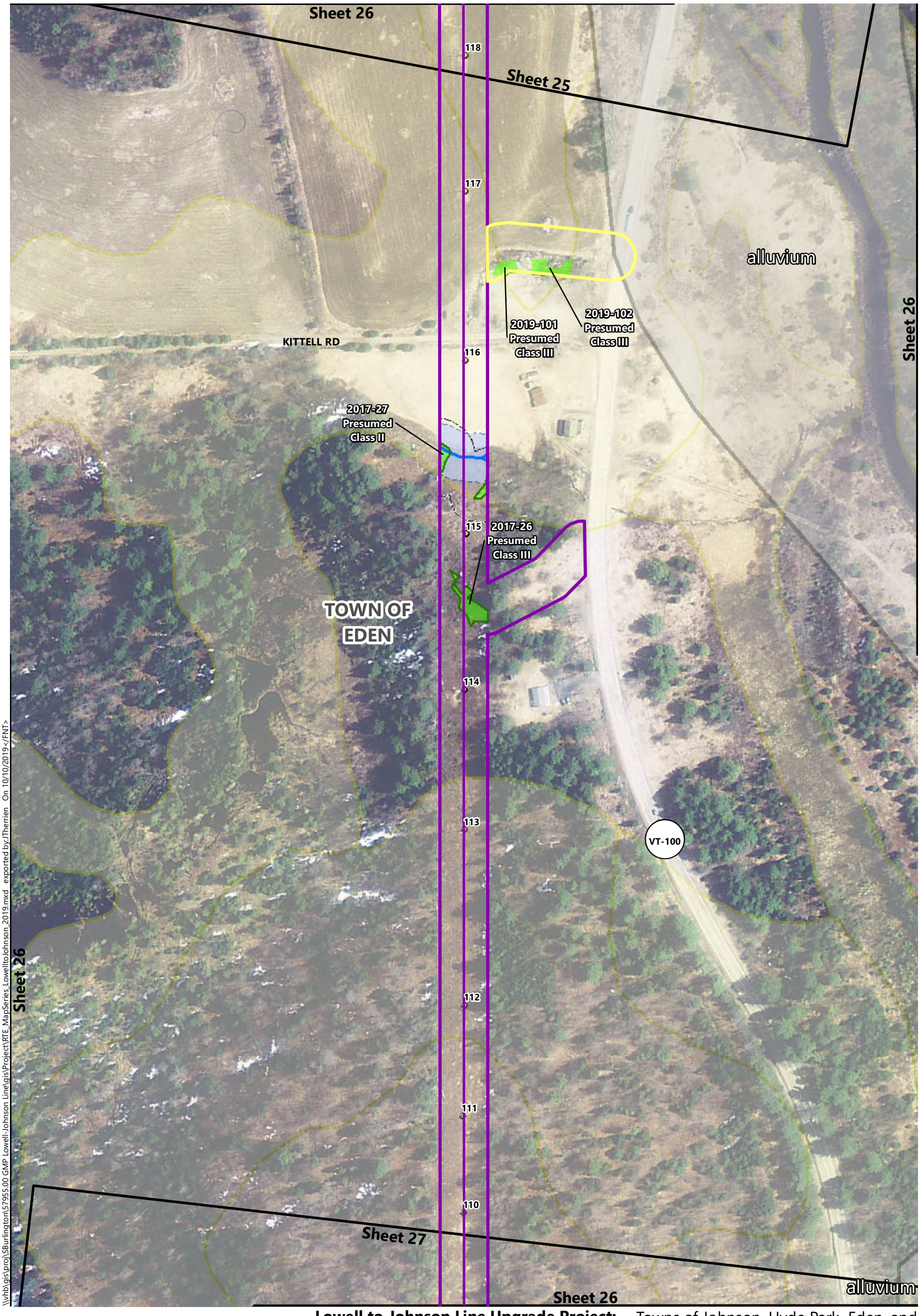

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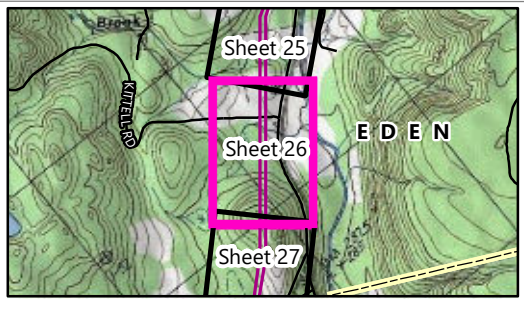

Rare, Threatened and Endangered Species Survey
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GREEN MOUNTAIN POWER

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Sheet 27

Sheet 26

alluvium

VT-100

109

108

107

Sheet 27

TOWN OF EDEN

106

2017-25 Presumed Class III

2017-24 Presumed Class III

105

104

OBER HILL RD

2017-23 Presumed Class II

103

TOWN OF HYDE PARK

Sheet 27

102

2017-22 Presumed Class II

101

Sheet 28

Sheet 27

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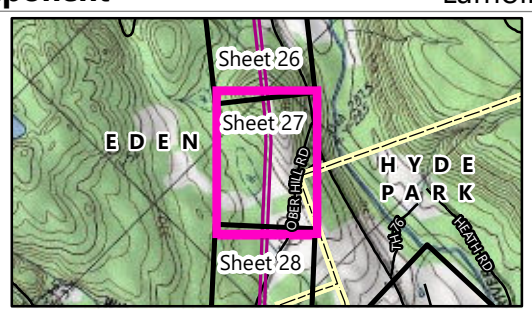

Rare, Threatened and Endangered Species Survey Target Area and Results Sheet 27 of 38

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GREEN MOUNTAIN POWER

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Sheet 28

Sheet 27

100

2017-22 Presumed Class II

99

TOWN OF EDEN

98

Sheet 28

2017-21 Presumed Class II

97

96

OBER HILL RD

2017-19 Presumed Class II

95

94

Sheet 28

TOWN OF JOHNSON

2017-20 Presumed Class III

93

92

Sheet 29

2017-18 Presumed Class II

Sheet 28

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B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
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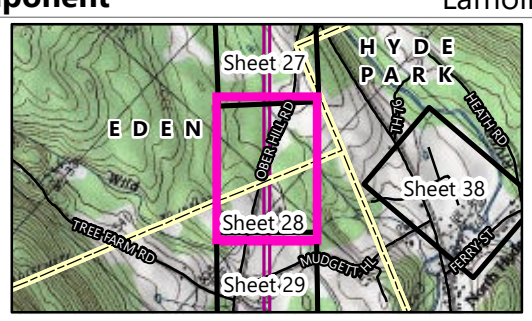

Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 28 of 38

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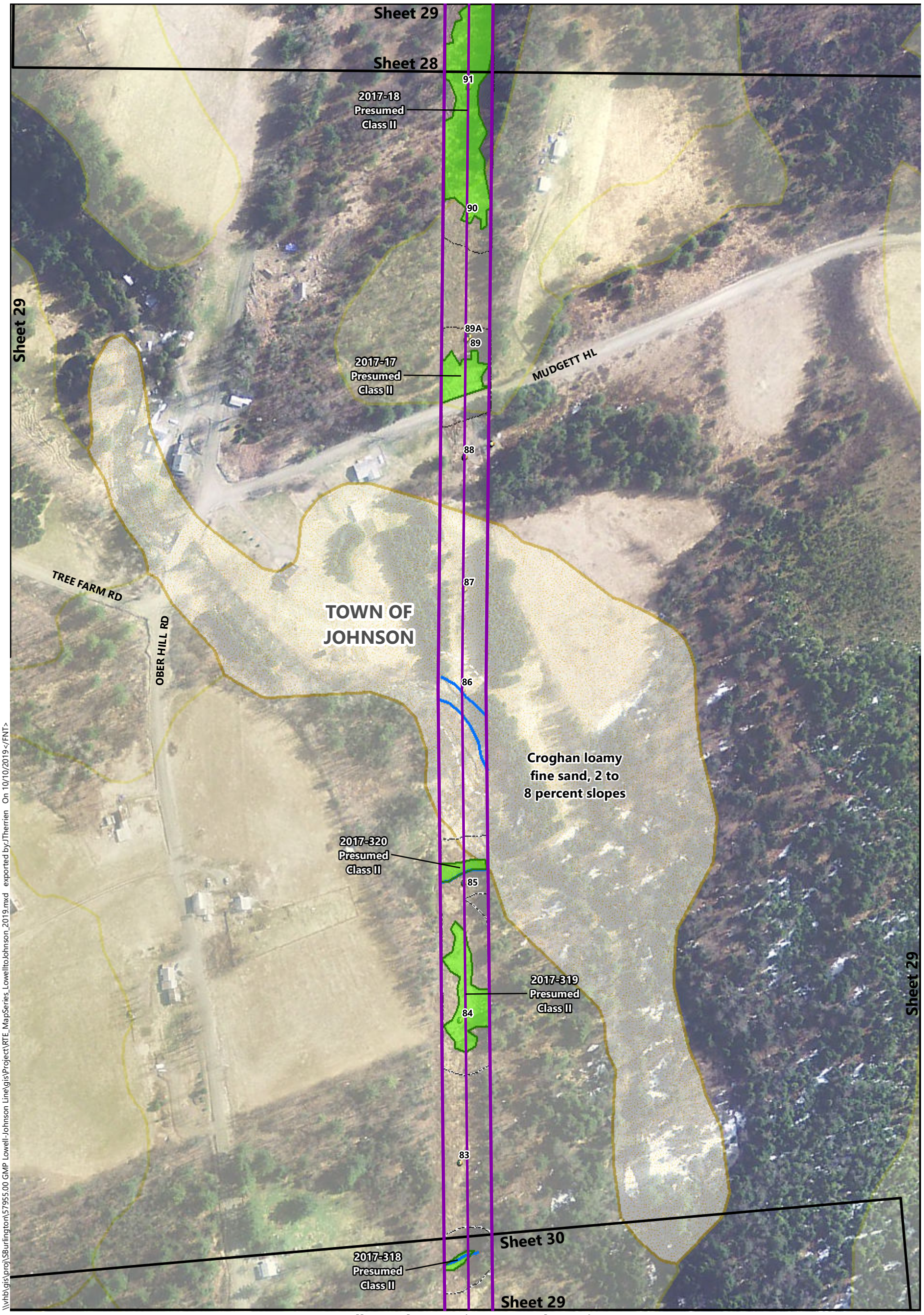

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Lowell to Johnson Line Upgrade Project:
B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
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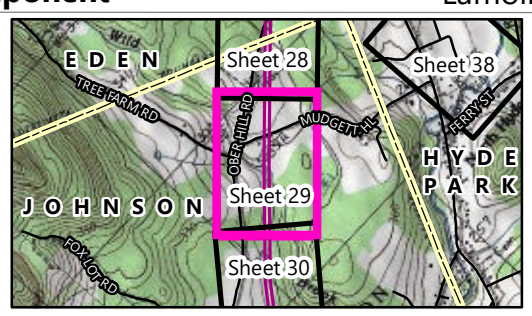

Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 29 of 38

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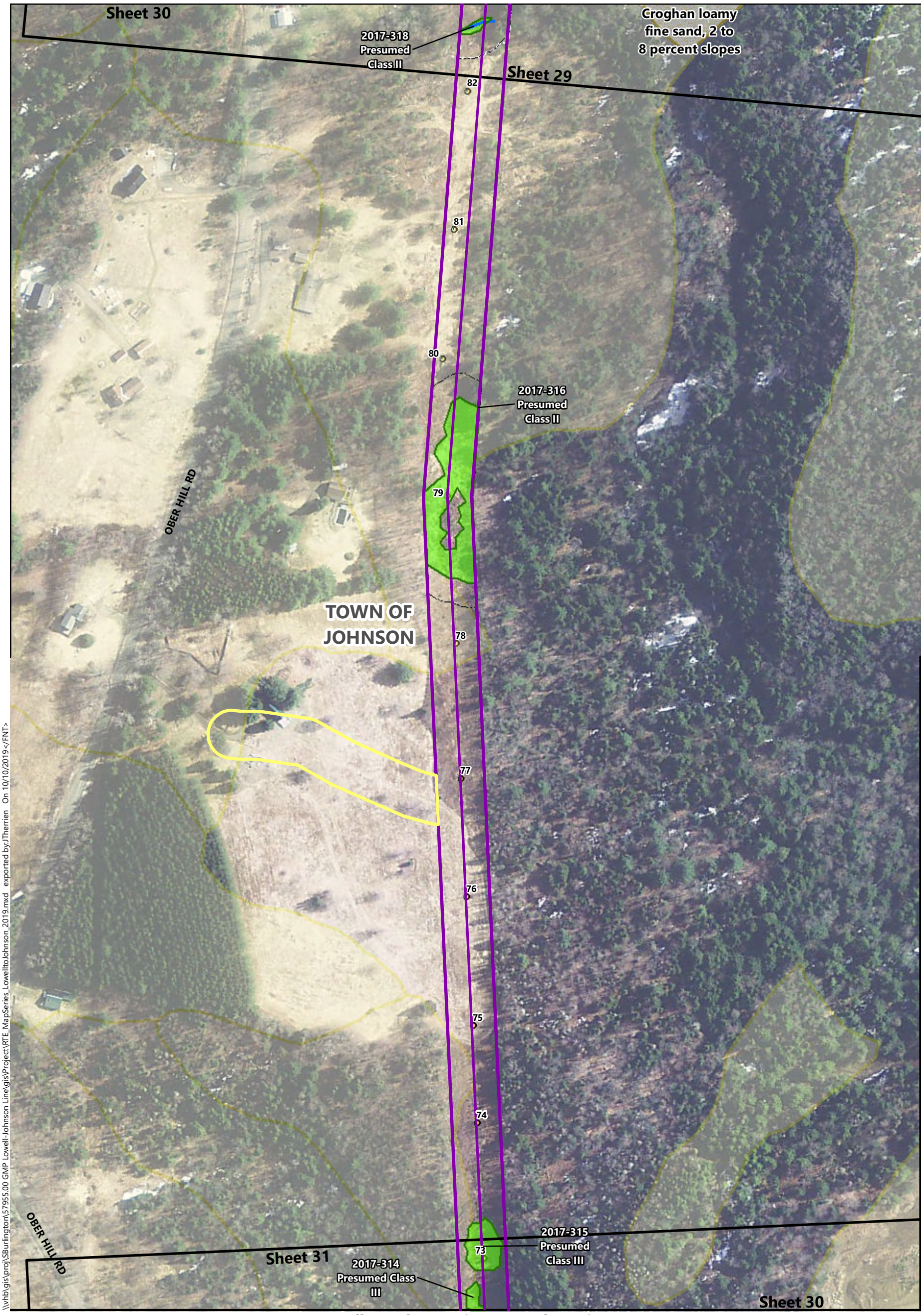

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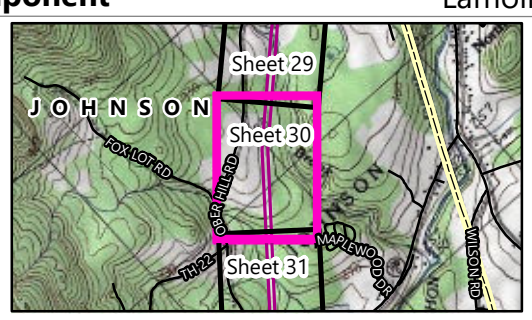

Rare, Threatened and Endangered Species Survey
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GREEN MOUNTAIN POWER

vhb October 10, 2019

Sheet 31

73

2017-315 Presumed Class III

2017-314 Presumed Class III

Sheet 30

MAPLEWOOD DR

BIG HOUSE CV

TH 22

72

2017-313 Presumed Class III

71

Sheet 31

2017-312 Presumed Class II

70

TOWN OF JOHNSON

69

OBER HILL RD

2017-311 Presumed Class III

68

2017-309 Presumed Class II

Adams-Adams variant loamy fine sands, rocky, 8 to 15 percent slopes

67

2019-100 Presumed Class III

Sheet 31

66

Searsport muck

65

Sheet 32

Sheet 31

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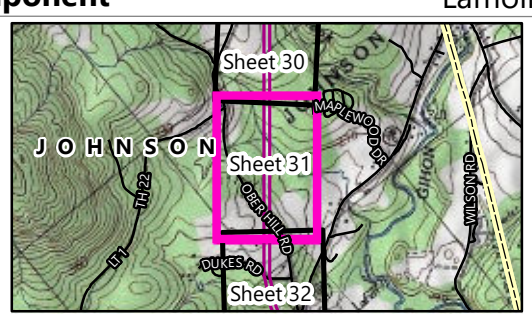

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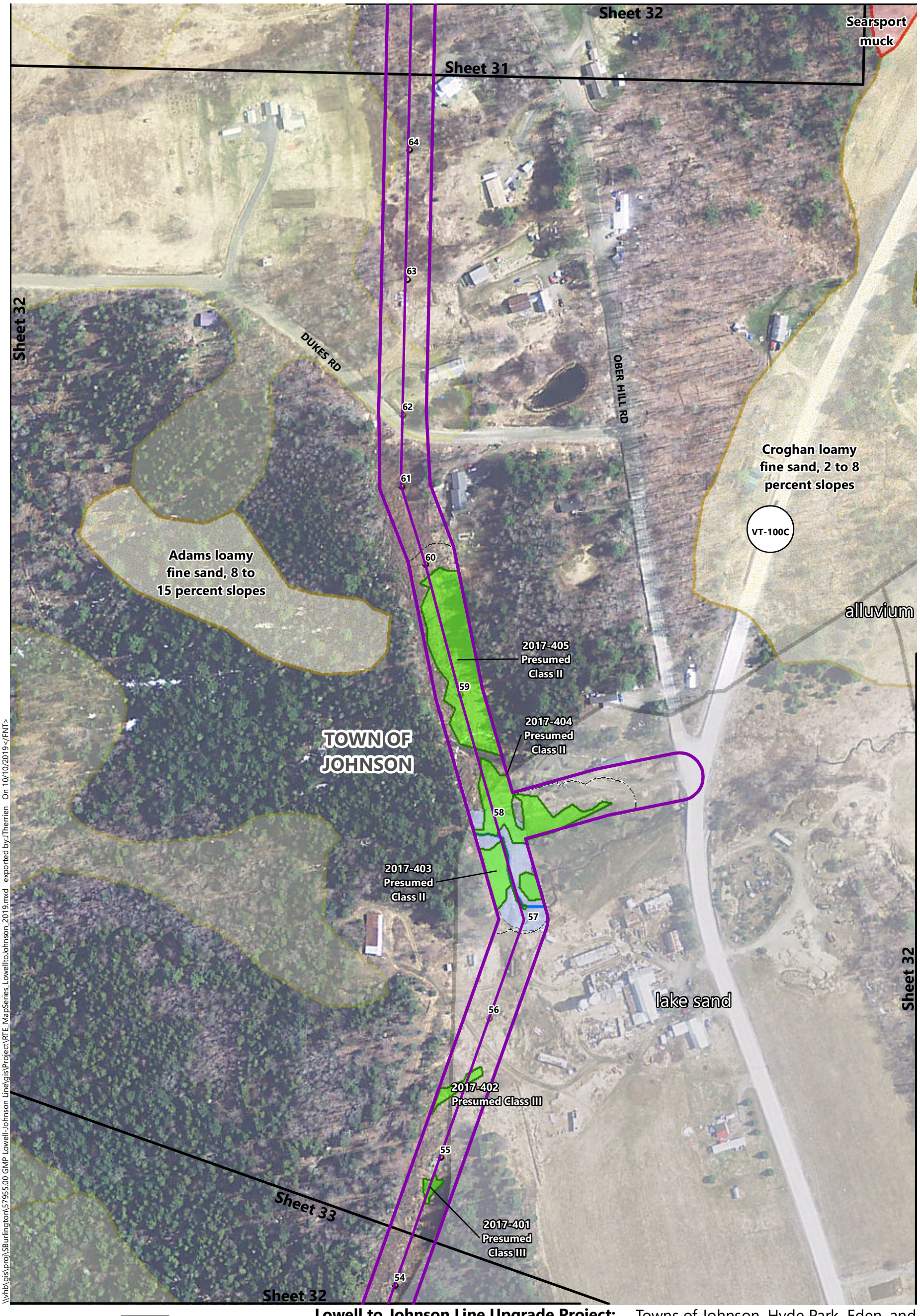
GREEN MOUNTAIN POWER

vhb October 10, 2019



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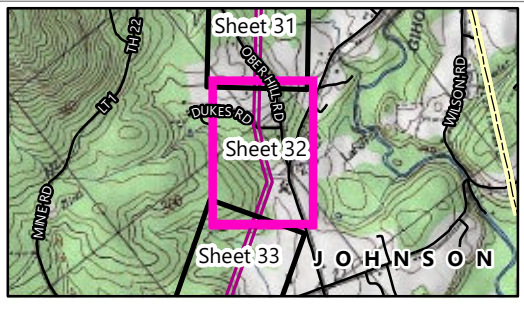

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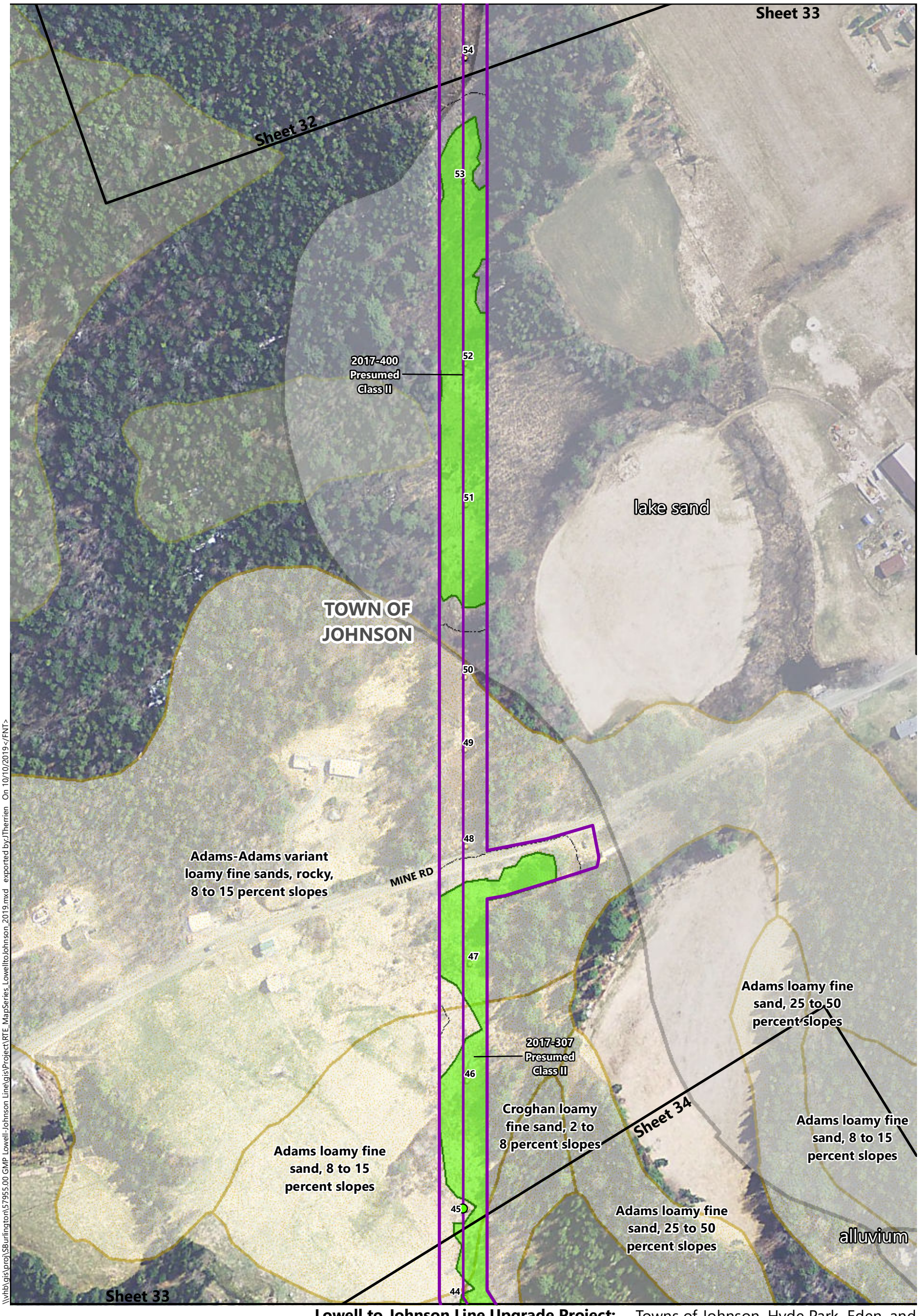

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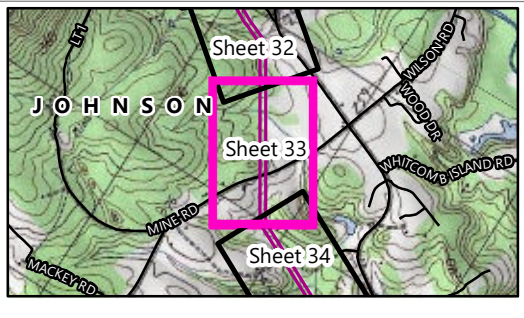

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GREEN MOUNTAIN POWER

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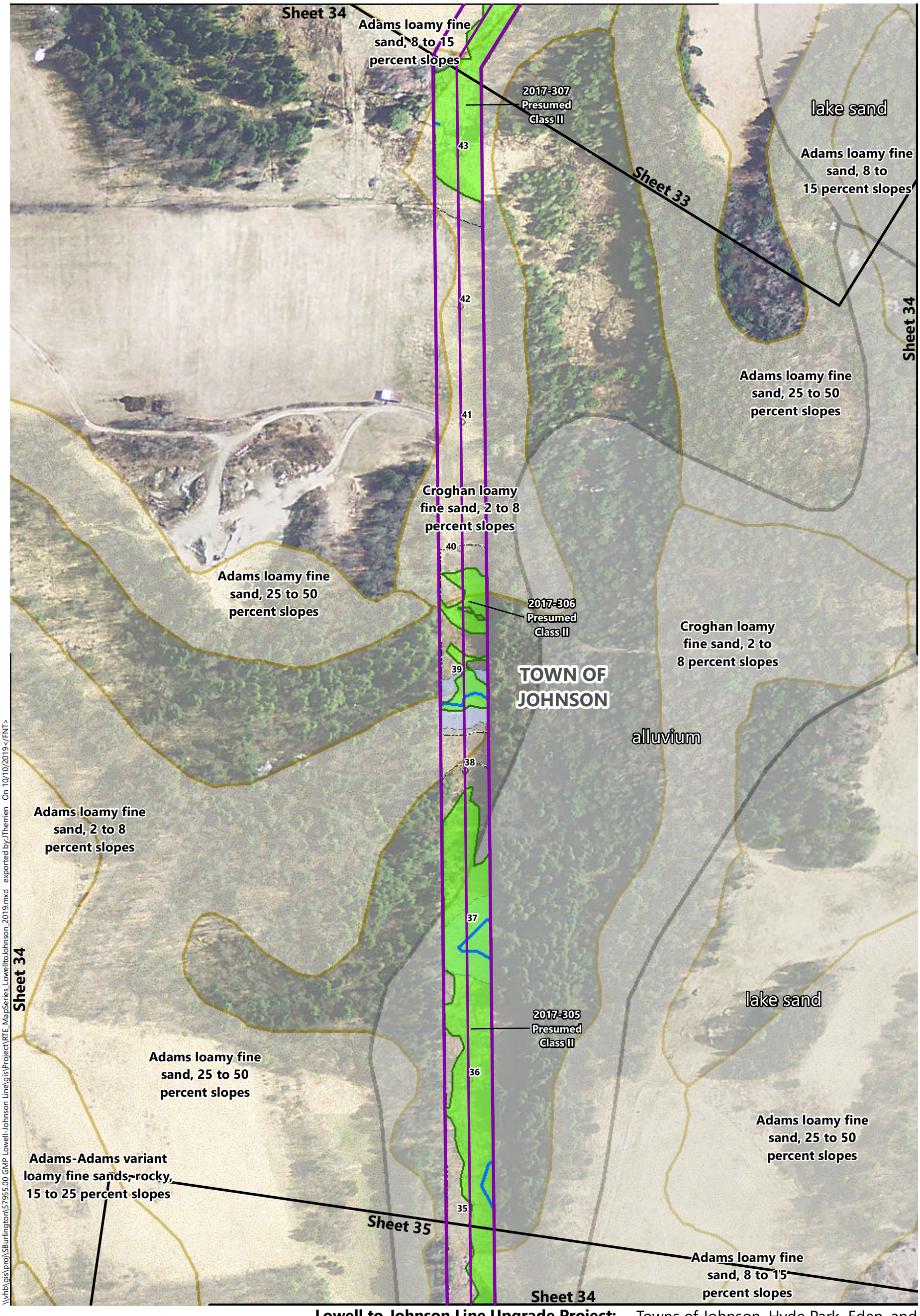

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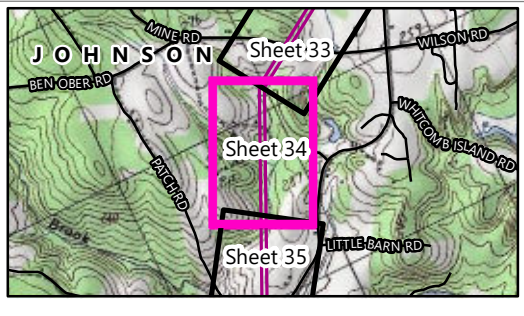
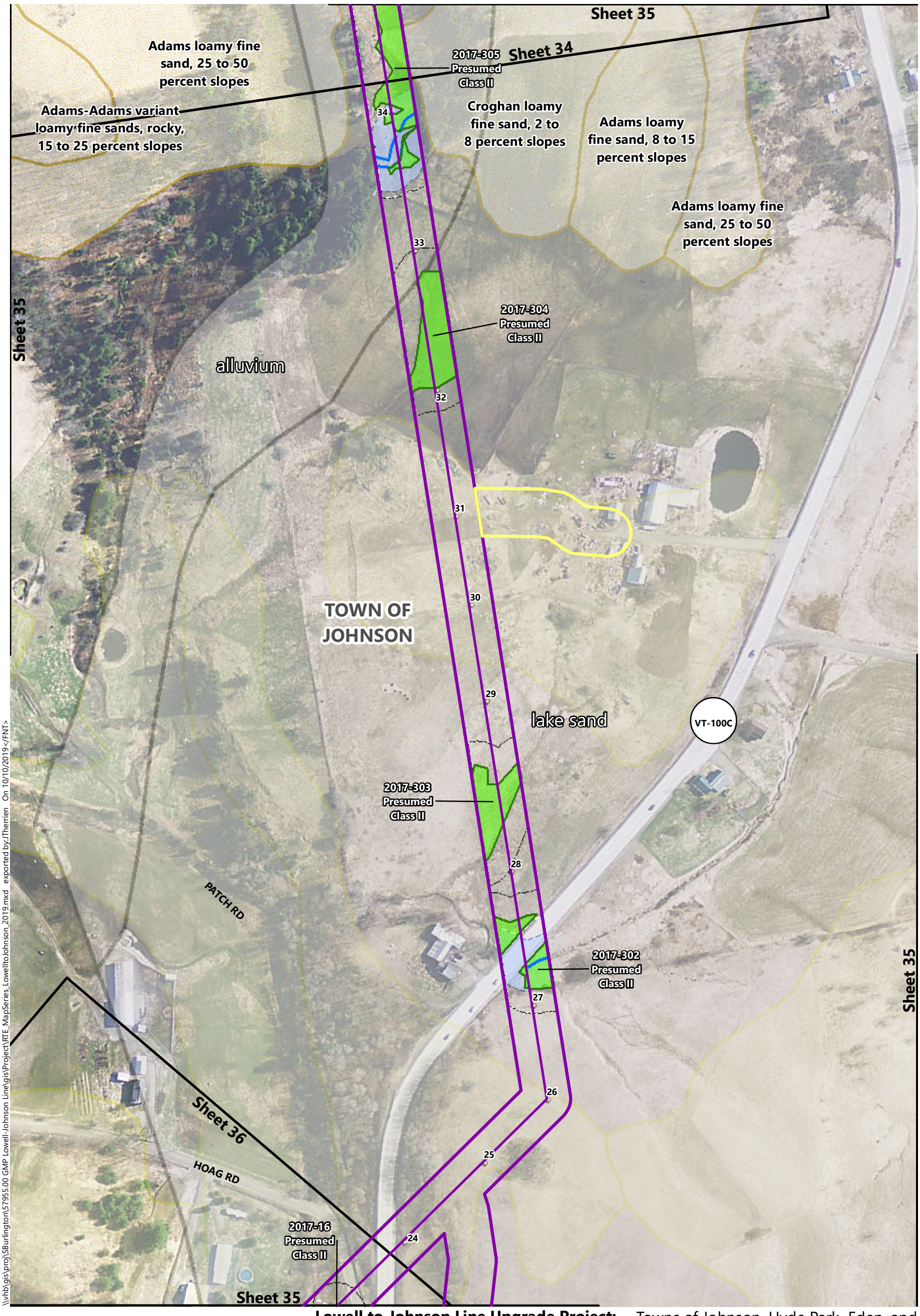
Towns of Johnson, Hyde Park, Eden, and Lowell
Lamoille and Orleans Counties, Vermont



Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 34 of 38

Sources:
Background Imagery by VCGI (Collected in Spring, 2011)
ANR (Vermont Agency of Natural Resources - Various Dates)
FWD (Vermont Department of Fish and Wildlife - Various Dates)
GMP (Green Mountain Power - 2016-2017).
VOGP (Vermont Open Geodata Portal - Various Dates)
SGC (2019)
VHB (2017-19)



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200 100 0 200 Feet

- Prior Study Corridor (VHB)
- 2019 off-ROW Access Study Areas (VHB)
- RTE Plant Location - Rare and Protected (VHB)
- RTE Plant Location - Rare (VHB)
- RTE Plant Area (VHB)
- RTE Plant Buffer (VHB)
- Surficial Geology Sands (VCGI)
- Organic Soils (VCGI)
- Sands (VCGI)
- Part Sandy (VCGI)
- Serpentine-type Bedrock (VCGI)
- Calcareous-type Bedrock (VCGI)*
- NHI Element Occurance (FWD)
- Uncommon Species (FWD)
- Line 133/B20 Line (GMP)
- Utility Pole (GMP)
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- Delineated Stream (VHB)
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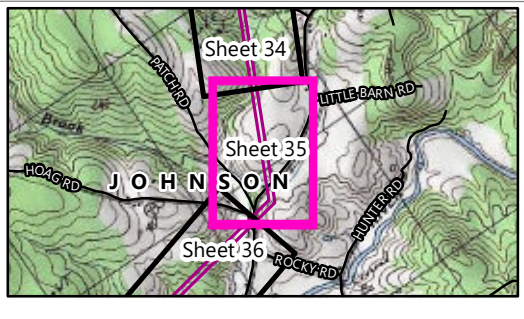
- Riparian Buffer (VHB)
- Proposed River Corridor (VHB)
- Confirmed Vernal Pool (ANR*
- Unconfirmed Vernal Pool (ANR)*
- Town Boundary (VCGI)

* Feature not present in map extent

Lowell to Johnson Line Upgrade Project: B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
Lamoille and Orleans Counties, Vermont



Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 35 of 38

Sources:
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SGC (2019)
VHB (2017-19)

GREEN MOUNTAIN POWER

vhb October 10, 2019

Sheet 36

HOAG RD

lake sand

2017-16 Presumed Class II

23

ROCKY RD

Sheet 35

2017-14 Presumed Class III

2017-15 Presumed Class III

22

21

2017-13 Presumed Class III

Sheet 36

20

alluvium

VT-100C

2017-74 Presumed Class II

TOWN OF JOHNSON

2017-12 Presumed Class II

19

2017-11 Presumed Class III

18

2017-78 Presumed Class II

2017-75 Presumed Class II

2017-76 Presumed Class II

2017-10 Presumed Class II

17

lake sand

2017-77 Presumed Class III

2017-9 Presumed Class II

16

15

2017-8 Presumed Class II

Sheet 37

14

2017-301 Presumed Class II

13

Sheet 36

SINCLAIR RD

\\vhb\gis\proj\SBurlington\57955.00 GMP Lowell-Johnson Line\gis\Project\RTE_MapSeries_LowelltoJohnson_2019.mxd exported by:JTherrien On 10/10/2019</FNT>

Sheet 36

200 100 0 200 Feet

- Prior Study Corridor (VHB)
- 2019 off-ROW Access Study Areas (VHB)
- RTE Plant Location - Rare and Protected (VHB)
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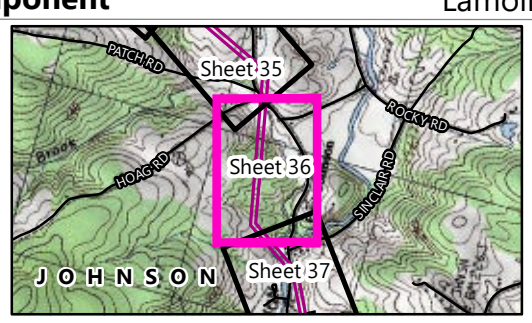
* Feature not present in map extent

Lowell to Johnson Line Upgrade Project:
B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
Lamoille and Orleans Counties, Vermont



Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 36 of 38

Sources:
Background Imagery by VCGI (Collected in Spring, 2011)
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VOGP (Vermont Open Geodata Portal - Various Dates)
SGC (2019)
VHB (2017-19)

GREEN MOUNTAIN POWER

vhb October 10, 2019

Sheet 37

2017-8 Presumed Class II

13

2017-301 Presumed Class II

alluvium

Sheet 36

SINCLAIR RD

12

Adams loamy fine sand, 2 to 8 percent slopes

2017-7 Presumed Class II

11

2017-6 Presumed Class III

10

9

2017-73 Presumed Class II

2017-5 Presumed Class III

VT-100C

TOWN OF JOHNSON

8

TH 67

GILLEN AV

lake sand

2017-4 Presumed Class II

7

2017-3 Presumed Class III

LOG CABIN LN

6

NIELSEN LN

Adams loamy fine sand, 8 to 15 percent slopes

2017-300 Presumed Class II

5

2017-2 Presumed Class III

LAMBERT LN

4

4A

2017-1 Presumed Class II

Johnson Substation
44.637158
-72.668361
18.15 miles

3

2

352SS

Adams loamy fine sand, 25 to 50 percent slopes

Sheet 37

Sheet 37

\\vhb\gis\proj\SBurlington\57955.00 GMP Lowell-Johnson Line\gis\Project\RTE_MapSeries_LowelltoJohnson_2019.mxd exported by:JTherrien On 10/10/2019</FNT>

200 100 0 200 Feet

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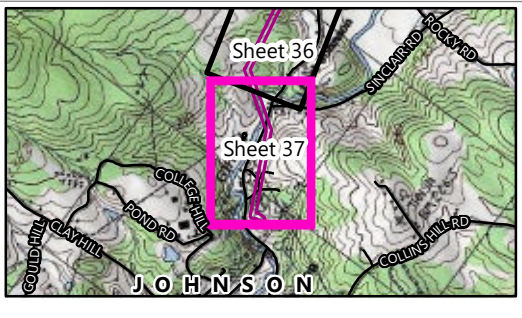
* Feature not present in map extent

Lowell to Johnson Line Upgrade Project:
B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
Lamoille and Orleans Counties, Vermont



Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 37 of 38

Sources:
Background Imagery by VCGI (Collected in Spring, 2011)
ANR (Vermont Agency of Natural Resources - Various Dates)
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GMP (Green Mountain Power - 2016-2017).
VOGP (Vermont Open Geodata Portal - Various Dates)
SGC (2019)
VHB (2017-19)

GREEN MOUNTAIN POWER

vhb October 10, 2019

VT-100

MUDGET DR

DEER RUN LN

LOCKE AVE

MUDGETT HILL RD

TOWN OF
HYDE PARK

FERRY ST

alluvium

lake sand

pebbly sand

HEATH RD

State Rank = S3?
Global Rank = G5
SF ID = 13335
Type = Vertebrate Animal

Sheet 38

\\vhb\gis\proj\SBurlington\57955.00 GMP Lowell-Johnson Line\gis\Project\RTE_MapSeries_LowelltoJohnson_2019.mxd exported by:JTherrien On 10/10/2019</FNT>

200 100 0 200 Feet

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Lowell to Johnson Line Upgrade Project:
B20 Line Component

Towns of Johnson, Hyde Park, Eden, and Lowell
Lamoille and Orleans Counties, Vermont

Rare, Threatened and Endangered Species Survey
Target Area and Results
Sheet 38 of 38

Sources:
Background Imagery by VCGI (Collected in Spring, 2011)
ANR (Vermont Agency of Natural Resources - Various Dates)
FWD (Vermont Department of Fish and Wildlife - Various Dates)
GMP (Green Mountain Power - 2016-2017).
VOGP (Vermont Open Geodata Portal - Various Dates)
SGC (2019)
VHB (2017-19)

ATTACHMENT 2

Target Rare, Threatened, and Endangered Plant Survey Species List
Project: Lowell to Johnson Line Upgrade: B20 Line Component
Client: Green Mountain Power
Location: Lowell, Eden, and Johnson, Vermont
Prepared By: VHB
Date: May 18, 2017; Formatting Revised August 28, 2019.

Species	Common Name	State Rank	Global Rank	Vermont Status	Federal Status	Target Habitat[1]	Survey Window[2]	Source[3]
Adiantum aleuticum	Aleutian Maidenhair-fern	S1	G5?	-	-	Moist and shaded crevices in rocks, especially near falling or rushing water where the plant benefits from the constant mist.	Summer	Element Occurrence Report 4406.
Adiantum viridimontanum	Green Mountain Maidenhair-fern	S2	G3	**T**	-	Cliffs, balds, or ledges, floodplains, forests, meadows, and fields, shores of rivers or lakes.	Summer	Element Occurrence Data accessed April 18, 2017; Potential Rare Plant Species of Serpentine Outcrop (Thompson, Sorenson 2005).
Allium canadense var. canadense	Wild Garlic	S1	G5T5	**T**	-	Dry woods and sandy soil; sandy woods of oak or pine.	Spring	Sandplain rare plants (Bob Popp).
Asclepias amplexicaulis	Blunt-leaved Milkweed	S1	G5	**T**	-	Woodlands, sandy fields.	Summer	Sandplain rare plants (Bob Popp).
Asclepias tuberosa	Butterfly-weed	SH	G5	**T**	-	Dry fields, sand plains, roadsides, disturbed areas.	Summer-Late Summer	Sandplain rare plants (Bob Popp).
Calystegia spithamaea ssp. spithamaea	Low Bindweed	S2	G4G5T4T5	**T**	-	Sandy fields, roadsides, and clearings, railroads, woodlands, sandplain grasslands.	Summer-Late Summer	Sandplain rare plants (Bob Popp).
Carex foenea	Bronze Sedge	S2	G5	**E**	-	Fields roadsides, woodlands, and other places in open dry soils. Temperate Calcareous Outcrop and Sandplains.	Spring-Summer	Sandplain rare plants (Bob Popp).
Carex muehlenbergii var. muehlenbergii	Muehlenberg's sedge	S2	G5T5	**T**	-	Dry-mesic to xeric, open areas such as grasslands, sandy fields, woodlands, and forest openings.	Spring-Summer	Sandplain rare plants (Bob Popp).
Ceanothus herbaceus	Prairie Redroot	S1	G5	**E**	-	Sandy lake shores, banks and fields.	Spring-Summer	Sandplain rare plants (VHB).
Crocanthemum bicknellii	Plains Frostweed	S2	G5	**T**	-	Open, sandy soils of woodlands, roadsides, clearings, dry fields, and sandplains.	Summer	Sandplain rare plants (Bob Popp).
Cyperus houghtonii	Houghton's sedge	S2	G4?	**T**	-	Dry-mesic to xeric sands and ledges, including roadsides, lake shores, sandplains, and woodlands.	Late Summer	Sandplain a rare plants (Bob Popp).
Dryopteris filix-mas	Male wood fern	S2	G5	**T**	-	Forests; talus or rocky slopes.	Summer-Late Summer	Kingdom Community Wind Survey (VHB 2010).
Helianthus strumosus	Harsh Sunflower	S2S3	G5	**T**	-	Deciduous forests, riverbanks, fields, roadsides; open rights-of-way.	Summer-Late Summer	Sandplain rare plants (Bob Popp).
Hudsonia tomentosa	Beach heather	S1	G5	**E**	-	Dunes, sandplains, sandy river beaches, lake shores.	Summer	Sandplain rare plants (Bob Popp).

Target Rare, Threatened, and Endangered Plant Survey Species List
Project: Lowell to Johnson Line Upgrade: B20 Line Component
Client: Green Mountain Power
Location: Lowell, Eden, and Johnson, Vermont
Prepared By: VHB
Date: May 18, 2017; Formatting Revised August 28, 2019.

Species	Common Name	State Rank	Global Rank	Vermont Status	Federal Status	Target Habitat[1]	Survey Window[2]	Source[3]
Isotria verticillata	Large whorled pogonia	S2	G5	**T**		Mesic to dry-mesic, often acidic, forests and woodlands.	Summer	Sandplain rare plants (Bob Popp).
Lactuca hirsuta	Hairy lettuce	S1S2	G5?	**T**	-	Dry fields, roadsides, forest edges and clearings, woodlands.	Summer-Late Summer	Sandplain rare plants (Bob Popp).
Lathyrus japonicus var. maritimus	Beach pea	S2	G5T5	**T**	-	Coastal sites with disjointed populations on Lake Champlain.	Summer	Sandplain rare plants (Bob Popp).
Lechea mucronata	Hairy pinweed	S1	G5	**E**	-	Fields, roadsides, waste areas, woodlands, clearings; Utility rights-of-way and other open habitats in thin soils.	Summer-Late Summer	Sandplain rare plants (Bob Popp).
Lespedeza hirta ssp. hirta	Hairy bush-clover	S1	G5T5?	**T**	-	Woodlands, forest clearings, dry openings; Woodlands, dry fields, thin forests, clearings in forests, railroad edges, and utility rights-of-way.	Late Summer	Sandplain rare plants (Bob Popp).
Lupinus perennis	Wild lupine	S1	G5	**E**	-	Sandy or gravelly soil of fields, roadsides, floodplains, railroads, woodlands, cleared rights-of-way, and waste areas.	Spring-Summer	Sandplain rare plants (Bob Popp's List).
Minuartia marcescens	Marcescent Sandwort	S1	G2G3	**T**	-	Alpine or subalpine zones, cliffs, balds, or ledges, ridges or ledges.	Summer-Late Summer	Potential Rare Plant Species of Serpentine Outcrop (Thompson, Sorenson 2005).
Piptatheropsis pungens	Slender mountain rice	S2	G5	**T**	-	Deciduous or mixed evergreen-deciduous woodlands and barrens, dry-mesic to xeric openings.	Spring-Summer	Sandplain rare plants (Bob Popp).
Quercus ilicifolia	Scrub oak	S1	G5	**E**	-	Xeric to dry-mesic woodlands and barrens; pine and other barrens, rocky summits, openings in woodlands, and utility rights-of-way. Often on upper slopes, crests, and hilltops in dry acidic thin, sandy, or rocky soils.	Late Summer-Fall	Sandplain rare plants (Bob Popp).
Spiranthes casei var. casei	Case's Ladies'-tresses	S2?	G4T4	-	-	Mesic to dry open, sandy, sterile sites in meadows, pastures, open woodlands, outcrops, roadsides, railroad banks, sand pits and old fields from sea level to 550m elevation.	Late Summer	Element Occurrence Data accessed April 18, 2017.
Solidago odora ssp. odora	Sweet goldenrod	SH	G5T5	**T**		Woodlands, dry fields, roadsides; rocky openings.	Summer	Sandplain rare plants (Bob Popp).

[1] **Sources for Habitat Description:**

Brown, P.M. 2007. *Wild Orchids of the Northeast: New England, New York, Pennsylvania, and New Jersey*. University Press of Florida.
EFloras.org. http://www.efloras.org/index.aspx
Gilman, A.V. 2015. *New Flora of Vermont.* New York Botanical Garden.
Gleason, H.A. and A. Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. The New York Botanical Garden.
Haines, A. 2011. *Flora Novae Angliae*. New England Wildflower Society/Yale University Press, New Haven, CT . 973 Pp.
Langdon, R.W., Ferguson, M.T., and K.M. Cox. 2006. *Fishes of Vermont*. Vermont Department of Fish and Wildlife.
Maine Department of Agriculture, Conservation and Forestry. Accessed: http://www.maine.gov/dacf/mnap/features/rare_plants/plantlist.htm
Newcomb, L. 1977. *Newcomb's Wildflower Guide*. Little, Brown, and Company, Boston.
Seymour, F.C.. 1982. *The Flora of New England: Second Edition*. Phytologia Memoirs 5. Plainfield, NJ: Harold N. Moldenke and Alma L. Moldenke. 611 p.

[2] **Survey Window:** Spring (April-May), Summer (June-July), Late Summer (August-September), Fall (October-November).
[3] **Sources for Target Species:**

Thompson, E.H. and Sorenson, E.R. 2005. *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont*. Vermont Department of Fish and Wildlife and The Nature Conservancy.
Vermont Natural Resources Atlas. 2017. *Element Occurrence Reports*. Accessed April 2017
Popp, B. *Rare Sandplain Plant Species.* Vermont Fish and Wildlife.
VHB. 2010. *Section 248 Natural Resources Report- Kingdom Community Wind Project.*

ATTACHMENT 3

Lowell to Johnson Line Upgrade – B20 Line Rare, Threatened, and Endangered Plant Assessment Photographs

PROJECT NUMBER

57955.00

CLIENT

Green Mountain Power, Inc.

2152 Post Road

Rutland, Vermont 05701

LOCATION

Lowell, Eden, Johnson, and Hyde Park, Vermont

NO. 1 / 8.2017

Targeted habitat for rare, threatened, and endangered plant ("RTE") surveys: waste rock and tailings, including serpentinite bedrock, along the Vermont Asbestos Group ("VAG") Mine in Eden and Lowell, Vermont.

NO. 2 / 8.2017

Targeted habitat for RTE surveys: waste rock and tailings, including serpentinite bedrock, along the VAG Mine.

NO. 3 / 8.2017

Targeted habitat for RTE surveys: waste rock and tailings, including serpentinite bedrock, along the VAG Mine.

NO. 4 / 8.2017

Targeted habitat for RTE surveys: waste rock and tailings, including serpentinite bedrock, along the VAG Mine.

NO. 5 / 8.2017

Targeted habitat for RTE surveys: wetlands with organic/muck/peat soils.

NO. 6 / 8.2017

Targeted habitat for RTE surveys: wetlands with organic/muck/peat soils.

NO. 7 / 8.2.2017

Targeted habitat for RTE surveys: wetlands with organic/muck/peat soils.

NO. 8 / 8.3.2017

Targeted habitat for RTE surveys: sandy soil series as mapped by the Natural Resources Conservation Service ("NRCS").

NO. 9 / 8.2017

Targeted habitat for RTE surveys: areas mapped with dunite and periodite bedrock outcrops.

NO. 10 / 8.2017

Typical right-of-way ("ROW") habitat with matrix of wetlands and shrublands traversed by VHB Botanists between targeted habitsts for RTE surveys.

NO. 11 / 8.2017

Wetland habitat of few-nerved cottongrass (*Eriophorum tenellum*) along the B20 Line documented by VHB Botanists.

NO. 12 / 7.31.2017

VHB Botanists mapped one population on the B20 Line of few-nerved cottongrass (*Eriophorum tenellum*), ranked S1S2 in Vermont.

NO. 13 / 8.9.2017

Waste rock and tailings, including serpentinite bedrock, near the VAG mine, providing habitat for RTE and Uncommon plants in the genera *Adiantum* (maidenhair fern), *Spiranthes* (ladies' tresses), and *Botrychium* (grape-fern).

NO. 14 / 8.9.2017

Barren habitat downslope of waste rock and tailings, providing habitat for RTE and Uncommon plants in the genera *Adiantum* (maidenhair fern), *Spiranthes* (ladies' tresses), and *Botrychium* (grape-fern).

NO. 15 / 8.9.2017

Barren habitat downslope of waste rock and tailings, providing habitat for RTE and Uncommon plants in the genera *Adiantum* (maidehair fern), *Spiranthes* (ladies' tresses), and *Botrychium* (grape-fern).

NO. 16 / 8.9.2017

Barren habitat downslope of waste rock and tailings, providing habitat for RTE and Uncommon plants in the genera *Adiantum* (maidehair fern), *Spiranthes* (ladies' tresses), and *Botrychium* (grape-fern).

NO. 17 / 8.9.2017

Green Mountain maidenhair fern (*Adiantum viridimontanum*) featured in the bottom of the photo, ranked S2 and listed as Threatened in Vermont. Aleutian maidenhair fern (*Adiantum aleuticum*), featured at the top of the photo, ranked S1 in Vermont. Located by VHB Botanists along waste rock and tailings from VAG mine.

NO. 18 / 8.9.2017

Aleutian maidenhair fern (*Adiantum aleuticum*), ranked S1 in Vermont. Located by VHB Botanists along waste rock and tailings from VAG mine.

NO. 19 / 8.10.2017

Substrate near waste rock and tailings from the VAG mine, which provides habitat for rare and uncommon plants in the genus *Spiranthes*.

NO. 20 / 9.13.2017

VHB Botanists documented several plants belonging to *Spiranthes casei* (ranked S2? In Vermont), *Spiranthes ocroleuca* (ranked S3 in Vermont), and a possible hybrid with traits intermediate to the two *Spiranthes* species (rank conservatively assummed S2? by VHB).

NO. 21 / 8.8.2017

VHB Botanists documented several plants belonging to *Spiranthes casei* (ranked S2? in Vermont), *Spiranthes ocroleuca* (ranked S3 in Vermont), and a possible hybrid with traits intermediate to the two *Spiranthes* species (rank conservatively assummed S2? by VHB).

NO. 22 / 8.8.2017

VHB Botanists also documented leathery grapefern (*Botrychium multifidum*), ranked S3 (Uncommon) in Vermont in similar habitat to the above-described *Adiantum* and *Spiranthes* species.

NO. 23 / 7.5.2017

VHB Botanists also documented Grassleaf rush (*Juncus marginatus*), ranked S3 (Uncommon) in Vermont.

NO. 24 / 8.3.2017

VHB Botanists also documented poke milkweed (A*sclepias exaltata*), ranked S3 (Uncommon) in Vermont.

NO. 25 / 8.3.2017

VHB Botanists also documented Musky monkey-flower (M*imulus moschatus*), ranked S3 (Uncommon) in Vermont.

NO. 26 / 8.2017

VHB Botanists also documented ovate spikerush (*Eleocharis ovata*), ranked S3 (Uncommon) in Vermont.

All photographs taken by VHB Botanists in 2017.

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ATTACHMENT 4

Species Checklist - Rare, Threatened, and Endangered Plant Survey

Project: Lowell to Johnson Line Upgrade: B20 Line Component

Client: Green Mountain Power, Inc.

Location: Towns of Johnson, Hyde Park, Eden, and Lowell, Vermont

Field Investigator(s): A. Crary, C. Cyrus, C. Fenner, M. Jackman, C. Sheldon, J. Thompson, A. Wood.

Survey Date(s): 2017 - July 11, July 14, July 31-August 4, September 14; 2019 - May 9, July 2.

Prepared By: VHB - June 28, 2019; Revised October 14, 2019

Scientific Name [1]	Common Name	Family	Observed Habitat					VT Rarity Rank[2]	Non-Native Invasive Species [3]
			General Wetland	Organic Substrate Wetland	General Upland	Serpentinite/ Dunite Bedrock Geology Units	Sand Soil Map Units (Adams and Croghan Series)		
Abies balsamea (L.) Mill.	balsam fir	Pinaceae	X	X	X				
Acer negundo L.	boxelder	Aceraceae			X				
Acer pensylvanicum L.	striped maple	Aceraceae			X	X			
Acer rubrum L.	red maple	Aceraceae	X	X	X		X		
Acer saccharum Marsh.	sugar maple	Aceraceae			X				
Acer spicatum Lam.	mountain maple	Aceraceae			X				
Achillea millefolium L.	common yarrow	Asteraceae			X		X		
Adiantum aleuticum (Rupr.) Paris	Aleutian maidenhair	Pteridaceae			X			S1	
Adiantum viridimontanum Paris	Green Mountain maidenhair	Pteridaceae			X			S2, T	
Agrimonia striata Michx.	roadside agrimony	Rosaceae			X		X		
Agrostis gigantea Roth	redtop	Poaceae	X		X				
Agrostis perennans (Walter) Tuck.	upland bentgrass	Poaceae			X		X		
Alnus incana (L.) Moench ssp. rugosa (Du Roi) R.T. Clausen	speckled alder	Betulaceae	X	X	X				
Alnus viridis (Chaix) DC. ssp. crispa (Aiton) Turrill	mountain alder	Betulaceae	X					S3	
Amelanchier arborea (Michx. f.) Fernald	common serviceberry	Rosaceae	X						
Anaphalis margaritacea (L.) Benth.	western pearly everlasting	Asteraceae			X				
Anthoxanthum odoratum L.	sweet vernalgrass	Poaceae			X				
Anthriscus sylvestris (L.) Hoffm.	wild chervil	Apiaceae			X				WL
Apocynum androsaemifolium L.	spreading dogbane	Apocynaceae			X		X		
Apocynum cannabinum L.	Indianhemp	Apocynaceae			X				
Aralia hispida Vent.	bristly sarsaparilla	Araliaceae			X				
Aralia nudicaulis L.	wild sarsaparilla	Araliaceae			X				
Arisaema triphyllum (L.) Schott	Jack in the pulpit	Araceae	X		X				
Aronia melanocarpa (Michx.) Elliott	black chokeberry	Rosaceae		X					
Artemisia vulgaris L.	common wormwood	Asteraceae							
Asclepias syriaca L.	common milkweed	Asclepiadaceae			X		X		
Asclepias exaltata L.	poke milkweed	Asclepiadaceae			X			S3	
Athyrium filix-femina (L.) Roth	common ladyfern	Dryopteridaceae			X	X	X		
Berberis thunbergii DC.	Japanese barberry	Berberidaceae			X				B
Betula alleghaniensis Britton	yellow birch	Betulaceae			X				
Betula papyrifera Marshall	paper birch	Betulaceae			X	X	X		
Betula populifolia Marshall	gray birch	Betulaceae	X		X		X		
Bidens frondosa L.	devil's beggartick	Asteraceae	X						
Borago officinalis L.	common borage	Boraginaceae			X	X			
Botrychium multifidum (S.G. Gmel.) Trevis.	leathery grapefern	Ophioglossaceae			X			S3	
Brachyelytrum aristosum (Michx.) Trel.	northern shorthusk	Poaceae			X	X			
Bromus ciliatus L.	fringed brome	Poaceae	X		X				
Bromus inermis Leyss.	smooth brome	Poaceae			X		X		
Bulbostylis capillaris (L.) Kunth ex C.B. Clarke	densetuft hairsedge	Cyperaceae			X				
Calamagrostis canadensis (Michx.) P. Beauv.	bluejoint	Poaceae	X	X					
Caltha palustris L.	yellow marsh marigold	Ranunculaceae	X	X					
Campanula rapunculoides L.	rampion bellflower	Campanulaceae			X				
Campanula rotundifolia L.	bluebell bellflower	Campanulaceae				X			
Carex annectens (E.P. Bicknell) E.P. Bicknell	yellowfruit sedge	Cyperaceae	X						
Carex baileyi Britton	Bailey's sedge	Cyperaceae	X						
Carex comosa Boott	longhair sedge	Cyperaceae	X						
Carex conoidea Schkuhr ex Willd.	openfield sedge	Cyperaceae	X		X				
Carex crinita Lam.	fringed sedge	Cyperaceae	X	X					
Carex debilis Michx.	white edge sedge	Cyperaceae	X	X					
Carex echinata Murray	star sedge	Cyperaceae		X					
Carex flava L.	yellow sedge	Cyperaceae	X	X					
Carex gracillima Schwein.	graceful sedge	Cyperaceae	X		X				
Carex intumescens Rudge	greater bladder sedge	Cyperaceae			X		X		
Carex lasiocarpa Ehrh.	woollyfruit sedge	Cyperaceae	X	X					
Carex laxiculmis Schwein.	spreading sedge	Cyperaceae	X					S3	
Carex leptalea Wahlenb.	bristlystalked sedge	Cyperaceae	X	X					
Carex lurida Wahlenb.	shallow sedge	Cyperaceae	X	X					
Carex lupulina Muhl. ex Willd.	hop sedge	Cyperaceae		X					
Carex magellanica Lam.	boreal bog sedge	Cyperaceae		X					
Carex pallescens L.	pale sedge	Cyperaceae				X			
Carex pensylvanica Lam.	Pennsylvania sedge	Cyperaceae			X	X			
Carex platyphylla Carey	broadleaf sedge	Cyperaceae			X				
Carex radiata (Wahlenb.) Small	eastern star sedge	Cyperaceae	X	X					
Carex rosea Schkuhr ex Willd.	rosy sedge	Cyperaceae		X					
Carex scabrata Schwein.	eastern rough sedge	Cyperaceae	X	X					
Carex scoparia Schkuhr ex Willd.	broom sedge	Cyperaceae	X	X					
Carex stipata Muhl. ex Willd.	awlfruit sedge	Cyperaceae	X	X					
Carex stricta Lam.	upright sedge	Cyperaceae	X						
Carex tribuloides Wahlenb.	blunt broom sedge	Cyperaceae	X			X			
Carex vesicaria L.	blister sedge	Cyperaceae	X						
Carex vulpinoidea Michx.	fox sedge	Cyperaceae	X	X					
Celastrus orbiculatus Thunb.	Oriental bittersweet	Celastraceae			X				B
Centaurea stoebe L.	spotted knapweed	Asteraceae	X		X				WL
Cerastium arvense L.	field chickweed	Caryophyllaceae			X				
Cerastium fontanum Baumg.	common mouse-ear chickweed	Caryophyllaceae					X		
Chamaesyce maculata (L.) Small	spotted sandmat	Euphorbiaceae			X				
Chamerion angustifolium (L.) Holub	fireweed	Onagraceae			X		X		
Chelone glabra L.	white turtlehead	Scrophulariaceae	X	X					
Cicuta bulbifera L.	bulblet-bearing water hemlock	Apiaceae	X						
Cicuta maculata L.	spotted water hemlock	Apiaceae		X					
Circaea canadensis sensu Fernald	enchanter's nightshade	Onagraceae			X				
Circaea lutetiana L.	broadleaf enchanter's nightshade	Onagraceae			X				
Cirsium arvense (L.) Scop.	Canada thistle	Asteraceae			X				
Cirsium muticum Michx.	swamp thistle	Asteraceae	X						
Cirsium vulgare (Savi) Ten.	bull thistle	Asteraceae			X				
Clematis virginiana L.	devil's darning needles	Ranunculaceae	X		X	X	X		

Species Checklist - Rare, Threatened, and Endangered Plant Survey

Project: Lowell to Johnson Line Upgrade: B20 Line Component

Client: Green Mountain Power, Inc.

Location: Towns of Johnson, Hyde Park, Eden, and Lowell, Vermont

Field Investigator(s): A. Crary, C. Cyrus, C. Fenner, M. Jackman, C. Sheldon, J. Thompson, A. Wood.

Survey Date(s): 2017 - July 11, July 14, July 31-August 4, September 14; 2019 - May 9, July 2.

Prepared By: VHB - June 28, 2019; Revised October 14, 2019

Scientific Name [1]	Common Name	Family	Observed Habitat					VT Rarity Rank[2]	Non-Native Invasive Species [3]
			General Wetland	Organic Substrate Wetland	General Upland	Serpentinite/ Dunite Bedrock Geology Units	Sand Soil Map Units (Adams and Croghan Series)		
Clinopodium vulgare L.	wild basil	Lamiaceae			X		X		
Clintonia borealis (Aiton) Raf.	bluebead	Liliaceae			X				
Convolvulus arvensis L.	field bindweed	Convolvulaceae			X				
Conyza canadensis (L.) Cronquist	Canadian horseweed	Asteraceae			X		X		
Cornus alternifolia L. f.	alternateleaf dogwood	Cornaceae			X	X			
Cornus amomum Mill.	silky dogwood	Cornaceae	X		X				
Cornus canadensis L.	bunchberry dogwood	Cornaceae	X		X				
Cornus sericea L.	redosier dogwood	Cornaceae	X						
Corylus cornuta Marshall	beaked hazelnut	Betulaceae			X		X		
Coptis trifolia (L.) Salisb.	threeleaf goldthread	Ranunculaceae			X		X		
Crataegus succulenta Schrad. ex Link	fleshy hawthorn	Rosaceae			X				
Cypripedium calceolus L. var. parviflorum (Salisb.) Fernald	lady's-slipper orchid	Orchidaceae	X					S3	
Cypripedium parviflorum Salisb. var. parviflorum	lesser yellow lady's slipper	Orchidaceae	X						
Cystopteris tenuis (Michx.) Desv.	upland brittle bladderfern	Dryopteridaceae			X		X		
Dactylis glomerata L.	orchardgrass	Poaceae			X		X		
Dalibarda repens L.	robin runaway	Rosaceae	X		X		X		
Danthonia spicata (L.) P. Beauv. ex Roem. & Schult.	poverty oatgrass	Poaceae			X	X			
Dasiphora fruticosa (L.) Rydb. ssp. floribunda (Pursh) Kartesz	shrubby cinquefoil	Rosaceae	X						
Daucus carota L.	Queen Anne's lace	Apiaceae			X		X		
Dennstaedtia punctilobula (Michx.) T. Moore	eastern hayscented fern	Dennstaedtiaceae			X	X	X		
Deschampsia flexuosa (L.) Trin.	wavy hairgrass	Poaceae				X	X		
Desmodium canadense (L.) DC.	showy ticktrefoil	Fabaceae			X				
Dianthus deltoides L.	maiden pink	Caryophyllaceae			X				
Dichanthelium clandestinum (L.) Gould	deertongue	Poaceae			X		X		
Dichanthelium depauperatum (Muhl.) Gould	starved panicgrass	Poaceae			X	X			
Diervilla lonicera Mill.	northern bush honeysuckle	Caprifoliaceae			X		X		
Digitalis grandiflora Mill.	yellow foxglove	Scrophulariaceae			X				
Diphasiastrum digitatum (Dill. ex A. Braun) Holub	groundcedar	Lycopodiaceae	X		X				
Diphasiastrum tristachyum (Pursh) Holub	blue ground-cedar	Lycopodiaceae				X			
Doellingeria umbellata (Mill.) Nees	parasol whitetop	Asteraceae	X	X					
Drosera rotundifolia L.	roundleaf sundew	Droseraceae	X	X					
Dryopteris carthusiana (Vill.) H.P. Fuchs	spinulose woodfern	Dryopteridaceae			X				
Dryopteris cristata (L.) A. Gray	crested woodfern	Dryopteridaceae	X	X					
Dryopteris goldiana (Hook. ex Goldie) A. Gray	Goldie's woodfern	Dryopteridaceae			X				
Dryopteris marginalis (L.) A. Gray	marginal woodfern	Dryopteridaceae			X	X			
Dulichium arundinaceum (L.) Britton	three-way sedge	Cyperaceae	X	X					
Eleocharis ovata (Roth) Roem. & Schult.	ovate spikerush	Cyperaceae	X					S3	
Epilobium ciliatum Raf. ssp. glandulosum (Lehm.) Hoch & P.H. Raven	fringed willowherb	Onagraceae	X						
Epilobium hirsutum L.	codlins and cream	Onagraceae	X						
Epilobium strictum Muhl. ex Spreng.	downy willowherb	Onagraceae	X						
Epipactis helleborine (L.) Crantz	broadleaf helleborine	Orchidaceae			X				
Equisetum arvense L.	field horsetail	Equisetaceae	X	X					
Equisetum fluviatile L.	water horsetail	Equisetaceae	X	X					
Equisetum hyemale L.	scouringrush horsetail	Equisetaceae			X				
Equisetum sylvaticum L.	woodland horsetail	Equisetaceae	X						
Equisetum variegatum Schleich. ex F. Weber & D. Mohr	variegated scouringrush	Equisetaceae				X			
Eragrostis pectinacea (Michx.) Nees ex Steud.	tufted lovegrass	Poaceae	X						
Erigeron philadelphicus L.	Philadelphia fleabane	Asteraceae			X				
Eriophorum tenellum Nutt.	fewnerved cottongrass	Cyperaceae		X				S1S2	
Eriophorum virginicum L.	tawny cottongrass	Cyperaceae	X						
Erythranthe moschata var. moschata (Syn. Mimulus moschatus)	musk flower	Scrophulariaceae	X	X				S3	
Eupatorium perfoliatum L.	common boneset	Asteraceae	X	X					
Euthamia graminifolia (L.) Nutt.	flat-top goldentop	Asteraceae	X		X				
Eutrochium maculatum (L.) E.E. Lamont	spotted joe pye weed	Asteraceae	X			X			
Eurybia macrophylla (L.) Cass.	bigleaf aster	Asteraceae	X		X				
Fagus grandifolia Ehrh.	American beech	Fagaceae			X				
Festuca rubra L.	red fescue	Poaceae			X				
Fallopia japonica (Houtt.) Ronse Decr.	Japanese knotweed	Polygonaceae			X				B
Fragaria vesca L.	woodland strawberry	Rosaceae			X				
Fragaria virginiana Duchesne	Virginia strawberry	Rosaceae	X		X				
Fraxinus nigra Marshall	black ash	Oleaceae		X					
Fraxinus pennsylvanica Marshall	green ash	Oleaceae	X	X	X				
Galeopsis bifida Boenn.	splitlip hempnettle	Lamiaceae			X				
Galium aparine L.	stickywilly	Rubiaceae	X		X				
Galium asprellum Michx.	rough bedstraw	Rubiaceae	X	X					
Galium mollugo L.	false baby's breath	Rubiaceae			X				
Gaultheria procumbens L.	eastern teaberry	Ericaceae			X	X			
Gentiana linearis Froel.	narrowleaf gentian	Gentianaceae	X	X					
Geum rivale L.	purple avens	Rosaceae	X						
Glyceria canadensis (Michx.) Trin.	rattlesnake mannagrass	Poaceae	X	X					
Glyceria grandis S. Watson	American mannagrass	Poaceae	X	X					
Glyceria melicaria (Michx.) F.T. Hubbard	melic mannagrass	Poaceae	X						
Glyceria striata (Lam.) Hitchc.	fowl mannagrass	Poaceae	X						
Gymnocarpium dryopteris (L.) Newman	western oakfern	Dryopteridaceae			X	X			
Gratiola aurea Pursh	golden hedgehyssop	Scrophulariaceae	X						
Hieracium aurantiacum L.	orange hawkweed	Asteraceae			X	X			
Hieracium caespitosum Dumort.	meadow hawkweed	Asteraceae			X				
Hieracium paniculatum L.	Allegheny hawkweed	Asteraceae				X			
Hieracium scabrum Michx.	rough hawkweed	Asteraceae	X		X				
Hydrocotyle americana L.	American marshpennywort	Apiaceae	X						
Hypericum boreale (Britton) E.P. Bicknell	northern St. Johnswort	Clusiaceae	X						
Hypericum ellipticum Hook.	pale St. Johnswort	Clusiaceae	X	X					
Hypericum punctatum Lam.	spotted St. Johnswort	Clusiaceae	X		X				
Ilex mucronata (L.) Powell, Savolainen & Andrews	catberry	Aquifoliaceae	X	X					
Ilex verticillata (L.) A. Gray	common winterberry	Aquifoliaceae	X						
Impatiens capensis Meerb.	jewelweed	Balsaminaceae	X	X	X		X		

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Prepared By: VHB - June 28, 2019; Revised October 14, 2019

Scientific Name [1]	Common Name	Family	Observed Habitat					VT Rarity Rank[2]	Non-Native Invasive Species [3]
			General Wetland	Organic Substrate Wetland	General Upland	Serpentinite/ Dunite Bedrock Geology Units	Sand Soil Map Units (Adams and Croghan Series)		
Iris versicolor L.	harlequin blueflag	Iridaceae	X	X					
Juglans cinerea L.	butternut	Juglandaceae			X				
Juncus brevicaudatus (Engelm.) Fernald	narrowpanicle rush	Juncaceae	X		X				
Juncus canadensis J. Gay ex Laharpe	Canadian rush	Juncaceae	X						
Juncus effusus L.	common rush	Juncaceae	X	X					
Juncus marginatus Rostk.	grassleaf rush	Juncaceae	X					S3	
Juncus tenuis Willd.	poverty rush	Juncaceae	X		X	X	X		
Juniperus communis L.	common juniper	Cupressaceae			X		X		
Lactuca biennis (Moench) Fernald	tall blue lettuce	Asteraceae			X				
Lactuca canadensis L.	Canada lettuce	Asteraceae			X				
Laportea canadensis (L.) Weddell	Canadian woodnettle	Urticaceae			X				
Larix laricina (Du Roi) K. Koch	tamarack	Pinaceae	X	X					
Leersia oryzoides (L.) Sw.	rice cutgrass	Poaceae	X	X					
Lemna minor L.	common duckweed	Lemnaceae	X						
Leucanthemum vulgare Lam.	oxeye daisy	Asteraceae			X		X		
Linnaea borealis L.	twinflower	Caprifoliaceae			X				
Lobelia inflata L.	Indian tobacco	Campanulaceae					X		
Lobelia spicata Lam.	palespike lobelia	Campanulaceae	X		X				
Lolium perenne L. ssp. multiflorum (Lam.) Husnot	Italian ryegrass	Poaceae	X						
Lonicera canadensis W. Bartram ex Marshall	American fly honeysuckle	Caprifoliaceae			X		X		
Lonicera dioica L.	limber honeysuckle	Caprifoliaceae			X				
Lonicera morrowii A. Gray	Morrow's honeysuckle	Caprifoliaceae	X		X		X		B
Lotus corniculatus L.	bird's-foot trefoil	Fabaceae			X		X		
Ludwigia palustris (L.) Elliott	marsh seedbox	Onagraceae	X						
Luzula multiflora (Ehrh.) Lej. ssp. multiflora var. multiflora	common woodrush	Juncaceae					X		
Lycopodiella inundata (L.) Holub	inundated clubmoss	Lycopodiaceae	X						
Lyonia ligustrina (L.) DC.	maleberry	Ericaceae	X						
Lycopus americanus Muhl. ex W.P.C. Barton	American water horehound	Lamiaceae	X						
Lycopus uniflorus Michx.	northern bugleweed	Lamiaceae		X					
Lysimachia ciliata L.	fringed loosestrife	Primulaceae	X		X		X		
Lysimachia nummularia L.	creeping jenny	Primulaceae	X		X				
Lysimachia quadrifolia L.	whorled yellow loosestrife	Primulaceae			X		X		
Lysimachia terrestris (L.) Britton, Sterns & Poggenb.	earth loosestrife	Primulaceae	X						
Lythrum salicaria L.	purple loosestrife	Lythraceae	X						B
Maianthemum canadense Desf.	Canada mayflower	Liliaceae			X	X	X		
Maianthemum racemosum (L.) Link	feathery false lily of the valley	Liliaceae			X	X			
Malus Mill.	apple	Rosaceae			X		X		
Malva moschata L. var. rosea hort.	musk mallow	Malvaceae			X				
Melilotus officinalis (L.) Lam.	sweetclover	Fabaceae			X		X		
Mentha arvensis L.	wild mint	Lamiaceae	X		X				
Mitchella repens L.	partridgeberry	Rubiaceae			X	X	X		
Mimulus ringens L.	Allegheny monkeyflower	Scrophulariaceae		X					
Myosotis scorpioides L.	true forget-me-not	Boraginaceae	X						
Nabalus altissimus (L.) Hook.	tall rattlesnake-root	Asteraceae			X	X			
Oclemena acuminata (Michx.) Greene	whorled wood aster	Asteraceae			X	X	X		
Oenothera biennis L.	common evening primrose	Onagraceae	X		X	X	X		
Onoclea sensibilis L.	sensitive fern	Dryopteridaceae	X	X	X				
Oryzopsis asperifolia Michx.	roughleaf ricegrass	Poaceae			X				
Osmunda cinnamomea L.	cinnamon fern	Osmundaceae	X	X					
Osmunda claytoniana L.	interrupted fern	Osmundaceae	X		X				
Osmunda regalis L.	royal fern	Osmundaceae	X	X					
Oxalis stricta L.	common yellow oxalis	Oxalidaceae			X	X	X		
Oxalis corniculata L.	creeping woodsorrel	Oxalidaceae			X		X		
Packera schweinitziana (Nutt.) W.A. Weber & Á. Löve	Schweinitz's ragwort	Asteraceae	X	X					
Parthenocissus quinquefolia (L.) Planch.	Virginia creeper	Vitaceae	X		X	X	X		
Phalaris arundinacea L.	reed canarygrass	Poaceae	X		X				WL
Phegopteris connectilis (Michx.) Watt	long beechfern	Thelypteridaceae			X				
Phleum pratense L.	timothy	Poaceae			X		X		
Phragmites australis (Cav.) Trin. ex Steud.	common reed	Poaceae	X	X					B
Picea rubens Sarg.	red spruce	Pinaceae	X		X		X		
Pinus strobus L.	eastern white pine	Pinaceae	X		X		X		
Plantago lanceolata L.	narrowleaf plantain	Plantaginaceae	X		X				
Plantago rugelii	blackseed plantain	Plantaginaceae			X				
Platanthera clavellata (Michx.) Luer	small green wood orchid	Orchidaceae	X	X					
Platanthera lacera (Michx.) G. Don	green fringed orchid	Orchidaceae	X						
Platanthera psycodes (L.) Lindl.	lesser purple fringed orchid	Orchidaceae	X	X					
Polygonum aviculare L.	prostrate knotweed	Polygonaceae			X		X		
Polygonum convolvulus L.	black bindweed	Polygonaceae				X			
Polygonatum pubescens (Willd.) Pursh	hairy Solomon's seal	Liliaceae			X	X			
Polygonum sagittatum L.	arrowleaf tearthumb	Polygonaceae	X						
Polygonum virginianum L.	jumpseed	Polygonaceae	X		X				
Polypodium appalachianum Haufler & Windham	Appalachian polypody	Polypodiaceae				X			
Polypodium virginianum L.	rock polypody	Polypodiaceae			X				
Polystichum acrostichoides (Michx.) Schott	Christmas fern	Dryopteridaceae			X		X		
Populus balsamifera L.	balsam poplar	Salicaceae	X		X		X		
Populus tremuloides Michx.	quaking aspen	Salicaceae			X	X	X		
Potamogeton gramineus L.	variableleaf pondweed	Potamogetonaceae	X						
Potentilla arguta Pursh	tall cinquefoil	Rosaceae			X				
Potentilla simplex Michx.	common cinquefoil	Rosaceae	X		X		X		
Prenanthes alba L.	white rattlesnakeroot	Asteraceae			X		X		
Prunella vulgaris L.	common selfheal	Lamiaceae			X		X		
Prunus pensylvanica L. f.	pin cherry	Rosaceae			X		X		
Prunus virginiana L.	chokecherry	Rosaceae	X		X	X	X		
Pseudognaphalium macounii (Greene) Kartesz	Macoun's cudweed	Asteraceae			X			S3	
Pteridium aquilinum (L.) Kuhn	western brackenfern	Dennstaedtiaceae			X	X	X		
Pyrola americana Sweet	American wintergreen	Pyrolaceae			X				

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			General Wetland	Organic Substrate Wetland	General Upland	Serpentinite/ Dunite Bedrock Geology Units	Sand Soil Map Units (Adams and Croghan Series)		
Ranunculus acris L.	tall buttercup	Ranunculaceae	X		X		X		
Ranunculus recurvatus Poir.	blisterwort	Ranunculaceae	X						
Ranunculus repens L.	creeping buttercup	Ranunculaceae		X					
Rhamnus alnifolia L'Hér.	alderleaf buckthorn	Rhamnaceae	X	X					
Rhinanthus minor L.	little yellow rattle	Scrophulariaceae	X		X		X		
Rhus typhina L.	staghorn sumac	Anacardiaceae			X		X		
Ribes americanum Mill.	American black currant	Grossulariaceae			X				
Ribes cynosbati L.	eastern prickly gooseberry	Grossulariaceae	X		X				
Ribes hirtellum Michx.	hairystem gooseberry	Grossulariaceae			X				
Rosa multiflora Thunb.	multiflora rose	Rosaceae			X		X		WL
Rubus allegheniensis Porter	Allegheny blackberry	Rosaceae	X		X		X		
Rubus hispidus L.	bristly dewberry	Rosaceae	X	X					
Rubus idaeus L.	American red raspberry	Rosaceae			X	X	X		
Rubus occidentalis L.	black raspberry	Rosaceae	X		X		X		
Rubus odoratus L.	purpleflowering raspberry	Rosaceae	X		X		X		
Rudbeckia hirta L.	blackeyed Susan	Asteraceae			X		X		
Rumex acetosella L.	common sheep sorrel	Polygonaceae			X				
Rumex crispus L.	curly dock	Polygonaceae	X		X		X		
Rumex obtusifolius L.	bitter dock	Polygonaceae	X						
Sagittaria latifolia Willd.	broadleaf arrowhead	Alismataceae	X						
Salix bebbiana Sarg.	Bebb willow	Salicaceae	X		X				
Salix discolor Muhl.	pussy willow	Salicaceae	X						
Salix eriocephala Michx.	Missouri River willow	Salicaceae			X				
Salix lucida Muhl.	shining willow	Salicaceae	X	X					
Salix nigra Marshall	black willow	Salicaceae	X						
Salix sericea Marshall	silky willow	Salicaceae		X					
Sambucus nigra L. ssp. canadensis (L.) R. Bolli	American black elderberry	Caprifoliaceae			X				
Sambucus racemosa L.	red elderberry	Caprifoliaceae			X				
Sanicula marilandica L.	Maryland sanicle	Apiaceae			X				
Schizachne purpurascens (Torr.) Swallen	false melic	Poaceae			X	X	X		
Schizachyrium scoparium (Michx.) Nash	little bluestem	Poaceae				X	X		
Scirpus atrovirens Willd.	green bulrush	Cyperaceae	X		X				
Scirpus cyperinus (L.) Kunth	woolgrass	Cyperaceae	X	X					
Scirpus microcarpus J. Presl & C. Presl	panicled bulrush	Cyperaceae	X	X					
Scutellaria galericulata L.	marsh skullcap	Lamiaceae	X	X					
Securigera varia (L.) Lassen	crownvetch	Fabaceae			X		X		
Silene latifolia Poir.	bladder campion	Caryophyllaceae			X				
Sisyrinchium montanum Greene	strict blue-eyed grass	Iridaceae			X	X			
Solanum dulcamara L.	climbing nightshade	Solanaceae	X		X	X			
Solidago altissima L.	tall goldenrod	Asteraceae	X		X	X	X		
Solidago canadensis L.	Canada goldenrod	Asteraceae	X		X	X	X		
Solidago gigantea Aiton	giant goldenrod	Asteraceae	X		X				
Solidago juncea Aiton	early goldenrod	Asteraceae			X				
Solidago nemoralis Aiton	gray goldenrod	Asteraceae	X		X	X			
Solidago puberula Nutt.	downy goldenrod	Asteraceae			X				
Solidago rugosa Mill.	wrinkleleaf goldenrod	Asteraceae	X		X		X		
Solidago simplex Kunth	Mt. Albert goldenrod	Asteraceae			X				
Sorbus americana Marshall	American mountain ash	Rosaceae	X		X				
Sparganium americanum Nutt.	American bur-reed	Sparganiaceae	X						
Spiraea alba Du Roi	white meadowsweet	Rosaceae	X		X		X		
Spiraea tomentosa L.	steeplebush	Rosaceae	X		X		X		
Spiranthes casei Catling & Cruise	Case's lady's tresses	Orchidaceae			X			S2?	
Spiranthes ochroleuca (Rydb.) Rydb.	yellow nodding lady's tresses	Orchidaceae			X			S3	
Stellaria graminea L.	grass-like starwort	Caryophyllaceae			X				
Streptopus lanceolatus (Aiton) Reveal	twistedstalk	Liliaceae			X				
Symphyotrichum lanceolatum (Willd.) G.L. Nesom	white panicle aster	Asteraceae			X		X		
Symphyotrichum lateriflorum (L.) Á. Löve & D. Löve	calico aster	Asteraceae	X		X				
Symphyotrichum novae-angliae (L.) G.L. Nesom	New England aster	Asteraceae	X		X				
Symphyotrichum puniceum (L.) Á. Löve & D. Löve	purplestem aster	Asteraceae	X		X				
Taxus canadensis Marshall	Canada yew	Taxaceae			X				
Taraxacum officinale F.H. Wigg. ssp. officinale	common dandelion	Asteraceae			X		X		
Thalictrum dioicum L.	early meadow-rue	Ranunculaceae			X				
Thalictrum pubescens Pursh	king of the meadow	Ranunculaceae	X		X				
Thelypteris noveboracensis (L.) Nieuwl.	New York fern	Thelypteridaceae	X		X				
Thelypteris palustris Schott	eastern marsh fern	Thelypteridaceae	X	X					
Thuja occidentalis L.	arborvitae	Cupressaceae	X			X			
Tiarella cordifolia L.	heartleaf foamflower	Saxifragaceae	X		X				
Tilia americana L.	American basswood	Tiliaceae			X				
Toxicodendron radicans (L.) Kuntze	eastern poison ivy	Anacardiaceae			X				
Tragopogon lamottei Rouy	Jack-go-to-bed-at-noon	Asteraceae			X				
Triadenum fraseri (Spach) Gleason	Fraser's marsh St. Johnswort	Clusiaceae	X	X					
Trifolium arvense L.	rabbitfoot clover	Fabaceae	X		X		X		
Trifolium campestre Schreb.	field clover	Fabaceae			X				
Trifolium pratense L.	red clover	Fabaceae	X		X		X		
Trifolium repens L.	white clover	Fabaceae			X				
Tsuga canadensis (L.) Carrière	eastern hemlock	Pinaceae	X		X	X			
Tussilago farfara L.	coltsfoot	Asteraceae			X				
Typha angustifolia L.	narrowleaf cattail	Typhaceae	X						
Typha latifolia L.	broadleaf cattail	Typhaceae	X	X					
Utricularia gibba L.	humped bladderwort	Lentibulariaceae		X				S3	
Uvularia sessilifolia L.	sessileleaf bellwort	Liliaceae			X				
Vaccinium angustifolium Aiton	lowbush blueberry	Ericaceae			X				
Vaccinium macrocarpon Aiton	cranberry	Ericaceae		X					
Vaccinium myrtilloides Michx.	velvetleaf huckleberry	Ericaceae	X		X				
Vaccinium oxycoccos L.	small cranberry	Ericaceae		X					
Vaccinium pallidum Aiton	Blue Ridge blueberry	Ericaceae			X				

Species Checklist - Rare, Threatened, and Endangered Plant Survey

Project: Lowell to Johnson Line Upgrade: B20 Line Component

Client: Green Mountain Power, Inc.

Location: Towns of Johnson, Hyde Park, Eden, and Lowell, Vermont

Field Investigator(s): A. Crary, C. Cyrus, C. Fenner, M. Jackman, C. Sheldon, J. Thompson, A. Wood.

Survey Date(s): 2017 - July 11, July 14, July 31-August 4, September 14; 2019 - May 9, July 2.

Prepared By: VHB - June 28, 2019; Revised October 14, 2019

Scientific Name [1]	Common Name	Family	Observed Habitat					VT Rarity Rank[2]	Non-Native Invasive Species [3]
			General Wetland	Organic Substrate Wetland	General Upland	Serpentinite/ Dunite Bedrock Geology Units	Sand Soil Map Units (Adams and Croghan Series)		
Valeriana officinalis L.	garden valerian	Valerianaceae	X	X					WL
Veratrum viride Aiton	green false hellebore	Liliaceae	X	X					
Verbascum blattaria L.	moth mullein	Scrophulariaceae			X				
Verbascum thapsus L.	common mullein	Scrophulariaceae			X		X		
Verbena hastata L.	swamp verbena	Verbenaceae	X						
Veronica americana Schwein. ex Benth.	American speedwell	Scrophulariaceae			X		X		
Veronica chamaedrys L.	germander speedwell	Scrophulariaceae			X				
Veronica scutellata L.	skullcap speedwell	Scrophulariaceae	X	X					
Viburnum acerifolium L.	mapleleaf viburnum	Caprifoliaceae			X				
Viburnum cassinoides L.	withe rod	Caprifoliaceae	X	X					
Viburnum lantanoides Michx.	hobblebush	Caprifoliaceae			X	X			
Viburnum lentago L.	nannyberry	Caprifoliaceae			X				
Viburnum nudum L.	possumhaw	Caprifoliaceae			X				
Viburnum opulus L.	European cranberrybush	Caprifoliaceae			X		X		
Vicia cracca L.	bird vetch	Fabaceae			X		X		
Vicia villosa Roth	winter vetch	Fabaceae	X	X	X		X		
Zizia aurea (L.) W.D.J. Koch	golden zizia	Apiaceae	X		X				

[1] Nomenclature follows USDA-NRCS PLANTS database (2014) and/or Haines (2011) and/or Gilman (2015).

[2] The Vermont State Rank from Vermont Natural Heritage Inventory. 2018. *Rare and Uncommon Native Vascular Plants of Vermont.* Vermont Fish & Wildlife Department. Effective August 9, 2018.

[3] Vermont Agency of Agriculture, Food & Markets (VTAAFM) *Quarantine #3- Noxious Weeds* (2012). A= Class A Noxious Weeds, B= Class B Noxious Weeds
Vermont Agency of Natural Resources (ANR) Vermont Wildlife Action Plan- Appendix K *Exotic Invasive and Pest Species* (2017). WL= Watch List Species

Appendix C
B22 Line Component: Section 248
Natural Resources Memorandum

Memorandum

To: GMP Johnson to Lowell Line Upgrade: B22 Line Component Project File

Date: October 29, 2019

Project #: 57955.00

From: Andrew J. Wood; Adam Crary, PWS, PWD

Re: Section 248 Natural Resources Assessment

At the request of Green Mountain Power ("GMP"), VHB conducted database and field assessments of natural resources in support of a line rebuild project for an approximately 1.55-mile segment of the Morrisville Water and Light ("MWL") B22 34.5kV transmission line in Morristown, Vermont ("B22 Line" or "B22 Component"). The B22 Line corridor extends from the MWL Substation #3 near the Morristown Corners-Cadys Falls Road intersection north to Duhamel-Cadys Falls Road intersection, with all activities proposed to occur within MWL's existing 100-foot-wide right-of-way ("ROW") corridor. This corridor, centered on the existing alignment, was the basis for the extent of VHB's natural resources assessment ("Study Area," depicted in the Natural Resource Map in Attachment 1). This approach allowed for the identification and evaluation of potential impacts to natural resources which could result in a proximal buffer or setback that would overlap with the proposed B22 Component activities. The contents of this technical memorandum present the results from VHB's natural resources assessment, as well as potential impacts to 30 V.S.A. Section 248(b)(5) natural resources criteria from potential B22 Component activity. This memorandum is intended to supplement VHB's overall Natural Resources Report prepared to collectively summarize each of the components of the Johnson-Lowell Line Rebuild Project, in which the B22 Line segment is one component.

The natural resources assessment for the B22 Component included database reviews and field assessments designed to include an evaluation of the following criteria, as incorporated into the Vermont Public Utility Commission ("PUC") Section 248 review for a Certificate of Public Good ("CPG"):

- Outstanding Resource Waters (10 V.S.A. § 1424a(d));
- Headwaters (§ 6086(a)(1)(A));
- Floodways (§ 6086(a)(1)(D));
- Streams (§ 6086(a)(1)(E));
- Shorelines (§ 6086(a)(1)(F));
- Wetlands (§ 6086(a)(1)(G));
- Rare or Irreplaceable Natural Areas ("RINA") (§ 6086(a)(8));
- Necessary Wildlife Habitat and Endangered Species (§ 6086 (a)(8)(A)); and,
- Primary Agricultural Soils (§ 6001(15)).

A description of the site conditions in the Study Area, individual methodologies for each resource assessment, the findings, and an evaluation of the B22 Component with respect to each criterion are presented below. VHB has relied upon B22 Component information provided by GMP and the B22 Component site plans prepared by SGC Engineering to assist in evaluating the potential B22 Component impacts to natural resources. VHB Environmental Scientists conducted detailed natural resources assessments throughout the Study Area on May 9, 2019, and a follow-up rare plant survey was conducted on August 1, 2019. The results of VHB's natural resources assessments are described below.

40 IDX Drive, Building 100
Suite 200
South Burlington, Vermont 05403

Memorandum

B22 COMPONENT DESCRIPTION

The Project consists of reconductoring and rebuilding a 1.55-mile segment of the existing 34.5kV transmission line which would involve replacing structures along a segment of the existing transmission line. Pole replacement would follow the best management practices ("BMPs") as described in the ANR Pentachlorophenol Report as released in January 2016 (ANR 2016b). B22 Component work is limited to areas of the ROW between the Duhamel/Cadys Falls Road intersection south to Morristown Corners Road. The B22 Component will not require corridor widening, any tree clearing, or new road building, and any off-ROW accesses will utilize existing access points that will not require upgrades. VHB's overall Natural Resources Report provides further Project Description.

STUDY AREA DESCRIPTION

The Study Area is comprised of an approximately 100-foot corridor centered on the existing line segment to be reconductored as well as one area at the existing MWL Substation #3 to be used for a B22 Component construction laydown area. VHB undertook field assessments for certain natural resources In May and August of 2019. No off-ROW accesses required field assessments.

The Study Area occurs in the Northern Green Mountains biophysical region of Vermont, which is characterized by high elevations, cool summer temperatures, and acidic metamorphic rock (Thompson and Sorenson 2005). The Study Area is within the Kenfield Brook and Ryder Brook sub-watersheds of the Lamoille River watershed (HUC 8: 04150405). The Study Area is located mainly within a matrix of agricultural and residential land, with scattered pockets of shrubland. Two Vermont Hydrography Dataset ("VHD")-mapped streams cross the Study Area, draining to Ryder Brook to the east of the ROW. Ryder Brook, while not within the Study Area, flows to the north roughly parallel with the B22 line, and drains to the Lamoille River which is located near the northern terminus of VHB's Study Area. There are no Vermont Significant Wetlands Inventory ("VSWI")-mapped wetlands within the Study Area, although one VSWI feature associated with Ryder Brook is present approximately 200 feet to the east of the B22 line outside the Study Area along Ryder Brook to the east. The Study Area encompasses slight hills and depressions, ranging from approximately 550 feet to 700 feet above mean sea level, according to Light Detection and Ranging ("LIDAR") data (VCGI 2019). The Natural Resources Conservation Service ("NRCS") has mapped the dominant soils within the Study Area as Colton-Duxbury Complex (2-8 percent slopes), Colton-Duxbury Slopes (25-50 percent slopes), Boothbay silt loam (3-8 percent slopes), and Adams loamy sand (15-25 percent slopes). Depictions of the Study Area and surrounding landscape are included in the Natural Resources Map (Attachment 1). Representative photographs of the Study Area from VHB's field assessments are included in Attachment 2.

SECTION 248 NATURAL RESOURCES CRITERIA

<u>Outstanding Resource Waters (10 V.S.A § 1424A (D))</u>

The Vermont Water Quality Standards ("VWQS", ANR 2017c), under section 29A-105(d), state that the Secretary of ANR may, under 10 V.S.A. Section 1424(a), designate Outstanding Resource Waters ("ORW"). The following waterways have been designated as ORWs:

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1. Batten Kill River, Towns of East Dorset and Arlington;
2. Pike's Falls/Ball Mountain, Town of Jamaica;
3. Poultney River, Towns of Poultney and Fair Haven; and,
4. Great Falls, Ompompanoosuc River, Town of Thetford.

VHB reviewed the Study Area against this list to determine if it includes or is located in the vicinity of any listed ORW. No ORWs are located within, adjacent to, or intersecting the Study Area, and therefore the B22 Component will not result in any impact under this criterion.

Headwaters (§ 6086(a)(1)(A))

VHB analyzed available information, including soils data, topographic maps, and state-mapped public water supply source protection areas, as well as field reviewed the Study Area to determine if it is located on any lands that meet the Headwaters criterion of V.S.A. §6086(a)(1)(A) as incorporated in the Section 248(b) review. If located in a headwater, a project is required to meet any applicable health and environmental conservation department regulations regarding reduction of the quality of the ground or surface waters flowing through or upon lands that are not devoted to intensive development. The sub-categories for headwaters determination are as follows:

i. Headwaters or watersheds characterized by steep slopes and shallow soils; or
ii. Drainage areas of 20 square miles or less; or
iii. Above 1,500 feet elevation; or
iv. Watersheds of public water supplies designated by ANR; or
v. Areas supplying significant amounts of recharge waters to aquifers.

Subcategory i.
The majority of the Study Area occurs on slopes ranging from 0-15 percent, although some areas exceed 15 percent and 25 percent slopes, which could be considered steep slopes. All soils mapped by the NRCS are relatively deep (>80 inches to restrictive features). Based on this information the Study Area as a whole is not characterized by steep slopes and shallow soils, and therefore it is VHB's opinion that *subcategory i* is not met.

Subcategory ii.
The Study Area drains to the Lamoille River watershed, which, at the northern terminus of the B22 line, drains approximately 268 square miles of upslope area (USGS 2019); therefore, *subcategory ii* is not met.

Subcategory iii.
The Study Area is below elevations of 1,500 feet, and therefore *subcategory iii* is not met.

Subcategory iv.
No Surface Water Source Protection Areas ("SWSPA") are present within the Study Area, and therefore *subcategory iv* is not met.

Subcategory v.
One Zone 1 Groundwater Source Protection Area ("GWSPA") associated with the Lamoille Family Center is present within the Study Area, and therefore sub-category *v* is met.

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Based on VHB's analysis, the Study Area meets *subcategory v* as it includes one GWPSA, and therefore it is VHB's judgement that a small section of the Study Area on Map Sheet 3 in Attachment 1 that would constitute a headwaters location. The B22 Component will not create new impervious surface that would require operational stormwater management or permits nor anticipates sufficient soil disturbance to warrant coverage on its own under the Vermont construction stormwater discharge general permit or equivalent individual permit. However, VHB assumes the B22 Component would be included within the overall Project that will collectively require coverage under the Vermont General Permit ("GP") 3-9020 for stormwater discharges from construction sites. The risk category has not yet been assessed, but the Project may be required or voluntarily develop a specific Erosion Prevention and Sediment Control ("EPSC") plan for use during construction, but at minimum, EPSC procedures for low-risk sites would be used for any soil disturbance created by Project activity per GP 3-9020 requirement. There are no existing poles to be removed or proposed structures within the headwater locations, but the Project will follow the BMPs for pole removal and installation as included in Appendix 1 of the Pentachlorophenol Report (ANR 2016b). As such, the Project would meet all applicable health and DEC water quality regulations regarding the quality of groundwater and surface waters.

Floodways (§ 6086(a)(1)(D))

The Act 250 Floodway criterion, as incorporated into Section 248 review, takes into consideration a project's effect on both floodways and floodway fringes. The term "floodway" is defined to mean "the channel of a watercourse which is expected to flood on an average of at least once every 100 years and the adjacent land areas which are required to carry and discharge the flood of the watercourse" (10 V.S.A. § 6001(6)). The term "floodway fringe" is defined as "an area outside of a floodway and is flooded with an average frequency of once or more in each 100 years" (Id. § 6001(7)). A project's impacts are considered with respect to both flood inundation and fluvial erosion hazards pursuant to the *Flood Hazard Area and River Corridor Protection Procedure*, (ANR 2017a). The Flood Hazard Area and River Corridor Protection Procedure addresses both inundation risks as represented by Federal Emergency Management Agency ("FEMA")-mapped flood information, and potential fluvial erosion risks associated with the geomorphic principles necessary to achieve stable fluvial processes. The River Corridor consists of the meander belt or fluvial erosion hazard area, which is defined as the lateral width of a stream corridor that may be subject to fluvial erosion from stream channel lateral migration as well as a 50-foot riparian buffer outside of this meander belt (ANR 2017a). The meander belt is typically determined by geomorphic assessments of channel bankfull width, meander centerline, confining lateral topography, channel type, and current channel adjustments, which is then translated into the channel-width-to-belt-width ratio, dependent on stream sensitivity type and adjacent landform.

VHB reviewed the available FEMA data for the Town of Morristown, Vermont, to determine if the Study Area is situated within designated floodways. VHB also reviewed available mapping from the State of Vermont River Corridor Mapping. Based on the review of Flood Insurance Rate Map ("FIRM") (Panel #5000640009C and #5000640007C) and as digitized by VHB on the Natural Resources Map Series in Attachment 1, there are mapped floodway fringes (synonymous with 100-year floodplain) associated with Ryder Brook and the Lamoille River within or adjacent to portions the Study Area, concentrated near the northern and southern limits of the B22 Component. The B22 Component does not involve any activities within floodway fringe areas.

There are ANR-mapped River Corridors associated with Ryder Brook and the Lamoille River within small portions of

Memorandum

the Study Area, concentrated near the northern and southern limits of the B22 Component. There are no other waters (perennial streams) within the Study Area that would require River Corridors. The following B22 Component elements occur within ANR-mapped River Corridors:

- Half of the MWL Substation #3 and the B22 Component laydown area are within the Ryder Brook River Corridor. The substation will not require upgrades and the laydown area is adjacent to the substation in an area formerly used for a laydown, will not require upgrades for the B22 Component, and will be used temporarily during construction;
- Proposed Structures 35 and 36 occur within the Lamoille River Corridor and would be replacements for existing poles within the same location;
- The existing dead-end pole structure are the northern terminus of the B22 Component segment is on the Lamoille River Corridor boundary, on the opposite side of Duhamel Road from the river, which will not require replacement.

There is a temporary equipment pad needed at proposed replacement structure 37 nearby the mapped Lamoille River Corridor that VHB assumes would be placed outside the corridor. Since there will be no new infrastructure and only pole replacement activities within floodways, floodway fringes or river corridors would be the replacement of two existing transmission utility pole, and because the replacement structures would be placed in the same location as the existing poles and not closer to the waters of the Lamoille River, VHB understands that these B22 Component activities are exempt from regulation under the FHARC Rule per section 29-302(3) but would constitute a Reporting Activity Requiring Registration under the FHARC General Permit. As such, the B22 Component would not restrict or divert the flow of flood waters (floodway or floodway fringe), or endanger the health, safety, and welfare of the public, riparian, or downstream landowners during flooding or from potential erosion.

Streams (§ 6086(a)(1)(E))

The Act 250 Streams criterion, as incorporated into Section 248 review, requires that projects will, when feasible, maintain natural stream channel condition, and will not endanger the health, safety, or welfare of the public or adjoining landowners (10 V.S.A. § 6086(a)(1)(E)).

When applicable, stream delineation flagging is conducted pursuant to ANR Riparian Buffer Guidance (ANR 2005). Stream Top of Bank ("TOB") and Top of Slope ("TOS") are flagged in the field according to ANR Riparian Buffer Guidance. Stream TOB and TOS are flagged on larger channels and stream center-line ("SC") is flagged for smaller channels; all flagging is labeled with the stream ID and flag number. Stream determinations and Ordinary High Water ("OHW") width measurements follow guidance provided in the United States Army Corps of Engineers ("USACE") *Regulatory Guidance Letter: Subject- Ordinary High-Water Identification* (USACE 2005). OHW limits are flagged when applicable, typically on larger stream features. Stream flow regimes are preliminarily classified as ephemeral, intermittent, or perennial, and are determined based on qualitative observations of instream hydrology indicators at the time of observation, as well as geomorphic characteristics, and are subject to professional judgment.

VHB Environmental Scientists conducted stream delineation and assessment work within the Study Area on May 9, 2019. The Study Area is intersected by four stream and/or ditch segments. In the southern portion of the Study Area, a ditched channel, 2019-SC-100, conveys water from Wetland 2019-1 towards a farm road and is eventually directed under the farm road to a roadside ditch. Further north, two stream channels cross the B22 Line, flowing west-to-east.

Memorandum

Stream 2019-SC-101 is an intermittent stream channel passing through pastured land. Although lacking riparian vegetation, the channel is clearly defined. Further north, Stream 2019-TOS-102 is an intermittent stream at the bottom of a deeply incised gully. Riparian buffer zones of 50 foot were applied to both above-mentioned stream features; the buffer was applied from SC of the former feature, and from TOS of the latter features (See Attachment 1 for depictions of the delineated streams and their associated riparian buffers).

There are no direct activities proposed within delineated stream channels. As shown on the Natural Resources Map (Attachment 1), there are 2 existing poles within riparian buffers of two intermittent streams, which will be removed by the B22 Component and the B22 Component has designed new structures to avoid the riparian buffers. There will be two replacement structures within the riparian area for the Lamoille River, which is covered under the Shorelines criterion. Temporary on-ROW access across intermittent stream 2019-SC-101 will be necessary and will utilize temporary construction mat bridging to avoid stream impacts.

Overall, there would be a reduction of structures within riparian buffers in the B22 Component segment. No tree removal within riparian buffers is proposed nor other activity beyond the normal maintenance/operation of the existing lines. The B22 Component would maintain the natural stream channel condition, and would not endanger the health, safety, or welfare of the public or adjoining landowners.

Shorelines (§ 6086(a)(1)(F))

Shorelines are defined under Act 250, and incorporated into Section 248, as "the land adjacent to the waters of lakes, ponds, reservoirs, and rivers. Shorelines shall include the land between the mean high-water mark and the mean low water mark of such surface waters" (10 V.S.A. *§ 6001(17);* Argentine 2008). The Study Area was reviewed against these criteria to determine if it is located on or adjacent to any shoreline areas. If a project does occur within Shorelines, the following shoreline management criteria are required to be met:

(i) retain the shoreline and the waters in their natural condition;
(ii) allow continued access to the waters and the recreational opportunities provided by the waters;
(iii) retain or provide vegetation which will screen the development or subdivision from the waters;
(iv) stabilize the bank from erosion as necessary with vegetation cover.

Shoreline associated with the Lamoille River is present at the northern limit of the B22 Component. The closest proposed structure (36) is within 50-feet of the river top-of-bank but is a replacement of an existing pole in the same location. Because the B22 Component activities within/near the Shoreline would include only the rebuild of existing utility infrastructure within an existing ROW that will not require additional tree clearing, B22 Component activities would not impinge on current shoreline condition, recreational use, or existing riparian vegetation, or result in decreased bank stability from the current condition and would therefore not have any undue adverse impacts on the Lamoille River shoreline.

Wetlands (§ 6086(a)(1)(G))

The Act 250 Wetlands criterion, under Section 248 review, requires that the proposed project comply with the

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Vermont Wetland Rules ("VWR") (ANR 2018b). The VWR regulate significant wetlands (Class I and Class II wetlands) and their buffers. Impacts to Class III wetlands are not considered under Act 250 Criterion 1(G) but are generally reviewed under Section 248(b)(5) through consideration of the potential for undue adverse impacts on the natural environment. Further, wetlands are regulated by the federal USACE Section 404 permit program, as well as the related DEC Section 401 Water Quality Certification review process.

VHB Wetland delineations are made pursuant to applicable methodologies outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region Routine Determination Method* (USACE 2011). Wetlands are identified in the field with pink flagging. Field notes are taken to record information such as presumed VWR wetland classification, general characteristics, potential functions and values of the wetland, and any unique qualities observed during the site assessment, along with other considerations relevant to support site findings. Wetland types are classified in accordance with the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). Wetland functions and values are evaluated based on the field notes and observations per the VWR (ANR 2018b). Features are mapped in the field using sub-meter capable mobile data collection technology.

VHB Environmental Scientists conducted wetland delineation and assessment work within the Study Area on May 9, 2019. VHB delineated four wetlands within the Study Area:

- Wetland 2019-1 is a small feature located within an active barnyard agricultural area. It is part of a man-made pond feature draining water to ditched channel 2019-JD-100. It is dominated by narrow-leaved cattail (*Typha latifolia*) and provides minimal function. As such, VHB proposes 2019-1 as a Class III wetland feature.

- Wetland 2019-2 is a relatively small feature within a pastured area, sloping to an ephemeral channel that forms outside of the Study Area. It is characterized by common buttercup (*Ranunculus acris*) and fringed sedge (*Carex crinita*) and provides minimal function. As such, VHB proposes 2019-2 as a Class III wetland feature.

- Wetland 2019-3 is a small feature connected to intermittent stream 2019-SC-101. It is characterized by soft rush (*Juncus effusus*) and narrow-leaved goldenrod (*Euthamia graminifolia*). Although this wetland is on an eroded slope within a pasture and does not provide bank stability, it is contiguous to an intermittent stream thereby meeting VWR Presumption 4.6c definition; as such, VHB proposes this wetland as a Class II (significant) wetland feature. As a proposed significant wetland feature under the Vermont Wetland Rules, this feature would receive a 50-foot protected buffer.

- Wetland 2019-4 is part of a large wetland complex located in the upper terrace of the Lamoille River. Within the Study Area, it is characterized by narrow-leaved cattail (*Typha angustifolia*), fringed sedge (*Carex crinita*), and speckled alder (*Alnus incana*). The complex is contiguous to the Lamoille River, and meets VWR Presumptions 4.6a/b. Additionally, it shows evidence of prior beaver (*Castor canadensis*) activity and provides a variety of wildlife habitat features as described in the VWR, as well as multiple VWR functions at significant levels. As such, VHB proposed this wetland as a Class II (significant) wetland feature and subject to a 50-foot protected buffer.

Photographs of each on-site wetland are included in the Representative Natural Resources Assessment Photographs

Memorandum

(Attachment 2). Additional details supporting classifications for each wetland feature are included in the Wetland Summary Table (Attachment 3). Data supporting wetland delineations are included in the USACE Wetland Determination Data Forms (Attachment 4).

Proposed impacts to significant (Class II) wetlands and their associated 50-foot buffer zones for uses other than those allowed under the VWR, require a Vermont Wetland Permit ("VWP") from the DEC. The discharge of fill in any wetland (or water) under USACE jurisdiction requires permit coverage from the USACE under Section 404 of the CWA. The B22 Component does not propose any temporary or permanent impacts to any Class II wetland or buffer that are not an Allowed Use under the VWR. The B22 Component does not involve any new structures in wetlands or Class II wetland buffers and includes removal of one existing pole from Class II wetland 2019-3 buffer. Proposed structure 35 is located in the buffer/fringe of Class II wetland 2019-4 and will be replaced in the same location. The B22 Component activities would meet the requirements under VWR Allowed Use 6.081, which will involve application of the required BMPs under this use.

In addition to following the BMPs developed for compliance with Allowed Use 6.08, and as included where applicable on the B22 Component plans, the B22 Component has also avoided or adequately minimized impacts to Class II wetland and buffer by:

- Avoiding any temporary or permanent fills;
- Avoiding any tree cutting and woody plant disturbance other than on-ROW cutting as necessary for routine maintenance activities;
- Designing proposed pole locations stepwise: 1) avoid buffers, 2) avoid wetlands, or 3) at existing pole locations (or drier);
- Use of multiple existing ROW access roads and points to access poles from upland locations with no new road building;
- For unavoidable access in wetlands, following a stepwise procedure to avoid soil impacts: 1) via frozen ground or dry conditions, 2) via minimized construction mat areas in accordance with USACE BMPs or low-ground pressure equipment;
- Existing poles within wetlands to be removed would be flush cut, with access in accordance with BMPs;
- Following EPSC measures during construction;
- Demarcating wetlands and buffers during construction; and
- Following BMPs included in the plans to minimize the spread of non-native invasive species within resource areas.

As such, the B22 Component activities within wetlands will comply with the VWR as an Allowed Use that will not require a VWR permit. In order to retain the flexibility for construction access in wetlands via construction mats, the B22 Component anticipates a requirement to obtain authorization from the USACE pursuant to Section 404 of the CWA. If not able to meet Self-Verification requirements, the B22 Component will file a pre-construction notification

1 The routine repair and maintenance of utility poles, lines, and corridors in a manner which minimizes adverse impacts and is in accordance with Best Management Practices developed by the (ANR) Secretary.

Memorandum

("PCN") under the Vermont General Permit ("GP") subsequent to the Petition. As such, the B22 Component will comply with the VWRs and will not result in undue impacts to significant wetlands.

Rare or Irreplaceable Natural Areas ("RINA") (§ 6086(a)(8)), and Necessary Wildlife Habitat and Endangered Species (§6086(a)(8)(A))

From Act 250, as incorporated into Section 248 review, a project must be shown to have no undue adverse effect on Rare or Irreplaceable Natural Areas ("RINA") (§ 6086(a)(8)). Additionally, a project must not destroy or significantly imperil Necessary Wildlife Habitat ("NWH") or any Endangered Species (§ 6086(a)(8)(A)).

RINA

Per the Vermont Fish and Wildlife Department ("FWD"), significant natural communities can be deemed RINA as part of the four-part test required by Act 250 Criterion 8.[2] Determinations of "Significance" are made by applying a combination of community ranking, current condition (age, degree of disturbance), and landscape context (size, degree of fragmentation) to determine an "Element (or Community) Occurrence Ranking". Rare (S1 and S2) natural communities can be considered significant when quality-ranked A, B, or C. Uncommon (S3) and common (S4) types require a quality rank of A or B to be considered significant. Very common (S5) types require an A-rank to be considered significant (ANR 2016c). Additional considerations for RINA include the presence of rare, threatened, or endangered ("RTE") species in these communities, or the presence of an association of natural communities that characterize a part of the landscape and for which ecologically intact examples are rare or declining in the state (ANR 2004).

To identify potential occurrences of known significant natural communities, VHB queried the Vermont Natural Heritage Inventory ("NHI") database for the presence of known Element Occurrences ("EOs") of significant natural community types within, adjacent to, and within one mile of the Study Area. No natural communities, significant or otherwise, are recorded within 1 mile of the Study Area. During the May 9, 2019 field visit, VHB Environmental Scientists reviewed the on-site vegetative assemblages against natural community type descriptions found in Thompson and Sorenson (2005). Based on this assessment, it is VHB's opinion that no significant natural communities are present within the Study Area and no RINA's are present.

Threatened or Endangered Species

Endangered Species include those that are defined as "threatened" or "endangered" on the Vermont state endangered species list and the state threatened species list, and that are protected under the Vermont Endangered Species law (10 V.S.A 123). Those species protected under the federal Endangered Species Act are included as well. Rare, but otherwise not protected species are often included under this Section 248 criterion as part of a project's

2 Act 250 Section 8 looks to whether a project will have an undue adverse effect on RINAs (10 V.S.A. § 6086(a)(8)). While the statute does not define a RINA, the Act 250 natural resources board has developed a four-part test to determine whether a project satisfies Criterion 8 with respect to RINAs. First, it must determine whether the project is located in a natural area. Second, it determines whether the natural area is rare and irreplaceable. Third, it determines whether the project will have an adverse effect on the RINA. Fourth, it determines whether the adverse effect, if any, would be undue.

Memorandum

potential impacts to the natural environment.

To identify potential occurrences of known RTE species, VHB queried the NHI database for the presence of known Element Occurrences ("EOs") within, adjacent to, and within one-mile of the Study Area. Based on the results of this database query, there are no recorded occurrences of RTE species within the Study Area. Within one mile, however, there is an EO for one uncommon species — Great blue heron (*Ardea herodias*) — that warrants additional consideration under FWD guidance. The EO in question is for a documented Great blue heron rookery site, which, under the *Guidelines for Protection and Mitigation of Impacts to Great Blue Heron Rookeries in Vermont* (ANR 2002), would constitute a Resource Category-2 ("RC-2") rookery. RC-2 rookeries receive protective buffers ranging from 300 to 1,300 feet from the heron rookery. Because the entirety of the Study Area is more than 2,000 feet away from the mapped Great blue heron EO, any potential resource buffer would have no impact on the B22 Component. VHB Environmental Scientists also determined that no heron rookeries were present within the Study Area during field visits in May 2019. As such, the B22 Component would have no impacts on heron rookeries or associated buffers. For full details from VHB's NHI database query, subsequent habitat analyses, and survey recommendations, see Attachment 5.

During initial fieldwork in May 2019, early in the growing season, a list of identifiable and representative plants was collected, (provided in Attachment 7), from which no RTE plants were documented. As this initial visit was before most RTE plants are expected to be identifiable, and although the NHI database query returned no EOs for RTE plant species, VHB noted that NRCS mapping of the Study Area includes sandy soils, which can provide habitat for a variety of RTE plant species. Accordingly, VHB Botanists conducted a survey on August 1, 2019, targeting RTE plants favoring sand habitat. This plant inventory followed ANR's *Guidance for Conducting Rare, Threatened, and Endangered Plant Inventories in Connection with Section 248 Projects* (ANR 2016a). All plant species identified in the RTE inventory were checked against the current *Rare and Uncommon Native Vascular Plants of Vermont* list (ANR 2018a) to determine their rarity rank and any potential protections under endangered species law. Based on the results of this targeted plant inventory, no RTE plants were detected in the Study Area. A complete list of identified on-site vascular plants from this follow-up survey is included in Attachment 8.

Additionally, VHB conducted a database query using the U.S. Fish and Wildlife Service ("USFWS") Information for Planning and Consultation ("IPaC") portal to review the Study Area against known distributions of federally threatened and endangered species. Based on this review, VHB determined the Study Area occurs within the range of the federally threatened and Vermont-endangered northern long-eared bat (*Myotis septentrionalis,* "MYSE"), although no critical habitat within or adjacent to the B22 Component has been designated for this species by USFWS (See Attachment 6 for the USFWS Official Species List).

As there are no known occurrences of MYSE (including hibernacula) within one mile of the B22 Component area, the Study Area is assumed to be "Potential MYSE Summer Habitat" under FWD *Regulatory Review Guidance for Protecting Northern Long-eared Bats and Their Habitats* (ANR 2017b). Under this assumption, if the B22 Component impacts less than 1 percent of suitable forested habitat within one mile, no additional conservation measures are required. Because no tree clearing is proposed for the B22 Component, there will be no potential impacts and no further coordination related to MYSE is required.

Memorandum

Based on the results of VHB's assessments of these natural resources criteria, the B22 Component will not destroy or significantly imperil any endangered species.

Necessary Wildlife Habitat
The types of habitat that typically constitute Necessary Wildlife Habitat ("NWH") include deer wintering habitat, black bear mast stands (concentrated American beech and oak species), black bear forested wetland habitat, black bear travel corridors, and in some cases, moose overwintering area.

VHB Environmental Scientists reviewed mapping of deer wintering area, bear mast stand, and bear habitat provided by ANR to determine if the Study Area is situated within or adjacent to mapped NWH. No mapped bear mast stands or bear wetland feeding areas are mapped within at least five miles of the B22 Component; furthermore, the B22 Component is not located within the general ANR black bear habitat polygon. The closest ANR-mapped deer wintering area is located approximately 3.6 miles to the north of the Study Area. During the field assessment, VHB Environmental Scientists determined that none of the above-described types of Necessary Wildlife Habitat are present within or adjacent to the Study Area. As such, the B22 Component will not destroy or significantly imperil necessary wildlife habitat.

<u>Primary Agricultural Soils (§ 6001(15))</u>
From 10 V.S.A. § 6001(15), Primary Agricultural Soils ("PAS") are defined as:

> *(A) An important farmland soils map unit that the Natural Resources Conservation Service of the U.S. Department of Agriculture ("NRCS") has identified and determined to have a rating of prime, statewide, or local importance, unless the (Act 250) District Commission determines that the soils within the unit have lost their agricultural potential. In determining that soils within an important farmland soils map unit have lost their agricultural potential, the Commission shall consider:*
>
> > *(i) impacts to the soils relevant to the agricultural potential of the soil from previously constructed improvements;*
> > *(ii) the presence on the soils of a Class I or Class II wetland under chapter 37 of this title;*
> > *(iii) the existence of topographic or physical barriers that reduce the accessibility of the rated soils so as to cause their isolation and that cannot reasonably be overcome; and*
> > *(iv) other factors relevant to the agricultural potential of the soils, on a site-specific basis, as found by the Commission after considering the recommendation, if any, of the Secretary of Agriculture, Food and Markets.*
>
> *(B) Soils on the project tract that the District Commission finds to be of agricultural importance, due to their present or recent use for agricultural activities and that have not been identified by the NRCS as important farmland soil map units.*

VHB's review is limited to the NRCS soil map unit designations, where PAS soils are defined as those soils with a prime agricultural soil rating of 1 (most desirable) through 7 (least desirable) with some soils with a rating of 8 included. Soils of statewide importance have an agricultural value of 7 or less, and soils of local importance consist of selected soil types with an agricultural value of 8 or less. VHB conducted a review of the NRCS soil map data to determine if PAS were present at the B22 Component site. NRCS soil map units are depicted on the Natural Resource Maps in

Memorandum

Attachment 1.

The Study Area contains a number of soil maps units that meet the definition of PAS, including Adams loamy sand (3-8 percent slopes), Boothbay silt loam (3-8 percent slopes), Boothbay silt loam (8-15 percent slopes), Colton-Duxbury complex (2-8 percent slopes), Charles silt loam (0-2 percent slopes) and Podunk fine sandy loam (0-3 percent slopes). Collectively, these PAS constitute roughly 55 percent of the Study Area.
The ground-disturbing B22 Component activities that would occur within PAS are the replacement of poles in an existing transmission line ROW and some minor land leveling to create 16'x20' equipment pads at select proposed structure locations. As the B22 Component would occur within existing cleared ROW areas, and the nature of the B22 Component is upgrading and maintaining existing transmission line infrastructure, no impact to PAS would result. The negligible soil disturbance from pole removal and replacement construction does not reduce the capacity of the land to support agriculture or silviculture beyond the existing ROW, and no change in land cover or land form within PAS or any portion of the B22 Component is proposed. As such, it is VHB's opinion that there will be no undue adverse effects to farming, farming potential, or PAS as a result of the B22 Component.

ATTACHMENTS

1. Natural Resource Map
2. Representative Site Photographs
3. Summary of Delineated Wetlands and Streams
4. USACE Wetland Determination Data Forms
5. Potential Rare, Threatened, and Endangered Plant Species and Significant Natural Communities Summary in the Project Region and On-site Habitats
6. USFWS IPaC Official Species List
7. Species Checklist — Early Season Partial Floristic Inventory
8. Species Checklist — RTE Plant Survey

Memorandum

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— 2018a. *Rare and Uncommon Native Vascular Plants of Vermont*. Fish and Wildlife Department. Effective August 9, 2018.

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—2017b. *Regulatory Review Guidance for Protecting Northern Long-eared Bats and Their Habitats*. Fish and Wildlife Department. Effective February 2017.

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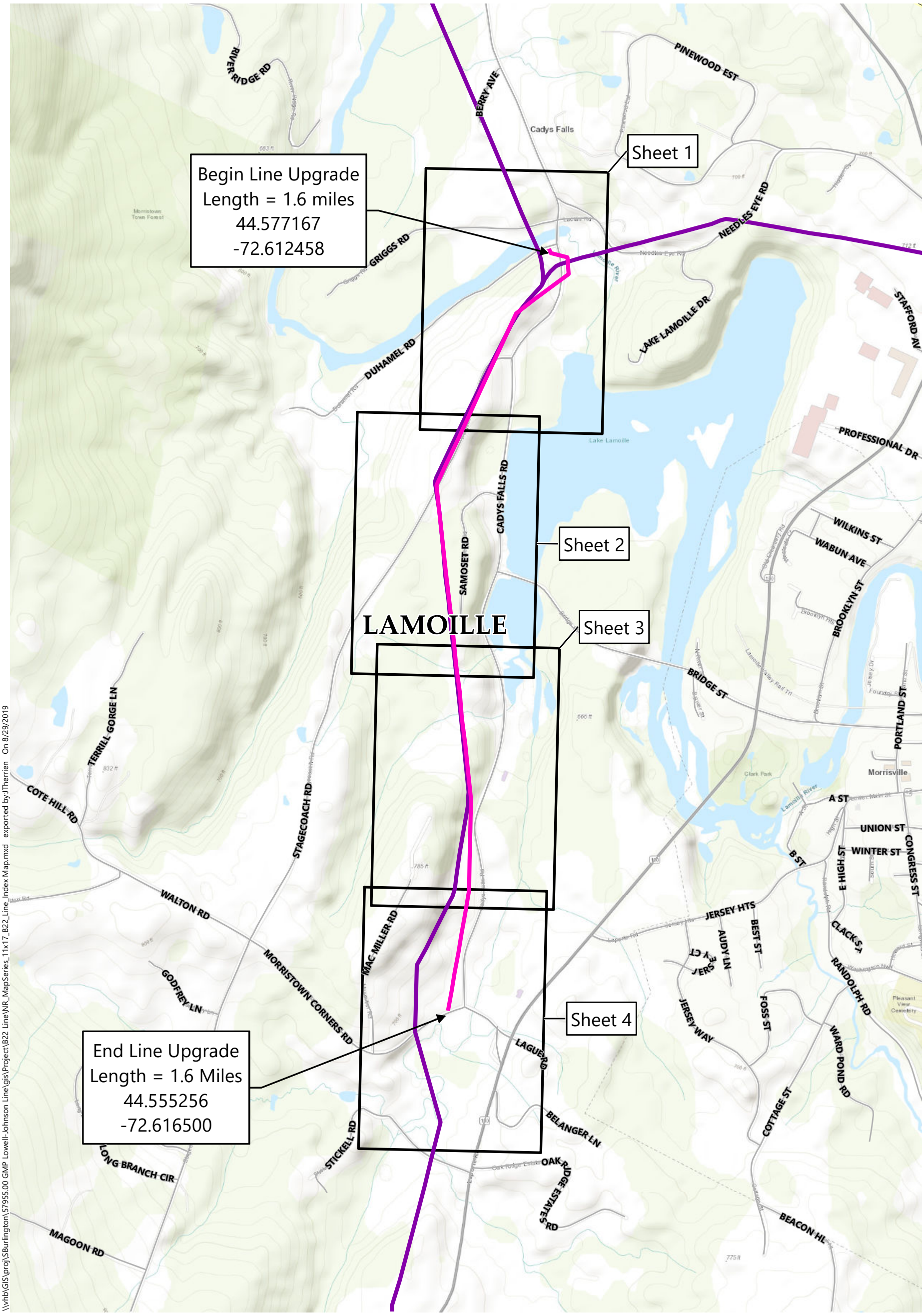
ATTACHMENT 1

GREEN MOUNTAIN POWER

vhb

August 29, 2019



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Lowell to Johnson Line Upgrade Project:
B22 Line Component

Morristown, Vermont

- Approx. Reconducted B22 Section (GMP)
- Existing Overhead Line (VCGI)
- Map Sheet (VHB)
- Town Boundary (VCGI)
- County Boundary (VCGI)
- Road (VTrans)

Natural Resources Map Series Index Map

Sources:
Background Imagery by VCGI (Collected in Spring, 2011)
ANR (Vermont Agency of Natural Resources - Various Dates)
GMP (Green Mountain Power - 2016-2017)
VCGI (Vermont Center for Geographic Information - Various Dates)
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VHB (2019)

GREEN MOUNTAIN POWER

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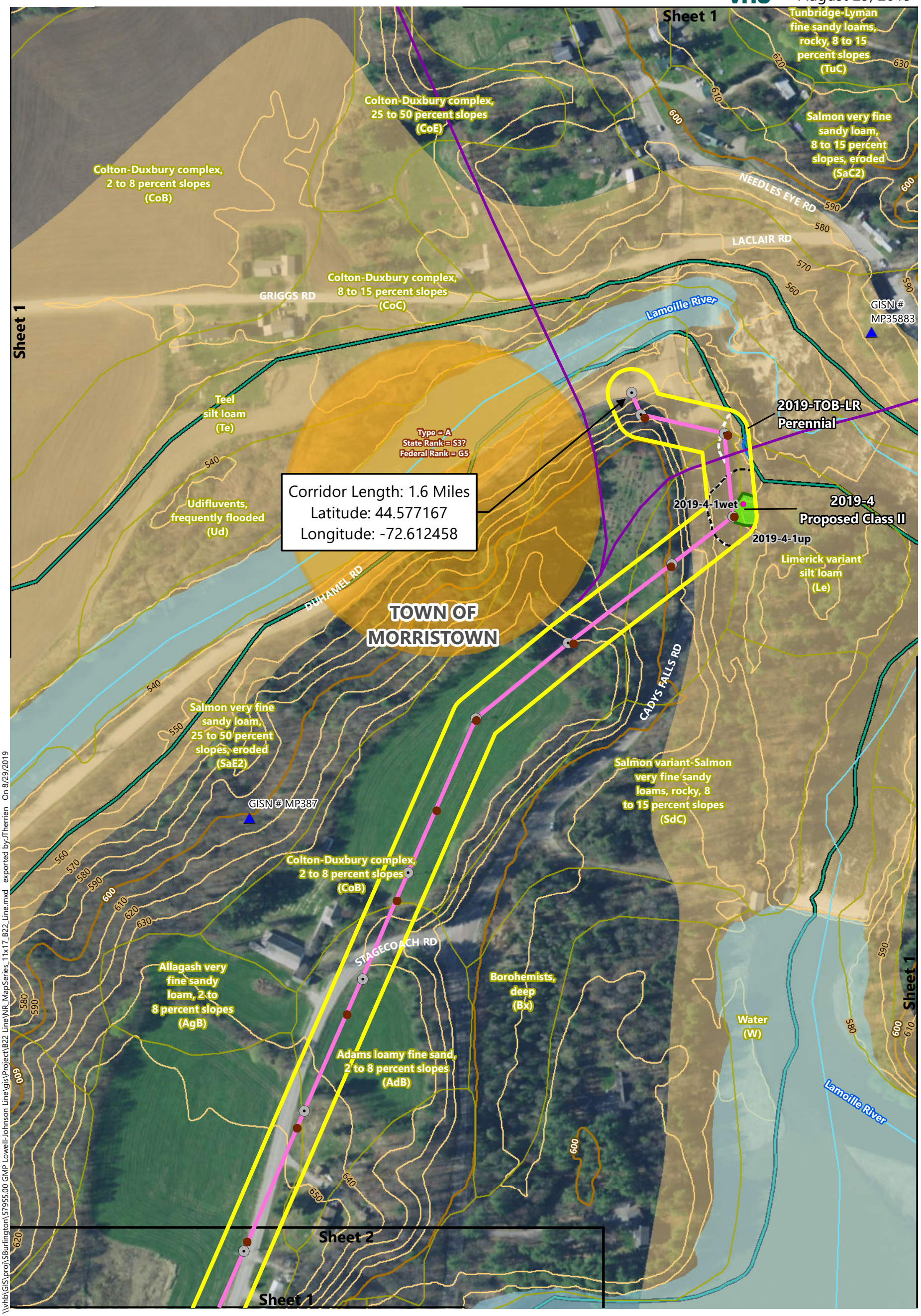

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Lowell to Johnson Line Upgrade Project: B22 Line Component

Morristown, Vermont

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- Observed Culvert (VHB)
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- Confirmed Vernal Pools (ANR)*
- Bear Feeding (FWD)*
- Bear Crossing (FWD)*
- Deer Wintering Area (ANR)*
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- VHD Waterbody (VCGI)
- FEMA 100 Year Flood Zone (VCGI/VHB)
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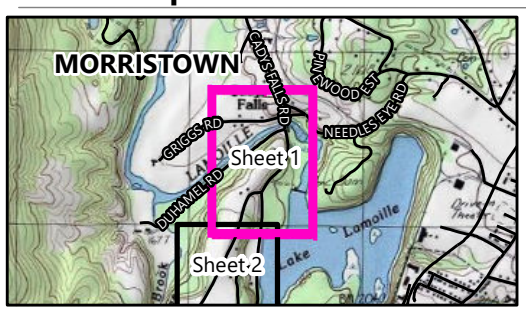

* Feature not present in map extent

Natural Resources Map Series
Sheet 1 of 4

Sources:
Background Imagery by VCGI (Collected in 2018)
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Wetland/waters delineation by VHB (Jackman, Wood) on May 9 and June 11, 2019 (Sheldon). RTE plant survey conducted by VHB (Wood) on August 1, 2019.

GREEN MOUNTAIN POWER

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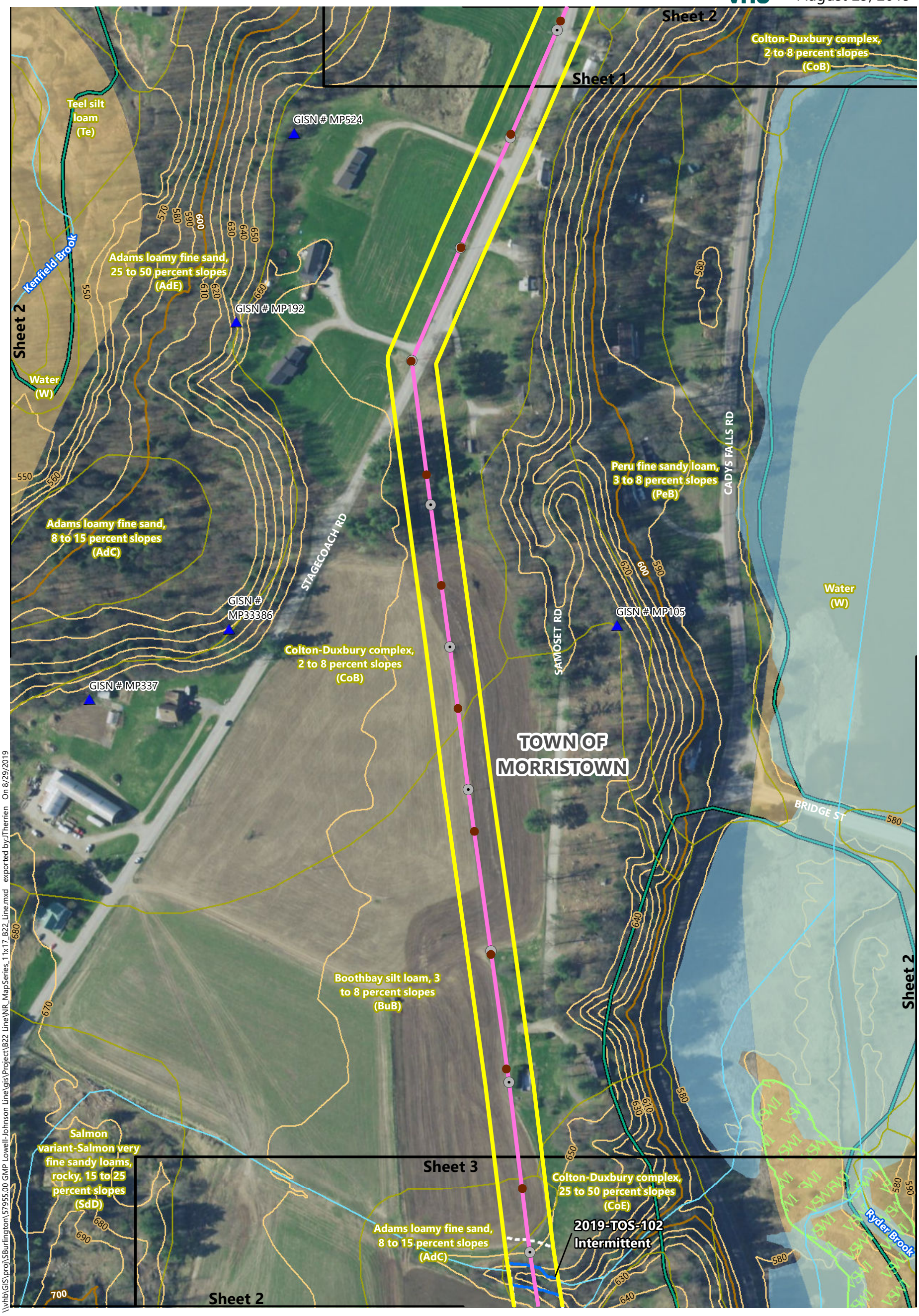
August 29, 2019



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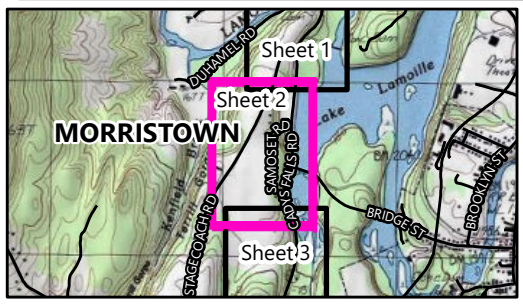
Lowell to Johnson Line Upgrade Project: B22 Line Component

Morristown, Vermont



Natural Resources Map Series
Sheet 2 of 4

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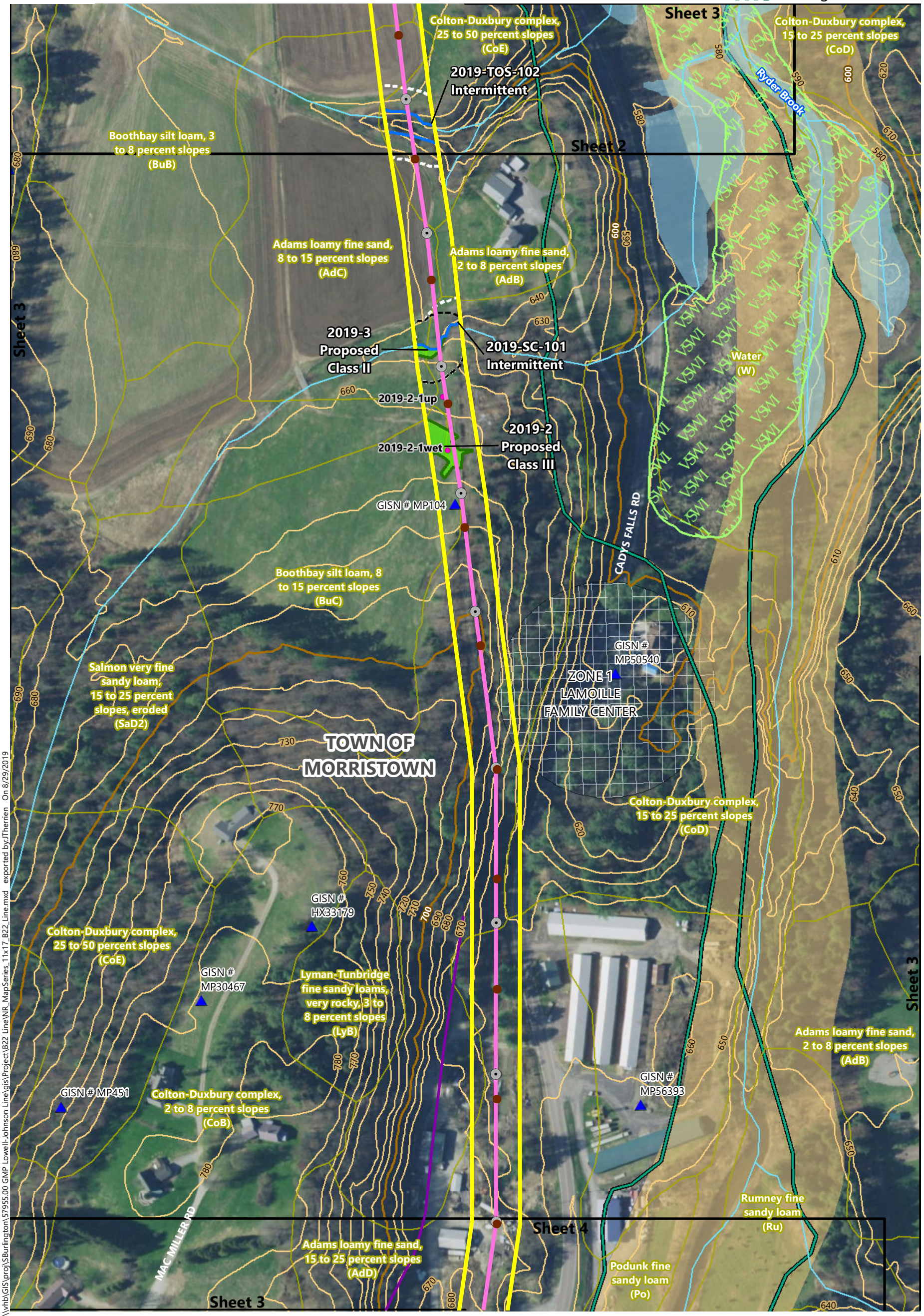

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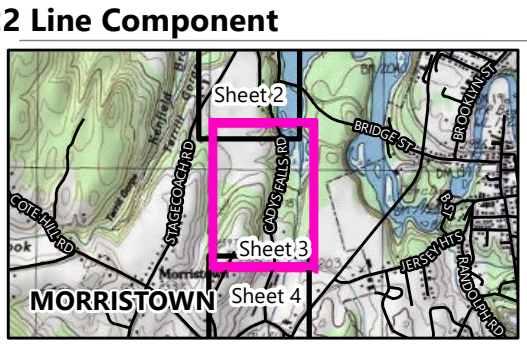

Lowell to Johnson Line Upgrade Project: B22 Line Component

Morristown, Vermont

Natural Resources Map Series
Sheet 3 of 4

Sources:
Background Imagery by VCGI (Collected in 2018)
ANR (Vermont Agency of Natural Resources - Various Dates)
FWD (Vermont Department of Fish and Wildlife - Various Dates)
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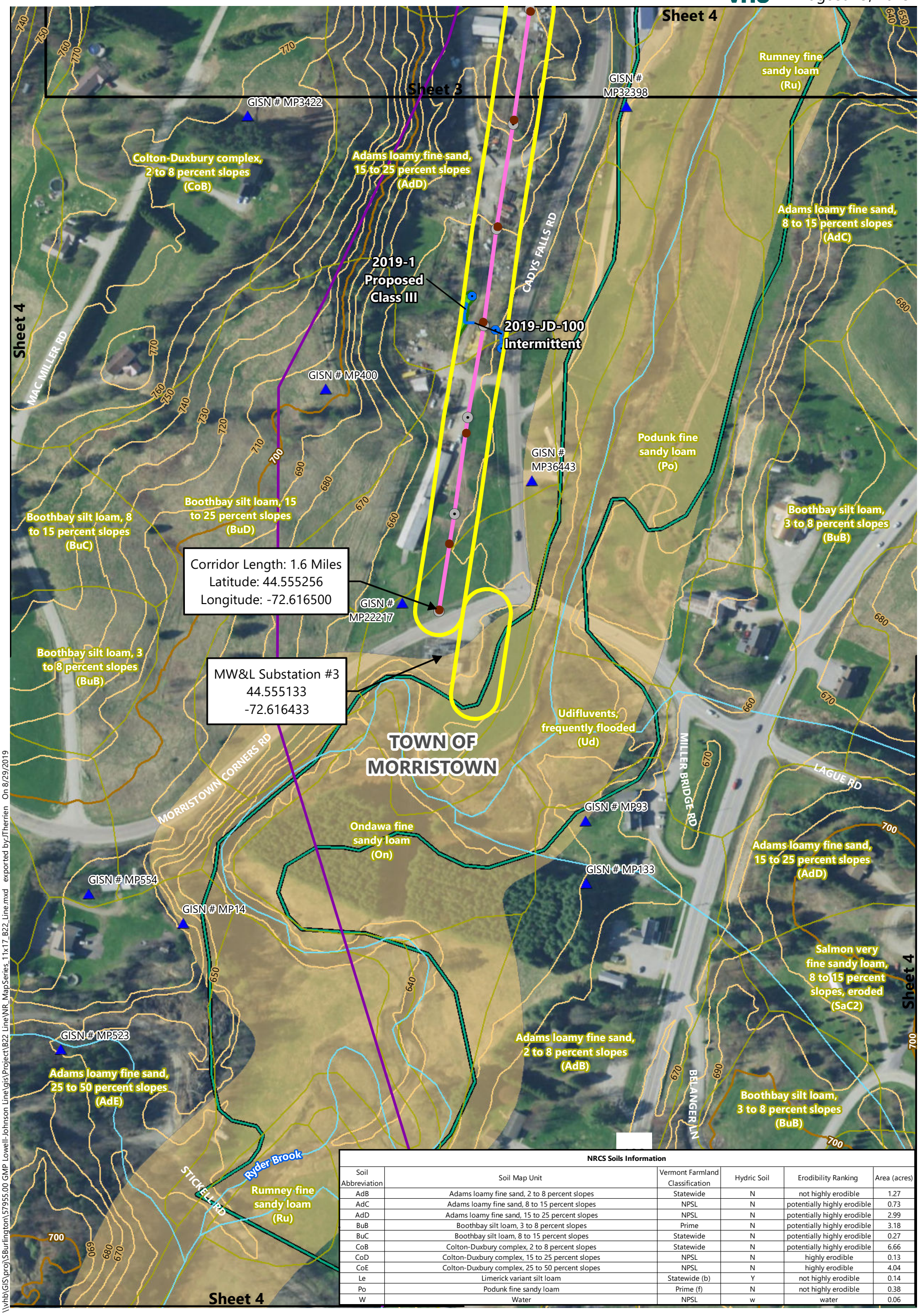

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NRCS Soils Information

Soil Abbreviation	Soil Map Unit	Vermont Farmland Classification	Hydric Soil	Erodibility Ranking	Area (acres)
AdB	Adams loamy fine sand, 2 to 8 percent slopes	Statewide	N	not highly erodible	1.27
AdC	Adams loamy fine sand, 8 to 15 percent slopes	NPSL	N	potentially highly erodible	0.73
AdD	Adams loamy fine sand, 15 to 25 percent slopes	NPSL	N	potentially highly erodible	2.99
BuB	Boothbay silt loam, 3 to 8 percent slopes	Prime	N	potentially highly erodible	3.18
BuC	Boothbay silt loam, 8 to 15 percent slopes	Statewide	N	potentially highly erodible	0.27
CoB	Colton-Duxbury complex, 2 to 8 percent slopes	Statewide	N	potentially highly erodible	6.66
CoD	Colton-Duxbury complex, 15 to 25 percent slopes	NPSL	N	highly erodible	0.13
CoE	Colton-Duxbury complex, 25 to 50 percent slopes	NPSL	N	highly erodible	4.04
Le	Limerick variant silt loam	Statewide (b)	Y	not highly erodible	0.14
Po	Podunk fine sandy loam	Prime (f)	N	not highly erodible	0.38
W	Water	NPSL	w	water	0.06

200 100 0 200 Feet

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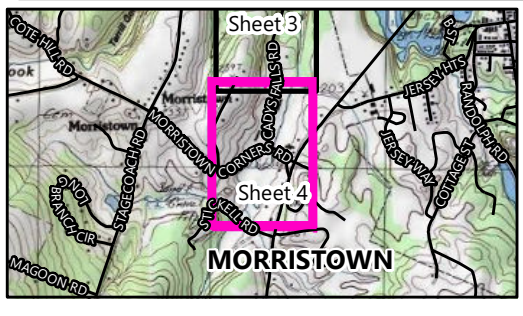
- 10 ft. Contour (VCGI)
- 100 ft. Contour (VCGI)

* Feature not present in map extent

Lowell to Johnson Line Upgrade Project: B22 Line Component

Morristown, Vermont



Natural Resources Map Series
Sheet 4 of 4

Sources:
Background Imagery by VCGI (Collected in 2018)
ANR (Vermont Agency of Natural Resources - Various Dates)
FWD (Vermont Department of Fish and Wildlife - Various Dates)
GMP (Green Mountain Power - 2016-2017).
VCGI (Vermont Center for Geographic Information - Various Dates)
SGC (2019)
VHB (2019)

Wetland/waters delineation by VHB (Jackman, Wood) on May 9 and June 11, 2019 (Sheldon). RTE plant survey conducted by VHB (Wood) on August 1, 2019.

ATTACHMENT 2

Lowell to Johnson Line Upgrade – B22 Line Representative Natural Resources Assessment Photographs

PROJECT NUMBER

57955.00

CLIENT

Green Mountain Power

2152 Post Road

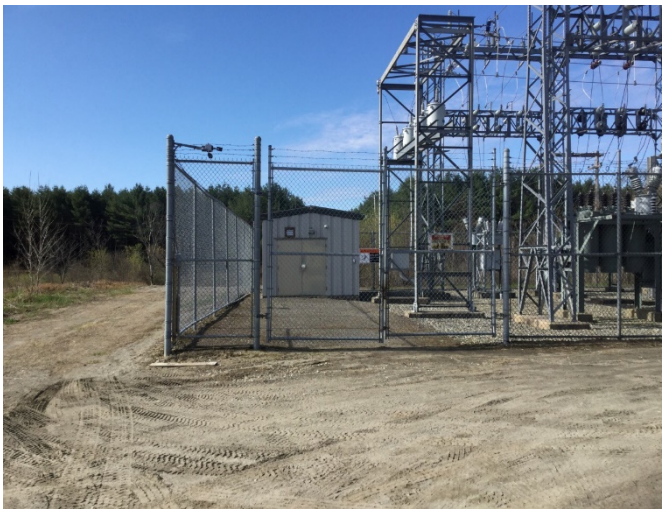
Rutland, Vermont 05701

LOCATION

Morristown, Vermont

NO. 1 / 5.9.2019

Morrisville Water and Light Substation #3, at southern terminus of B22 Line Study Area.



NO. 2 / 6.11.2019

Substation #3 and the proposed materials laydown area (to the left of substation fence in this image).

NO. 3 / 5.9.2019

Representative land-use in southern portion of the Study Area. Includes storage areas for various types of mechanical parts, soil, aggregate, tires, and machinery.

NO. 4 / 5.9.2019

Representative conditions along the southern portion of the Study Area, between area with materials storage and agricultural fields.

NO. 5 / 5.9.2019

Wetland 2019-1, within a barnyard area close to the southern limit of the B22 Line Study Area. Proposed as a Class-III wetland.

NO. 6 / 5.9.2019

Wetland 2019-2, within a pastured area of transmission right-of-way. Proposed as a Class III wetland.

NO. 7 / 5.9.2019

Wetland 2019-3, a fringing wetland feature adjacent to a small, intermittent stream channel. Wetland is to the left of the stream in this photograph, and has been heavily disturbed from livestock pasturing. Proposed as a Class-II wetland.

NO. 8 / 5.9.2019

Wetland 2019-4, a feature near the Lamoille River at the northern limit of the B22 Line Study Area. Within boundaries of Study Area, this wetland is predominantly PEM, but connects to greater riparian complex with heterogeneous cover types. Proposed as a Class-II wetland.

NO. 9 / 5.9.2019

Ditch 2019-JD-100, which drains Wetland 2019-1.

NO. 10 / 5.9.2019

Stream 2019-SC-101, cutting across the B22 line through a pastured area.

NO. 11 / 5.9.2019

Eastern extent of Stream 2019-SC-101 at the edge of right-of-way, looking east.

NO. 12 / 5.9.2019

Bottom of gully associated with Stream 2019-TOS-102.

NO. 13 / 5.9.2019

Gully associated with Stream 2019-TOS-102, which was dry at the time of the site visit in May 2019.

NO. 14 / 5.9.2019

A short section of the Lamoille River's Top-of-Bank is present within the Study Area (mapped as "2019-TOB-LR")

NO. 15 / 5.9.2019

Typical vegetation along 2019-TOB-LR within the Study Area.

NO. 16 / 5.9.2019

Representative conditions under the B22 Line as it runs parallel to Stagecoach Road.

NO. 17 / 5.9.2019

Representative conditions in wooded areas along the B22 Line.

NO. 18 / 5.9.2019

Representative conditions of agricultural land along the northern portion of the B22 Line.

NO. 19 / 5.9.2019

Representative conditions where the B22 Line crosses through Lake View Cemetery on Cadys Falls Road.

NO. 20 / 5.9.2019

Buildings and parking area near the B22 Line at Cadys Falls, near the junction of Cadys Falls Road and Dunhamel Road.

NO. 21 / 5.9.2019

Northern terminus of B22 Line Study Area, at Dunhamel Road. The Lamoille River is visible in background of this photograph.

NO. 22 / 5.9.2019

View to the north along B22 Line right-of-way (outside of Study Area) from Dunhamel Road.

NO. 23 / 5.9.2019

Buildings, utility poles, and transmission line at Cadys Falls.

NO. 24 / 5.9.2019

Representative conditions in right-of-way near the Lamoille River and Wetland 2019-4.

NO. 25 / 5.9.2019

Woodland with sandy soils identified as target area for RTE surveys. This area was inventoried by a VHB Botanist in August 2019.

NO. 26 / 8.1.2019

Shrubland with sandy soils identified as target area for RTE surveys. This area was inventoried by a VHB Botanist in August 2019.

NO. 27 / 8.1.2019

Roadside with sandy soils identified as target area for RTE surveys. This area was inventoried by a VHB Botanist in August 2019. A number of disturbance-tolerant species typical of sandy habitats were found, but no RTE plants were identified in this highly disturbed and managed area of roadsides and lawns.

NO. 28 / 8.1.2019

Open field with sandy soils identified as target area for RTE surveys. This area was inventoried by a VHB Botanist in August 2019. No RTE plants were identified in this matrix of agricultural and maintained right-of-way habitats.

All photographs taken by VHB (M. Jackman, A. Wood, C. Sheldon).

\\vhb\gbl\proj\SBurlington\57955.00 GMP Lowell-Johnson Line\SitePhotos\B22 Line\B22_Photolog-08272019.docx

ATTACHMENT 3

Summary of Delineated Wetlands
Project: Lowell to Johnson Line Upgrade: B22 Line Component
Client: Green Mountain Power
Location: Morristown, Vermont
Delineation Date(s): May 9, 2019 (VHB - M. Jackman, A. Wood); June 11, 2019 (VHB - C. Sheldon)
Prepared By: VHB - August 29, 2019

VHB Delineated Wetlands										
Wetland ID	Delineated Area (Square Feet)[1]	Cowardin Classification[2]	Vermont Wetland Rules Classification						Typical Vegetation	Comments
			Contiguous to a VSWI-mapped Wetland?	Riparian Wetland Contiguous to Stream Channel? (Flow Regime)[3]	VWR Section 4.6 Presumptions[4]	VWR Section 5 Functional Criteria Presence / Significance		VHB-Proposed VWR Classification[6]		
						Type[5]	VHB-Proposed Significant?			
2019-1	**1,175**	PEM/PSS	No	No	a	5.1 (L), 5.2 (L)	No	III	*Typha latifolia*	Located in a disturbed barnyard area with upland spoil piles. Road cut outside the Study Area causing groundwater discharge. Wetland is a man-made pond feature draining to jurisdictional ditch. Some upland areas lumped in. Overall, low-quality wetland feature.
2019-2	**4,652**	PEM	No	No	-	5.1 (L), 5.2 (L)	No	III	*Ranunculus acris, Carex crinita*	Wetland within pastured area, sloping to the east of Study Area. No surface connection observed to ephemeral channel present outside of Study Area, and therefore presumed not a contiguous wetland.
2019-3	**981**	PEM	No	Yes (Intermittent)	c	5.2 (L), 5.10 (L)	Yes	II	*Euthamia graminifolia, Juncus effusus*	Small wetland feature connected to stream 2019-SC-101. Wetland is contiguous and significant by interpretation of Presumption c. Field observations note that wetland functions may not be provided at a significant level, but we did not conduct that level of analysis. Banks eroded by livestock access to stream.
2019-4	**2,835**	PEM	No	Yes (Perennial)	a, b, c	5.1 (H), 5.2 (H), 5.3 (P), 5.4 (P), 5.10 (P)	Yes	II	*Typha angustifolia, Carex crinita, Alnus incana*	Located in upper terrace above river. Part of much larger riparian wetland complex with heterogeneous wetland cover types (PEM, PSS, PFO, etc.). Includes an open-water component outside Study Area; standing water provides habitat for fish, turtles, and amphibians.

[1]All wetlands field-delineated per the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northeast and North Central Region. U.S. Army Corps of Engineers. 2011; Delineated Wetlands that extend outside the Study Area are **bold.**

[2]Classification follows Cowardin, L.M., Carter, V., Golet, F.C. and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitat of the United States. U.S. Fish and Wildlife Service. FWS/OBD-79/31.

[3]Wetland contiguity to streams as defined in the Vermont ANR 12/9/05 *Guidance for Agency Act 250 and Section 248 Comments Regarding Riparian Buffers* and confirmed if a delineated perennial or intermittent stream channel inflows, through flows, and outflows from a delineated wetland (ephemeral channels not typically being subject to ANR Riparian Buffer Guidance). The vegetative assemblage or natural community type is used when determining riparian vegetation function. Flow regime determined based on qualitative observations of instream hydrology indicators and geomorphic characteristic and are subject to professional judgment (P=perennial, I=intermittent, E=ephemeral).

[4]Alpha-numeric codes correspond with Section 4.6 Presumptions of the 2018 Vermont Wetland Rules.

[5]VWR Section 5: Functional Criteria for Evaluating a Wetland's Significance: 5.1=Water Storage for Flood Water and Storm Runoff, 5.2=Surface and Groundwater Protection, 5.3=Fish Habitat, 5.4=Wildlife Habitat, 5.5=Exemplary Wetland Natural Community, 5.6=Rare, Threatened or Endangered Species Habitat, 5.7=Education and Research in Natural Sciences, 5.8=Recreational Value and Economic Benefits, 5.9=Open Space and Aesthetics, 5.10=Erosion Control Through Binding and Stabilizing the Soil. (P)= Present, (H)=High, (L)=Low; Correspond to observed level of functionality.

[6]VHB-Proposed VWR Classification is based on review and application of the VWR, particularly VHB's interpretation of Section 4.6 Presumptions and is subject to final determinations by the ANR-DEC.

Summary of Delineated Streams
Project: Lowell to Johnson Line Upgrade: B22 Line Component
Client: Green Mountain Power
Location: Morristown, Vermont
Delineation Date(s): May 9, 2019 (VHB - M. Jackman, A. Wood); June 11, 2019 (VHB - C. Sheldon)
Prepared By: VHB - August 29, 2019

VHB Delineated Streams											
Stream ID	**Stream Name**	**Associated Wetlands**	**Average Ordinary High Water (OHW) Width (Feet)[1]**	**Dominant Substrate**	**Water Depth (Inches)**	**Bank Height (Feet)**	**Flow Regime (Ephemeral, Intermittent, or Perennial)[2]**	**ANR-Mapped River Corridor? (Yes/No)[3]**	**Watershed Size (Square Miles)[4]**	**VWQS Classification[5]**	**Comments**
2019-JD-100	Unnamed ditch	2019-1	1.5	Gravel	1	0.5	Intermittent	No	<0.5	B	Ditched channel, partially buried under manure within barnyard area. Drains Wetland 2019-1.
2019-SC-101	Unnamed tributary to Ryder Brook	2019-3	1.0	Gravel	4	1.0	Intermittent	No	<0.5	B	Feature crosses B22 line through agricultural field. Bank condition is poor, and lacks buffer vegetation.
2019-TOS-102	Unnamed tributary to Ryder Brook	None	2.0	Cobble	0	1.3	Intermittent	No	<0.5	B	Nearly dry streambed in deep ravine. Channel is poorly defined, but Top-of-Slope well defined.
2019-TOB-LR	Lamoille River	2019-4	250	Bedrock	Not assessed	12	Perennial	Yes	268	B	Study Area includes small section of Top-of-Bank of the Lamoille River, a major Vermont River.

[1] U.S. Army Corps of Engineers (USACE). 2005. *Regulatory Guidance Letter. Subject: Ordinary High Water Mark Identification* . No. 05-05.

[2] Stream flow regime determined based on qualitative observations of in stream hydrology indicators and geomorphic characteristic and are subject to professional judgment.

[3] If no ANR-mapped river corridor is present, VHB proposed river corridor is applied pursuant to the DEC Flood Hazard Area and River Corridor Protection Procedure (2017), as applicable.

[4] Watershed size determined from Vermont ANR Natural Resources Atlas.

[5] Vermont Agency of Natural Resources (ANR). 2017. *Vermont Water Quality Standards* (Vt. Code R 12 004 052). List of streams from the State of Vermont 2016 303(d) Assessment of the Condition of Vermont Waters. Priority Listing of Vermont Waters. (Vermont Department of Environmental Conservation (VT DEC) – Watershed Management Division, 2016).

ATTACHMENT 4

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

2019-2-1up

Project Site: **Lowell to Johnson Line Upgrade: B22 Line Component** City/County: **Morristown/Lamoille** Samp. Date: **5/9/2019**

Applicant/Owner: **Green Mountain Power, Inc.** State: **Vermont** Sampling Point: **2019-2-1up**

Investigator(s): **MCJ** Section, Township, Range: **-**

Landform (hillslope, terrace, etc.): **Flat** Local relief (concave, convex, none): **Flat** Slope (%): **<1%**

Subregion (LRR or MLRA): **LRR R** Lat: **44.5636** Long: **-72.61586** Datum: **NAD 83**

Soil Map Unit: **Colton-Duxbury complex** NWI Class: **UPL**

Are climatic/hydrologic conditions on the site typical for this time of year? **Yes** (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? **No** Normal Circumstances? **Yes**

Are Vegetation, Soil, or Hydrology naturally problematic? **No** (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present? **NO**

Hydric Soil Present? **NO**

Wetland Hydrology Present? **NO**

Is This Sample Area Within a Wetland? **NO**

Remarks:

Sampled in pastured agricultural field outside wetland boundary.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ___ Depth (inches): ___

Water Table Present? ___ Depth (inches): ___

Saturation Present? Depth (inches):

Wetland Hydrology Present? **NO**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.15" of rain in 5 days prior in Morrisville, VT (NWS 2018); PDSI 0.89 (Near Normal) for week ending 5/25/2019

Remarks:

Saturation is > 15"

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	**10YR 3/2**	**100**					**COARSE SANDY LOAM**	
8-15	**2.5Y 4/3**	**100**					**COARSE SANDY LOAM**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (LRR R, MLRA 149B)
- ___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ___ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ___ Loamy Mucky Mineral (F1) (LRR K, L)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ___ Coast Prairie Redox (A16) (LRR K, L, R)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ___ Dark Surface (S9) (LRR K, L, M)
- ___ Polyvalue Below Surface (S8) (LRR K, L)
- ___ Thin Dark Surface (S9) (LRR K, L)
- ___ Iron-Manganese Masses (F12) (LRR K, L, R)
- ___ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ___ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **NO**

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: **2019-2-1up**

		Absolute % Cover	Dom. Sp?	Indicator Status
Tree Stratum (Plot size: **30' RAD**)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Sapling Stratum (Plot size: **15' RAD**)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Shrub Stratum (Plot size: **15' RAD**)				
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum (Plot size: **5' RAD**)				
1.	**Veronica arvensis**	**38**	**X**	**FACU**
2.	**Taraxacum officinale**	**38**	**X**	**FACU**
3.	**Trifolium pratense**	**15**		**FACU**
4.	**Ranunculus acris**	**3**		**FAC**
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		94	= Total Cover	
Woody Vines (Plot size: **15' RAD**)				
1.				
2.				
3.				
4.				
5.				
			= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: _____ (A)

Dominants across all strata: **2** (B)

% Dominants OBL, FACW, FAC: _____ (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:
OBL	x 1 =	
FACW	x 2 =	
FAC **3**	x 3 =	**9**
FACU **91**	x 4 =	**364**
UPL	x 5 =	
Sum: **94** (A)		**373** (B)

Prevalence Index = B/A = **3.97**

Hydrophytic Vegetation Indicators:

_____ Dominance Test is > 50%

_____ Prevalence Index is <= 3.0

_____ Problematic Hydrophytic Vegetation[1] (explain)

_____ Rapid Test for Hydrophytic Vegetation

_____ Morphological Adaptations

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? **NO**

Remarks: (If observed, list morphological adaptations below).

Management as pastured/agricultural land influencing plant composition.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

2019-2-1wet

Project Site: **Lowell to Johnson Line Upgrade: B22 Line Component** City/County: **Morristown/Lamoille** Samp. Date: **5/9/2019**

Applicant/Owner: **Green Mountain Power, Inc.** State: **Vermont** Sampling Point: **2019-2-1wet**

Investigator(s): **MCJ, AJW** Section, Township, Range: **-**

Landform (hillslope, terrace, etc.): **Flat** Local relief (concave, convex, none): **Concave** Slope (%): **<1%**

Subregion (LRR or MLRA): **LRR R** Lat: **44.5633** Long: **-72.61582** Datum: **NAD 83**

Soil Map Unit: **Colton-Duxbury complex** NWI Class: **PEM**

Are climatic/hydrologic conditions on the site typical for this time of year? **Yes** (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? **No** Normal Circumstances? **Yes**

Are Vegetation, Soil, or Hydrology naturally problematic? **No** (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**YES**	Is This Sample Area Within a Wetland? **YES**
Hydric Soil Present?	**YES**	
Wetland Hydrology Present?	**YES**	

Remarks:

Sampled in wetland within pastured/agricultural field.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

	Surface Water (A1)		Water-Stained Leaves (B9)
X	High Water Table (A2)		Aquatic Fauna (B13)
X	Saturation (A3)		Marl Deposits (B13)
	Water Marks (B1)		Hydrogen Sulfide Odor (C1)
	Sediment Deposits (B2)	X	Oxidized Rhizospheres on Living Roots (C3)
	Drift Deposits (B3)		Presence of Reduced Iron (C4)
	Algal Mat or Crust (B4)		Recent Iron Reduction in Tilled Soils (C6)
	Iron Deposits (B5)		Thin Muck Surface (C7)
	Inundation Visible on Aerial (B7)		Other (Explain in Remarks)
	Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

	Surface Soil Cracks (B6)
X	Drainage Patterns (B10)
	Moss Trim Lines (B16)
	Dry-Season Water Table (C2)
	Crayfish Burrows (C8)
	Saturation Visible on Aerial (C9)
	Stunted or Stressed Plants (D1)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
	Microtopographic Relief (D4)
	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?		Depth (inches):	
Water Table Present?	X	Depth (inches):	9
Saturation Present?	X	Depth (inches):	<1

Wetland Hydrology Present? **YES**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.15" of rain in 5 days prior in Morrisville, VT (NWS 2018); PDSI 0.89 (Near Normal) for week ending 5/25/2019

Remarks:

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	**10YR 2/1**	**95**	**7.5YR 3/4**	**5**	**C**	**M**	**SILT LOAM**	
9-15	**10YR 2/1**	**95**	**2.5YR 4/4**	**5**	**C**	**M**	**GRAVELLY SILT LOAM**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

	Histosol (A1)		Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
	Histic Epipedon (A2)		Thin Dark Surface (S9) (LRR R, MLRA 149B)
	Black Histic (A3)		Loamy Mucky Mineral (F1) (LRR K, L)
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)
	Stratified Layers (A5)		Depleted Matrix (F3)
	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)
	Sandy Gleyed Matrix (S4)		
	Sandy Redox (S5)		
	Stripped Matrix (S6)		
	Dark Surface (S7) (LRR R, MLRA 149B)		

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils[3]:

2 cm Muck (A10) (LRR K, L, MLRA 149B)
Coast Prairie Redox (A16) (LRR K, L, R)
5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
Dark Surface (S9) (LRR K, L, M)
Polyvalue Below Surface (S8) (LRR K, L)
Thin Dark Surface (S9) (LRR K, L)
Iron-Manganese Masses (F12) (LRR K, L, R)
Piedmont Floodplain Soils (F19) (MLRA 149B)
Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
Red Parent Material (F21)
Very Shallow Dark Surface (TF12)
Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: **Gravel/stone**

Depth (inches): **15**

Hydric Soil Present? **YES**

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: **2019-2-1wet**

Tree Stratum (Plot size: **30' RAD**)	Absolute % Cover	Dom. Sp?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling Stratum (Plot size: 15' RAD)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Shrub Stratum (Plot size: 15' RAD)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5' RAD)			
1. **Ranunculus acris**	**38**	**X**	**FAC**
2. **Carex crinita**	**15**	**X**	**OBL**
3. **Juncus effusus**	**15**	**X**	**OBL**
4. **Onoclea sensibilis**	**3**		**FACW**
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	71	= Total Cover	
Woody Vines (Plot size: 15' RAD)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: **3** (A)

Dominants across all strata: **3** (B)

% Dominants OBL, FACW, FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply By:
OBL	**30**	x 1 =	**30**
FACW	**3**	x 2 =	**6**
FAC	**38**	x 3 =	**114**
FACU		x 4 =	
UPL		x 5 =	
Sum:	**71** (A)		**150** (B)

Prevalence Index = B/A = **2.11**

Hydrophytic Vegetation Indicators:

- **X** Dominance Test is > 50%
- **X** Prevalence Index is <= 3.0
- ___ Problematic Hydrophytic Vegetation[1] (explain)
- ___ Rapid Test for Hydrophytic Vegetation
- ___ Morphological Adaptations

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? **YES**

Remarks: (If observed, list morphological adaptations below).

Management as pastured/agricultural land influencing plant composition.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

2019-4-1up

Project Site: **Lowell to Johnson Line Upgrade: B22 Line Component** City/County: **Morristown/Lamoille** Samp. Date: **5/9/2019**

Applicant/Owner: **Green Mountain Power, Inc.** State: **Vermont** Sampling Point: **2019-4-1up**

Investigator(s): **MCJ, AJW** Section, Township, Range: **-**

Landform (hillslope, terrace, etc.): **Bench** Local relief (concave, convex, none): **Convex** Slope (%): **<1%**

Subregion (LRR or MLRA): **LRR R** Lat: **44.576415** Long: **-72.611461** Datum: **NAD 83**

Soil Map Unit: **Charles silt loam** NWI Class: **UPL**

Are climatic/hydrologic conditions on the site typical for this time of year? **Yes** (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? **No** Normal Circumstances? **Yes**

Are Vegetation, Soil, or Hydrology naturally problematic? **No** (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present? **NO**

Hydric Soil Present? **NO**

Wetland Hydrology Present? **NO**

Is This Sample Area Within a Wetland? **NO**

Remarks:

Sampled on topographical rise along the southern edge of the wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? ___ Depth (inches): ___

Water Table Present? ___ Depth (inches): ___

Saturation Present? ___ Depth (inches): ___

Wetland Hydrology Present? **NO**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.15" of rain in 5 days prior in Morrisville, VT (NWS 2018); PDSI 0.89 (Near Normal) for week ending 5/25/2019

Remarks:

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	**10YR 3/3**	**100**					**FINE SANDY LOAM**	
8-16	**2.5YR 4/4**	**100**					**FINE SAND**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (LRR R, MLRA 149B)
- ___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ___ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ___ Loamy Mucky Mineral (F1) (LRR K, L)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ___ Coast Prairie Redox (A16) (LRR K, L, R)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ___ Dark Surface (S9) (LRR K, L, M)
- ___ Polyvalue Below Surface (S8) (LRR K, L)
- ___ Thin Dark Surface (S9) (LRR K, L)
- ___ Iron-Manganese Masses (F12) (LRR K, L, R)
- ___ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ___ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **NO**

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: **2019-4-1up**

Tree Stratum (Plot size: **30' RAD**)	Absolute % Cover	Dom. Sp?	Indicator Status
1. **Acer rubrum**	**15**	**X**	**FAC**
2. **Pinus strobus**	**15**	**X**	**FACU**
3. **Tsuga canadensis**	**3**		**FACU**
4.			
5.			
6.			
7.			
	33	= Total Cover	

Sapling Stratum (Plot size: **15' RAD**)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Shrub Stratum (Plot size: **15' RAD**)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: **5' RAD**)			
1. **Pteridium aquilinum**	**63**	**X**	**FACU**
2. **Maianthemum canadense**	**15**		**FACU**
3. **Pinus strobus**	**3**		**FACU**
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	81	= Total Cover	

Woody Vines (Plot size: **15' RAD**)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: **1** (A)

Dominants across all strata: **3** (B)

% Dominants OBL, FACW, FAC: **33%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:
OBL	x 1 =	
FACW	x 2 =	
FAC **15**	x 3 =	**45**
FACU **99**	x 4 =	**396**
UPL	x 5 =	
Sum: **114** (A)		**441** (B)

Prevalence Index = B/A = **3.87**

Hydrophytic Vegetation Indicators:

_____ Dominance Test is > 50%

_____ Prevalence Index is <= 3.0

_____ Problematic Hydrophytic Vegetation[1] (explain)

_____ Rapid Test for Hydrophytic Vegetation

_____ Morphological Adaptations

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? **NO**

Remarks: (If observed, list morphological adaptations below).

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

2019-4-1wet

Project Site: **Lowell to Johnson Line Upgrade: B22 Line Component** City/County: **Morristown/Lamoille** Samp. Date: **5/9/2019**

Applicant/Owner: **Green Mountain Power, Inc.** State: **Vermont** Sampling Point: **2019-4-1wet**

Investigator(s): **MCJ** Section, Township, Range: **-**

Landform (hillslope, terrace, etc.): **Depression** Local relief (concave, convex, none): **Concave** Slope (%): **<1%**

Subregion (LRR or MLRA): **LRR R** Lat: **44.57656** Long: **-72.61153** Datum: **NAD 83**

Soil Map Unit: **Charles silt loam** NWI Class: **PEM**

Are climatic/hydrologic conditions on the site typical for this time of year? **Yes** (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? **No** Normal Circumstances? **Yes**

Are Vegetation, Soil, or Hydrology naturally problematic? **No** (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present? **YES**

Hydric Soil Present? **YES**

Wetland Hydrology Present? **YES**

Is This Sample Area Within a Wetland? **YES**

Remarks:

Sampled within wetland at edge in PEM type, to west of open water area.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

X	Surface Water (A1)		Water-Stained Leaves (B9)
	High Water Table (A2)		Aquatic Fauna (B13)
	Saturation (A3)		Marl Deposits (B13)
	Water Marks (B1)		Hydrogen Sulfide Odor (C1)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)
	Drift Deposits (B3)		Presence of Reduced Iron (C4)
	Algal Mat or Crust (B4)		Recent Iron Reduction in Tilled Soils (C6)
	Iron Deposits (B5)		Thin Muck Surface (C7)
	Inundation Visible on Aerial (B7)		Other (Explain in Remarks)
	Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

	Surface Soil Cracks (B6)
	Drainage Patterns (B10)
	Moss Trim Lines (B16)
	Dry-Season Water Table (C2)
	Crayfish Burrows (C8)
	Saturation Visible on Aerial (C9)
	Stunted or Stressed Plants (D1)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
	Microtopographic Relief (D4)
	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? **X** Depth (inches): **12**

Water Table Present? Depth (inches):

Saturation Present? Depth (inches):

Wetland Hydrology Present? **YES**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.15" of rain in 5 days prior in Morrisville, VT (NWS 2018); PDSI 0.89 (Near Normal) for week ending 5/25/2019

Remarks:

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(in)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
4-0							**MUCK**	
0-16	**10YR 2/1**	**90**	**10YR 3/4**	**10**	**C**	**M**	**FINE SANDY LOAM**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

	Histosol (A1)		Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
	Histic Epipedon (A2)		Thin Dark Surface (S9) (LRR R, MLRA 149B)
	Black Histic (A3)		Loamy Mucky Mineral (F1) (LRR K, L)
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)
	Stratified Layers (A5)		Depleted Matrix (F3)
	Depleted Below Dark Surface (A11)	**X**	Redox Dark Surface (F6)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)
	Sandy Gleyed Matrix (S4)		
	Sandy Redox (S5)		
	Stripped Matrix (S6)		
	Dark Surface (S7) (LRR R, MLRA 149B)		

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils[3]:

	2 cm Muck (A10) (LRR K, L, MLRA 149B)
	Coast Prairie Redox (A16) (LRR K, L, R)
	5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
	Dark Surface (S9) (LRR K, L, M)
	Polyvalue Below Surface (S8) (LRR K, L)
	Thin Dark Surface (S9) (LRR K, L)
	Iron-Manganese Masses (F12) (LRR K, L, R)
	Piedmont Floodplain Soils (F19) (MLRA 149B)
	Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
	Red Parent Material (F21)
	Very Shallow Dark Surface (TF12)
	Other (Explain in Remarks)

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? **YES**

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: **2019-4-1wet**

	Absolute % Cover	Dom. Sp?	Indicator Status
Tree Stratum (Plot size: **30' RAD**)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling Stratum (Plot size: **15' RAD**)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Shrub Stratum (Plot size: **15' RAD**)			
1. **Alnus incana**	**15**	**X**	**FACW**
2. **Spiraea alba**	**15**	**X**	**FACW**
3. **Lonicera morrowii**	**15**	**X**	**FACU**
4. **Pinus strobus**	**3**		**FACU**
5.			
6.			
7.			
	48	= Total Cover	
Herb Stratum (Plot size: **5' RAD**)			
1. **Carex lurida**	**85**	**X**	**OBL**
2. **Typha angustifolia**	**15**		**OBL**
3. **Eutrochium purpureum**	**3**		**FAC**
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	103	= Total Cover	
Woody Vines (Plot size: **15' RAD**)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Dominance Test Worksheet:

# Dominants OBL, FACW, FAC:	**3**	(A)
# Dominants across all strata:	**4**	(B)
% Dominants OBL, FACW, FAC:	**75%**	(A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply By:
OBL	**100**	x 1 =	**100**
FACW	**30**	x 2 =	**60**
FAC	**3**	x 3 =	**9**
FACU	**18**	x 4 =	**72**
UPL		x 5 =	
Sum:	**151** (A)		**241** (B)

Prevalence Index = B/A = **1.60**

Hydrophytic Vegetation Indicators:

- **X** Dominance Test is > 50%
- **X** Prevalence Index is <= 3.0
- ____ Problematic Hydrophytic Vegetation[1] (explain)
- ____ Rapid Test for Hydrophytic Vegetation
- ____ Morphological Adaptations

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? **YES**

Remarks: (If observed, list morphological adaptations below).

ATTACHMENT 5

Vermont Potential Rare, Threatened, and Endangered Species and Natural Communities in the Project Region and Onsite Habitats Summary

Project: Lowell to Johnson Line Upgrade - B22 Line Component

Client: Green Mountain Power

Location: Morristown, Vermont

Prepared By: VHB (C. Sheldon, A. Wood) April 17, 2019; Updated August 27, 2019

	Species	Common Name	Type	State Rank	Global Rank	Vermont Status	Federal Status	EO Last Observed	Habitat Description[1]	Occurrence Description [2]	EO Mapped within Map Extent (Yes/No)	Potential for Habitat to Occur Onsite?	Additional Survey Recommended?	
													(Yes/No)	Comments
Element Occurrence Range: 1 mile Radius	*Ardea herodias*	Great Blue Heron	Animal	S3S4B	G5	-	-	1987	Breeds in rookeries in tall trees in forested wetlands or on islands near lakes, ponds, and open water.	Potential Resource Category 2 ("RC-2") rookery site near Lake Lamoille, Morristown, Vermont.	No	Yes	No	Minimal potential area within Study Area suitable for rookery site. No rookeries detected during 2019 site visits. Study Area is over 2,000 feet from mapped rookery location, outside of any potential RC-2 buffer zones.
	Ophiogomphus rupinsulensis	Rusty Snaketail	Animal	S3?	G5	-	-	2007	Streams and rivers with moderate/slow current, typically with silty and warm waters.	Below Cadys Falls on Lamoille River, Morristown, Vermont.	No	Yes	No	Not a listed species.
	Pandion haliaetus	Osprey	Animal	S3B	G5	-	-	2007	Breeds in wide range of habitats near water with abundant fish, primarily lakes and rivers as well as coastal waters. Requires elveated nest sites.	Nesting location on island in Lake Lamoille, Morristown, Vermont.	No	Yes	No	Not a listed species.

[1]Potential sources for habitat description listed below:

DeGraaf, R.M. and M. Yamasaki. 2001. *New England Wildlife: Habitat, Natural History, and Distribution.* University Press of New England. Lebanon, NH.

Pfeiffer, B., Blust, M., and K. McFarland. 2018. *Vermont Odonata Atlas.* Vermont Center for Ecostudies-Vermont Atlas of Life. Retrieved from http://val.vtecostudies.org

Thompson, E.H. and E.R. Sorenson. 2005. *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont* . Vermont Department of Fish and Wildlife and The Nature Conservancy.

Vermont Natural Heritage Inventory. 2019. *Element Occurrence Reports* . Vermont Fish and Wildlife Department. Accessed April 2019.

[2]Element Occurrence ("EO") Data Source:

Vermont Natural Heritage Inventory. 2019. *Element Occurrence Reports* . Vermont Fish and Wildlife Department. Accessed April 2019.

ATTACHMENT 6

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
http://www.fws.gov/newengland

In Reply Refer To:
Consultation Code: 05E1NE00-2019-SLI-2006
Event Code: 05E1NE00-2019-E-07007
Project Name: B22 Line

August 27, 2019

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

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

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

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

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

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

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

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

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

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

Attachment(s):

- Official Species List

Official Species List

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

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2019-SLI-2006

Event Code: 05E1NE00-2019-E-07007

Project Name: B22 Line

Project Type: TRANSMISSION LINE

Project Description: Transmission line work

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/44.56612233016634N72.61622290549445W

Counties: Lamoille, VT

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

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

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

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

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

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Critical habitats

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

ATTACHMENT 7

Species Checklist - Early Season Partial Floristic Inventory
Project: Lowell to Johnson Line Upgrade: B22 Line Component
Client: Green Mountain Power
Location: Morristown, Vermont
Survey Date(s): May 9, 2019 (A. Wood, M. Jackman)
Prepared By: VHB - August 26, 2019

Scientific Name [1]	Common Name	Family	Observed Habitat		Vermont Rarity Rank[2]	Non-Native Invasive Species[3]
			Upland	Wetland		
Acer negundo L.	boxelder	Aceraceae	X	X	-	-
Acer rubrum L.	red maple	Aceraceae	X	X	-	-
Acer saccharum Marshall	sugar maple	Aceraceae	X		-	-
Achillea millefolium L.	common yarrow	Asteraceae	X		-	-
Alliaria petiolata (M. Bieb.) Cavara & Grande	garlic mustard	Brassicaceae	X		-	**B**
Allium tricoccum Aiton	ramp	Liliaceae	X		-	-
Alnus incana (L.) Moench	gray alder	Betulaceae		X	-	-
Amelanchier arborea (Michx. f.) Fernald	common serviceberry	Rosaceae	X		-	-
Arabis glabra (L.) Bernh.	tower rockcress	Brassicaceae	X		-	-
Arctium L.	burdock	Asteraceae	X		-	-
Asclepias syriaca L.	common milkweed	Asclepiadaceae	X		-	-
Berberis thunbergii DC.	Japanese barberry	Berberidaceae	X		-	**B**
Betula alleghaniensis Britton	yellow birch	Betulaceae	X	X	-	-
Betula papyrifera Marshall	paper birch	Betulaceae	X		-	-
Betula populifolia Marshall	gray birch	Betulaceae	X		-	-
Carex crinita Lam.	fringed sedge	Cyperaceae		X	-	-
Caulophyllum thalictroides (L.) Michx.	blue cohosh	Berberidaceae	X		-	-
Chelidonium majus L.	celandine	Papaveraceae	X		-	-
Cirsium vulgare (Savi) Ten.	bull thistle	Asteraceae	X		-	-
Claytonia caroliniana Michx.	Carolina springbeauty	Portulacaceae	X		-	-
Cornus alternifolia L. f.	alternateleaf dogwood	Cornaceae	X		-	-
Cornus sericea L. ssp. sericea	redosier dogwood	Cornaceae		X	-	-
Corylus cornuta Marshall	beaked hazelnut	Betulaceae	X		-	-
Crataegus L.	hawthorn	Rosaceae	X		-	-
Daucus carota L.	Queen Anne's lace	Apiaceae	X		-	-
Dryopteris intermedia (Muhl. ex Willd.) A. Gray	intermediate woodfern	Dryopteridaceae	X		-	-
Equisetum arvense L.	field horsetail	Equisetaceae	X		-	-
Equisetum hyemale L.	scouringrush horsetail	Equisetaceae	X	X	-	-
Erythronium americanum Ker Gawl.	dogtooth violet	Liliaceae	X		-	-
Euthamia graminifolia (L.) Nutt.	flat-top goldentop	Asteraceae	X		-	-
Fagus grandifolia Ehrh.	American beech	Fagaceae	X		-	-
Polygonum cuspidatum Siebold & Zucc.	Japanese knotweed	Polygonaceae	X		-	**B**
Fragaria virginiana Duchesne	Virginia strawberry	Rosaceae	X		-	-
Fraxinus americana L.	white ash	Oleaceae	X		-	-
Galium mollugo L.	false baby's breath	Rubiaceae	X	X	-	-
Galium palustre L.	common marsh bedstraw	Rubiaceae		X	-	-
Glechoma hederacea L.	ground ivy	Lamiaceae	X		-	-
Gnaphalium uliginosum L.	marsh cudweed	Asteraceae	X		-	-
Houstonia caerulea L.	azure bluet	Rubiaceae	X		-	-
Juncus effusus L.	common rush	Juncaceae		X	-	-
Lactuca biennis (Moench) Fernald	tall blue lettuce	Asteraceae	X		-	-
Larix laricina (Du Roi) K. Koch	tamarack	Pinaceae	X		-	-
Lonicera morrowii A. Gray	Morrow's honeysuckle	Caprifoliaceae	X		-	**B**
Maianthemum canadense Desf.	Canada mayflower	Liliaceae	X		-	-
Malus Mill.	apple	Rosaceae	X		-	-
Matteuccia struthiopteris (L.) Todaro	ostrich fern	Dryopteridaceae		X	-	-
Oenothera biennis L.	common evening primrose	Onagraceae	X		-	-
Onoclea sensibilis L.	sensitive fern	Dryopteridaceae	X	X	-	-
Osmunda cinnamomea L.	cinnamon fern	Osmundaceae		X	-	-
Ostrya virginiana (Mill.) K. Koch	hophornbeam	Betulaceae	X		-	-
Penthorum sedoides L.	ditch stonecrop	Crassulaceae		X	-	-
Phalaris arundinacea L.	reed canarygrass	Poaceae		X	-	**WL**
Picea abies (L.) Karst.	Norway spruce	Pinaceae	X		-	-
Picea rubens Sarg.	red spruce	Pinaceae	X		-	-
Pinus resinosa Aiton	red pine	Pinaceae	X		-	-
Pinus strobus L.	eastern white pine	Pinaceae	X		-	-
Polystichum acrostichoides (Michx.) Schott	Christmas fern	Dryopteridaceae	X		-	-
Populus balsamifera L.	balsam poplar	Salicaceae	X		-	-

Species Checklist - Early Season Partial Floristic Inventory
Project: Lowell to Johnson Line Upgrade: B22 Line Component
Client: Green Mountain Power
Location: Morristown, Vermont
Survey Date(s): May 9, 2019 (A. Wood, M. Jackman)
Prepared By: VHB - August 26, 2019

Scientific Name [1]	Common Name	Family	Observed Habitat		Vermont Rarity Rank[2]	Non-Native Invasive Species[3]
			Upland	Wetland		
Populus deltoides W. Bartram ex Marshall	eastern cottonwood	Salicaceae	X		-	-
Populus grandidentata Michx.	bigtooth aspen	Salicaceae	X		-	-
Populus tremuloides Michx.	quaking aspen	Salicaceae	X		-	-
Prunus serotina Ehrh.	black cherry	Rosaceae	X		-	-
Prunus virginiana L.	chokecherry	Rosaceae	X		-	-
Quercus rubra L.	northern red oak	Fagaceae	X		-	-
Ranunculus acris L.	tall buttercup	Ranunculaceae		X	-	-
Rhus typhina L.	staghorn sumac	Anacardiaceae	X		-	-
Rubus allegheniensis Porter	Allegheny blackberry	Rosaceae	X		-	-
Rubus idaeus L.	American red raspberry	Rosaceae	X		-	-
Rubus odoratus L.	purpleflowering raspberry	Rosaceae	X		-	-
Rumex crispus L.	curly dock	Polygonaceae	X		-	-
Salix bebbiana Sarg.	Bebb willow	Salicaceae		X	-	-
Salix discolor Muhl.	pussy willow	Salicaceae		X	-	-
Sanguinaria canadensis L.	bloodroot	Papaveraceae	X		-	-
Solidago bicolor L.	white goldenrod	Asteraceae	X		-	-
Solidago canadensis L.	Canada goldenrod	Asteraceae	X		-	-
Spiraea alba Du Roi	white meadowsweet	Rosaceae		X	-	-
Taraxacum officinale F.H. Wigg.	common dandelion	Asteraceae	X		-	-
Thalictrum dioicum L.	early meadow-rue	Ranunculaceae	X		-	-
Thuja occidentalis L.	arborvitae	Cupressaceae	X		-	-
Trientalis borealis Raf.	starflower	Primulaceae	X		-	-
Trifolium pratense L.	red clover	Fabaceae	X		-	-
Trillium erectum L.	red trillium	Liliaceae	X		-	-
Tsuga canadensis (L.) Carrière	eastern hemlock	Pinaceae	X		-	-
Tussilago farfara L.	coltsfoot	Asteraceae	X	X	-	-
Typha latifolia L.	broadleaf cattail	Typhaceae		X	-	-
Ulmus americana L.	American elm	Ulmaceae		X	-	-
Uvularia sessilifolia L.	sessileleaf bellwort	Liliaceae	X		-	-
Vaccinium L.	blueberry	Ericaceae	X		-	-
Veratrum viride Aiton	green false hellebore	Liliaceae		X	-	-
Verbascum thapsus L.	common mullein	Scrophulariaceae	X		-	-
Veronica arvensis L.	corn speedwell	Scrophulariaceae	X		-	-
Vinca L.	periwinkle	Apocynaceae	X		-	-

X: Denotes plant species was found in this habitat/community type.

[1] Nomenclature follows USDA-NRCS PLANTS database (2017).

[2] Vermont Rarity Rank from: Vermont Natural Heritage Inventory - Vermont Fish and Wildlife Department. 2018. *Rare and Uncommon Native Vascular Plants of Vermont.* Effective August 9, 2018.

[3] Class B Noxious Weeds Species (B) from: Vermont Agency of Agriculture, Food & Markets. 2012. *Quarantine #3- Noxious Weeds.*
Watch List Species (WL) from: Vermont Invasive Exotic Plant Committee. 2017. *Quarantine and Watch List Update.*

ATTACHMENT 8

Species Checklist - RTE Plant Survey
Project: Lowell to Johnson Line Upgrade: B22 Line Component
Client: Green Mountain Power
Location: Morristown, Vermont
Survey Date(s): August 1, 2019 (A. Wood)
Prepared By: VHB - August 26, 2019

Scientific Name [1]	Common Name	Family	HABITAT/PROJECT AREA & CORRESPONDING NRCS SOIL SERIES								Vermont Rarity Rank[2]	Non-Native Invasive Species[3]
			Cadys Falls	Cemetery	Roadside	Field	Stream/Riparian	Skid Road	Junkyard	Substation		
			Limerick variant silt loam / Colton-Duxbury complex	Colton-Duxbury complex	Adams loamy fine sand / Colton-Duxbury complex	Colton-Duxbury complex / Boothbay silt loam / Adams loamy fine sand	Various soil types	Adams loamy fine sand / Colton-Duxbury complex	Adams loamy fine sand	Podunk fine sandy loam		
Acer negundo L.	boxelder	Aceraceae							X		-	-
Acer pensylvanicum L.	striped maple	Aceraceae		X							-	-
Acer rubrum L.	red maple	Aceraceae		X				X			-	-
Acer saccharum Marshall	sugar maple	Aceraceae	X								-	-
Achillea millefolium L.	common yarrow	Asteraceae		X	X	X		X			-	-
Agrimonia striata Michx.	roadside agrimony	Rosaceae				X					-	-
Alnus incana (L.) Moench	gray alder	Betulaceae	X						X		-	-
Anaphalis margaritacea (L.) Benth.	western pearly everlasting	Asteraceae	X								-	-
Anthoxanthum odoratum L.	sweet vernalgrass	Poaceae				X	X	X		X	-	-
Asclepias syriaca L.	common milkweed	Asclepiadaceae			X		X			X	-	-
Berberis thunbergii DC.	Japanese barberry	Berberidaceae						X			-	**B**
Betula alleghaniensis Britton	yellow birch	Betulaceae						X			-	-
Betula populifolia Marshall	gray birch	Betulaceae		X				X			-	-
Bromus inermis Leyss.	smooth brome	Poaceae			X						-	-
Carex crinita Lam.	fringed sedge	Cyperaceae	X				X				-	-
Carex lurida Wahlenb.	shallow sedge	Cyperaceae	X				X				-	-
Carex scoparia Schkuhr ex Willd.	broom sedge	Cyperaceae	X	X			X		X		-	-
Carex vulpinoidea Michx.	fox sedge	Cyperaceae				X		X			-	-
Centaurium pulchellum (Sw.) Druce	branched centaury	Gentianaceae			X				X		-	-
Chenopodium album L.	lambsquarters	Chenopodiaceae			X						-	-
Cichorium intybus L.	chicory	Asteraceae		X							-	-
Cirsium Mill.	thistle	Asteraceae							X		-	-
Clematis virginiana L.	devil's darning needles	Ranunculaceae	X	X			X				-	-
Clinopodium vulgare L.	wild basil	Lamiaceae						X			-	-
Commelina communis L.	Asiatic dayflower	Commelinaceae		X							-	-
Convolvulus arvensis L.	field bindweed	Convolvulaceae			X						-	-
Cornus racemosa Lam.	gray dogwood	Cornaceae	X								-	-
Cornus sericea L.	redosier dogwood	Cornaceae						X			-	-
Dactylis glomerata L.	orchardgrass	Poaceae	X		X	X					-	-
Daucus carota L.	Queen Anne's lace	Apiaceae	X	X	X	X		X	X	X	-	-
Dennstaedtia punctilobula (Michx.) T. Moore	eastern hayscented fern	Dennstaedtiaceae						X			-	-
Dianthus deltoides L.	maiden pink	Caryophyllaceae							X		-	-
Doellingeria umbellata (Mill.) Nees	parasol whitetop	Asteraceae	X								-	-
Dryopteris intermedia (Muhl. ex Willd.) A. Gray	intermediate woodfern	Dryopteridaceae		X							-	-
Equisetum arvense L.	field horsetail	Equisetaceae	X	X			X			X	-	-
Erigeron annuus (L.) Pers.	eastern daisy fleabane	Asteraceae	X			X		X	X	X	-	-
Eupatorium perfoliatum L.	common boneset	Asteraceae	X				X	X			-	-
Euthamia graminifolia (L.) Nutt.	flat-top goldentop	Asteraceae	X	X	X		X				-	-
Eutrochium maculatum (L.) E.E. Lamont	spotted joe pye weed	Asteraceae	X				X	X			-	-
Fagus grandifolia Ehrh.	American beech	Fagaceae		X							-	-
Fragaria L.	strawberry	Rosaceae	X								-	-
Fraxinus americana L.	white ash	Oleaceae		X							-	-
Fraxinus pennsylvanica Marshall	green ash	Oleaceae	X								-	-
Galium mollugo L.	false baby's breath	Rubiaceae	X		X	X				X	-	-
Hypericum L.	St. Johnswort	Clusiaceae	X				X				-	-
Hypericum perforatum L.	common St. Johnswort	Clusiaceae		X		X				X	-	-
Impatiens capensis Meerb.	jewelweed	Balsaminaceae	X					X	X		-	-
Juncus effusus L.	common rush	Juncaceae	X				X	X			-	-
Juncus tenuis Willd.	poverty rush	Juncaceae	X			X					-	-

Species Checklist - RTE Plant Survey
Project: Lowell to Johnson Line Upgrade: B22 Line Component
Client: Green Mountain Power
Location: Morristown, Vermont
Survey Date(s): August 1, 2019 (A. Wood)
Prepared By: VHB - August 26, 2019

Scientific Name [1]	Common Name	Family	HABITAT/PROJECT AREA & CORRESPONDING NRCS SOIL SERIES								Vermont Rarity Rank[2]	Non-Native Invasive Species[3]
			Cadys Falls	Cemetery	Roadside	Field	Stream/Riparian	Skid Road	Junkyard	Substation		
			Limerick variant silt loam / Colton-Duxbury complex	Colton-Duxbury complex	Adams loamy fine sand / Colton-Duxbury complex	Colton-Duxbury complex / Boothbay silt loam / Adams loamy fine sand	Various soil types	Adams loamy fine sand / Colton-Duxbury complex	Adams loamy fine sand	Podunk fine sandy loam		
Lemna L.	duckweed	Lemnaceae	X								-	-
Leucanthemum vulgare Lam.	oxeye daisy	Asteraceae				X	X				-	-
Lobelia inflata L.	Indian-tobacco	Campanulaceae						X			-	-
Lonicera morrowii A. Gray	Morrow's honeysuckle	Caprifoliaceae	X	X		X					-	**B**
Lonicera tatarica L.	Tatarian honeysuckle	Caprifoliaceae		X							-	**B**
Lotus corniculatus L.	bird's-foot trefoil	Fabaceae							X		-	-
Lychnis flos-cuculi L.	ragged robin	Caryophyllaceae	X								-	-
Lysimachia ciliata L.	fringed loosestrife	Primulaceae	X								-	-
Lythrum salicaria L.	purple loosestrife	Lythraceae	X				X		X		-	**B**
Maianthemum canadense Desf.	Canada mayflower	Liliaceae		X		X		X			-	-
Matricaria discoidea DC.	disc mayweed	Asteraceae	X		X						-	-
Matteuccia struthiopteris (L.) Todaro	ostrich fern	Dryopteridaceae	X	X							-	-
Medicago lupulina L.	black medick	Fabaceae	X		X						-	-
Melilotus albus Medik.	white sweetclover	Fabaceae	X		X				X	X	-	-
Mitchella repens L.	partridgeberry	Rubiaceae		X							-	-
Myosotis scorpioides L.	true forget-me-not	Boraginaceae	X				X				-	-
Oenothera biennis L.	common evening primrose	Onagraceae			X				X		-	-
Onoclea sensibilis L.	sensitive fern	Dryopteridaceae	X	X			X	X			-	-
Osmunda claytoniana L.	interrupted fern	Osmundaceae	X	X				X			-	-
Oxalis stricta L.	common yellow oxalis	Oxalidaceae			X	X					-	-
Parthenocissus quinquefolia (L.) Planch.	Virginia creeper	Vitaceae	X	X	X			X			-	-
Phalaris arundinacea L.	reed canarygrass	Poaceae			X						-	**WL**
Phleum pratense L.	timothy	Poaceae			X						-	-
Pinus strobus L.	eastern white pine	Pinaceae	X	X		X		X	X		-	-
Plantago lanceolata L.	narrowleaf plantain	Plantaginaceae				X			X		-	-
Plantago major L.	common plantain	Plantaginaceae			X				X	X	-	-
Polygonum cuspidatum Siebold & Zucc.	Japanese knotweed	Polygonaceae							X		-	**B**
Polygonum L.	knotweed	Polygonaceae			X						-	-
Populus deltoides W. Bartram ex Marshall	eastern cottonwood	Salicaceae	X						X	X	-	-
Populus grandidentata Michx.	bigtooth aspen	Salicaceae	X						X		-	-
Populus tremuloides Michx.	quaking aspen	Salicaceae				X			X	X	-	-
Potentilla recta L.	sulphur cinquefoil	Rosaceae	X				X				-	-
Prunella vulgaris L.	common selfheal	Lamiaceae		X	X		X				-	-
Prunus serotina Ehrh.	black cherry	Rosaceae						X			-	-
Prunus virginiana L.	chokecherry	Rosaceae		X							-	-
Pteridium aquilinum (L.) Kuhn	western brackenfern	Dennstaedtiaceae	X			X			X		-	-
Quercus rubra L.	northern red oak	Fagaceae		X							-	-
Ranunculus acris L.	tall buttercup	Ranunculaceae				X					-	-
Rhus typhina L.	staghorn sumac	Anacardiaceae	X			X			X	X	-	-
Rubus L.	blackberry	Rosaceae		X		X		X			-	-
Rubus odoratus L.	purpleflowering raspberry	Rosaceae	X								-	-
Rudbeckia hirta L.	blackeyed Susan	Asteraceae	X	X					X		-	-
Rumex crispus L.	curly dock	Polygonaceae		X	X				X		-	-
Salix L.	willow	Salicaceae							X		-	-
Scirpus cyperinus (L.) Kunth	woolgrass	Cyperaceae	X				X	X			-	-
Securigera varia (L.) Lassen	crownvetch	Fabaceae								X	-	-
Setaria pumila (Poir.) Roem. & Schult.	yellow foxtail	Poaceae			X						-	-
Silene latifolia Poir.	bladder campion	Caryophyllaceae	X								-	-
Silene vulgaris (Moench) Garcke	maidenstears	Caryophyllaceae	X		X		X		X		-	-

Species Checklist - RTE Plant Survey
Project: Lowell to Johnson Line Upgrade: B22 Line Component
Client: Green Mountain Power
Location: Morristown, Vermont
Survey Date(s): August 1, 2019 (A. Wood)
Prepared By: VHB - August 26, 2019

Scientific Name [1]	Common Name	Family	HABITAT/PROJECT AREA & CORRESPONDING NRCS SOIL SERIES								Vermont Rarity Rank[2]	Non-Native Invasive Species[3]
			Cadys Falls	Cemetery	Roadside	Field	Stream/Riparian	Skid Road	Junkyard	Substation		
			Limerick variant silt loam / Colton-Duxbury complex	Colton-Duxbury complex	Adams loamy fine sand / Colton-Duxbury complex	Colton-Duxbury complex / Boothbay silt loam / Adams loamy fine sand	Various soil types	Adams loamy fine sand / Colton-Duxbury complex	Adams loamy fine sand	Podunk fine sandy loam		
Solidago canadensis L.	Canada goldenrod	Asteraceae			X		X		X	X	-	-
Sonchus arvensis L.	field sowthistle	Asteraceae	X								-	-
Spergularia rubra (L.) J. Presl & C. Presl	red sandspurry	Caryophyllaceae			X						-	-
Spiraea alba Du Roi var. latifolia (Aiton) Dippel	white meadowsweet	Rosaceae	X	X	X	X	X	X	X	X	-	-
Spiraea tomentosa L.	steeplebush	Rosaceae	X	X				X	X		-	-
Stellaria graminea L.	grass-like starwort	Caryophyllaceae			X				X		-	-
Symphyotrichum laeve (L.) Á. Löve & D. Löve	smooth blue aster	Asteraceae		X							-	-
Taraxacum officinale F.H. Wigg.	common dandelion	Asteraceae	X		X						-	-
Thelypteris palustris Schott	eastern marsh fern	Thelypteridaceae					X				-	-
Thuja occidentalis L.	arborvitae	Cupressaceae	X	X							-	-
Tilia americana L.	American basswood	Tiliaceae	X								-	-
Trientalis borealis Raf.	starflower	Primulaceae		X							-	-
Trifolium arvense L.	rabbitfoot clover	Fabaceae			X					X	-	-
Trifolium campestre Schreb.	field clover	Fabaceae	X		X						-	-
Trifolium pratense L.	red clover	Fabaceae	X		X		X		X	X	-	-
Trifolium repens L.	white clover	Fabaceae			X				X		-	-
Tsuga canadensis (L.) Carrière	eastern hemlock	Pinaceae		X							-	-
Tussilago farfara L.	coltsfoot	Asteraceae	X						X		-	-
Typha angustifolia L.	narrowleaf cattail	Typhaceae	X								-	-
Typha latifolia L.	broadleaf cattail	Typhaceae	X								-	-
Ulmus americana L.	American elm	Ulmaceae	X								-	-
Verbascum thapsus L.	common mullein	Scrophulariaceae	X				X		X	X	-	-
Verbena hastata L.	swamp verbena	Verbenaceae							X		-	-
Vicia cracca L.	bird vetch	Fabaceae	X	X	X				X		-	-
Zea L.	corn	Poaceae				X					-	-

X: Denotes plant species was found in this community type or Project area.

[1] Nomenclature follows USDA-NRCS PLANTS database (2017).

[2] Vermont Rarity Rank from: Vermont Natural Heritage Inventory - Vermont Fish and Wildlife Department. 2018. *Rare and Uncommon Native Vascular Plants of Vermont.* Effective August 9, 2018.

[3] Class B Noxious Weeds Species (B) from: Vermont Agency of Agriculture, Food & Markets. 2012. *Quarantine #3- Noxious Weeds.*
Watch List Species (WL) from: Vermont Invasive Exotic Plant Committee. 2017. *Quarantine and Watch List Update.*

Appendix D
B20 Line Component: Flood Hazard and River Corridor Assessment Memorandum

Memorandum

To: GMP Johnson-Lowell Rebuild Project File

Date: October 29, 2019
Project #: 57955.00

From: Robert Wildey, P.E., CPESC
Water Resources Engineer

Thomas Bryce,
Water Resources Specialist

Re: B20 Line Component- Floodplain and River Corridor Assessment

At the request of Green Mountain Power ("GMP" or "co-Petitioner"), VHB conducted database and field assessments of natural resources in support of a line rebuild project for an approximately 18.15-mile segment of the GMP B20 transmission line traversing from the Johnson Substation (Johnson, Vermont) through Eden, Vermont, to the Lowell Substation (Lowell, Vermont) ("B20 Line" or "B20 Line Component"). The contents of this technical memorandum present the results from VHB's assessment of potential impacts from B20 Line Component activity to the Floodways criterion as reviewed under 30 V.S.A. Section 248(b)(5). This memorandum is intended to supplement VHB's overall Natural Resources Report prepared to collectively summarize each of the components of the Johnson-Lowell Line Rebuild Project, in which the B20 Line segment is one component.

FLOODWAYS [§ 6086(a)(1)(D)]

The Act 250 Floodway criterion (10 V.S.A. § 6086(a)(1)(D)), as incorporated into Section 248 review, takes into consideration a project's effect on both floodways and floodway fringes. The term "floodway" is defined to mean "the channel of a watercourse which is expected to flood on an average of at least once every 100 years and the adjacent land areas which are required to carry and discharge the flood of the watercourse." [10 V.S.A. § 6001(6)]. The term "floodway fringe" is defined as "an area which is outside of a floodway and is flooded with an average frequency of once or more in each 100 years." [Id. § 6001(7)]. A project's impacts are considered with respect to both flood inundation and fluvial erosion hazards pursuant to ANR Flood Hazard Area and River Corridor Protection Rule (ANR 2014). The Flood Hazard Area and River Corridor Protection Procedure ("FHARC Procedure", ANR 2017) addresses both inundation risks as represented by Federal Emergency Management Agency ("FEMA")-mapped flood information and potential fluvial erosion risks associated with the geomorphic principles necessary to achieve stable fluvial processes. These geomorphic principles are incorporated in the River Corridor concept, consisting of the meander belt or fluvial erosion hazard area, which is defined as the lateral width of a stream corridor that may be subject to fluvial erosion from stream channel lateral migration and a 50-foot riparian buffer outside of this meander belt (ANR 2017). The meander belt is typically determined by geomorphic assessments of channel bankfull width, meander centerline, confining lateral topography, channel type, and current channel adjustments, which is then translated into the channel-width to belt-width ratio, dependent on stream sensitivity type and adjacent landform.

Flood Hazard Area Mapping

VHB reviewed the available FEMA data for Orleans and Lamoille County in order to determine if any portions of the Study Area are situated within designated floodways or floodway fringes, as shown on Flood Insurance Rate Maps ("FIRMs") 500254B (FEMA, 1985), 500229 (FEMA, 1974), and 5000630010C (FEMA, 1987), copies of which are included in Attachment 1. VHB digitized the approximate extent of designated special flood hazard areas ("SFHA") for use on VHB's overall Natural Resources Map series (which is included with VHB's Natural Resources Report for the Project) and to guide the B20 Line Component design. However, a detailed flood study (and therefore, the extents of defined floodways) is only available for portions of the Study Area within the Town of Johnson. As a result, the approximate

40 IDX Drive, Building 100
Suite 200
South Burlington, Vermont 05403

Memorandum

mapping does not represent a detailed analysis of the flood hazard in all areas, but has been digitized by VHB for display on the Natural Resources Map series and has been used as the basis of this analysis. Based on the mapping of the available data, existing structures associated with the B20 Line Component occur in eight areas of approximate Zone A special flood hazard areas ("SFHAs") and no portions of the B20 Line Component would occur within the designated floodways. Approximate base flood elevations ("BFEs") were evaluated at these locations by overlaying the digitized Zone A polygons over LIDAR-derived topographic data available from VCGI. A summary of existing structures and the associated BFE within Flood Hazard Area and River Corridor Areas is included on page 1 of Attachment 2.

Existing structures 127, 128, and 129 are located within the SFHA of the Gihon River along VT Route 100 (see Sheets 24 and 25 of the Natural Resources Map series). Existing structures 239, 240, and 245 are located within the SFHA of the Burgess Branch (see Sheet 12 of the Natural Resources Map series). Existing pole 286 is located within the SFHA of an Unnamed tributary to Burgess Branch (see Sheet 8 of the Natural Resources Map series). Existing pole 337 is located within the SFHA of the Missisquoi River along VT Route 100.

The B20 Line Component will involve the replacement of the eight structures located within SFHAs, replacing the existing structures identified above. Because the transmission corridor must cross the SFHA within the existing right-of-way and pole spacing is limited by engineering requirements for safe operation, it is not possible to completely avoid placement of structures within the SFHA in these areas. However, the B20 Line Component has been designed where feasible to locate replacement structures in more favorable locations that would be less impacted during a flooding event, either farther from the source of flooding or at a higher elevation within the floodplain.

Four proposed structures within mapped SFHAs will be at the same elevation as the existing structures that they replace (130, 131, 132, 341). These structures are within the relatively broad floodplains of the Missisquoi River (341) or Gihon River (130-132). However, the ground surface at all of these structures is above the approximate BFE, except for structure 131 which is below the approximate BFE by one foot. Due to the broad valley floor in this location, it is not possible to relocate this structure to a higher elevation. Three proposed structures within mapped SFHAs will be at a higher elevation than the existing structures that they replace (245, 249, 290) and will be above the approximate BFE once constructed. One proposed structure (244) is at a lower elevation than under existing conditions, but the base of the new structure would be at the same elevation as the approximate BFE. However, the relocation of this structure allows an adjacent structure (245) to be elevated above the BFE, thereby resulting in an overall improvement in flood resilience. A summary of proposed structures within Flood Hazard Area and River Corridor Areas is included on page 2 of Attachment 2.

GMP understands that new structures within floodplains would require registration in accordance with the FHARC General Permit and would include installation methods that meet the Flood Hazard Area Standard (which, under the "no adverse impact standard," utility poles are considered an exception). The installation of all structures would occur with minimal ground disturbance and would not change the floodplain capacity within the Study Area. No new structures are proposed to be installed within the identified SFHAs.

Memorandum

River Corridor Mapping
VHB also reviewed the DEC River Corridor data published to ANR Natural Resources Atlas (ANR, 2019) for streams in the Study Area and found that portions of the Study Area occur within the DEC-mapped River Corridors for Burgess Branch, Gihon River, Wild Brook, Stony Brook, and the Missisquoi River.

Under existing conditions, there are 16 structures within DEC-mapped river corridors: one structure within the river corridor of the Missisquoi River, four structures within the river corridor of the Burgess Branch, one structure within the river corridor of an Unnamed Tributary to Burgess Branch, eight structures within the river corridor of the Gihon River, one structure within the river corridor of Stony Brook and one structure within the river corridor of Wild Brook.

In addition to the DEC-mapped river corridors, VHB field-mapped perennial stream channels within the Study Area that are subject to a 50-foot river corridor. Based on this mapping, VHB identified seven existing structures located within river corridors, including one structure along Dark Branch that is just upstream from the DEC-mapped river corridor. Both DEC and VHB-mapped river corridors are depicted on the Natural Resources Map series and structure locations within river corridors are identified on the Summary of Existing Utility Pole Locations included in Attachment 2.

The B20 Line Component result in four fewer structures located within river corridors than under existing conditions. The 15 structures that will be located within DEC-mapped river corridors and four structures that will be located within VHB-mapped river corridors will replace the existing structures described previously and are designed to be in locations that will be more resilient to lateral channel migration than the existing structures.

As with the SFHA, GMP understands that new structures within river corridors would require registration in accordance with the FHARC General Permit for "*Replacement or additional utility network poles, including related pole anchoring and supports, associated with an existing utility network transmission line and that are no closer to the river than the pre-existing poles.*"

SUMMARY
The B20 Line Component has been designed to increase the reliability of the utility system and the structures have been located to avoid and minimize impacts within flood hazard areas and river corridors. As designed and as reviewed in the field and discussed in pre-application coordination with the DEC Rivers Program, the B20 Line Component reduces the number of structures within these areas and therefore in VHB's judgement represents an overall improvement over existing structure location. As such, and following the procedures outlined in the General Permit for Registration or Application (if required by the Secretary), the proposed B20 Line Component would not restrict or divert the flow of flood waters (floodway or floodway fringe), or endanger the health, safety, and welfare of the public, riparian, or downstream landowners during flooding or from potential erosion.

ATTACHMENTS

1. FEMA Flood Insurance Rate Maps
2. Summary of Existing Structure Locations: Flood Hazard Area & River Corridor Areas

Memorandum

REFERENCES AND POTENTIAL SOURCES OF INFORMATION

FEMA. 1974. Federal Emergency Management Agency. Flood Insurance Rate Map – Town of Eden, Vermont. Effective Date: December 6, 1974. Accessed online: http://www.msc.fema.gov. Accessed March 8, 2019.

FEMA. 1985. Federal Emergency Management Agency. Flood Insurance Rate Map – Town of Lowell, Vermont. Effective Date: December 4, 1985. Accessed online: http://www.msc.fema.gov. Accessed: March 8, 2019.

FEMA. 1987. Federal Emergency Management Agency. Flood Insurance Rate Map – Town of Johnson, Vermont. Effective Date: April 17, 1987. Accessed online: http://www.msc.fema.gov. Accessed March 8, 2019.

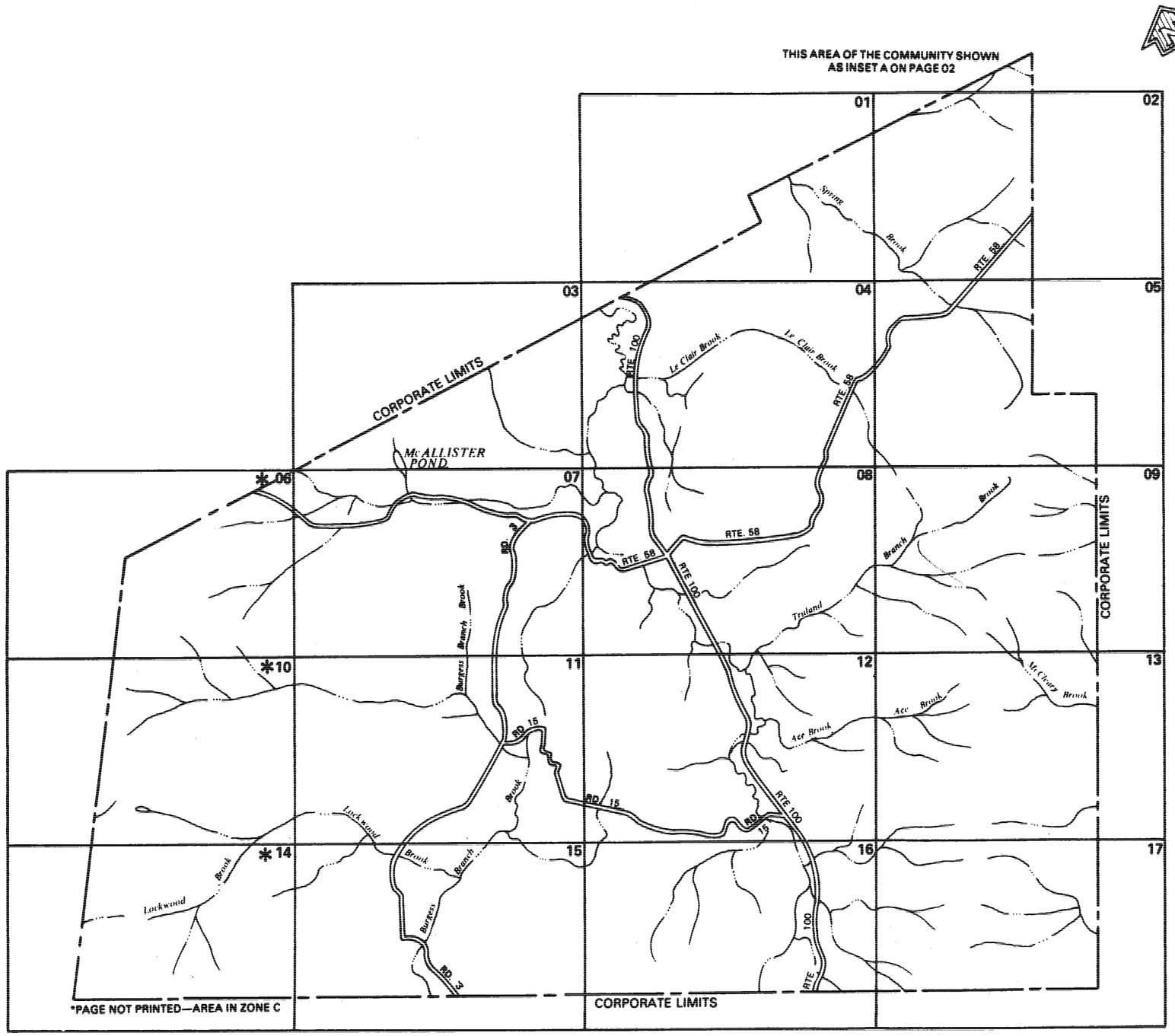
ANR. 2009. Technical Guidance for Determining Floodway Limits Pursuant to Act 250 Criterion 1(D). Updated October 9, 2009.

ANR. 2014. Vermont Department of Environmental Conservation Flood Hazard Area and River Corridor Protection Rule, Adopted October 24, 2014; Effective March 1, 2015.

ANR. 2017. Vermont Department of Environmental Conservation Flood Hazard Area and River Corridor Protection Procedure, Effective September 7, 2017.

ANR. 2019. Vermont Agency of Natural Resources - Natural Resources Atlas. Updated March 13, 2019. Accessed online: https://anrmaps.vermont.gov/websites/ANRA5/default.html. Accessed: March 8, 2019.

ATTACHMENT 1



KEY TO SYMBOLS

ZONE DESIGNATIONS*

ZONE C

ZONE A

ZONE C

Base Flood Elevation Line with elevation in feet	513
Base Flood Elevation where uniform within zone	(EL 987)
Elevation Reference Mark	RM7x
River Mile	• M1.5

*EXPLANATION OF ZONE DESIGNATIONS

A flood insurance map displays the zone designations for a community according to areas of designated flood hazards. The zone designations used by FEMA are:

Zone	Explanation
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding; flood depth 1 to 3 feet; product of flood depth (feet) and velocity (feet per second) less than 15.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by a flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Area between limits of 100-year flood and 500-year flood; areas of 100-year shallow flooding where depths less than 1 foot.
C	Areas outside 500-year flood.
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factor determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620.

INITIAL IDENTIFICATION: **SEPTEMBER 20, 1974**

FLOOD HAZARD BOUNDARY MAP REVISIONS: **SEPTEMEBER 17, 1976**

FLOOD INSURANCE RATE MAP EFFECTIVE: DECEMBER 4, 1985

FLOOD INSURANCE RATE MAP REVISIONS:

federal emergency management agency

FIRM

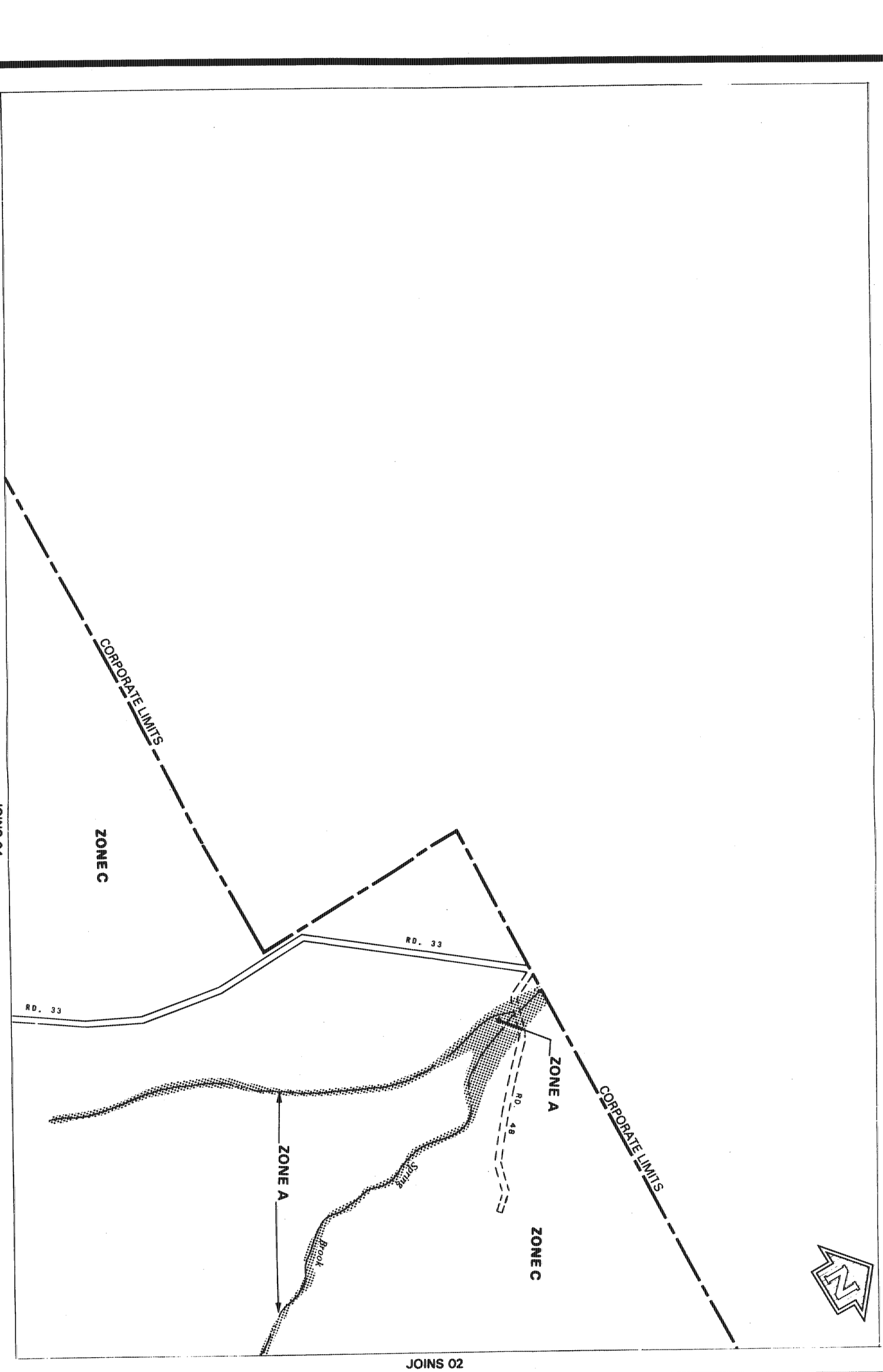
FLOOD INSURANCE RATE MAP 01-17

MAP INDEX

TOWN OF LOWELL, VT

ORLEANS COUNTY

COMMUNITY NUMBER 500254 B



federal emergency management agency

TOWN OF LOWELL, VT

ORLEANS COUNTY

01

APPROXIMATE SCALE

1000 0 1000 2000 3000 FEET

FLOOD INSURANCE RATE MAP

COMMUNITY NUMBER 500254

EFFECTIVE DATE

DECEMBER 4, 1985

SEE INSET A

ZONE C

CORPORATE LIMITS

ZONE A

ZONE C

JOINS 01

Spring Brook

ZONE A

ZONE C

ZONE C

Spring Brook

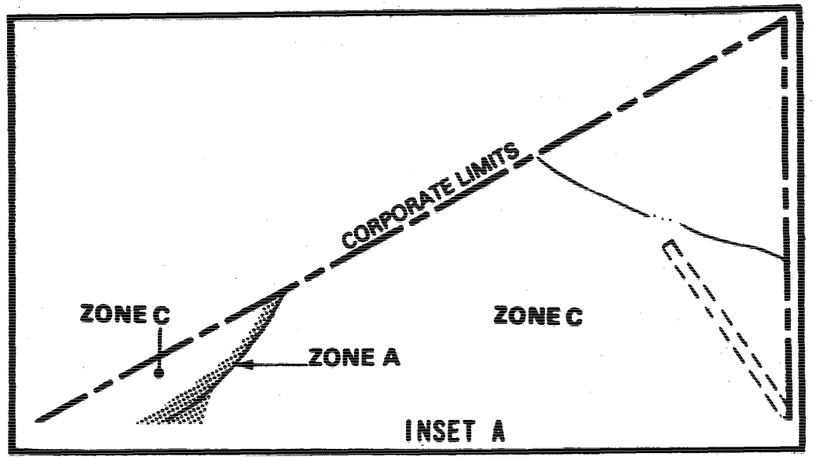
RTE. 58

RTE. 58

RD. 48

CORPORATE LIMITS

JOINS 05



APPROXIMATE SCALE

1000 0 1000 2000 3000 FEET

EFFECTIVE DATE

FLOOD INSURANCE RATE MAP

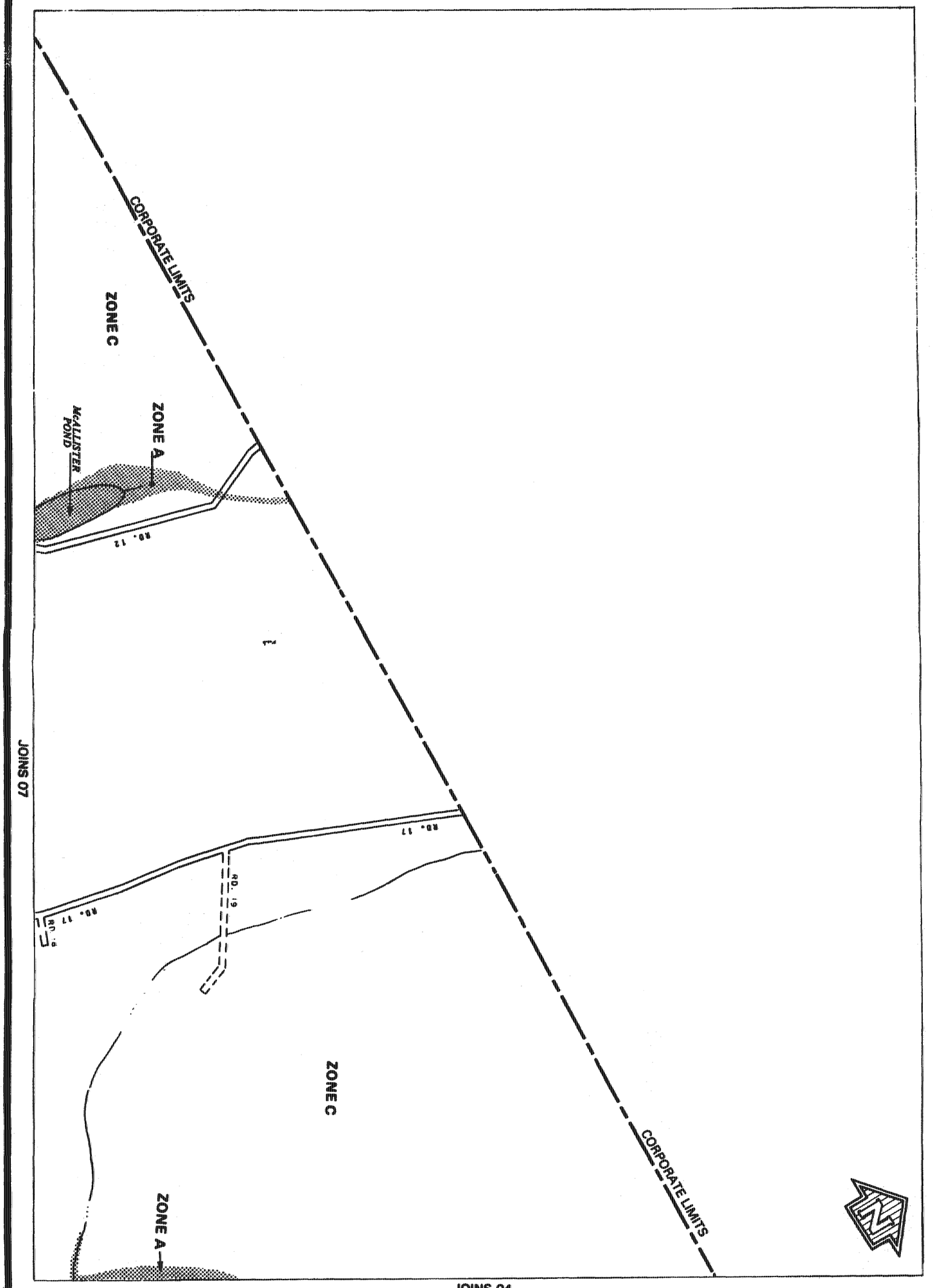
COMMUNITY NUMBER 500264

federal emergency management agency

TOWN OF LOWELL, VT

ORLEANS COUNTY

02



03	federal emergency management agency **TOWN OF LOWELL, VT** ORLEANS COUNTY	APPROXIMATE SCALE 1000 0 1000 2000 3000 FEET FLOOD INSURANCE RATE MAP COMMUNITY NUMBER 500254	EFFECTIVE DATE DECEMBER 4, 1985

JOINS 01

JOINS 03

JOINS 05

JOINS 08

CORPORATE LIMITS

RTE. 100

RTE. 58

RD. 33

RD. 35

RD. 36

RD. 42

RD. 34

RD. 41

RD. 28

Le Clair Brook

East Branch

ZONE A

ZONE C

APPROXIMATE SCALE

3000 FEET 2000 1000 0 1000

EFFECTIVE DATE

DECEMBER 1, 1988

FLOOD INSURANCE RATE MAP

COMMUNITY NUMBER 500254

federal emergency management agency

TOWN OF LOWELL, VT

ORLEANS COUNTY

04

JOINS 04

JOINS 09

JOINS 02

ZONE C

ZONE A

ZONE C

Sprite Brook

Le Clair Brook

RTE. 58

RTE. 58

RTE. 58

CORPORATE LIMITS

CORPORATE LIMITS

60

federal emergency management agency

TOWN OF LOWELL, VT

ORLEANS COUNTY

APPROXIMATE SCALE

1000 0 1000 2000 3000 FEET

FLOOD INSURANCE RATE MAP

COMMUNITY NUMBER 500264

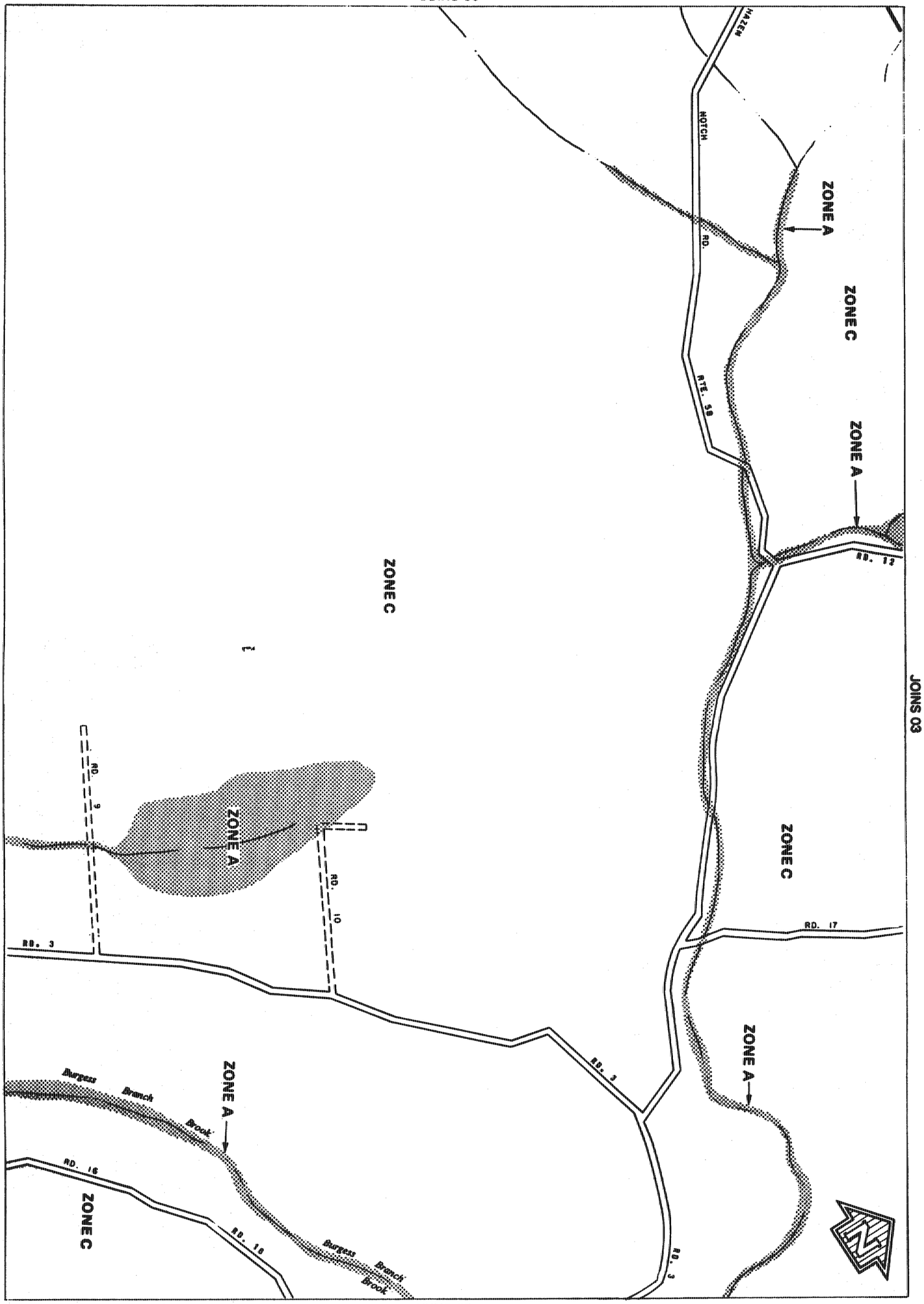
EFFECTIVE DATE

DECEMBER 4, 1998

JOINS 06

JOINS 11

JOINS 03



JOINS 08

07

federal emergency management agency

TOWN OF LOWELL, VT

ORLEANS COUNTY

APPROXIMATE SCALE

1000 0 1000 2000 3000 FEET

FLOOD INSURANCE RATE MAP

COMMUNITY NUMBER 500254

EFFECTIVE DATE

DECEMBER 1, 1988

federal emergency management agency

TOWN OF LOWELL, VT

ORLEANS COUNTY

APPROXIMATE SCALE

1000 0 1000 2000 3000 FEET

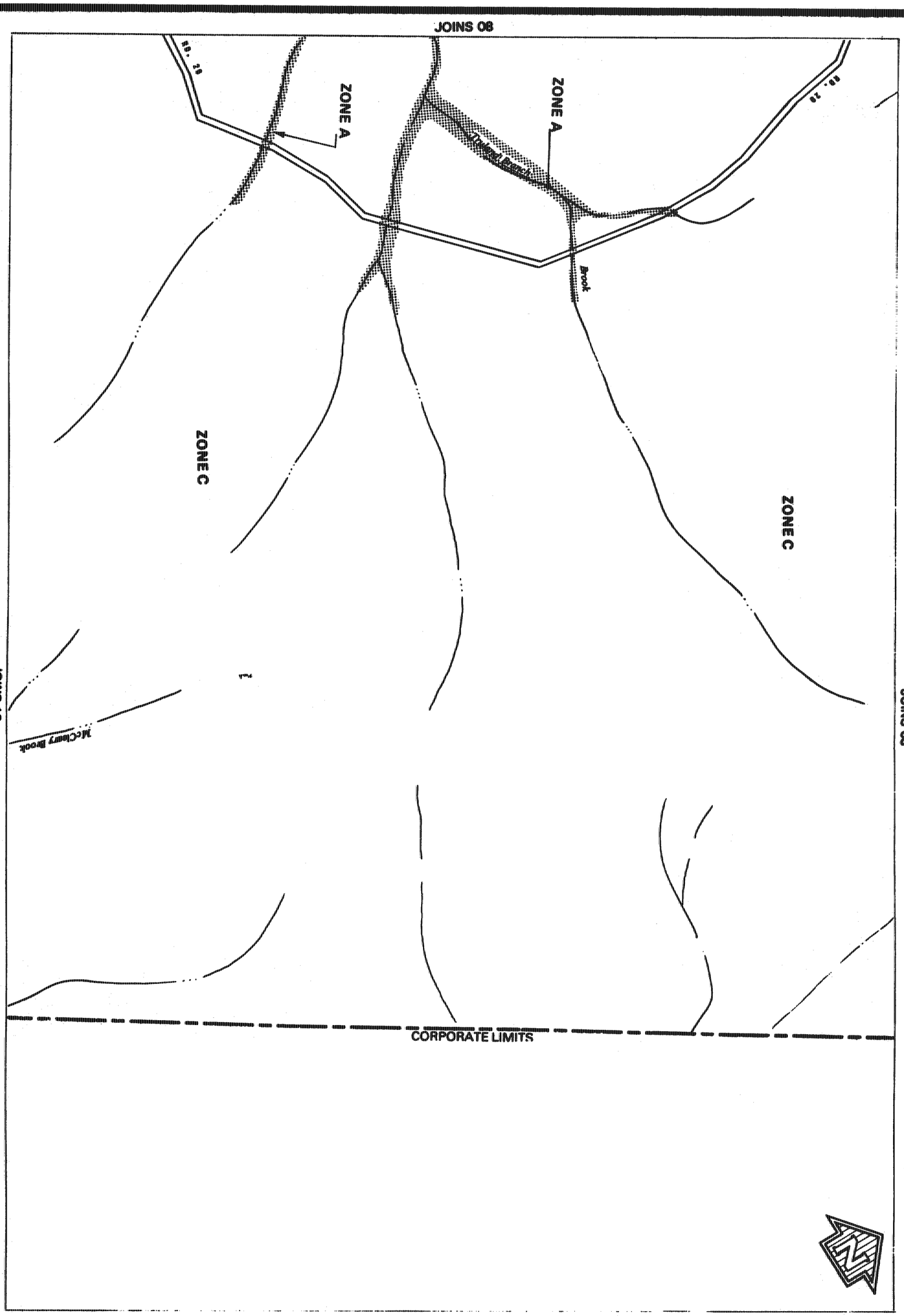
FLOOD INSURANCE RATE MAP

COMMUNITY NUMBER 500254

EFFECTIVE DATE

DECEMBER 4, 1986

08



08

federal emergency management agency

TOWN OF LOWELL, VT

ORLEANS COUNTY

APPROXIMATE SCALE

1000 0 1000 2000 3000 FEET

FLOOD INSURANCE RATE MAP

COMMUNITY NUMBER 500254

EFFECTIVE DATE

DECEMBER 4, 1986

JOINS 10

JOINS 16

JOINS 07

ZONE C

Lockwood Brook

ZONE C

Lockwood Brook

RD. 1

ZONE A

RD. 3

ZONE C

RD. 8

ZONE A

RD. 13

ZONE A

ZONE C

RD. 3

RD. 8

RD. 3

ZONE C

Burgess Branch Brook

ZONE A

Burgess Branch Brook

RD. 15

RD. 14

RD. 18

RD. 15

ZONE C

JOINS 12

11

federal emergency management agency

TOWN OF LOWELL, VT

ORLEANS COUNTY

APPROXIMATE SCALE

1000 0 1000 2000 3000 FEET

FLOOD INSURANCE RATE MAP

COMMUNITY NUMBER 500254

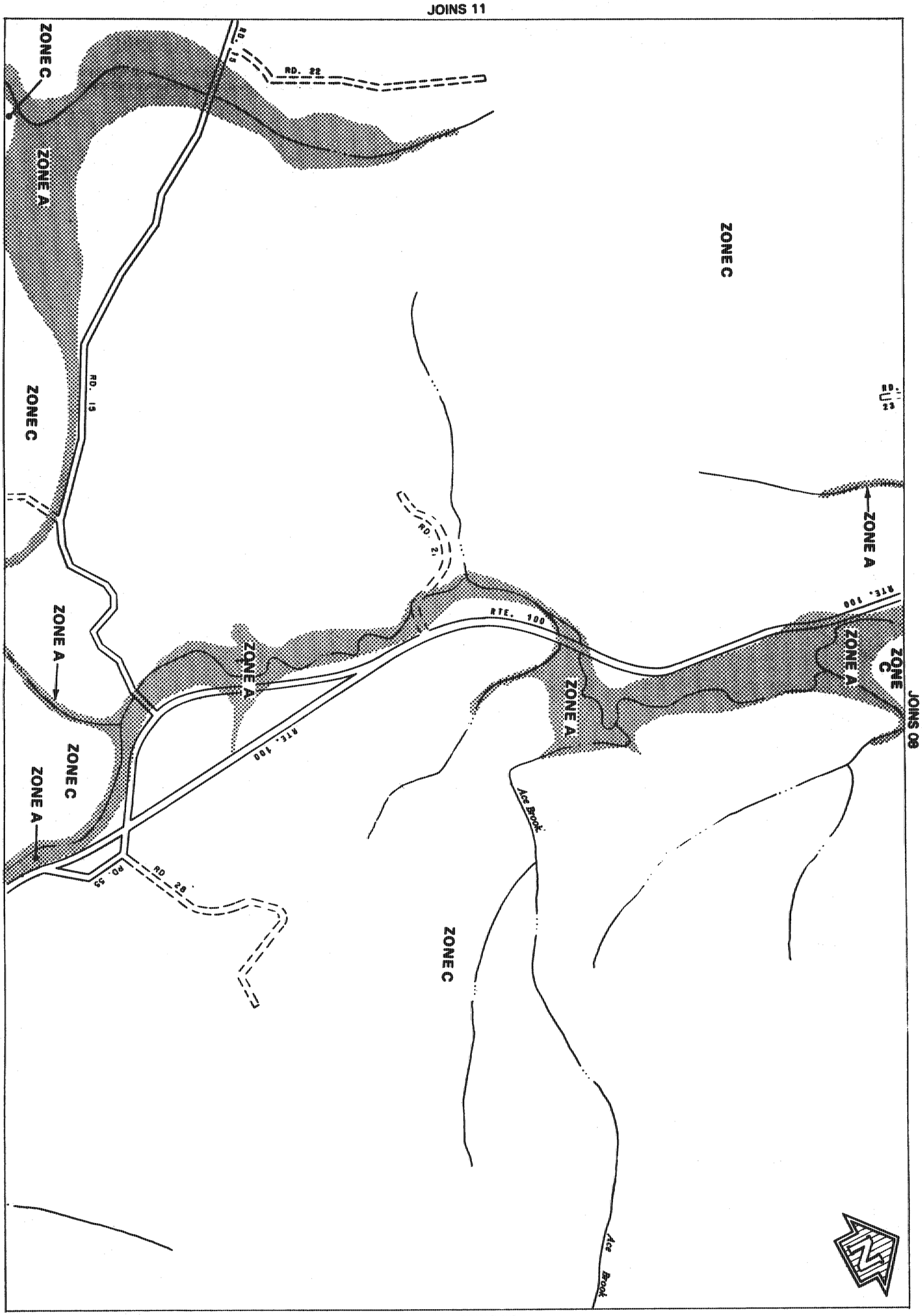
EFFECTIVE DATE

DECEMBER 4, 1986

JOINS 11

JOINS 16

JOINS 08



JOINS 13

federal emergency management agency

TOWN OF LOWELL, VT

ORLEANS COUNTY

12

APPROXIMATE SCALE

1000 0 1000 2000 3000 FEET

FLOOD INSURANCE RATE MAP

COMMUNITY NUMBER 500254

EFFECTIVE DATE

DECEMBER 4, 1990

federal emergency management agency

TOWN OF LOWELL, VT

ORLEANS COUNTY

13

FLOOD INSURANCE RATE MAP

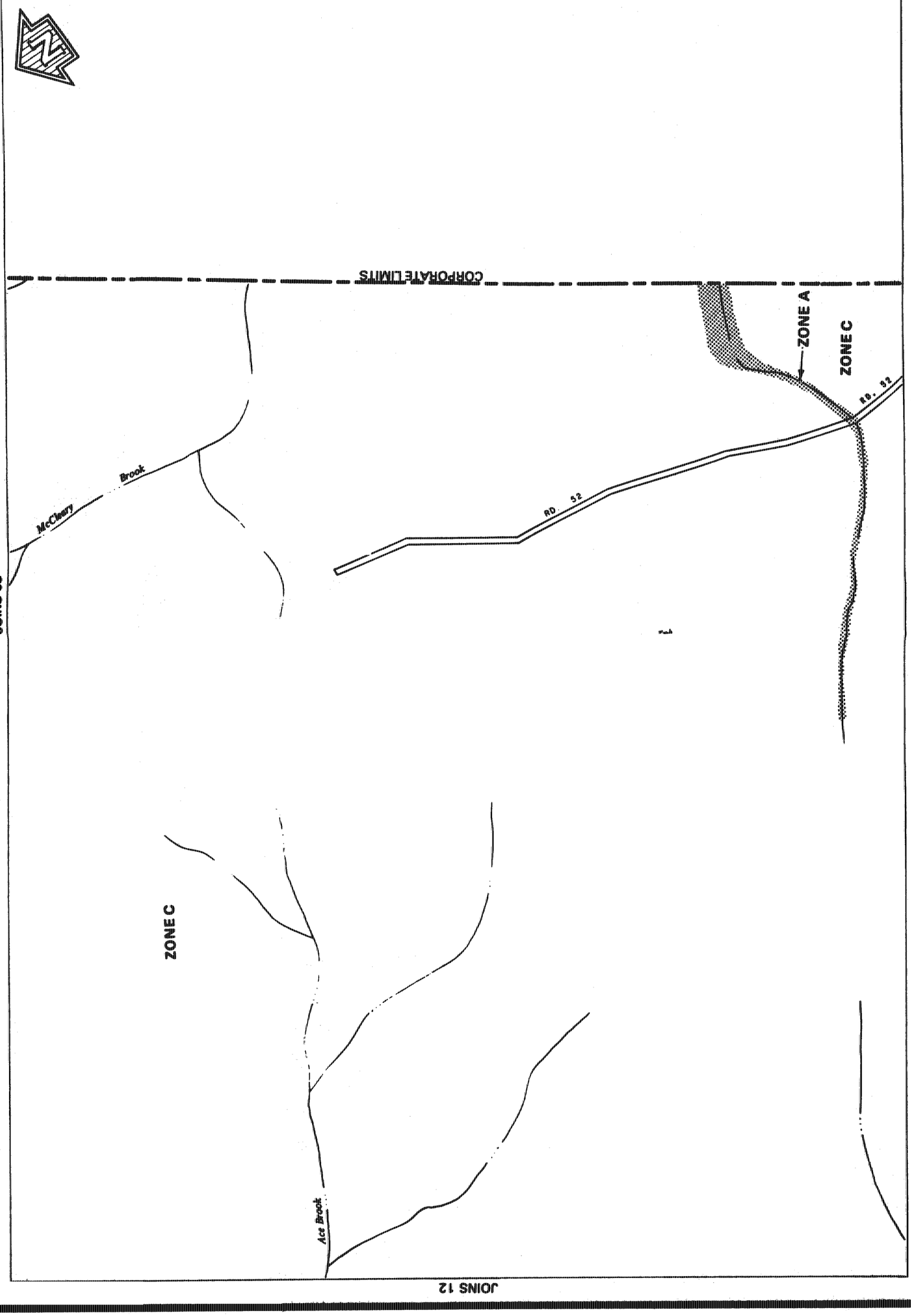
COMMUNITY NUMBER 500254

EFFECTIVE DATE

DECEMBER 4, 1984

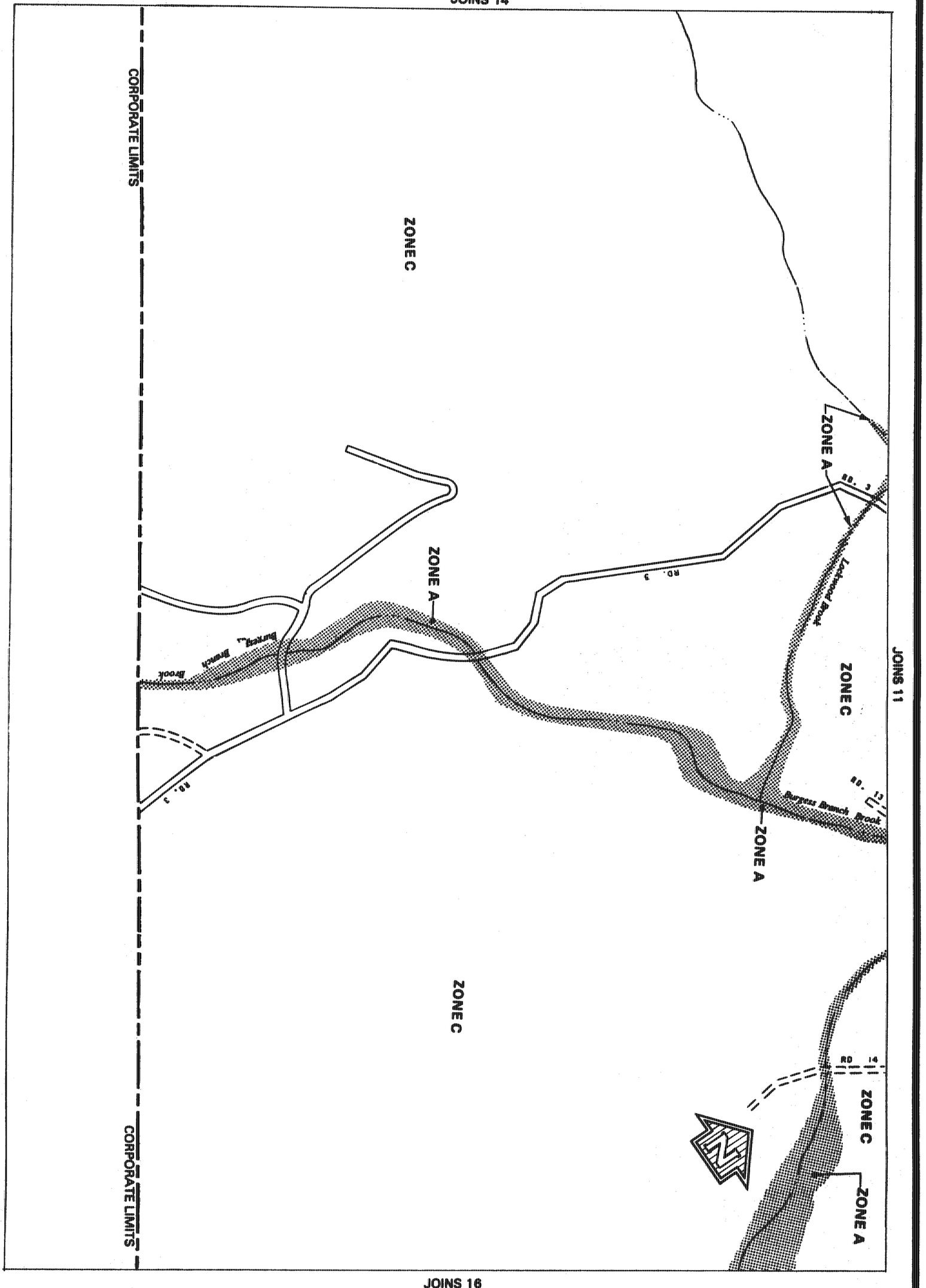
APPROXIMATE SCALE

1000 0 1000 2000 3000 FEET



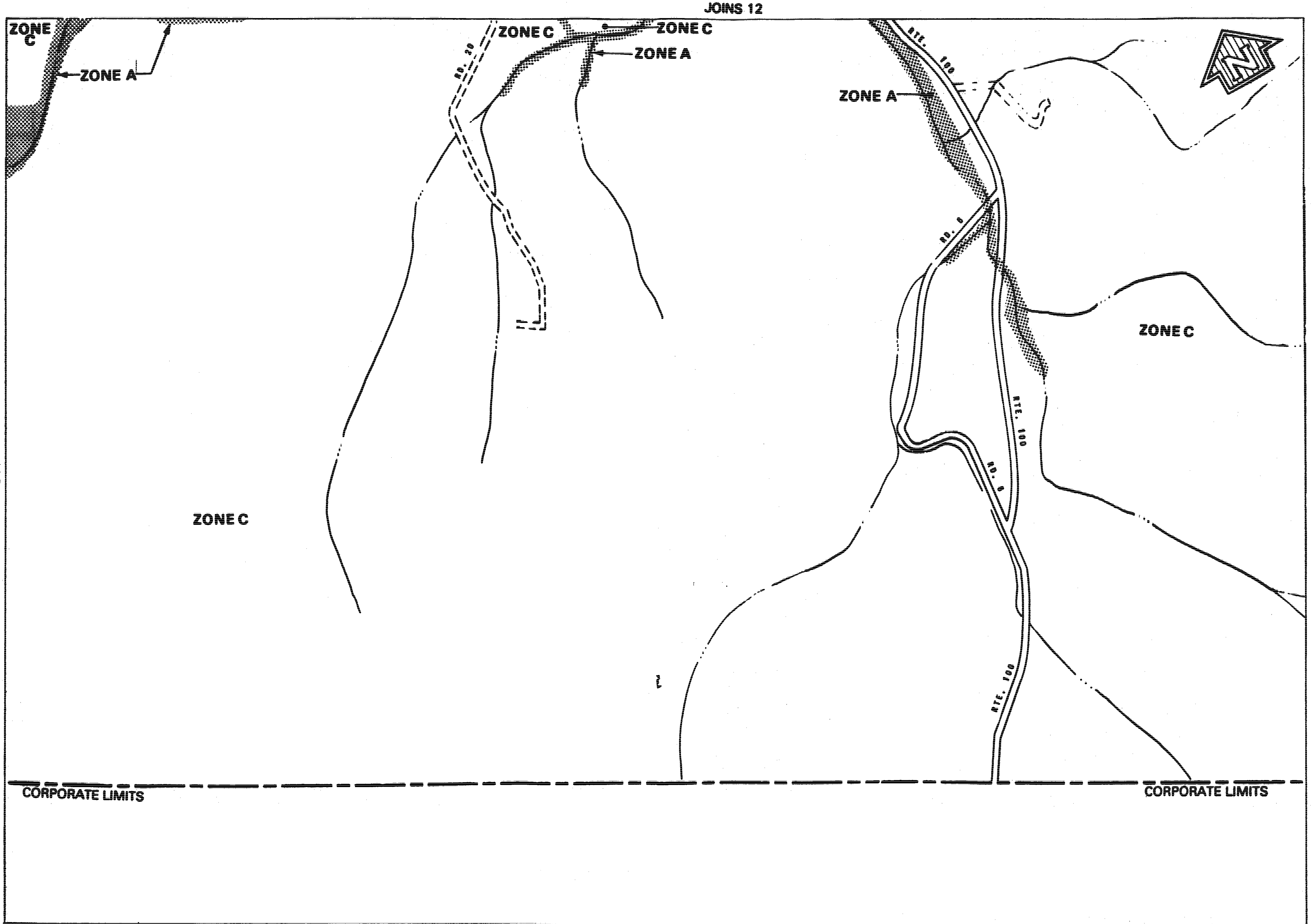
JOINS 14

JOINS 11



JOINS 16

15	federal emergency management agency **TOWN OF LOWELL, VT** ORLEANS COUNTY	APPROXIMATE SCALE 1000 0 1000 2000 3000 FEET FLOOD INSURANCE RATE MAP COMMUNITY NUMBER 500254	EFFECTIVE DATE DECEMBER 4, 1991



APPROXIMATE SCALE

1000 0 1000 2000 3000 FEET

EFFECTIVE DATE

DECEMBER 4, 19[illegible]

FLOOD INSURANCE RATE MAP

COMMUNITY NUMBER 500254

federal emergency management agency

TOWN OF LOWELL, VT

ORLEANS COUNTY

16

JOINS 16

ZONE C

CORPORATE LIMITS

RD. 50

ZONE A

ZONE A

RD. 50

ZONE C

RD. 50

CORPORATE LIMITS

JOINS 13

17

federal emergency management agency

TOWN OF LOWELL, VT

ORLEANS COUNTY

APPROXIMATE SCALE

1000 0 1000 2000 3000 FEET

FLOOD INSURANCE RATE MAP

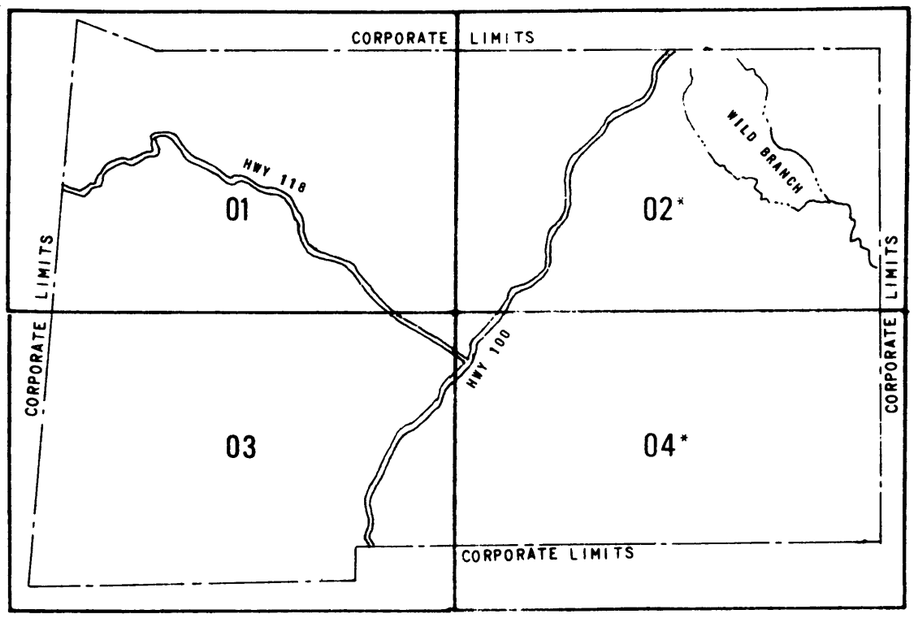
COMMUNITY NUMBER 500254

EFFECTIVE DATE

DECEMBER 4, 1985

These maps may not include all Special Flood Hazard Areas in the community. After a more detailed study, the Special Flood Hazard Areas shown on these maps may be modified, and other areas added.
Consult NFIA Servicing Company or local insurance agent or broker to determine if properties in this community are eligible for flood insurance.

Community No. 500229



LEGEND

Levee

Sea Wall

SPECIAL FLOOD HAZARD AREA — ZONE A

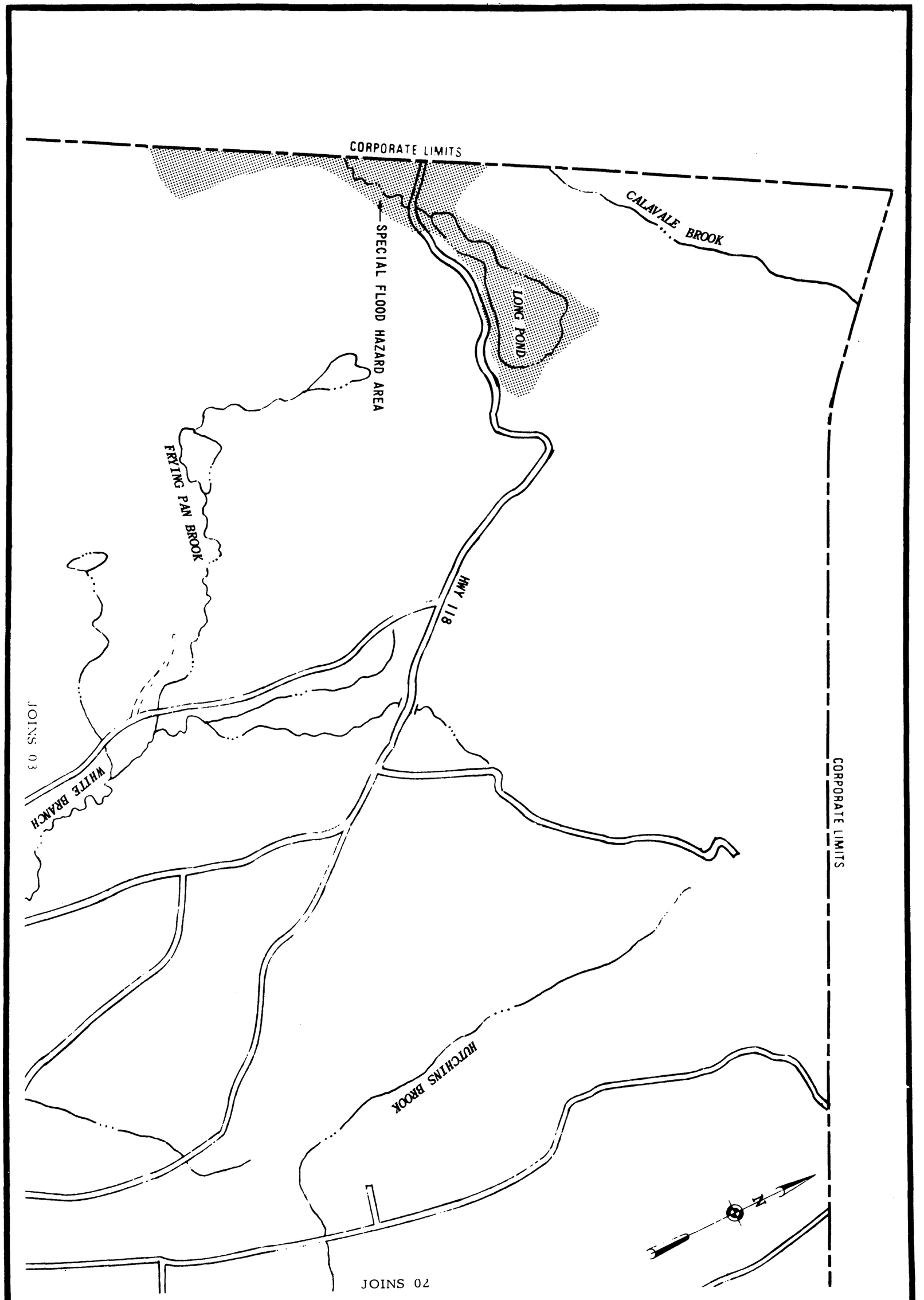
* NOT PRINTED (DATA NOT AVAILABLE)

SPECIAL FLOOD HAZARD AREA
IDENTIFICATION DATE
DECEMBER 6, 1974

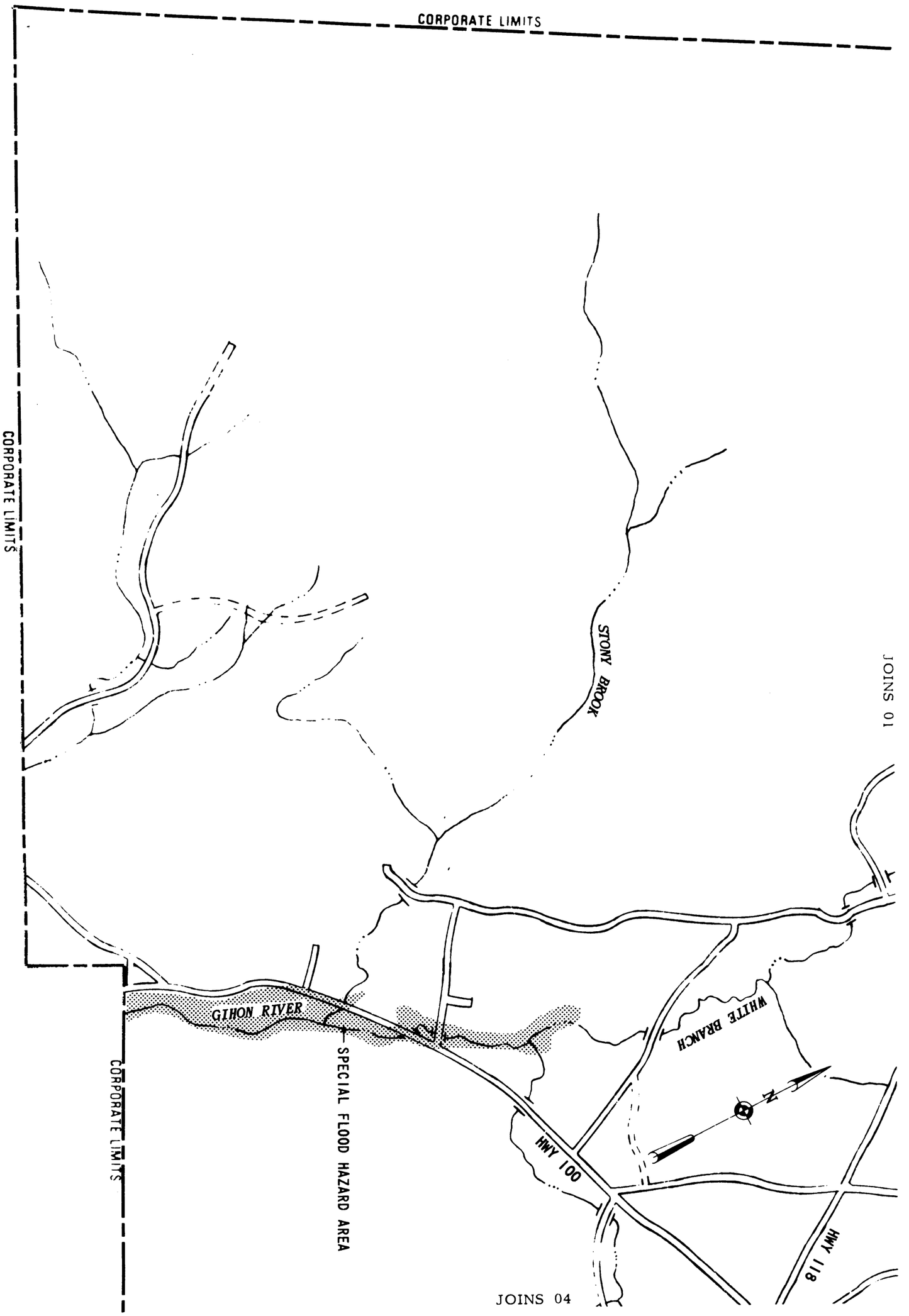
(NUMBERS ON THIS INDEX REFER TO THE LAST TWO DIGITS OF INDIVIDUAL MAP NUMBERS)

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration
TOWN OF EDEN, VT
(LAMOILLE CO.)

MAP INDEX
FIA FLOOD HAZARD BOUNDARY MAPS
No H 01-04



01	DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT Federal Insurance Administration TOWN OF EDEN, VT (LAMOILLE CO.)	APPROXIMATE SCALE 1000 0 2000 4000 6000 FEET	
		FIA FLOOD HAZARD BOUNDARY MAP No. H 01	Effective Date: DECEMBER 6, 1974



03

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration
TOWN OF EDEN, VT
(LAMOILLE CO.)

APPROXIMATE SCALE
1000 0 2000 4000 6000 FEET

FIA FLOOD HAZARD BOUNDARY MAP
No. H 03

Effective Date:
DECEMBER 6, 1974

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

- **ZONE A** — No base flood elevations determined.
- **ZONE AE** — Base flood elevations determined.
- **ZONE AH** — Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- **ZONE AO** — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE A99** — To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined.
- **ZONE V** — Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- **ZONE VE** — Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

- **ZONE X** — Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

- **ZONE X** — Areas determined to be outside 500-year flood plain.
- **ZONE D** — Areas in which flood hazards are undetermined.

- Flood Boundary
- Floodway Boundary
- Zone D Boundary
- Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.
- 513 — Base Flood Elevation Line; Elevation in Feet*
- D — D — Cross Section Line
- (EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone*
- RM7 X — Elevation Reference Mark

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside special flood hazard areas. The coastal flooding elevations shown may differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

Elevation reference marks are described in the Flood Insurance Study Report.

Coastal base flood elevations apply only landward of 0.0 NGVD.

Coastal base flood elevations shown on this map include the effects of wave action.

For adjoining map panels see separately printed Map Index.

MAP REPOSITORY

Town Clerk's Office, Johnson, Vermont, 05656 (Maps available for reference only, not for distribution).

INITIAL IDENTIFICATION:
JUNE 21, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS:
JANUARY 28, 1977

FLOOD INSURANCE RATE MAP EFFECTIVE:
FEBRUARY 1, 1979

FLOOD INSURANCE RATE MAP REVISIONS:
April 17, 1987-to lower base flood elevations and to reduce special flood hazard areas.

To determine if flood insurance is available, contact an insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE
1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
JOHNSON, VERMONT
LAMOILLE COUNTY

PANEL 10 OF 15
(SEE MAP INDEX FOR PANELS NOT PRINTED)

PANEL LOCATION

COMMUNITY-PANEL NUMBER
500063 0010 C

MAP REVISED:
APRIL 17, 1987

Federal Emergency Management Agency

ATTACHMENT 2

Summary of Existing Structure Locations
Flood Hazard Area & River Corridor ("FHARC") Areas
Client: Green Mountain Power Corporation ("GMP")
Project: B20 Lowell-Johnson Transmission Line
Prepared by VHB on: October 18, 2019

Location ID	Structure Height (Feet)	Town	FEMA Flood Zone	FEMA Map ID	FEMA Map Effective Date	Approximate Base Flood Elevation * (Feet)	Approximate Ground Surface Elevation (Feet)	River Corridor
337	50	Lowell	A	500254B	12/4/1985	808	808	Missisquoi River
286	40	Lowell	A	500254B	12/4/1985	1190	1191	Unnamed tributary to Burgess Branch
261	35	Lowell	-	-	-	-	-	2017-SC-126
245	40	Lowell	A	500254B	12/4/1985	1164	1157	Burgess Branch
244	40	Lowell	-	-	-	-	-	Burgess Branch
243	45	Lowell	-	-	-	-	-	Burgess Branch
241	45	Lowell	-	-	-	-	-	Burgess Branch
240	40	Lowell	A	500254B	12/4/1985	1186	1182	Not located in corridor (Burgess Branch)
239	35	Lowell	A	500254B	12/4/1985	1190	1202	Not located in corridor (Burgess Branch)
199	35	Eden	-	-	-	-	-	2017-TOB-DB / Dark Branch
189	35	Eden	-	-	-	-	-	2017-TOB-9
135	35	Eden	-	-	-	-	-	Gihon River
134	45	Eden	-	-	-	-	-	Gihon River
129	40	Eden	A	500229	12/6/1974	901	902	Gihon River
128	40	Eden	A	500229	12/6/1974	901	900	Gihon River
127	60	Eden	A	500229	12/6/1974	897	907	Not located in corridor (Gihon River)
120	35	Eden	-	-	-	-	-	Stony Brook
86	45	Johnson	-	-	-	-	-	Wild Brook
58	40	Johnson	-	-	-	-	-	2017-SC-400
57	45	Johnson	-	-	-	-	-	2017-SC-400
37	40	Johnson	-	-	-	-	-	2017-SC-102
34	45	Johnson	-	-	-	-	-	2017-SC-102
23	60	Johnson	-	-	-	-	-	Gihon River
13	35	Johnson	-	-	-	-	-	Gihon River
12	60	Johnson	-	-	-	-	-	Gihon River
11	50	Johnson	-	-	-	-	-	Gihon River

Notes:

* Approximate Base Flood Elevation determined using LIDAR-derived contours available from VCGI (http://maps.vcgi.vermont.gov/gisdata/vcgi/packaged_zips/ElevationContours_CN2T/)

Summary of Proposed Structure Locations
Flood Hazard Area & River Corridor ("FHARC") Areas
Client: Green Mountain Power Corporation ("GMP")
Project: B20 Lowell-Johnson Transmission Line
Prepared by VHB on: October 18, 2019

Location ID	Structure Height (Feet)	Town	FEMA Flood Zone	FEMA Map ID	FEMA Map Effective Date	Approximate Base Flood Elevation * (Feet)	Approximate Ground Surface Elevation (Feet)	River Corridor
341	60	Lowell	A	500254B	12/4/1985	808	808	Missisquoi River
290	50	Lowell	A	500254B	12/4/1985	1190	1192	Unnamed tributary to Burgess Branch
266	50	Lowell	-	-	-	-	-	2017-SC-126
249	50	Lowell	A	500254B	12/4/1985	1164	1161	Burgess Branch
248	50	Lowell	-	-	-	-	-	Burgess Branch
247	55	Lowell	-	-	-	-	-	Burgess Branch
246	65	Lowell	-	-	-	-	-	Burgess Branch
245	55	Lowell	A	500254B	12/4/1985	1186	1196	Not located in corridor (Burgess Branch)
244	60	Lowell	A	500254B	12/4/1985	1190	1190	Not located in corridor (Burgess Branch)
165	50	Eden	-	-	-	-	-	2017-SC-109
132	50	Eden	A	500229	12/4/1974	901	902	Gihon River
131	50	Eden	A	500229	12/5/1974	901	900	Gihon River
130	65	Eden	A	500229	12/6/1974	897	907	Not located in corridor (Gihon River)
123	55	Eden	-	-	-	-	-	Stony Brook
87	65	Johnson	-	-	-	-	-	Wild Brook
68	55	Johnson	-	-	-	-	-	2017-SC-130
57	60	Johnson	-	-	-	-	-	2017-SC-400
23	65	Johnson	-	-	-	-	-	Gihon River
22	65	Johnson	-	-	-	-	-	Gihon River
14	55	Johnson	-	-	-	-	-	Gihon River
13	60	Johnson	-	-	-	-	-	Gihon River
12	60	Johnson	-	-	-	-	-	Gihon River

Notes:

* Approximate Base Flood Elevation determined using LIDAR-derived contours available from VCGI (http://maps.vcgi.vermont.gov/gisdata/vcgi/packaged_zips/ElevationContours_CN2T/)

Appendix E
Lowell Substation Natural Resources Memorandum

Memorandum

To:	Tim Upton, Green Mountain Power Corporation	Date:	March 3, 2016
		Project #:	57808.00
From:	Chelsea Martin, Environmental Scientist	Re:	248 Natural Resources Assessment Lowell Substation Project, Lowell, Vermont

At the request of Green Mountain Power Corporation ("GMP" or "Petitioner"), VHB conducted a natural resources assessment, including a wetland and water delineation, in support of the rebuild of the GMP Lowell Substation (the "Project"). The existing substation is located at 2337 Vermont Route 100 in Lowell, Vermont. The new Substation will be located between the existing GMP Substation, and the new Vermont Electric Cooperative, Inc. ("VEC") substation just to the north of the proposed Project, which is depicted on the Natural Resources Map included in Attachment 1. The contents of this technical memorandum presents the results of a database and field assessments of natural resources, as well as addresses potential impacts to the 30 V.S.A. Section 248(b)(5) natural resources criteria from Project activity.

This memorandum summarizes results of an evaluation of the following Act 250 Criteria, which are also incorporated into the Public Service Board ("PSB") Section 248 review for a Certificate of Public Good ("CPG"):

- Outstanding Resource Waters (10 V.S.A. § 1424a(d))
- Water Pollution (§ 6086(a)(1) (in Part))
    - Headwaters (§ 6086(a)(1)(A))
    - Waste Disposal (§ 6086(a)(1)(B))
    - Floodways (§ 6086(a)(1)(D))
    - Streams (§ 6086(a)(1)(E))
    - Shorelines (§ 6086(a)(1)(F))
    - Wetlands (§ 6086(a)(1)(G))
    - Water Supply (§ 6086(a)(2-3))
    - Soil Erosion (§ 6086(a)(4))
    - Rare or Irreplaceable Natural Areas ("RINA")(§ 6086(a)(8)), and Necessary Wildlife Habitat and Endangered Species (§ 6086 (a)(8)(A))

An assessment of each criterion is presented in the Section 248 Natural Resources Site Screening Table in Attachment 2. The table includes a brief assessment of potential impacts to the natural resources covered by each criteria, as well as recommended approaches for follow-up detailed surveys, design or management options to avoid/minimize potential adverse effects, and identification of collateral environmental permits that may be required for the Project activity.

This memorandum includes a brief description of the existing site conditions, the Project description, and overall summary of the site screening resource assessments. Representative site photographs of the site are provided in Attachment 3. VHB has relied upon Project information and a site plan provided by GMP to assist in evaluating potential Project impacts to natural resources.

SITE DESCRIPTION

The Lowell Substation occurs in Northern Green Mountains biophysical region of Vermont, within the Missisquoi River watershed (HUC 8 – 04150407). Based on the Natural Resources Conservation Service ("NRCS") soil mapping, the dominant soils with the Study Area are Adams loamy find sand, 0 to 3 percent slopes. VHB's Natural Resources Map shows the limit of the existing substation yard. The existing substation yard measures approximately 105 feet by 50 feet

40 IDX Drive, Building 100
Suite 200
South Burlington, Vermont 05403

Memorandum

and is surrounded by a chain-link fence topped with barbed wire. The existing substation also includes the control building and an additional steel structure. Surface water drainage from the existing substation and the surrounding area flows to the north or east towards grassy or vegetated areas.

A second substation, owned by VEC, is located approximately 130 feet north of GMP's existing Lowell Substation. The land immediately surrounding the substations is primarily maintained as lawn with scattered evergreen trees, between the substations and VT Route 100. The surrounding area is comprised of a mix of low-density residential and commercial development along VT Route 100, agricultural land, forest, and existing transmission line infrastructure. The closest mapped surface water is the East Branch of the Missisquoi River located approximately 1,300 feet to the southwest of the Project site.

PROJECT DESCRIPTION

Pursuant to the Project, the proposed rebuild of the GMP Lowell substation will take place along the southeast corner of the existing VEC Substation, and will share a partial fence line. The proposed substation facility will include a new approximately 140-foot by 110-foot fenced in yard; new control building; and the new equipment and support components, including equipment foundations, grounding grid, oil containment system, transformers, switches, and breakers. The Project will also require relocating a small section of transmission line and installing one new structure, to accommodate the rebuilt substation design. Once the rebuilt substation is commissioned, the existing facilities will be demolished, including removing all of the existing substation components, which will be reused, recycled, or disposed of at the appropriate facilities. The site will then be graded and seeded to match the surrounding landscape of open field.

SECTION 248 NATURAL RESOURCES CRITERIA SUMMARY AND CONCLUSIONS

VHB conducted a natural resources assessment, which included both field assessments, conducted on September 20, 2015, and a desktop review of both public and privileged databases (State and federal), in support of the GMP Lowell Substation Project. The methods and results of these assessments are summarized in the Section 248 Natural Resources Site Screening Table (Attachment 3).

As summarized in the Section 248 Natural Resources Site Screening Table (Attachment 2), VHB queried the U.S. Fish and Wildlife Service's ("USFWS") online Information, Planning, and Conservation System ("IPaC") database for information regarding federal-listed species in the Project region (Orleans County). From the USFWS IPaC review, the Project Study Area occurs in the known range for the federally threatened and Vermont-endangered northern long-eared bat (*Myotis septentrionalis*, "NLEB"). In general, tree clearing can have direct or indirect impacts to protected forest bats, such as the NLEB. Direct impacts could result from felling a tree while being used by a maternity colony; and indirect impacts can occur if functional forest travel corridors are interrupted so bat travel between forest blocks is impeded. Based on the site plans provided by the Petitioner, Project construction would require removing approximately five (5) trees, as well as shrubs, between the proposed substation site and VT Route 100, to provide sufficient space for the relocated section of transmission line. The trees to be removed are eastern white pine (*Pinus strobus*), and are not contiguous to forested blocks in the vicinity, and do not function as a travel corridor. VHB consulted with the Vermont Fish and Wildlife Department ("FWD") (Bennet, February 29, 2016) who confirmed VHB's database search results, that there are no known hibernacula or summer roost trees in the Project vicinity. The five trees represent significantly less than 1-percent of available forest area within 1-mile of the Project. Therefore the Project would not result in direct or indirect impacts to NLEB.

Memorandum

Based on VHB's assessment of the Project with respect to the natural resources criteria, listed above and assessed by VHB, VHB concludes that the Project will not have any undue adverse effects to the natural environment. VHB also concludes that the Project will not require Federal or State Collateral Permits.

ATTACHMENTS:

- Attachment 1 – Lowell - Natural Resources Map
- Attachment 2 – Section 248 Natural Resources Site Screening Table
- Attachment 3 - Representative Site Photographs

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ATTACHMENT 1

March 1, 2016

Natural Resource Site Assessment
Conducted by VHB (N. Sibley) on
September 2, 2015

VHB Natural Resources
Study Area
Approximate Area = 2 acres
72°26'51.1"W 44°48'13.4"N

Proposed GMP Lowell
Substation Location
44° 48' 13.1"N
72° 26' 50.3"W

Existing GMP Lowell
Substation Location
44° 48' 12.0"N
72° 26' 51.5"W

VHB Natural Resources
Study Area

2015-1-Up

GELO PARK RD
TOWN OF LOWELL
VT 100
26A
Lowell
River

Copyright:© 2013 National Geographic Society, i-cubed

\\vhb\pro\Vermont\57808.00 GMP Lowell Sub\GIS\Project\GMP_Lowell_Substation_NR_Map.mxd

NRCS Soils Information				
Soil Abbreviation	Soil Map Unit	Vermont Farmland Classification	Erodibility Ranking	Area (acres)
26A	Adams loamy fine sand, 0 to 3 percent slopes	Statewide	Not highly erodible	2

75 37.5 0 75 Feet

Green Mountain Power Corp. Lowell Substation

Lowell, Vermont

Natural Resources Map

Legend

- Study Area (VHB)
- Proposed Substation (GMP)
- Existing Substation (GMP)
- Delineation Datapoint (VHB)
- VSWI Wetland (VT ANR)*
- Waterbody (VHD)*
- Stream (VHD)*
- River Corridor (VT ANR)*
- NHI Element Occurrences*
- NHI Uncommon Occurrences*
- Bear Crossing (VT FWD)*
- Bear Feeding (VT FWD)*
- Bear Habitat (VT FWD)
- Deer Wintering Area (VT ANR)*
- Public Well (VT ANR)*
- Private Wells (VT ANR)
- GW Protection Area (VT ANR)
- SW Protection Area (VT ANR)*
- Soils (NRCS)
- Contour - 2 ft (VCGI)
- County Boundary*
- Town Boundary*
- Parcel Boundary
- Interstate*
- US Route*
- Vermont State Highway
- Town Road

* Feature not present within map extent

Sources: Background ESRI Basemap layer (2014); NHI Element Occurrences, Surface Water Protection Area, Ground Water Protection Area, Deer Wintering Area, and Bear Habitat by ANR (2013-2015); River Corridor by ANR (2015); Contours from VCGI (2012); Streams and Waterbodies by VHD (2010); Soils from NRCS (2008); VSWI Wetlands by ANR (2014); Public and Private Wells from VT ANR (2011); Roads from VTrans (2013); Parcel data downloaded from VCGI (2014); Study Area prepared by VHB (2015); Delineation datapoint GPS located by VHB (2015).

There is no FEMA Floodplain Mapping available for the Project vicinity.

ATTACHMENT 2

Section 248 Natural Resources Site Screening Table

Project Name: Lowell Substation
Client: Green Mountain Power, Inc.
Project Location: Removal of the existing substation to be for the rebuilding of a new substation just to the north of its current footprint
Study Area: Approximately 2 Acres
Project Plan Source/Date: VHB Natural Resources Map, dated February 17, 2016
Prepared by: VHB (C. Martin, P.Kallfelz-Werts)
Date: March 1, 2016

		Outstanding Resource Waters (10 V.S.A. § 1424a(d))	Headwaters (§ 6086(a)(1)(A))	Waste Disposal (§ 6086(a)(1)(B);	Floodways (§ 6086(a)(1)(D))	Streams (§ 6086(a)(1)(E))	Shorelines (§ 6086(a)(1)(F))	Wetlands (§ 6086(a)(1)(G))	Water Supply (§ 6086(a)(2-3))	Soil Erosion (§ 6086(a)(4))	Rare or Irreplaceable Natural Areas (§ 6086(a)(8))	Wildlife Habitat and Endangered Species (§ 6086(a)(8)(a))
Section 248 Natural Resources Criteria Assessment	**Identification Method**	Review of the Natural Resources Board/ Agency of Natural Resources list of Outstanding Resource Waters ("ORW") (ANR)	Sub-criteria reviewed (as applicable) by evaluating NRCS soils data, contour data; watershed size; ground and surface water protection areas to determine if the site meets the headwater criteria	Review of Project, the operational storm water runoff from new impervious area, "Oil and Hazardous Material Investigation and Pre-Construction Soil Sampling Work Plan"	Review of floodplain mapping provided by VCGI and FEMA (Community Panel Number 500254B); Review of ANR River Corridor Map Layer (DEC)	A review of the VHD stream mapping provided by VCGI; field delineation on September 20, 2015	VHB reviewed the waterbody data provided by VCGI to determine if there are any named waterbodies including lakes, ponds, reservoirs, or rivers.	Review of VSWI mapping provided by VCGI; presence/absence (if present) for potential federal/state jurisdictional features; field delineation on September 20, 2015	Review of existing water supplies and water required for the Project	Review of NRCS-mapped soil survey series and K-factors used to determine potential soil erodibility; soil series are considered to be of "medium" or "high" erodibility ranking (Medium 0.17<K<0.37 and High K>0.36) according to the Vermont Standards and Specifications for Erosion Prevention and Sediment Control.	Review of the significant natural community mapping provided by VT ANR Department of Fish and Wildlife. Field verification of community types on September 20, 2015	Database (public and priveleged) review of Rare, Threatened and Endangered Species (RTE), black bear and deer wintering habitat data provided by VT FWD Natural Heritage Inventory program, and USFWS IPaC database
	Presence/ Absence	Absent	Present	Present	Absent	Absent	Absent	Absent	Absent	"Medium Erodibility" soils are present.	Absent	Potential
	Resource Description	None Present	Project Study Area meets sub-criterion (iv) overlaps the groundwater protection area of a public water supply well; however, the Project Site is located outside of the groundwater protection area.	The Project will not need permanent sanitary waste treatment. The Project involves a slight increase in the total impervious area in the Project parcel (addition of approximately 4,900 sq ft to the existing 2,900 sq ft, for a total of 7,300 sq ft). The "Oil and Hazardous Material Investigation and Pre-Construction Soil Sampling Work Plan" prepared for the Project follows accepted methods as described in the "Procedure for Conducting Hazardous Material Investigation and Remediation Activities Under 30 V.S.A. Section 248" (VT Waste Management and Prevention Division 2013). Woody debris created by the Project will be used on site for mulch or disposed of in an appropriate upland location. Waste generated by the contractor (i.e., office trash, or temporary toilets) will be the responsibility of the contractor to dispose of properly.	Study Area is not within a mapped FEMA floodway or ANR River Corridor. There are no streams delineated within the Study Area.	None Present	None Present	There are no VSWI-mapped wetlands within the Study Area. VHB did not delineate any wetlands within the Study Area	The Project will not require on-going water consumption. Therefore there will be no undue adverse effect to water supplies as a result of this Project	Adams loamy sand, 0 to 3 percent slopes (K-factor 0.17) is a not highly erodible soil and is considered K factor Medium erodibility.	There are no significant natural communities that would be considered RINA mapped within the Study Area.	There are no RTE species or necessary wildlife habitat mapped within the Project Site or Study Area. There are four plant species (one state-threatened) and one animal species that are mapped within one mile of the Study Area. All RTE species mapped within one mile are restricted to Serpentine Outcrops or stream/ river shore habitats, niether of which are found within the Project Study Area. The only IPAC-identified potential protected species is the *Myotis septentrionalis* (Northern long-eared bat).
	Further Survey Recommended?	No	No	No	No	No	No	No	No	No	No	No
	Potential Adverse Impacts (Yes/No)	No	No	No	No	No	No	No	No	No	No	No
	Impact Mitigation Description/ Recommendation	NA	NA	No	NA	NA	NA	NA	No	NA	NA	NA
	Impact Assessment	Not applicable, nodesignated or prospective ORW present within the Study Area	The Project is located in an area that could be considered a headwaters area, however, the Project would not adversely affect groundwater or surface water because all applicable health and Vermont Department of Environmental Conservation ("VT DEC") regulations regarding the quality of groundwater and surface waters will be be complied with.	Based on information provided, the Project would not result in adverse impacts to water quality from stormwater runoff; total on site impervious will be approximately 7,300 sq ft, (less than one acre) therefore will not require a permit. Also, See the "GMP Oil and Hazardous Materials Investigation and Pre-Construction Soil Sampling Work Plan" for details regarding handling oil or other potentially hazardous materials associated with the existing substation equipment.	None; the Study Area is not located within a Floodway or River Corridor	None; there are no mapped VHD streams or streams identified within the Study Area during the field delineation.	None; the Project is not located within a Shoreline and there are no Shorelines Present within the Study Area	None; there were no delineated wetlands within the Study Area	The Project will not require on-going water consumption. Therefore there will be no undue adverse effect to water supplies as a result of this Project	Soil disturbance will be minimal during construction of the new substation and deconstruction of the existing substation (approximately 23,600 sq ft); low-risk site EPSC measures will be implemented during construction activities, if necessary.	Not applicable; there are no Rare or Irreplaceable Natural Areas mapped within the Project Site. The closest mapped significant communities is approximately 0.4 mile away and is a Serpentine Outcrop. This community type is not present within the Study Area.	The Project is located within the summer range of the northern long-ear bat ("NLEB") (*Myotis septentrionalis*); in general, tree clearing can have direct or indirect impacts to protected forest bats, such as the NLEB. The Project will require removing a small number of trees within the Project site, to allow for substation construction and relocated section of transmission line. Consultation with VT FWD confirmed there are no NLEB hibernacula or known summer roost trees in the vicinity, and the small area of tree removal will not have an undue adverse impact.
Collateral Environmental Permits (Federal or State)	**Permit(s) Applicable to Criterion**	None specific for Act 250-defined headwater activities	None specific for Act 250-defined headwater activities	Wastewater System and Potable Water Supply Permit/Operational Stormwater Discharge Permit (GP 3-9015/INDS)	Vermont Flood Hazard and River Corridor Protection Permit	Clean Water Act Section 404 Permit/ Clean Water Act Section 401 WQC/ Stream Alteration Permit	Rivers and Harbors Act Section 10 Permit/ Shoreland Encroachment Permit/Lake Encroachment Permit	Clean Water Act Section 404 Permit/ Clean Water Act Section 401 WQC/ Vermont Wetland Permit	Environmental Protection Rules, Water Supply Rule	Soil Erosion: Construction Stormwater Discharge Permit (GP 3-9020/INDC).	None	Endangered Species Takings Permit (None for NWH)/ Incidental Takings Permit
	Agency	NA	VT Public Service Board	VT DEC Wastewater Section/VT DEC Stormwater Section	VT DEC River Management Section	USACE/ VT DEC Watershed Management Division/ VT DEC River Management Section	USACE/ VT DEC Lakes and Ponds Section	USACE/ DEC Watershed Management Division/ VT DEC Wetland Section	VT DEC Drinking Water and Groundwater Protection Division	Soil Erosion: VT DEC Storm water Section.	NA	VT FWD/ U.S. Fish and Wildlife Service
	Permit(s) Required (Yes/No)	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**

ATTACHMENT 3

Natural Resource Assessment Site Photographs
Green Mountain Power (GMP)
Lowell Substation
Lowell, Vermont

Photograph 1. Existing GMP Lowell Substation

Photograph 2. Existing GMP Substation

Photograph 3. Existing VEC Lowell Substation.

Photograph 4. Existing Access Road to proposed Substation

Photograph 5. Area Surrounding Substations and existing overhead line.

Photograph 6. Existing overhead lines and utility infrastructure.