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# WILDLIFE ASSESSMENT REPORT
## 1 Bon Terrain Drive
### Tax Map 2, Block 26, Lot 4
### Amherst, New Hampshire

September 2021
File No. 04.0191274.00

**PREPARED FOR:**
EIP One Bon Terrain Drive, LLC
Needham, Massachusetts

**GZA GeoEnvironmental, Inc.**
5 Commerce Park North, Suite 201 | Bedford, NH 03110-6984
603-623-3600

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5 Commerce Park North
Suite 201
Bedford, NH 03110
T: 603.623.3600
F: 603.624.9463
www.gza.com

**Via Email**

September 13, 2021
File No. 04.0191274.00

EIP One Bon Terrain Drive, LLC
Attn: John Hennessey
20 Pickering Street
Needham, Massachusetts 02492

Re: Wildlife Assessment Report
1 Bon Terrain Drive
1 Bon Terrain Drive
Tax Map 2, Block 26, Lot 4 (±43.5 acres)
Amherst, New Hampshire

Dear Mr. Hennessey:

GZA GeoEnvironmental, Inc. (GZA) is pleased to submit the attached revised Wildlife Assessment Report in support of an Alteration of Terrain permit for the proposed industrial building expansion project at 1 Bon Terrain Drive (i.e., Tax Map 2, Block 26, Lot 4) in Amherst, New Hampshire (Site). This report summarizes the results of the field work completed on July 15, 2021, to document and assess the potential for threatened, endangered, and special concern wildlife species on the Site.

Please contact Tracy Tarr at 603-235-6992 or *tracy.tarr@gza.com* if you have any questions or concerns.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Logan Young
Field Biologist

Deborah M. Zarta Gier, CNRP
Consultant/Reviewer

Tracy L. Tarr, CWS, CESSWI
Associate Principal

NMS/TLT/DMZ
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Attachment: Wildlife Assessment Report

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## PART 1: SUMMARY AND FINDINGS

### 1.1 PROPOSED PROJECT

This report presents the results of the wildlife assessment conducted by GZA GeoEnvironmental, Inc. (GZA) in support of the submittal of an Alteration of Terrain permit to New Hampshire Department of Environmental Services (NHDES) for proposed construction in Amherst, New Hampshire (see table below). EIP One Bon Terrain, LLC is seeking to permit the expansion of the existing industrial building on the Site for future use as a commercial industrial park on Tax Map 2, Block 26, Lot 4 (Site). Access to the Site will be from Bon Terrain Drive in Amherst, New Hampshire and is comprised of approximately ±43.5 acres of Appalachian Oak-Pine Forest, Developed Land, Shrubland, Marsh and Shrub wetland, Pond, Potential Vernal Pool, and Temperate Swamp cover.

| | | | |
|---|---|---|---|
| WILDLIFE BIOLOGIST: | Tracy L. Tarr, CWS, CESSWI | NHB FILE: | NHB21-1916 |
| COMPANY: | GZA GeoEnvironmental, Inc. | PROJECT NAME: | 1 Bon Terrain Drive |
| COMPANY ADDRESS: | 5 Commerce Park North<br>Suite 201<br>Bedford, NH 03110 | PROJECT ADDRESS: | 1 Bon Terrain Drive<br>(Tax Map 2, Block 26, Lot 4),<br>Amherst, NH |
| BIOLOGIST E-MAIL: | tracy.tarr@gza.com | APPLICANT: | EIP One Bon Terrain Drive, LLC |
| BIOLOGIST PHONE NUMBER: | 603-235-6992 | AoT APPLICATION: | TBD |

In GZA's opinion, the following selection describes our findings.

**PHASE I Threatened and Endangered Wildlife and Habitat Assessment Findings:**
*Check one*

☐ No threatened and endangered wildlife and habitat present, no threatened or endangered wildlife, habitat, or wildlife corridors likely to be impacted by project activities.
☐ Threatened and endangered wildlife and habitat present; HOWEVER, NO threatened or endangered wildlife, habitat, or wildlife corridors likely to be impacted by project activities. No conservation measures are proposed.
☒ Threatened and endangered wildlife and habitat present or wildlife corridors present. Proposed actions have the potential for impacts. Conservation measures incorporated into the proposed project or project design.

### 1.2 THREATENED AND ENDANGERED WILDLIFE AND HABITAT

- Three major upland habitats and four major wetland habitats were identified on Site including Developed Land, Appalachian-Oak-Pine Forest, Shrubland, Marsh and Shrub Wetland, Pond, Potential Vernal Pool, and Temperate Swamp cover, totaling ±43.5 acres.

- Based on habitat evaluation, GZA ranked 10 endangered, threatened, and special concern species as having potential to occur on or immediately adjacent to the Site, including American bumble bee, rusty-patched bumble bee, yellow-banded bumble bee, yellow bumble bee, Blanding's turtle, eastern box turtle, eastern

hognose snake, little brown bat, smooth green snake, and spotted turtle. These species have potential to occur based on review of habitat types and rare species records in Amherst.

## 1.3 PROPOSED CONSERVATION MEASURES

Based on a review of habitats, GZA offers the following BMP recommendations, as recommended in the WAP and/or typically requested by NHFG.

1. Maintain an upland buffer to on-site wetlands where possible. The current plan maintains a 100-foot wetland buffer in portions of the Site (see Detailed Site Plan 1 prepared by Meridian Land Services, Inc., dated August 2, 2021). The incorporation of this buffer will serve to preserve habitat, travel corridors, and water quality, benefitting rare wetland species.

2. Manufactured erosion and sediment control products, except for silt fence installed in accordance with Env-Wq 1506.04, utilized for, but not limited to, slope protection, runoff diversion, slope interruption, perimeter control, inlet protection, check dams, and sediment traps shall not contain welded plastic, plastic, or multi-filament or monofilament polypropylene netting or mesh.

3. Consider native wildflowers in the seed mix for the restoration of disturbed soils associated with roadways and related infrastructure to promote habitat for bumble bees.

4. Site operators shall be informed of the potential presence of rare species on the Site. Add Blanding's turtle, eastern box turtle, eastern hognose snake, smooth green snake, and spotted turtle identification information to construction plans, per request by NHFG. If observed during construction, contact NHFG immediately upon observation, and safely relocate amphibians and reptiles out of construction areas if observed.

5. Prior to daily construction activities, work areas will be searched for snakes and turtles.

6. Turtle nesting season extends from late May through the beginning of July and hatchling turtles typically emerge from the ground from mid-August through early October. If Blanding's or spotted turtles are found laying eggs or if hatchling turtles are seen in the work area, contact NHFG (Melissa Doperalski at 603-271-1738 (o)/ 603-479-1129 (cell) or Josh Megyesy at 603-271-1125 (o)/ 978-575-0802 (cell) for further instructions.

7. Install temporary barriers (e.g., silt fence) around construction areas for spring/summer construction to exclude turtles and snakes from active construction areas.

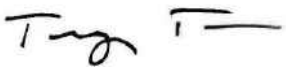
8. All observations of threatened or endangered species shall be reported immediately to the New Hampshire Fish and Game Department Nongame and Endangered Wildlife Environmental Review Program by phone at 603-271-2461 and by email at NHFGreview@wildlife.nh.gov unless as otherwise specified below. Email subject line: NHB21-1916, 1 Bon Terrain Drive, Amherst, Wildlife Species Observation. Photographs shall be provided for verification as feasible.

In GZA's opinion, if the BMPs identified above are followed, the project design "will not appreciably jeopardize the continued existence of state or federally threatened and endangered species."

**Printed name, date and signature of Individual that conducted the Phase I Threatened and Endangered Wildlife and Habitat Assessment.**

Tracy L. Tarr, CWS, CESSWI — Name – printed

September 13, 2021 — Date



Signature

**Check Applicable Requested Action**

☐ **Request for NHFG Concurrence with Findings in compliance with Env. Wq. 1503.19(h)(1)a**

☒ **Request for NHFG Concurrence with Findings and Proposed Conservation Measures in compliance with Env. Wq. 1503.19(h)(1)b***

☐ **Requests further coordination with NHFG to discuss proposed conservation measures and/or potential focused survey needs (Phase II)***

☐ **Other**

**PART 2: NHB DATACHECK RESULTS LETTER AND FIGURES**

See **Appendix B** in **Part 4: Appendices** for NHB Datacheck Results Letter (i.e., Memo). The following Figures, consistent with NHDES AoT requirements have been included in the **Figures** section at the end of this document:

| | |
|---|---|
| FIGURE 1 | LOCUS PLAN |
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**PART 3: DETAILED EVALUATION**

## 3.1 INTRODUCTION

This report presents the results of the wildlife assessment conducted by GZA GeoEnvironmental, Inc. (GZA) in support of the submittal of an Alteration of Terrain permit to NHDES for proposed construction at 1 Bon Terrain Drive (i.e., Tax Map 2, Block 26, Lot 4) in Amherst, New Hampshire. This report was prepared to address the requirements of Env-Wq 1503.19 and RSA 212-A:9, III, which requires a report to document that a project "will not appreciably jeopardize the continued existence of state or federally threatened and endangered species." The Site parcel totals approximately ±43.5 acres containing Appalachian Oak-Pine Forest, Developed Land, Shrubland, Marsh and Shrub wetland, Pond, Potential Vernal Pool, and Temperate Swamp cover. (i.e., Site, see **Figure 1** - *Locus Plan*; **Figure 2** - *Aerial Overview*; **Figure 3** – *Land Cover Type Overlay*; **Figure 4** – *2020 Wildlife Action Plan Land Cover*, and **Figure 5** – *2020 Wildlife Action Plan Habitat Tiers*).

EIP One Bon Terrain, LLC is proposing to permit the expansion of an existing industrial building on the Site for future use as a commercial industrial park (see **Figure 6** – *Detailed Site Plan 1*).

GZA was retained by EIP One Bon Terrain, LLC to prepare a wildlife assessment per Env-Wq 1503.19, and as required by RSA 212-A:9, III, wherein the applicant must demonstrate that the project will not "appreciably jeopardize the continued existence of state or federally threatened and/or endangered species" for a permit to be issued. This assessment included the following components:

- Review existing georeferenced wildlife habitat data available through the New Hampshire Wildlife Action Plan (WAP) to characterize the regional significance and landscape connectivity of the Site;
- Describe wildlife habitat types and observed wildlife species;
- Utilize the Natural Heritage Bureau (NHB) memos provided by Meridian Land Services, Inc. (Meridian) to identify known records of rare species near the project Site;
- Assess the potential for currently listed New Hampshire or federally threatened, endangered wildlife species, or special concern species to occur on the Site (see "Rare Plants, Rare Animals, and Exemplary Communities in New Hampshire Towns," published by the New Hampshire Natural Heritage Bureau [NH NHB], dated July 2020);
- Recommend conservation measures (i.e., best management practices [BMPs]) to protect threatened, endangered, and special concern species, consistent with the WAP, if in GZA's opinion there is potential for threatened and endangered wildlife to occur on Site; and
- Prepare a report summarizing methods, observations, and findings of the field assessment, consistent with reporting requirements outlined in "Phase I Threatened and Endangered Wildlife and Habitat Assessment Outline and Template, Version 1, dated September 25, 2020, published by NHFG.

GZA completed wildlife assessment field work on July 15, 2021. It is our understanding that documentation from this effort will be used by EIP One Bon Terrain, LLC, and the project engineer Meridian in their submittal of an Alteration of Terrain permit to NHDES. This report is subject to the Limitations in **Appendix A**.

## 3.2 PROJECT DESCRIPTION

### 3.2.1 SCOPE OF WORK

Professional services provided by GZA within the work area described below included:

- *Review of existing georeferenced statewide data to assess landscape context of the Site.* GZA reviewed WAP habitat mapping and habitat ranking. In addition, GZA reviewed the NH NHB query provided by Meridian (NHB20-2096) for locations of rare species to assess whether rare species are known to occur on the Site. GZA also reviewed the NH NHB document titled "Rare Plants, Rare Animals, and Exemplary Communities in New Hampshire Towns" (NH NHB 2020) to assess the potential for rare vertebrates at the Site.

- *Assessment and classification of habitat types.* GZA mapped habitat types to assess habitat rarity and predict wildlife usage on the Site. The habitat assessment was completed by Wildlife Biologist Nyssa Seekamp on July 15, 2021, under the direction of Wildlife Biologist Tracy Tarr. Ms. Seekamp has a B.S. in Marine, Estuarine and Freshwater Biology and Ms. Tarr has a B.S. in Wildlife Management and an M.S. in Wildlife Ecology: Natural Resources.

- *Documentation of wildlife (observed and potential).* As part of documentation, GZA completed visual observations for wildlife and wildlife sign (i.e., tracks, scat, feathers) along random traverse routes across the Site on July 15, 2021. Wildlife tracking surveys, habitat survey, and visual and acoustic species survey were completed by Ms. Seekamp, under the direction of Tracy Tarr.

### 3.2.2 DESCRIPTION OF WORK AREA AND SURROUNDING LAND USES

Based on materials prepared by Meridian and field review of current conditions, the Site contains wooded cover, developed impervious cover, developed barren cover, forested wetlands, and pond habitats. Based on a review of historic aerial imagery available from Google Earth and Nationwide Environmental Title Research, LLC, the southern and northeastern areas of the Site have been cleared for development since at least 1978. The northern portion of the Site contained wooded land and forested wetlands since at least 1947 and remains that way today. The Site currently contains an industrial building and associated parking lot on the southern half of the site, which was constructed around 2005. The Site is bordered to the north and east by residential and commercial development. The Site is bordered to the south by open sand and gravel deposits, and wooded land. The Site is bordered to the west by the Amherst substation, and sand and gravel interspersed with wooded areas. Witches Brook is located approximately 0.37 miles south of the Site and is an important tributary where rare species are known to occur (Comprehensive Environmental, Inc. and Pennichuck Water Works, Inc. 2002).

The Site contains, "Highest Ranked Habitat in Biological Region" on the northern portion of the site and to the eastern and western boundaries. "Highest Ranked Habitat in Biological Region" is present just north and to the southwest of the Site, and "Supporting Landscapes" are present to the north, west and east of the Site according to the NH WAP (see ***Figure 5*** – *'2020 Wildlife Action Plan Habitat Tiers'*). Past site use and landscape position are considered in the following narrative.

## 3.3 METHODOLOGY

### 3.3.1 WILDLIFE HABITAT MAPPING

GZA assessed habitat conditions on July 15, 2021, by conducting vegetation assessments along random traverse routes and in random plant plot locations throughout the property. At the time of assessment, weather conditions were clear with light wind and temperatures averaging 70 degrees Fahrenheit. GZA identified dominant plant species along random traverse routes and plots to describe the vegetation composition of individual areas. Habitat boundaries were determined by assessing major changes in vegetation through aerial photograph interpretation and field reconnaissance. Upland habitat classifications were based on habitats recognized in the New Hampshire WAP and further refined in DeGraaf and Yamasaki 2001. Wetlands were delineated by Meridian.

GZA utilized the WAP and Wildlife Habitat Assessment Field Data Form, developed with guidance from the NHFG, New Hampshire Audubon, and the University of New Hampshire (UNH) Cooperative Extension, to develop a datasheet for wildlife assessment required under New Hampshire Administrative Rule Env-Wq 1503.19 and RSA 212-A:9, III. The form specifically documents the presence of major wildlife habitat types, which are known to provide potential habitat to rare species based on the New Hampshire WAP (see **Appendix C**). In addition, GZA utilized the New Hampshire NHB memo for the project to determine if any rare species or exemplary natural communities are known to occur on the project Site (NHB21-1916, see **Section 2**). Additionally, the town based WAP maps developed by the NHFG were reviewed to determine the presence of any regionally significant habitat areas (e.g., highest ranked habitats or supporting landscapes).

To assess the potential impacts of the proposed project on habitats for rare species, GZA created an overlay map of the property of existing wetland and upland habitats. Approximate habitat areas were mapped and calculated in a Geographic Information System (GIS) database.

### 3.3.2 DOCUMENTATION OF WILDLIFE

The presence of wildlife species on the Site was assessed by identifying species through song, track, nest, and scat identification, as well as direct observations. Birds were assessed along random traverse route using binoculars and by call survey (identifying songs). Mammals were assessed by visual observation and track survey. Amphibians were assessed by call identification and visual identification. Because wildlife species can be cryptic and seasonally active, GZA utilized known habitat preferences (see DeGraaf and Yamasaki 2001) to predict potential habitat utilization by rare wildlife species on the Site to supplement information gained from direct observations.

GZA assessed potential for presence by reviewing individual habitat requirements of each species including minimum home range size and breeding habitat requirements, as well as prior documentation in the Town of Amherst. Species considered to have limited to near zero potential to be present on Site based on habitat requirements and previous town records are ranked by GZA as “not likely” to be present. Species with some potential to be present (i.e., if they have general habitat requirements or preferred habitats are found on-site but are not recorded in Amherst as of July 2020, or habitats present are suboptimal), are ranked by GZA as “low” potential. Species that are known to occur near the Site and the Site contains or directly borders preferred habitat or have very general habitat requirements and high tolerance of development are ranked as “possible.” GZA has identified potential BMPs to reduce/eliminate impacts to “possible” species, based on guidance provided in the NH WAP and feedback received by the NHFG during project correspondence, as well as for similar projects.

## 3.4 HABITAT MAPPING AND WILDLIFE DOCUMENTATION RESULTS

### 3.4.1 UPLAND WILDLIFE HABITATS

The Site contains approximately 17.9% Appalachian-Oak-Pine, 40.2% Developed Land and 18.9% Shrubland habitat cover (see **Figure 3** – *Land Cover Type Overlay*). The Site contains areas of forested cover to the east, west and north, in addition to an industrial building and associated parking areas.

#### *3.4.1.1 Appalachian-Oak-Pine Forest*

Approximately ±7.8 acres of the Site is Appalachian-Oak-Pine habitat. The canopy layer contains white pine (*Pinus strobus*), white oak (*Quercus alba*), grey birch (*Betula populifolia*), and red maple (*Acer rubrum*). The shrub layer contains white oak, grey birch, red maple, and lowbush blueberry (*Vaccinium angustifolium*). The herbaceous stratum contains white oak, sweet fern (*Comptonia peregrina*), sphagnum moss (*Sphagnum sp.*), club moss (*Lycopodiopsida sp.*), various grasses (*Poaceae spp.*), princess pine (*Lycopodium obscurum*), black huckleberry (*Gaylussacia baccata*), and wintergreen (*Gaultheria procumbens*).

GZA observed common resident bird species including grey catbird (*Dumetella carolinensis*), black-capped chickadee (*Poecile atricapillus*), red-winged blackbird (*Agelaius phoeniceus*), and wild turkey (*Meleagris gallopavo*). Evidence of cicada (*Cicadoidea familu*), eastern chipmunk (*Tamias striatus*) and white-tailed deer (*Odocoileus virginianus*) were also present. GZA did not observe any threatened or endangered wildlife.

*Photo 1. View of Appalachian-Oak-Pine cover.*

*Photo 2. View of open understory in Appalachian-Oak-Pine habitat.*

*Photo 3. View of early-successional Appalachian-Oak-Pine habitat.*

*3.4.1.2 Developed (Impervious or Barren)*

Approximately ±17.5 acres of the Site is Developed Impervious or Barren Land habitat. The canopy layer contains white pine, grey birch, red maple, and staghorn sumac (*Rhus typhina*). The shrub layer contains staghorn sumac, juniper (*Juniperus sp.*), and Japanese barberry (*Berberis thunbergii*). The herbaceous layer contains grasses maintained as lawn.

GZA observed common resident bird species including wild turkey and house sparrow (*Passer domesticus*). Evidence of eastern gray squirrel (*Sciurus carolinensis*) and eastern chipmunk were also present. GZA did not observe any threatened or endangered wildlife.

*Photo 4. View of Developed cover.*

*Photo 5. View of herbaceous and landscaped vegetation in Developed habitat.*

#### *3.4.1.3 Shrubland*

Approximately ±8.2 acres of the Site is Shrubland habitat, in association with a maintained utility easement. The canopy layer contains staghorn sumac, grey birch, and fire cherry (*Prunus pensylvanica*). The shrub layer contains staghorn sumac, white oak, aspen (*Populus tremuloides*), black raspberry (*Rubus occidentalis*), creeping juniper (*Juniperus horizontalis*), eastern raspberry (*Rubus occidentalis*), autumn olive (*Elaeagnus umbellata*), and Japanese honeysuckle (*Lonicera japonica*). The herbaceous layer contains white oak, sweet fern, sphagnum moss, swamp dewberry (*Rubus hispidus*), purple loosestrife (*Lythrum salicaria*), oriental bittersweet (*Celastrus orbiculatus*), early goldenrod (*Solidago juncea*), round-headed bush clover (*Lespedeza capitata*), white meadowsweet (*Spiraea alba*), St. John's wort (*Hypericum perforatum*), bracken fern (*Pteridium aquilinum*), New England aster (*Symphyotrichum novae-angliae*), bird's-foot trefoil (*Lotus corniculatus*), spotted knapweed (*Centaurea stoebe*), horseweed (*Erigeron canadensis*), clover (*Trifolium sp.*), common milkweed (*Asclepias syriaca*), fleabane (*Erigeron annuus*), and heller's rosette grass (*Dichanthelium oligosanthes*).

GZA observed common resident bird species including wild turkey. GZA also observed monarch butterfly (*Danaus plexippus*) and common eastern bumblebee (*Bombus impatiens*). Evidence of white-tailed deer was also present. GZA did not observe any threatened or endangered wildlife.

*Photo 6. View of Shrubland habitat to the east.*

*Photo 7. View of Shrubland habitat to the north.*

### 3.4.2 WETLAND HABITATS

The Site contains approximately 7.8% Marsh and Shrub Wetland, 2.8% Pond, and 12% Temperate Swamp habitat (see **Figure 3** – *Land Cover Type Overlay*). The Site contains multiple areas of forested wetlands to the north and along the eastern Site boundary, and two Ponds, one running along the western site boundary and one bordering Developed habitat to the east. Wetlands were delineated by Meridian.

#### *3.4.2.1 Marsh and Shrub Wetland*

Approximately ±3.4 acres of the Site is Marsh and Shrub Wetland habitat. This cover type includes an approximate 0.5-acre inclusion of peatland cover type, containing predominantly haircap moss (*Polytrichum commune*), bristly blackberry (*Rubus hispidus*) and dewberry. The canopy layer contains white pine and grey birch. The shrub layer consists of red maple, grey birch, lowbush blueberry, highbush blueberry (*Vaccinium corymbosum*), steeplebush

(*Spiraea tomentosa*), and blackberry (*Rubus sp.*). The herbaceous layer contains plantain-leaved sedge, bird's-foot trefoil, St. John's wort, bracken fern, meadowsweet, sphagnum moss, dark green bulrush (*Scirpus atrovirens*), Canada mayflower (*Maianthemum canadense*), and royal fern (*Osmunda regalis*).

GZA observed common resident bird species including red-winged blackbird, American robin (*Turdus migratorius*), tufted titmouse (*Baeolophus bicolor*), and turkey vulture (*Cathartes aura*). GZA also observed autumn meadowhawk (*Sympetrum vicinum*), and grey tree frog (*Dryophytes versicolor*). GZA did not observe any threatened or endangered wildlife.

*Photo 8. View of isolated Marsh and Shrub wetland habitat.*

*Photo 9. View of Marsh and Shrub Wetland habitat to the north.*

*Photo 10. View of herbaceous-dominant Marsh Wetland habitat to the northeast.*

### *3.4.2.2 Temperate Swamp*

Approximately ±5.2 acres of the Site is Temperate Swamp habitat. The canopy layer contains grey birch, white pine, red maple, white oak, aspen, and American beech (*Fagus grandifolia*). The shrub layer consists of red maple, white oak, grey birch, and lowbush blueberry. The herbaceous layer contains plantain-leaved sedge, bracken fern,

royal fern, sphagnum moss, club moss, various grasses, Canada mayflower, princess pine, wintergreen, swamp dewberry, and steeplebush.

GZA observed common resident bird species including tufted titmouse, house sparrow, red-winged blackbird, and northern cardinal (*Cardinalis cardinalis*), as well as evidence of white-tailed deer. GZA did not observe any threatened or endangered wildlife.

*Photo 11. View of groundcover in Temperate Swamp habitat.*

*Photo 12. View of Temperate Swamp habitat to the northeast.*

*Photo 13. View of Temperate Swamp habitat to the north.*

*3.4.2.3 Pond*

Approximately ±1.2 acres of the Site is Pond habitat running along the western site boundary. The pond is bordered by a canopy layer dominated by grey birch, white pine, red maple, white oak, aspen, and American beech. The shrub layer consists of red maple, white oak, grey birch, and lowbush blueberry. The herbaceous layer contains plantain-leaved sedge, bracken fern, royal fern, sphagnum moss, club moss, Canada mayflower, princess pine, wintergreen, swamp dewberry, and steeplebush. GZA did not observe any threatened or endangered wildlife.

*Photo 14. View of Pond habitat.*

#### *3.4.2.4 Potential Vernal Pool*

Approximately ±0.19 acres of the Site is Potential Vernal Pool habitat in the northeast portion of the site. The canopy layer contains grey birch, white pine, red maple, white oak, aspen, and American beech. The shrub layer consists of red maple, white oak, grey birch, and lowbush blueberry. The herbaceous layer contains bracken fern, royal fern, various grasses, Canada mayflower, princess pine, wintergreen, swamp dewberry, and steeplebush. GZA did not observe any threatened or endangered wildlife.

*Photo 15. View of Potential Vernal Pool habitat to the northeast.*

### 3.4.3 THREATENED, ENDANGERED, AND SPECIAL CONCERN WILDLIFE SPECIES

According to NHB21-1916, sensitive wildlife species have not been reported to occur within the vicinity of the Site parcels, however a negative result does not mean that a sensitive species is not present. The Site contains seven general habitat types within the parcel (Appalachian-Oak-Pine, Developed Land, Shrubland, Marsh and Shrub Wetland, Temperate Swamp, Potential Vernal Pool, and Pond habitat) that are considered to have some potential to support federally and state listed wildlife species. Pursuant to Env-Wq 1503.19, the following assessment

focuses on state and federal threatened and endangered species. In addition, per NHFG guidance for AoT wildlife assessments, the assessment considers special concern species that are either listed on the NHB report and/or are known to occur in the Town of Amherst. Per NHFG guidance, GZA also provides information on Species of Greatest Conservation Need that were observed on Site or believed to be present based on available information.

As documented in the NH WAP, 63 endangered, threatened, and special concern species have potential to utilize Appalachian-Oak-Pine, Developed Land, Shrubland, Marsh and Shrub Wetland, Temperate Swamp, Potential Vernal Pool, and Pond cover types. The specific habitat requirements of each of these species and likelihood for potential presence on the Site is discussed below to give context to the potential for these species to occur on the Site (see **Table 1**).

In GZA's opinion, of the 63 threatened and endangered species known to use Appalachian-Oak-Pine, Developed Land, Shrubland, Marsh and Shrub Wetland, Temperate Swamp, Potential Vernal Pool, and Pond habitat, 10 species have potential to occur on Site. Of these American bumble bee, rusty-patched bumble bee, yellow-banded bumble bee, yellow bumble bee, Blanding's turtle, eastern box turtle, eastern hognose snake, little brown bat, smooth green snake, and spotted turtle are ranked as "possible."

#### *3.4.3.1 American Bumble Bee, Rusty-Patched Bumble Bee, Yellow Bumble Bee, and Yellow-Banded Bumble Bee*

The American bumble bee, yellow bumble bee, and yellow-banded bumble bee are listed as Special Concern, and the rusty-patched bumble bee is listed as State and Federally Endangered. These species occur in meadows, crop fields, orchards, and gardens. Nectar plants for the American bumble bee include thistles, sunflowers, vetches, asters, St. John's wort, goldenrods, Vaccinium varieties, and clovers. These species have underground nests and require untilled areas for breeding. Per the NHWAP, including native wildflowers in landscaping and avoiding/limiting the use of pesticides in landscaping can serve to protect these species.

#### *3.4.3.2 Blanding's Turtle*

The Blanding's turtle is listed as State Endangered. This species utilizes a variety of wetlands throughout the year including vernal pools, beaver flowages, marshes, scrub-shrub, and forested wetlands with standing water. Blanding's turtles are known to make routine seasonal movements to vernal pools for foraging and other activities in the spring, as well as for summer rest periods known as aestivation. In addition, Blanding's turtles make large overland movements to nest in anthropogenic habitats such as uplands with exposed, sandy soils. Habitat that may support this species is present at the Site and Blanding's turtles are reported to occur in the vicinity. The Site contains one potential vernal pool and areas of scrub-shrub, emergent, and forested floodplain wetlands typically utilized by this species. The project does not propose any wetland impacts. Providing pre-made NHFG flyers and/or species identification information on construction plans for the project contractor, is a recommended construction BMP. If Blanding's turtles are observed, turtles should be safely relocated out of the way of construction activities and immediately reported to the NHFG.

#### *3.4.3.3 Eastern Box Turtle*

The eastern box turtle is listed as State Endangered. This species is a generalist, utilizing open woodlands, old fields, thickets, and pastures. Eastern box turtles are also known to utilize wetlands and shallow streams, preferring a diversity of habitats in close proximity with one another. The box turtle utilizes open woodlands but is generally close to water such as marshes, bogs, ponds, and stream banks. They prefer open habitats including old fields and clearings with sandy soils for nesting. Habitat that may support this species is present at the Site

and eastern box turtles are reported to occur in the vicinity. The Site contains large areas of forested wetland, Appalachian Oak-Pine Forest, and Pond that may support this species. In addition, exposed soils associated with proposed construction may be utilized for spring/summer nesting habitat. The project does not propose any wetland impacts. Retention of forested cover outside of proposed construction areas of the Site will provide additional supporting habitat for this species. Providing pre-made NHFG flyers and/or species identification information on construction plans for the project contractor, is a recommended construction BMP. Installation of temporary barriers (e.g., silt fence) around construction areas for spring/summer construction is also recommended to exclude turtles from active construction areas. If eastern box turtles are observed, turtles should be safely relocated out of the way of construction activities and immediately reported to the NHFG.

*3.4.3.4 Eastern Hognose Snake*

The eastern hognose snake is listed as state endangered. This species utilizes a variety of habitats, including beaches, fields, and dry open pine or deciduous woodlands. Eastern hognose snakes are known to maintain a relatively large home range of >100 acres (LaGory et al. 2009, Goulet et al. 2015), and occur in the southern and central areas of the state throughout the Merrimack River watershed. This species prefers loamy, sandy soils which are present at the Site, and have potential to occur near sand and gravel operations. Hognose snakes feed primarily on toads and occur in uplands, often in sandy soils that facilitate burrowing. Habitat that may support this species is present at the Site and eastern hognose snakes are known to occur in the vicinity. The Site contains Appalachian Oak-Pine Forest which has potential to be utilized by hognose snake. In addition, large areas of open, sand and gravel habitat is located south and west of the Site and may provide potential habitat for this species. Providing pre-made NHFG flyers and/or species identification information on construction plans for the project contractor, is a recommended construction BMP. If eastern hognose snakes are observed, snakes should be safely relocated out of the way of construction activities and immediately reported to the NHFG. If matting is required for slope stabilization, the project should consider “wildlife friendly” matting (e.g., coco or jute matting) to limit and prevent mortality to snakes.

*3.4.3.5 Little Brown Bat*

The little brown bat is listed as State Endangered. This species is found statewide in all forest types and commonly roosts during the summer in buildings and caves. Forages on a variety of insects over wetlands, streams, and open areas. They utilize rivers, streams, and trails as corridors to navigate throughout their surroundings. The little brown bat, like many other NH bats, were previously very common but significantly impacted by white-nose syndrome with a 99% decline in numbers at hibernaculum sites. This species has not been formally recorded in Amherst but were very common prior to white-nose syndrome. The NH WAP recommends that property owners consider avoiding exclusion of bats (e.g., evicting bats from attics) from May 15 - August 15 when maternity colonies may be present.

*3.4.3.6 Smooth Green Snake*

The smooth green snake is listed as Special Concern. This species is typically found in open habitats, typically with dense herbaceous vegetation, including grassy fields, wet meadows, marsh edges, abandoned agricultural land, shrublands, utility rights-of-way, and lightly wooded areas. Smooth green snakes are known to occur in Amherst. The Site contains areas of shrubland and emergent marsh wetland containing dense, herbaceous cover which may support this species. Providing pre-made NHFG flyers for species identification, to be added to construction plans by the project contractor, is a recommended construction BMP. If smooth green snakes are observed, snakes should be safely relocated out of the way of construction activities and immediately reported to the NHFG. In

addition, as typically required by NHFG, manufactured erosion and sediment control products, except for silt fence installed in accordance with Env-Wq 1506.04, shall not contain welded plastic, plastic, or multi-filament or monofilament polypropylene netting or mesh.

*3.4.3.7 Spotted Turtle*

The spotted turtle is listed as State Threatened. This species utilizes a variety of wetlands throughout the year including vernal pools, marshes, woodland streams, and scrub-shrub and forested wetlands with standing water. Spotted turtles are known to make routine seasonal movements to vernal pools for foraging and other activities in the spring. Habitat that may support this species is present at the Site and spotted turtles are known to occur in Amherst. The Site contains areas of pond, scrub-shrub and emergent wetlands typically utilized by this species. Developed or barren land cover with exposed soils at the Site may also be utilized for spring/summer nesting habitat, although this has not been observed. The project does not propose any wetland impacts. Providing pre-made NHFG flyers for species identification, to be added to construction plans by the project contractor, is a recommended construction BMP. If spotted turtles are observed, turtles should be safely relocated out of the way of construction activities and immediately reported to the NHFG.

**Table 1. Summary of NH Threatened, Endangered, and Special Concern Wildlife Associated with On-site Habitat Types.**

| Species (common name) | Broad Habitat Association | Federal Listing | State Listing | Minimum/Special habitat requirements | Likelihood of Presence on Site Based on Minimum/Special Habitat Requirements |
|---|---|---|---|---|---|
| **American bumble bee** | Developed/ Shrubland | Not federally listed | Special Concern | Ground-nesting bumble bee that occurs in meadows, crop fields, orchards, and gardens. Nectar plants include thistle, bunch berry, purple coneflower, Joe-Pye-weed, sunflower, St. John's wort, goldenrods, and clovers. The Site contains habitat that may support this species. | Possible |
| **American eel** | Rivers & Streams, Lakes & Ponds, Marine and Estuarine | Not federally listed | Special Concern | Catadromous species found in almost any freshwater habitat hydrologically connected to the ocean. Prefer lakes, ponds, and large rivers. Known to occur in Amherst as of July 2020, however, pond habitats on the Site lack hydrological connection to the ocean, thus it is unlikely this species would be present. | Not Likely |
| **American kestrel** | Developed, Shrubland, Shrubland | Not federally listed | Special Concern | Occupies a diversity of habitats including forested edges, shrublands, pastures, utility ROWs, marshes, beaver complexes, and suburban areas. Requires nest cavities in trees (minimum 12-inch diameter at breast height) and elevated perches for hunting. The Site vicinity contains habitat that may support this species; however, habitat acreage present at the Site is likely too small to support this species. | Low |

| Species (common name) | Broad Habitat Association | Federal Listing | State Listing | Minimum/Special habitat requirements | Likelihood of Presence on Site Based on Minimum/Special Habitat Requirements |
|---|---|---|---|---|---|
| **American pipit** | Shrubland, Alpine, Dune | Not federally listed | Special Concern | Occupies a variety of habitats during migration and winter, including agricultural fields, dunes, mudflats, and open grassy areas. Known to breed on arctic and alpine tundra. Found on Mount Washington in alpine sedge meadow communities (Hendricks and Verbeek 2012). The Site is outside of the normal distribution for this species; thus it is unlikely this species would be present. | Not Likely |
| **Bald eagle** | Appalachian Oak-Pine, Spruce-Fir, Northern Hardwood-Conifer, Hemlock-Hardwood-Conifer, Floodplain Forest, Marsh-Shrub Wetland, Rivers and streams, Pond and Lake | Protected by the Bald & Golden Eagle Protection Act | Special Concern | Found in association with aquatic habitats such as large lakes, rivers, and coastal estuaries. Nests often in forested areas adjacent to large water bodies and avoids human disturbance. Known to occur in Amherst, however the Site is located within large areas of forested land and lacks critical habitat features required by this species. | Not Likely |
| **Banded sunfish** | Rivers and streams, Pond | Not federally listed | Special Concern | Prefer vegetated areas of ponds, lakes, and backwaters of lowland streams. May be found in low gradient headwater streams with beaver activity. Known to occur in Amherst as of July 2020, however the Site lacks vegetated stream habitat preferred by this species. | Low |
| **Bank swallow** | Rivers and streams, Pond, Shrubland, Marsh/Shrub Wetland | Not federally listed | Special Concern | Inhabits shrublands, fields, or open areas adjacent to water. Requires exposed, vertical banks along rivers, lakes, and oceans where regular erosion occurs. The Site lacks critical habitat features for this species. | Not Likely |
| **Blanding's turtle** | Temperate Swamp, Marsh/scrub-shrub, Vernal Pool | Not federally listed | State Endangered | Utilizes a diversity of wetland types, as well as exposed, sandy anthropogenic soils for nesting. Beaver flowages, marshes, permanently flooded scrub-shrub/forested wetlands, and vernal pools are preferred summer and overwintering habitat. Females make large overland movements and may travel 1 km to reach nesting locations. Known to occur in Amherst as of July 2020. | Possible |

| Species (common name) | Broad Habitat Association | Federal Listing | State Listing | Minimum/Special habitat requirements | Likelihood of Presence on Site Based on Minimum/Special Habitat Requirements |
|---|---|---|---|---|---|
| **Blueback herring** | Pond, Estuarine, Marine | Not federally listed | Special Concern | Inhabit coastal waters but migrate to freshwater rivers and streams to spawn, preferring waters with moderately flowing currents. Not reported to occur in Amherst and on-Site currents were observed to be slow-moving and unlikely to provide critical habitat features required to support this species. | Not Likely |
| **Blue-spotted/Jefferson salamander complex** | Appalachian Oak-Pine, Northern Hardwood-Conifer, Hemlock-Hardwood Conifer, Floodplain Forest, Northern Swamp, Temperate Swamp, Peatland, Marsh/Shrub Wetland, Vernal Pool | Not federally listed | Special Concern | Known to form hybrid populations in New Hampshire. Requires vernal pools for breeding in conjunction with large areas of undisturbed upland forest connected by suitable dispersal corridors. Known to occur in Amherst as of July 2020. The Site contains potential habitat however it lacks large areas of undisturbed upland forest required by this species. | Low |
| **Bridle shiner** | Pond | Not federally listed | State Threatened | Found in waters containing dense communities of submerged aquatic vegetation, such as shorelines and lake/pond cove wetlands associated with large river backwaters and slow-flowing streams. Not known to occur in Amherst. | Not Likely |
| **Burbot** | Rivers and streams, Pond | Not federally listed | Special Concern | A native cold-water fish found in medium and large lakes with deep water in NH. Also found in cold water rivers and streams in the Connecticut, upper Merrimack Saco, and Androscoggin River drainages. Not reported to occur in Amherst. | Not Likely |
| **Cerulean warbler** | Appalachian Oak-Pine, Floodplain Forest | Not federally listed | Special Concern | Requires extensive (>250 ha) mature deciduous forests. Not reported to occur in Amherst. | Not Likely |
| **Cliff swallow** | Developed | Not federally listed | State Threatened | Requires vertical substrates with overhangs for nesting, a mud supply for nest construction, a water source, and open foraging areas near nest sites. Primarily found in Coos County and the Lakes Region with some scattered colonies near the Seacoast. Not reported to occur in Amherst. | Not Likely |

| Species (common name) | Broad Habitat Association | Federal Listing | State Listing | Minimum/Special habitat requirements | Likelihood of Presence on Site Based on Minimum/Special Habitat Requirements |
|---|---|---|---|---|---|
| **Common gallinule** | Marsh/Shrub Wetland | Not federally listed | Special Concern | Breeds in freshwater wetlands containing dense mixes of emergent and floating vegetation. Only recorded in three sites since 1990 and believed to possibly be extirpated from NH. Not reported to occur in Amherst. | Not Likely |
| **Common loon** | Pond and Lake, Rivers and streams | Not federally listed | State Threatened | Widely distributed to freshwater lakes and large rivers, preferring open water >2 acres. Prefers nesting areas in marshes, islands, and shorelines. Not reported to occur in Amherst. | Not Likely |
| **Common nighthawk** | Appalachian Oak-Pine, Hemlock-Hardwood-Conifer, Developed, Pine Barren, Rocky Ridge/Cliff/Talus | Not federally listed | State Endangered | Prefers open areas including shrublands, cultivated fields, woodland clearings, beaches, railroad rights-of-way, and flat gravel roofs. Not reported to occur in Amherst. | Not Likely |
| **Coppery Emerald** | Appalachian Oak-Pine, Temperate Swamp | Not federally listed | Special Concern | Only NH population reported to occur in Kingston. Usually occurs in forested peatlands, such as cedar swamps, not present at the Site. Not reported to occur in Amherst. | Not Likely |
| **Eastern box turtle** | Appalachian Oak-Pine, Hemlock-Hardwood-Conifer, Temperate Swamp, Marsh/Shrub Wetland, Shrubland, Shrubland | Not federally listed | State Endangered | Utilizes open woodlands but is generally close to water such as marshes, bogs, ponds, and stream banks. Prefers old fields and clearings with sandy soils for nesting. Like all NH turtles, requires well-drained soil for nesting. The Site is located within an area of fragmented commercial development but does contain areas of scrubby woodlands with various clearings and forested wetlands. Known to occur in Amherst as of July 2020. | Possible |
| **Eastern hognose snake** | Appalachian Oak-Pine, Hemlock-Hardwood-Conifer, Marsh/Shrub Wetland, Vernal Pool, Pine Barren, Shrubland | Not federally listed | State Endangered | Utilizes beaches, fields, and dry open pine or deciduous woodlands. Prefers sandy soils and has been known to occur in the Southern and Central parts of New Hampshire. Known to occur in Amherst as of July 2020. | Possible |
| **Eastern meadowlark** | Shrubland | Not federally listed | State Threatened | Breeds in a variety of shrubland. Prefers fields greater than 5 ha in size but may be variable (Heckert 1994, Vickery et al. 1994). This species is known to occur in | Not Likely |

| Species (common name) | Broad Habitat Association | Federal Listing | State Listing | Minimum/Special habitat requirements | Likelihood of Presence on Site Based on Minimum/Special Habitat Requirements |
|---|---|---|---|---|---|
| | | | | Amherst but the size of shrubland habitat at the Site is unlikely to support this species. The onsite fields do not meet the size requirements for this species and are separated by forested wetlands, which may limit use. | |
| **Eastern pondmussel** | Pond | Not federally listed | State Endangered | Inhabits ponds, lakes, and low velocity segments of streams and rivers containing fine sands or other soft sediments. Not reported to occur in Amherst. | Not Likely |
| **Eastern red bat** | Appalachian Oak-Pine, Spruce-Fir, Hemlock-Hardwood-Conifer, Northern Hardwood-Conifer, Floodplain Forest, Northern Swamp, Temperate Swamp | Not federally listed | Special Concern | Uses a variety of hardwood and softwood habitats, especially with still water, along roads/trails, and in regenerating and older forest age classes. Most active over water in early evening. Summer roosts in dense foliage and tree crowns. Like other bats, decimated by white-nose syndrome. Not formally reported to occur in Amherst. | Not Likely |
| **Eastern small-footed bat** | Appalachian Oak-Pine, Hemlock-Hardwood-Conifer, Northern Hardwood-Conifer, Caves and Mines, Rocky Ridge/Cliff/Talus | Not federally listed | State Endangered | Females form small maternity colonies, often in rocky crevices of cliffs and sometimes in crevices in buildings. Favors drafty, cool, and dry hibernacula such as entrances of mines and caves. There is only one known colony in New Hampshire in an abandoned mine in Coos County. Not formally reported to occur in Amherst. | Not Likely |
| **Eastern whip-poor-will** | Hemlock-Hardwood-Pine, Appalachian Oak-Pine, Pine Barren, Shrubland | Not federally listed | Special Concern | Prefers dry open woodlands, especially pine and oak, adjacent to early successional forests, large clearings, or fields. Known to occur in central Carroll County and southeastern Merrimack County. Not formally reported to occur in Amherst and the Site is located within an area of fragmented commercial development, which may limit use. | Not Likely |
| **Finescale dace** | Rivers and streams, Pond | Not federally threatened | Special Concern | Prefers lower gradient, cool headwater streams and small ponds with cover and aquatic vegetation. NH populations only known in Coos and Sullivan counties. Not reported to occur in Amherst. | Not Likely |

| Species (common name) | Broad Habitat Association | Federal Listing | State Listing | Minimum/Special habitat requirements | Likelihood of Presence on Site Based on Minimum/Special Habitat Requirements |
|---|---|---|---|---|---|
| **Fowler's toad** | Appalachian Oak-Pine, Marsh/Shrub Wetland, Vernal Pool, Rivers and streams, Pond, Shrubland, Pine Barren, Dune | Not federally listed | State Threatened | Utilizes sandy alluvial soils and requires shallow water for breeding. Found along roadsides, near homes and gardens, and in fields and pastures (Wright and Wright 1949). This species has an irregular or spotty distribution throughout New England and New York, likely caused by poor documentation. Historically reported to occur in Amherst and contains sandy soils and upland habitat, however the Site is lacking larger river systems and lakes typically utilized by this species. | Not Likely |
| **Golden eagle** | Appalachian Oak-Pine, Spruce-Fir, Northern Hardwood-Conifer, Hemlock-Hardwood-Conifer, Rocky Ridge/Cliff/Talus | Protected by the Bald & Golden Eagle Protection Act | State Endangered | Utilizes a variety of open habitats, especially in mountainous terrain. Typically nests on mountain cliffs associated with coniferous forest. Hunts over open areas and prefers remote locations with low human disturbance. May be seen during migration in New Hampshire. Not reported to occur in Amherst. | Not Likely |
| **Grasshopper sparrow** | Shrubland | Not federally listed | State Threatened | Prefers dry fields with sparse grasses, rarely using areas with >35% shrub cover. Prefers habitats 12-40 ha in size. Not formally recorded in Amherst, and the size of shrubland habitat at the Site is unlikely to support this species. | Not Likely |
| **Hoary Bat** | Appalachian Oak-Pine, Spruce-Fir, Hemlock-Hardwood-Conifer, Northern Hardwood-Conifer, Floodplain Forest, Northern Swamp, Temperate Swamp | Not federally listed | Special Concern | Prefers coniferous forests but also utilizes deciduous forests. Roosts in foliage, hollow trees, and woodpecker cavities in the summer. Uncommon and not formally reported to occur in Amherst. | Not Likely |
| **Horned lark** | Shrubland, Dune | Not federally listed | Special Concern | Breeds in sparsely vegetated lands including tundra, dunes, and airports. Occurs in fields and open habitats during non-breeding season. Not historically common, populations in NH currently isolated to airports. Not formally recorded in Amherst. | Not Likely |

| Species (common name) | Broad Habitat Association | Federal Listing | State Listing | Minimum/Special habitat requirements | Likelihood of Presence on Site Based on Minimum/Special Habitat Requirements |
|---|---|---|---|---|---|
| **Kennedy's emerald** | Temperate Swamp, Marsh/scrub-shrub | Not federally listed | Special Concern | Occurs in bogs, fens, and swamps with flowing water. The adults will utilize adjacent uplands for foraging. Not formally reported to occur in Amherst. | Not Likely |
| **Lake whitefish** | Pond | Not federally listed | Special Concern | Pelagic, cool water species requiring large rivers or deep, cold lakes. Spawn in shallow water reefs or tributaries with rocky substrates. NH populations only recorded in central NH. Not formally reported to occur in Amherst. | Not Likely |
| **Least bittern** | Marsh/Shrub Wetland | Not federally listed | Special Concern | Found in freshwater and brackish marshes containing dense vegetation. Prefers wetland habitats >12.5 acres in size containing tall, emergent vegetation dispersed with open water (summarized in DeGraaf and Yamasaki 2001). Not formally recorded in Amherst, and the size of wetland habitat at the Site is unlikely to support this species. | Not Likely |
| **Little brown bat** | Appalachian Oak-Pine, Spruce-Fir, Hemlock-Hardwood-Conifer, Northern Hardwood-Conifer, Floodplain Forest, Temperate Swamp, Pine Barren, Caves and Mines | Not federally listed | State Endangered | Found statewide in all forest types and utilize buildings and caves. Forages over wetlands, streams, and open areas. Previously very common but impacted by white-nose syndrome like many other NH bats, with a 99% decline in numbers at hibernaculum sites. Not formally recorded in Amherst but previously very common prior to white-nose syndrome. Per the WAP, primary protection strategy in NH is to protect summer colonies by prohibiting exclusion of bats from buildings from May 15-Aug 15. | Possible |
| **Marbled salamander** | Appalachian Oak-Pine | Not federally listed | State Endangered | Requires temporary, fishless ponds (i.e., vernal pools) for breeding. Utilizes forested habitat near palustrine wetlands. Wetlands must hold standing water for about 10 months to be considered viable habitat for this species (Noble and Brady 1933, Bishop 1941). Known to occur in Amherst as of July 2020, and the Site contains habitat that may support this species. However, viable wetland and upland habitats are likely too fragmented by commercial development to support this species. | Low |
| **New England cottontail** | Shrubland | Not federally listed | State Endangered | Occupies a variety of habitats including native shrubland and regenerating forests. This species prefers early | Low |

| Species (common name) | Broad Habitat Association | Federal Listing | State Listing | Minimum/Special habitat requirements | Likelihood of Presence on Site Based on Minimum/Special Habitat Requirements |
|---|---|---|---|---|---|
| | | | | successional habitats associated with small-scale disturbances and dense understory cover. Known to occur in Amherst as of July 2020, however the Site is located near areas of commercial development and lacks habitat features required to support this species. | |
| **Northern black racer** | Appalachian Oak-Pine, Hemlock-Hardwood-Conifer, Rocky Ridge/Cliff/Talus, Shrubland, Shrubland | Not federally listed | State Threatened | Associated with a variety of habitats, including early successional forests, old fields, rocky ledges, sand pits, and woodlands. NH populations use larger territories than southern populations, with mean home range >100 acres. Known to occur in Amherst; however, the Site does not contain habitat acreage required by this species. | Not Likely |
| **Northern harrier** | Peatland, Marsh/Shrub Wetland, Shrubland, Shrubland, Salt Marsh | Not federally listed | State Endangered | Found in a variety of large, open habitats year-round, such as fields and marshes. Maintains a winter range of predominantly coastal wetlands and a breeding range confined largely to northern portions of the State. Nests on the ground in dense stands of vegetation near shrublands. Not reported to occur in Amherst. | Not Likely |
| **Northern leopard frog** | Rivers and streams, Shrubland, Shrubland, Floodplain Forest, Marsh/Shrub Wetland, Pond and Lake | Not federally listed | Special Concern | Utilizes wet meadows and breeds in ponds, marshes, slow shallow streams, and weedy lake shores. The Site contains some habitat features which may seasonally support this species, however no sightings have been reported in Amherst after 1994. | Not likely |
| **Northern long-eared bat** | Appalachian Oak-Pine, Spruce-Fir, Hemlock-Hardwood-Conifer, Northern Hardwood-Conifer, Caves and Mines | Federally Threatened | State Endangered | Forages over ponds, clearings, and in forests. Requires specific hibernaculum conditions, typically found in mines/caves in winter, and to a lesser degree in man-made features that maintain temperatures between 2 and 7 degrees Celsius during the winter. Dead hardwoods with cavities and/or loose bark are considered important for summer maternity colonies. Like other bats, decimated by white-nosed syndrome at hibernaculum sites. Not formally reported to occur in Amherst. Where considered present, the USFWS/USACE typically requires protection of known roost trees, | Not Likely |

| Species (common name) | Broad Habitat Association | Federal Listing | State Listing | Minimum/Special habitat requirements | Likelihood of Presence on Site Based on Minimum/Special Habitat Requirements |
|---|---|---|---|---|---|
| | | | | protection of hibernaculum, and may request limitation of cutting from June to July during the pup season. No maternity roost trees or hibernaculum are known to occur on or near the Site. | |
| **Northern redbelly dace** | Rivers and streams, Pond | Not federally threatened | Special Concern | Utilizes lower gradient, cool headwater streams and small ponds with minimal flow and overhanging vegetative cover. Not formally reported to occur in Amherst. | Not Likely |
| **Peregrine falcon** | Developed, Rocky Ridge/Cliff/Talus | Not federally listed | State Threatened | Utilizes open habitats and open forested regions typically where there are rocky cliffs with ledges, near water and abundant prey. May be seen during fall migration. Sometimes breeds in cities on tall buildings. Not formally reported to occur in Amherst. | Not Likely |
| **Pied-billed grebe** | Peatland, Marsh/Shrub Wetland | Not federally listed | State Threatened | Inhabits ponds or slow portions of streams with dense stands of emergent vegetation with some woody vegetation. Requires habitats between 5 and 12 acres for breeding. Not formally reported to occur in Amherst. | Not Likely |
| **Purple martin** | Developed | Not federally listed | State Threatened | Habitat is reliant on housing structures provided by people. Colonies can occur in a wide variety of situations, but usually they are in open areas close to water. The Site lacks critical habitat features required to support this species. | Not Likely |
| **Rapids clubtail** | Appalachian Oak-Pine, Northern Hardwood-Conifer, Hemlock-Hardwood-Conifer, Floodplain Forest, Rivers and streams | Not federally listed | Special Concern | Utilizes moderate to large rivers with muddy to silty bottoms, sometimes with interspersed riffles. Adults forage in adjacent forests. Occurs in low numbers in the Merrimack River. Not formally reported to occur in Amherst. | Not Likely |
| **Redfin pickerel** | Ponds | Not federally listed | Special Concern | Inhabits slow-moving, acidic, tea-colored streams with dense vegetation. Commonly found in brush piles and in low gradient streams flowing through abandoned beaver ponds. Not formally recorded in Amherst. | Not Likely |
| **Ringed boghaunter** | Appalachian Oak-Pine, Hemlock-Hardwood- | Not federally listed | State Threatened | Requires wetlands with extensive sphagnum, generally acidic fens, which are not present in the Site vicinity. Formally recorded in Amherst as of July | Not Likely |

| Species (common name) | Broad Habitat Association | Federal Listing | State Listing | Minimum/Special habitat requirements | Likelihood of Presence on Site Based on Minimum/Special Habitat Requirements |
|---|---|---|---|---|---|
| | Conifer, Peatland, Temperate Swamp, Marsh/Shrub Wetland | | | 2020., however, the Site lacks areas of extensive floating or suspended sphagnum required to support this species. | |
| **Round whitefish** | Rivers and streams | Not federally listed | State Threatened | In NH, utilizes medium to large lakes with deep, cold water habitat, and rivers. Spawns in shallow water over cobble and gravel. Not formally reported to occur in Amherst. | Not Likely |
| **Rusty blackbird** | Spruce-Fir, Peatland, Marsh/Shrub Wetland | Not federally listed | Special Concern | Breeds in stunted or regenerating spruce-fir-hardwood forest within 500 meters of a water source, such as streams, ponds, or fens. Not formally reported to occur in Amherst. | Not Likely |
| **Rusty-patched bumble bee** | Developed/ Shrubland | Federally Endangered | State Endangered | Utilizes meadows, crop fields, orchards, gardens, and other locations with flowering plants. Nectar plants include sunflowers, asters, goldenrods, honeysuckles, and *Vaccinium* varieties. The Site contains habitat that may support this species. | Possible |
| **Silver-haired bat** | Appalachian Oak-Pine, Spruce-Fir, Hemlock-Hardwood-Conifer, Northern Hardwood-Conifer, Northern Swamp, Temperate Swamp | Not federally listed | Special Concern | Found in NH only during summer months as they migrate to southern states in the Fall and stay through the winter. Forages in hardwood clear-cuts, and coniferous or mixed forest near lakes, streams, or ponds. Typically roosts in tree hollows. These bats are estimated to require snag densities of at least 21 per hectare (Bat Conservation International 2021). Not formally reported to occur in Amherst. | Not Likely |
| **Skillet clubtail** | Appalachian Oak-Pine, Hemlock-Hardwood-Conifer, Floodplain Forest, Rivers and streams | Not federally listed | Special Concern | Utilizes habitat adjacent to large, slow moving rivers. Most records in NH come from the Merrimack River between Canterbury and Manchester, and from the Contoocook River in Hopkinton (Hunt 2012). Not formally reported to occur in Amherst. | Not Likely |
| **Smooth green snake** | Peatland, Marsh/Shrub Wetland, Shrubland, Shrubland, | Not federally listed | Special Concern | Favors varying types open or lightly forested areas and shrubland habitats. Utilizes rotting logs and animal burrows for breeding, as well as rock crevices during hibernation. Known to occur in Amherst as of July 2020. Consider adding | Possible |

| Species (common name) | Broad Habitat Association | Federal Listing | State Listing | Minimum/Special habitat requirements | Likelihood of Presence on Site Based on Minimum/Special Habitat Requirements |
|---|---|---|---|---|---|
| | Rocky Ridge/Cliff/Talus | | | identification information to plans, contact NHFG immediately upon observation, and safely relocate snakes outside of construction areas if observed. | |
| **Sora** | Marsh/Shrub Wetland | Not federally listed | Special Concern | Breeds in large marshes containing shallow or intermediate-depth water levels, and dominated by emergent cattails, sedges, and bulrushes. Not formally reported to occur in Amherst and on-site wetlands are not large enough to support this species. | Not Likely |
| **Spotted turtle** | Marsh/scrub-shrub, Temperate Swamp, Vernal Pool | Not federally listed | State Threatened | Utilizes a variety of wetlands including vernal pools, marshes, sedge meadows, streams, and forested/scrub shrub wetlands with standing water. Like all NH turtles, requires well-drained soil for nesting. Known to occur in Amherst as of July 2020 and on-site wetlands contain habitat features, such as shallow waters with abundant submergent and emergent vegetation (NHFG 2015), typically preferred by this species. | Possible |
| **Swamp darter** | Pond, Rivers and streams | Not federally listed | Special Concern | Utilizes small, vegetated ponds, impounded areas, low gradient streams, and large rivers. Prefer shallow areas with soft, muddy substrate, dense vegetation, and accumulated detritus. Known to occur in Amherst as of July 2020, however Pond habitat at the Site is isolated from adjacent watercourses and this species is not reported to occur north of the Souhegan River. | Not Likely |
| **Timber rattlesnake** | Appalachian Oak-Pine, Hemlock-Hardwood-Conifer, Shrubland, Rocky Ridge/Cliff/Talus | Not federally listed | State Endangered | Utilizes forested areas with rocky outcroppings, often in remote settings. Individual snakes have large home ranges and are susceptible to road mortality and newly emerged fungal diseases. Often reported in scattered locations throughout the southern half of New Hampshire extending into the White Mountains. Only one known extant population reported in 1992. Not formally reported to occur in Amherst. | Not Likely |
| **Tricolored bat** | Appalachian Oak-Pine, Spruce-Fir, Hemlock-Hardwood-Conifer, Northern | Not federally listed | State Endangered | Hibernate in caves and mines, and occasionally in other structures. Like other bats, this species has been decimated by white-nosed syndrome. Protection of hibernaculum is considered of primary importance to this species. Data on summer habitat use is limited | Not Likely |

| Species (common name) | Broad Habitat Association | Federal Listing | State Listing | Minimum/Special habitat requirements | Likelihood of Presence on Site Based on Minimum/Special Habitat Requirements |
|---|---|---|---|---|---|
| | Hardwood-Conifer, Floodplain Forest, Northern Swamp, Temperate Swamp, Caves and Mines | | | although there is data to suggest that maternity colonies are foliage roosters, and may prefer deciduous trees in the summer, possibly selecting oak and maple. Not formally reported to occur in Amherst. Per the WAP, primary protection strategies in NH are to protect summer colonies by prohibiting exclusion of bats from buildings from May 15 - Aug 15, prevent occupied trees from being cut down, and protect qualities of mine hibernacula. | |
| **Upland sandpiper** | Shrubland | Not federally listed | State Endangered | Occupies a variety of shrubland habitats, including airfields and agricultural areas. Requires a mix of short and tall grasses, and habitat areas over 60 ha. Not formally reported to occur in Amherst and the Site lacks critical habitat required by this species. | Not Likely |
| **Vesper sparrow** | Pine Barren, Shrubland | Not federally listed | Special Concern | Breeds in pine barrens or dry, open, grassy areas with patches of bare ground and elevated perches. Species is area sensitive and requires habitats >50 acres in size. Known to occur in Amherst as of July 2020, however, the Site lacks critical habitat features required to support this species. | Not Likely |
| **Wood turtle** | Rivers and streams, Floodplain Forest, Shrubland | Not federally listed | Special Concern | Utilizes slow-moving streams and adjacent uplands (often within 600 feet of streams). Like all NH turtles, requires well-drained soil for nesting such as open sandy areas, banks, and meadows. Known to occur in Amherst as of July 2020. If present, exposed soils at the Site may provide potential nesting habitat. However, the Site is located within dense urban development and highly fragmented from surrounding habitat typically preferred by this species. This species utilizes slow-moving streams and rivers, as well as upland habitats bordering riparian zones, often within approximately 600 feet of riparian habitats. The nearest riparian habitat is approximately 1500 feet away from the Site, so it is less likely this species is present. | Low |
| **Yellow-banded bumble bee** | Developed/ Shrubland | Not federally listed | Special Concern | Utilizes meadows, crop fields, orchards, gardens, and other locations with flowering plants. Nectar plants include | Possible |

| Species (common name) | Broad Habitat Association | Federal Listing | State Listing | Minimum/Special habitat requirements | Likelihood of Presence on Site Based on Minimum/Special Habitat Requirements |
|---|---|---|---|---|---|
| | | | | *Vaccinium* varieties, willows, roses, *Rubus* varieties, honeysuckles, asters, and goldenrods. The Site contains habitat that may support this species. | |
| **Yellow bumble bee** | Developed/ Shrubland | Not federally listed | Special Concern | Utilizes meadows, crop fields, orchards, gardens, and other locations with flowering plants. Nectar plants include honeysuckles, thistles, clovers, loosestrifes, vetches, and bee balms. The Site contains habitat that may support this species. | Possible |

### 3.4.4 POTENTIAL IMPACTS AND PROPOSED CONSERVATION MEASURES

The project includes the construction of a proposed building addition and associated parking lot in Shrubland and Developed Land cover types. The Site currently contains an industrial warehouse building, parking areas, open land, and forested land. The current project design proposes grading and construction of paved access, construction of a 30,000-square foot addition to the existing structure, and potential relocation of the subsurface stormwater system. (see **Figure 6** – *Detailed Site Plan 1*).

Based on a GIS analysis overlaying the Site Plan prepared by Meridian onto the land cover type plan prepared by GZA, the proposed construction will convert approximately 3.2 acres of Shrubland habitat to Developed Land. Existing areas of wooded land, pond and forested wetlands are not proposed to be impacted by proposed construction. Based on GZA's assessment, the Site has some potential to support 10 rare species, including American bumble bee, rusty-patched bumble bee, yellow-banded bumble bee, yellow bumble bee, Blanding's turtle, eastern box turtle, eastern hognose snake, little brown bat, smooth green snake, and spotted turtle The project proposes installation of a subsurface stormwater system and paved access to the proposed parking lot within the Town of Amherst's 100-foot wetland buffer. No wetland impacts are proposed.

Based on a review of habitats, GZA offers the following BMP recommendations, as recommended in the WAP and/or typically requested by NHFG.

1. Maintain an upland buffer to on-site wetlands where possible. The current plan maintains a 100-foot wetland buffer in portions of the Site (see **Figure 6** - *Detailed Site Plan 1* prepared by Meridian, dated August 2, 2021). The incorporation of this buffer will serve to preserve habitat, travel corridors, and water quality, benefitting rare wetland species.

2. Manufactured erosion and sediment control products, except for silt fence installed in accordance with Env-Wq 1506.04, utilized for, but not limited to, slope protection, runoff diversion, slope interruption, perimeter control, inlet protection, check dams, and sediment traps shall not contain welded plastic, plastic, or multi-filament or monofilament polypropylene netting or mesh.

3. Consider native wildflowers in the seed mix for the restoration of disturbed soils associated with roadways and related infrastructure to promote habitat for bumble bees.

4. Site operators shall be informed of the potential presence of rare species on the Site. Add Blanding's turtle, eastern box turtle, eastern hognose snake, smooth green snake, and spotted turtle identification information to construction plans, per request by NHFG. If observed during construction, contact NHFG immediately upon observation, and safely relocate amphibians and reptiles out of construction areas if observed.

5. Prior to daily construction activities, work areas will be searched for snakes and turtles.

6. Turtle nesting season extends from late May through the beginning of July and hatchling turtles typically emerge from the ground from mid-August through early October. If Blanding's or spotted turtles are found laying eggs or if hatchling turtles are seen in the work area, contact NHFG (Melissa Doperalski at 603-271-1738 (o)/ 603-479-1129 (cell) or Josh Megyesy at 603-271-1125 (o)/ 978-575-0802 (cell) for further instructions.

7. Install temporary barriers (e.g., silt fence) around construction areas for spring/summer construction to exclude turtles and snakes from active construction areas.

8. All observations of threatened or endangered species shall be reported immediately to the New Hampshire Fish and Game Department Nongame and Endangered Wildlife Environmental Review Program by phone at 603-271-2461 and by email at NHFGreview@wildlife.nh.gov unless as otherwise specified below. Email subject line: NHB21-1916, 1 Bon Terrain Drive, Amherst, Wildlife Species Observation. Photographs shall be provided for verification as feasible.

In GZA's opinion, if the BMPs identified above are followed, the project design "will not appreciably jeopardize the continued existence of state or federally threatened and endangered species."

## 3.5 FINDING AND CONCLUSIONS

GZA has completed a wildlife assessment, as required by NHDES to support the submittal of an Alteration of Terrain permit by EIP One Bon Terrain Drive, LLC. The assessment included a review of state-wide wildlife data, classification and mapping of habitat types, wildlife documentation, and impact assessment for the proposed construction of a public park and mixed-used residential units. The following is a summary of our findings and conclusions:

- GZA created a wildlife habitat database using GIS to create an aerial habitat overlay of the project, and to identify wildlife habitats of regional significance near or on the Site. In addition, GZA completed a survey for wildlife during July 15, 2021, to document mammals, birds, amphibians, and reptiles.

- Three major upland habitats and three wetland habitats totaling approximately ±43.5 acres were identified on the Site including Developed Land, Appalachian-Oak-Pine, Shrubland, Marsh and Shrub Wetland, Pond, Potential Vernal Pool, and Temperate Swamp habitat.

- Based on habitat evaluation, GZA ranked 10 endangered, threatened, and special concern species as having potential to occur on or immediately adjacent to the Site, including American bumble bee, rusty-patched

bumble bee, yellow-banded bumble bee, yellow bumble bee, Blanding's turtle, eastern box turtle, eastern hognose snake, little brown bat, smooth green snake, and spotted turtle. These species have potential to occur based on review of habitat types and rare species records in Amherst.

- In GZA's opinion, if conservation measures/BMPs are followed, the project design "will not appreciably jeopardize the continued existence of state or federally threatened and endangered species".

## 3.6 REFERENCES

Arbuthnot, M. 2008. A Landowner's Guide to New England Cottontail Habitat Management. U.S. Fish & Wildlife Publications.

Bishop, S.C. 1941. The salamanders of New York. N.Y. State Museum Bulletin 324:1-365

Comprehensive Environmental, Inc. & Pennichuck Water Works, Inc. 2002. Study of Urban Non-Point Source Pollution: Witches Brook North Subwatershed.

DeGraaf, R. M., and Yamasaki. 2001. New England Wildlife: Habitat, Natural History, and Distribution. University Press of New England. Hanover and London.

DeGraaf, R. M., Yamasaki, M., Leak, W. B., and Lester, A. M. 2006. Technical Guide to Forest Wildlife Habitat Management in New England. University Press of New England, Lebanon, NH.

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, Yale University Press, New Haven.

Heckert, J.R. 1994. The effects of habitat fragmentation on mid-western grassland bird communities. Ecological Applications 4:461-471.

Hendricks, P. and N. A. Verbeek. 2012. American Pipit (*Anthus rubescens*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology.

Hunt, P.D. 2012. The New Hampshire Dragonfly Survey: A final report. Report to NH Fish and Game Department, Nongame and Endangered Species Program. New Hampshire Audubon, Concord, NH.

New Hampshire Fish and Game Department. 2015. New Hampshire Wildlife Action Plan.

New Hampshire Fish and Game Department. 2020. New Hampshire Wildlife Action Plan" Habitat Land Cover Map and Highest Ranked Habitat by Ecological Condition" dataset. UNH GRANIT Clearinghouse.

New Hampshire Natural Heritage Bureau. 2020. Rare Plants, Animals, and Exemplary Communities in New Hampshire Towns. DNCR – Division of Forests and Lands. 306 pages.

New Hampshire Wildlife Sightings Database Maps. 07/25/2021. Nongame & Endangered Wildlife Program. NH Fish & Game Department

Noble, G.K., and M.K. Brady. 1933. Observation on the life history of the marbled salamander, *Ambystoma opacum* (Amphibia, Urodela, Ambystomatidae). Journal of Herpetology 11: 169-176

U.S. Fish and Wildlife Service. 2007. National Bald Eagle Management Guidelines.

Vickery, P.D., M.L. Hunter, Jr., and S.M. Melvin. 1994. Effects of habitat area on the distribution of grassland birds in Maine. Conservation Biology 8:1087-1097.

Wright, A.H. and A.A. Wright. 1949. Handbook of frogs and toads. Third edition. Comstock Publishing Associates. Ithaca, New York.

# Appendix A – Limitations

**USE OF REPORT**

1. GZA GeoEnvironmental, Inc. (GZA) has prepared this report on behalf of, and for the exclusive use of EIP One Bon Terrain Drive, LLC ("Client") for the stated purpose(s) and location(s) identified in the report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not identified in the agreement, for any use, without our prior written permission, shall be at that party's risk, and without any liability to GZA.

**STANDARD OF CARE**

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Report and/or proposal, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the data gathered and observations made during the course of our work. Conditions other than described in this report may be found at the subject location(s).

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

**LIMITS TO OBSERVATIONS**

4. Natural resource characteristics are inherently variable. Biological community composition and diversity can be affected by seasonal, annual or anthropogenic influences. In addition, soil conditions are reflective of subsurface geologic materials, the composition and distribution of which vary spatially.

5. The observations described in this report were made on the dates referenced and under the conditions stated therein. Conditions observed and reported by GZA reflect the conditions that could be reasonably observed based upon the visual observations of surface conditions and/or a limited observation of subsurface conditions at the specific time of observation. Such conditions are subject to environmental and circumstantial alteration and may not reflect conditions observable at another time.

6. The conclusions and recommendations contained in this report are based upon the data obtained from a limited number of surveys performed during the course of our work on the site, as described in the Report. There may be variations between these surveys and other past or future surveys due to inherent environmental and circumstantial variability.

**RELIANCE ON INFORMATION FROM OTHERS**

7. Preparation of this Report may have relied upon information made available by Federal, state and local authorities; and/or work products prepared by other professionals as specified in the report. Unless specifically stated, GZA did not attempt to independently verify the accuracy or completeness of that information.

**COMPLIANCE WITH REGULATIONS AND CODES**

8. GZA's services were performed to render an opinion on the presence and/or condition of natural resources as described in the Report. Standards used to identify or assess these resources as well as regulatory jurisdiction, if any, are stated in the Report. Standards for identification of jurisdictional resources and regulatory control over them may vary between governmental agencies at Federal, state and local levels and are subject to change over time which may affect the conclusions and findings of this report.

**NEW INFORMATION**

9. In the event that the Client or others authorized to use this report obtain information on environmental regulatory compliance issues at the site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this work, may modify the conclusions stated in this report.

**ADDITIONAL SERVICES**

10. GZA recommends that we be retained to provide further investigation, if necessary, which would allow GZA to (1) observe compliance with the concepts and recommendations contained herein; (2) evaluate whether the manner of implementation creates a potential new finding; and (3) evaluate whether the manner of implementation affects or changes the conditions on which our opinions were made.

**Appendix B – NHB Memo**

# Memo

NH Natural Heritage Bureau
NHB DataCheck Results Letter

Please note: portions of this document are confidential.
Maps and NHB record pages are confidential and should be redacted from public documents.

**To**: Douglas Brodeur, Meridian Land Services
PO BOX 118
Milford, NH 03055

**From**: Jessica Bouchard, NH Natural Heritage Bureau
**Date**: 6/15/2021 (valid until 06/15/2022)
**Re**: Review by NH Natural Heritage Bureau
**Permits**: MUNICIPAL POR - Amherst, NHDES - Alteration of Terrain Permit, USEPA - Stormwater Pollution Prevention

**NHB ID:** **NHB21-1916** Town: Amherst Location: 1 Bon Terrain Drive
Description: 30,000 SF addition and other improvements to an existing distribution warehouse facility.

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

**Comments** **NHB: Please provide photos of the proposed expansion area. NHB recommends surveying for both licorice goldenrod and northern blazing star within the proposed disturbance area. Contact NHB for additional species information and recommendations for the time of year to survey.**
**F&G: No Comments At This Time**

| Plant species | State[1] | Federal | Notes |
|---|---|---|---|
| licorice goldenrod (*Solidago odora ssp. odora*)* | T | -- | |
| northern blazing star (*Liatris novae-angliae var. novae-angliae*) | E | -- | Threats to this highly imperilled species are development activities that eliminate its habitat and invasion of its open, grassy habitat by trees and shrubs. |

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

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

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

# Appendix C - Wildlife Habitat Assessment Field Data Form

**Wildlife Habitat Assessment Field Data Form**



**Person Completing Form:** Nyssa Seekamp **Date(s) of Assessment:** July 22, 2021

**Project Name:** Wildlife Habitat Assessment – 1 Bon Terrain Drive

## I. SITE DESCRIPTION

**Project Location:** Tax Map 2, Block 26, Lots 4, 1 Bon Terrain Drive, Amherst, NH 03031

**Site size:** ±43.5 acres **Street:** Bon Terrain Drive **Town:** Amherst **County:** Hillsborough

**Nearest Road:** ☒ On Site ☐ Adjacent to Site ☐ _____ mi from Site

**Type of Road:** ☐ Dirt ☒ 2-Lane Paved ☐ 4-Lane Paved Interstate

**Existing Structures on Site:** Industrial building

**Adjacent Land Uses (check all that apply):**

☒ Forest ☒ Shrubland ☒ Grassland ☐ Cropland
☒ Wetland ☐ Open Water ☒ Residential ☐ Pasture
☒ Industrial/Commercial ☒ Utility right-of-way ☐ Quarry
☐ Other:

**Habitat Types Present:**

☒ Forest ☒ Shrub/Old Field ☒ Grass/Forb ☐ Cultivated ☐ Pine Barren
☐ Pasture ☒ Wetland ☐ Open Water ☐ Dunes ☐ Marine
☒ Sand/Gravel ☐ Rocky Ridge/Cliff ☐ Alpine ☒ Developed
☐ Other:

**Streams:**

☒ None ☐ Intermittent ☐ Perennial

**Stream Order:** 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐

**Water Bodies:**

☒ None ☐ Small pond - natural ☐ Small pond - constructed ☐ Great pond ☐ Estuary
☐ Lake ☐ Stormwater feature

**This form was developed based on the draft created this form was developed based on the draft "Wildlife Habitat Assessment Field Data Form" developed by the NH Fish and Game Department (NHFG), NH Audubon, and UNH Cooperative Extension. GZA updated the list of habitats based on information in the 2020 NHFG Wildlife Action Plan and habitat associations reported in New England Wildlife: Habitat, Natural History, and Distribution (DeGraaf and Yamasaki 2001).**

**Wetlands:**

☒ Forested ☐ Sedge Meadow ☐ Shallow Marsh ☐ Deep Marsh
☒ Shrub Swamp ☒ Peatland/Bog ☒ Vernal pool ☐ Salt Marsh
☐ Other: GZA observed forested wetlands on site.

**Dominant Forest Types:**

☐ Aspen-Birch ☐ Spruce-Fir ☐ Red Oak ☐ Northern Hardwood
☐ Hemlock ☒ Oak-Pine ☐ Other:

**Forest Age Class:**

☒ Regeneration-Seedling ☒ Sapling-Pole ☒ Mature ☐ Older Growth

## II. HABITATS AND ASSOCIATED POTENTIAL RARE WILDLIFE

**Develop List of Potential Wildlife Species Present Based on the Site Description**

This information, derived from the NH Wildlife Action Plan, provides insight into which species listed as threatened or endangered in NH have potential to inhabit an area. Since this is a potential list, fieldwork and judgement when assessing the impacts of a project are still essential.

**Avoid or Minimize Impacts to the Following Habitats:**

| Wildlife Habitat[1] | Habitat Present | Size (acres) | Associated Listed Wildlife[2] (change to **BOLD** if present) | Comments |
|---|---|---|---|---|
| High elevation spruce-fir forest | ☐ | | American marten (*Martes americana*)<br>American three toed-woodpecker (*Picoides dorsalis*)<br>Bald eagle (*Haliaeetus leucocephalus*)<br>Bicknell's Thrush (*Catharus bicknelli*)<br>Canada lynx (*Lynx canadensis*)<br>Eastern wolf (*Canis lupus*)<br>Golden eagle (*Aquila chrysaetos*)<br>Northern bog lemming (*Synaptomys borealis sphagnicola*)<br>Spruce grouse (*Falcipennis canadensis*)<br><br>SGCN Species<br>Long-tailed shrew (*Sorex dispar*)<br>Moose (*Alces alces*)<br>Purple finch (*Haemorhous purpureus*)<br>Ringed emerald (*Somatochlora albicincta*)<br>Rock vole (*Microtus chrotorrhinus*)<br>Sedge darner (*Aeshna juncea*) | |

**This form was developed based on the draft created this form was developed based on the draft "Wildlife Habitat Assessment Field Data Form" developed by the NH Fish and Game Department (NHFG), NH Audubon, and UNH Cooperative Extension. GZA updated the list of habitats based on information in the 2020 NHFG Wildlife Action Plan and habitat associations reported in New England Wildlife: Habitat, Natural History, and Distribution (DeGraaf and Yamasaki 2001).**

| Wildlife Habitat[1] | Habitat Present | Size (acres) | Associated Listed Wildlife[2] (change to **BOLD** if present) | Comments |
|---|---|---|---|---|
| Low elevation spruce-fir forest | ☐ | | American three-toed woodpecker (*Picoides dorsalis*)<br>Bald eagle (*Haliaeetus leucocephalus*)<br>Canada lynx (*Lynx canadensis*)<br>Canada warbler (*Cardellina canadensis*)<br>Eastern red bat (*Lasiurus borealis*)<br>Golden eagle (*Aquila chrysaetos*)<br>Hoary bat (*Lasiurus cinereus*)<br>Little brown bat (*Myotis lucifugus*)<br>Northern bog lemming (*Synaptomys borealis sphagnicola*)<br>Northern long-eared bat (*Myotis septentrionalis*)<br>Rusty blackbird (*Euphagus carolinus*)<br>Silver-haired bat (*Lasionycteris noctivagans*)<br>Spruce grouse (*Falcipennis canadensis*)<br>Tricolored bat (*Perimyotis subflavus*)<br><br><u>SGCN Species</u><br>Big brown bat (*Eptesicus fuscus*)<br>Cape May warbler (*Setophaga tigrina*)<br>Chimney swift (*Chaetura pelagica*)<br>Moose (*Alces alces*)<br>Northern goshawk (*Accipiter gentilis*)<br>Ocellated emerald (*Somatochlora minor*)<br>Olive-sided flycatcher (*Contopus cooperi*)<br>Purple finch (*Haemorhous purpureus*)<br>Ruffed grouse (*Bonsai umbrellas*) | |
| Northern hardwood-conifer forest | ☐ | | American marten (*Martes americana*)<br>Bald eagle (*Haliaeetus leucocephalus*)<br>Blue-spotted/Jefferson complex (*Ambystoma laterale/jeffersonianum*)<br>Eastern red bat (*Lasiurus borealis*)<br>Eastern small-footed bat (*Myotis leibii*)<br>Eastern wolf (*Canis lupus*)<br>Golden eagle (*Aquila chrysaetos*)<br>Hoary bat (*Lasiurus cinereus*)<br>Little brown bat (*Myotis lucifugus*)<br>Northern bog lemming (*Synaptomys borealis sphagnicola*)<br>Northern long-eared bat (*Myotis septentrionalis*)<br>Rapids clubtail (*Gomphus quadricolor*)<br>Silver-haired bat (*Lasionycteris noctivagans*)<br>Tricolored bat (*Perimyotis subflavus*) | |

| Wildlife Habitat[1] | Habitat Present | Size (acres) | Associated Listed Wildlife[2] (change to **BOLD** if present) | Comments |
|---|---|---|---|---|
| | | | <u>SGCN Species</u><br>Big brown bat (*Eptesicus fuscus*)<br>Canada warbler (*Cardellina canadensis*)<br>Chimney swift (*Chaetura pelagica*)<br>Long-tailed shrew (*Sorex dispar*)<br>Moose (*Alces alces*)<br>Northern goshawk (*Accipiter gentilis*)<br>Olive-sided flycatcher (*Contopus cooperi*)<br>Purple finch (*Haemorhous purpureus*)<br>Ringed emerald (*Somatochlora albicincta*)<br>Rock vole (*Microtus chrotorrhinus*)<br>Ruffed grouse (*Bonsai umbrellas*)<br>Scarlet tanager (*Piranga olivacea*)<br>Sedge darner (*Aeshna juncea*)<br>Southern bog lemming (*Synaptomys cooperi*)<br>Veery (*Catharus fuscescens*)<br>Wood thrush (*Hylocichla mustelina*) | |
| Hemlock-hardwood-conifer forest | ☐ | | Bald eagle (*Haliaeetus leucocephalus*)<br>Blue-spotted/Jefferson complex (*Ambystoma laterale/jeffersonianum*)<br>Common nighthawk (*Chordeiles minor*)<br>Eastern box turtle (*Terrapene carolina carolina*)<br>Eastern hognose snake (*Heterodon platirhinos*)<br>Eastern red bat (*Lasiurus borealis*)<br>Eastern small-footed bat (*Myotis leibii*)<br>Eastern whip-poor-will (*Antrostomus vociferus*)<br>Golden eagle (*Aquila chrysaetos*)<br>Hoary bat (*Lasiurus cinereus*)<br>Little brown bat (*Myotis lucifugus*)<br>Northern black racer (*Coluber constrictor*)<br>Northern long-eared bat (*Myotis septentrionalis*)<br>Rapids clubtail (*Gomphus quadricolor*)<br>Ringed boghaunter (*Gomphus quadricolor*)<br>Silver-haired bat (*Lasionycteris noctivagans*)<br>Skillet clubtail (*Gomphus ventricosus*)<br>Timber rattlesnake (*Crotalus horridus*)<br>Tricolored bat (*Perimyotis subflavus*)<br><br><u>SGCN Species</u> | |

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| Wildlife Habitat[1] | Habitat Present | Size (acres) | Associated Listed Wildlife[2] (change to **BOLD** if present) | Comments |
|---|---|---|---|---|
| | | | American woodcock (*Scolopax minor*)<br>Big brown bat (*Eptesicus fuscus*)<br>Black-billed cuckoo (*Coccyzus erythropthalmus*)<br>Canada warbler (Cardellina canadensis)<br>Chimney swift (*Chaetura pelagica*)<br>Moose (*Alces alces*)<br>Northern goshawk (*Accipiter gentilis*)<br>Purple finch (*Haemorhous purpureus*)<br>Ruffed grouse (*Bonsai umbrellas*)<br>Scarlet tanager (*Piranga olivacea*)<br>Veery (*Catharus fuscescens*)<br>Wood thrush (*Hylocichla mustelina*) | |
| Appalachian oak-pine forest | ☒ | 7.8 | Bald eagle (*Haliaeetus leucocephalus*)<br>Blue-spotted/Jefferson complex (*Ambystoma laterale/jeffersonianum*)<br>Cerulean warbler (*Setophaga cerulea*)<br>Common nighthawk (*Chordeiles minor*)<br>Coppery emerald (*Somatochlora georgiana*)<br>Eastern box turtle (*Terrapene carolina carolina*)<br>Eastern hognose snake (*Heterodon platirhinos*)<br>Eastern red bat (*Lasiurus borealis*)<br>Eastern small-footed bat (*Myotis leibii*)<br>Eastern whip-poor-will (*Antrostomus vociferus*)<br>Fowler's toad (*Anaxyrus fowleri*)<br>Golden eagle (*Aquila chrysaetos*)<br>Hoary bat (*Lasiurus cinereus*)<br>Little brown bat (*Myotis lucifugus*)<br>Marbled salamander (*Ambystoma opacum*)<br>Northern black racer (*Coluber constrictor*)<br>Northern long-eared bat (*Myotis septentrionalis*)<br>Rapids clubtail (*Gomphus quadricolor*)<br>Ringed boghaunter (*Gomphus quadricolor*)<br>Silver-haired bat (*Lasionycteris noctivagans*)<br>Skillet clubtail (*Gomphus ventricosus*)<br>Timber rattlesnake (*Crotalus horridus*)<br>Tricolored bat (*Perimyotis subflavus*)<br><br><u>SGCN Species</u><br>American woodcock (*Scolopax minor*)<br>Big brown bat (*Eptesicus fuscus*) | |

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| Wildlife Habitat[1] | Habitat Present | Size (acres) | Associated Listed Wildlife[2] (change to **BOLD** if present) | Comments |
|---|---|---|---|---|
| | | | Black-billed cuckoo (*Coccyzus erythropthalmus*)<br>Chimney swift (*Chaetura pelagica*)<br>Eastern towhee (*Pipilo erythrophthalmus*)<br>Moose (*Alces alces*)<br>Northern goshawk (*Accipiter gentilis*)<br>Purple finch (*Haemorhous purpureus*)<br>Ruffed grouse (*Bonsai umbrellas*)<br>Scarlet tanager (*Piranga olivacea*)<br>Veery (*Catharus fuscescens*)<br>Wood thrush (*Hylocichla mustelina*) | |
| Floodplain forest | ☐ | | Bald eagle (*Haliaeetus leucocephalus*)<br>Blanding's turtle (*Emydoidea blandingii*)<br>Blue-spotted/Jefferson complex (*Ambystoma laterale/jeffersonianum*)<br>Cerulean warbler (*Setophaga cerulea*)<br>Eastern red bat (*Lasiurus borealis*)<br>Hoary bat (*Lasiurus cinereus*)<br>Northern leopard frog (*Lithobates pipiens*)<br>Rapids clubtail (*Gomphus quadricolor*)<br>Skillet clubtail (*Gomphus ventricosus*)<br>Spotted turtle (*Clemmys guttata*)<br>Tricolored bat (*Perimyotis subflavus*)<br>Wood turtle (*Glyptemys insculpta*)<br><br><u>SGCN Species</u><br>Big brown bat (*Eptesicus fuscus*)<br>Eastern ribbonsnake (*Thamnophis sauritus*)<br>Moose (*Alces alces*)<br>Purple finch (*Haemorhous purpureus*)<br>Veery (*Catharus fuscescens*)<br>Wood thrush (*Hylocichla mustelina*) | |
| Northern swamp | ☐ | | Blue-spotted/Jefferson complex (*Ambystoma laterale/jeffersonianum*)<br>Eastern red bat (*Lasiurus borealis*)<br>Hoary bat (*Lasiurus cinereus*)<br>Kennedy's emerald (*Somatochlora kennedyi*)<br>Little brown bat (*Myotis lucifugus*)<br>Silver-haired bat (*Lasionycteris noctivagans*)<br>Tricolored bat (*Perimyotis subflavus*) | |

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| Wildlife Habitat[1] | Habitat Present | Size (acres) | Associated Listed Wildlife[2] (change to **BOLD** if present) | Comments |
|---|---|---|---|---|
| | | | SGCN Species<br>American water shrew (*Sorex palustris albibarbis*)<br>American woodcock (*Scolopax minor*)<br>Big brown bat (*Eptesicus fuscus*)<br>Canada warbler (*Cardellina canadensis*)<br>Cape May warbler (*Setophaga tigrina*)<br>Lyre-tipped spreadwing (*Lestes unguiculatus*)<br>Mink frog (*Lithobates septentrionalis*)<br>Moose (*Alces alces*)<br>Ocellated emerald (*Somatochlora minor*)<br>Olive-sided flycatcher (*Contopus cooperi*)<br>Purple finch (*Haemorhous purpureus*)<br>Veery (*Catharus fuscescens*) | |
| Temperate swamp | ☒ | 5.2 | Blanding's turtle (*Emydoidea blandingii*)<br>Blue-spotted/Jefferson complex (*Ambystoma laterale/jeffersonianum*)<br>Coppery Emerald (*Somatochlora georgiana*)<br>Eastern box turtle (*Terrapene carolina carolina*)<br>Eastern red bat (*Lasiurus borealis*)<br>Hoary bat (*Lasiurus cinereus*)<br>Kennedy's emerald (*Somatochlora kennedyi*)<br>Little brown bat (*Myotis lucifugus*)<br>Ringed boghaunter (*Gomphus quadricolor*)<br>Silver-haired bat (*Lasionycteris noctivagans*)<br>Spotted turtle (*Clemmys guttata*)<br>Tricolored bat (*Perimyotis subflavus*)<br><br>SGCN Species<br>American woodcock (*Scolopax minor*)<br>Big brown bat (*Eptesicus fuscus*)<br>Canada warbler (*Cardellina canadensis*)<br>Moose (*Alces alces*)<br>Olive-sided flycatcher (*Contopus cooperi*)<br>Veery (*Catharus fuscescens*) | |
| Peatland | ☐ | | Blanding's turtle (*Emydoidea blandingii*)<br>Blue-spotted/Jefferson complex (*Ambystoma laterale/jeffersonianum*)<br>Kennedy's emerald (*Somatochlora kennedyi*)<br>Northern harrier (*Circus cyaneus*)<br>Pied-billed grebe (*Podilymbus Podiceps*) | |

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| Wildlife Habitat[1] | Habitat Present | Size (acres) | Associated Listed Wildlife[2] (change to **BOLD** if present) | Comments |
|---|---|---|---|---|
| | | | Pine barrens bluet (*Enallagma recurvatum*)<br>Ringed boghaunter (*Gomphus quadricolor*)<br>Rusty blackbird (*Euphagus carolinus*)<br>Smooth green snake (*Liochlorophis vernalis*)<br>Spotted turtle (*Clemmys guttata*)<br><br><u>SGCN Species</u><br>Eastern ribbonsnake (*Thamnophis sauritus*)<br>Eastern towhee (*Pipilo erythrophthalmus*)<br>Mink frog (*Lithobates septentrionalis*)<br>Ocellated emerald (*Somatochlora minor*)<br>Olive-sided flycatcher (*Contopus cooperi*)<br>Sedge darner (*Aeshna juncea*) | |
| Permanently flooded marsh and/or naturally occurring shrub wetland | ☒ | 3.4 | Bald eagle (*Haliaeetus leucocephalus*)<br>Bank swallow (*Riparia riparia*)<br>Blanding's turtle (*Emydoidea blandingii*)<br>Blue-spotted/Jefferson complex (*Ambystoma laterale/jeffersonianum*)<br>Common gallinule (*Gallinula galeata*)<br>Eastern box turtle (*Terrapene carolina carolina*)<br>Eastern hognose snake (*Heterodon platirhinos*)<br>Fowler's toad (*Anaxyrus fowleri*)<br>Kennedy's emerald (*Somatochlora kennedyi*)<br>Least bittern (*Ixobrychus exilis*)<br>Northern harrier* (*Circus cyaneus*)<br>Northern leopard frog (*Lithobates pipiens*)<br>Pied-billed grebe (*Podilymbus Podiceps*)<br>Ringed boghaunter (*Gomphus quadricolor*)<br>Rusty blackbird (*Euphagus carolinus*)<br>Smooth green snake (*Liochlorophis vernalis*)<br>Sora (*Porzana carolina*)<br>Spotted turtle (*Clemmys guttata*)<br><br><u>SGCN Species</u><br>American black duck (*Anas rubripes*)<br>American woodcock (*Scolopax minor*)<br>Eastern ribbonsnake (*Thamnophis sauritus*)<br>Lyre-tipped spreadwing (*Lestes unguiculatus*)<br>Marsh wren (*Cistothorus palustris*)<br>Mink frog (*Lithobates septentrionalis*) | |

| Wildlife Habitat[1] | Habitat Present | Size (acres) | Associated Listed Wildlife[2] (change to **BOLD** if present) | Comments |
|---|---|---|---|---|
| | | | Moose (*Alces alces*)<br>Olive-sided flycatcher (*Contopus cooperi*)<br>Ruffed grouse (*Bonsai umbrellas*)<br>Sedge wren (*Cistothorus platensis*) | |
| Vernal pool | ☒ | 0.19 | Blanding's turtle (*Emydoidea blandingii*)<br>Blue-spotted/Jefferson complex (*Ambystoma laterale/jeffersonianum*)<br>Eastern hognose snake (*Heterodon platirhinos*)<br>Fowler's toad (*Anaxyrus fowleri*)<br>Marbled salamander (*Ambystoma opacum*)<br>Spotted turtle (*Clemmys guttata*)<br><br><u>SGCN Species</u><br>Eastern ribbonsnake (*Thamnophis sauritus*)<br>Lyre-tipped spreadwing (*Lestes unguiculatus*) | |
| Rivers and Streams | ☐ | | American brook lamprey (*Lethenteron appendix*)<br>American eel (*Anguilla rostrata*)<br>Appalachian tiger beetle (*Cicindela ancocisconensis*)<br>Atlantic sturgeon+ (*Acipenser oxyrinchus*)<br>Bald eagle (*Haliaeetus leucocephalus*)<br>Banded sunfish+ (*Enneacanthus obesus*)<br>Bank swallow (*Riparia riparia*)<br>Brook floater+ (*Alasmidonta varicosa*)<br>Burbot (*Lota lota*)<br>Cobblestone tiger beetle+ (*Cicindela marginipennis*)<br>Common loon+ (*Gavia immer*)<br>Dwarf wedgemussel+ (*Alasmidonta heterodon*)<br>Finescale dace (*Phoxinus neogaeus*)<br>Fowler's toad+ (*Anaxyrus fowleri*)<br>Northern leopard frog+ (*Lithobates pipiens*)<br>Northern redbelly dace (*Chrosomus eos*)<br>Puritan tiger beetle+ (*Cicindela puritana*)<br>Rapids clubtail+ (*Gomphus quadricolor*)<br>Round whitefish (*Prosopium cylindraceum*)<br>Sea lamprey (*Petromyzon marinus*)<br>Shortnose sturgeon+ (*Acipenser brevirostrum*)<br>Skillet clubtail+ (*Gomphus ventricosus*)<br>Swamp darter (*Etheostoma fusiforme*)<br>Wood turtle (*Glyptemys insculpta*) | |

| Wildlife Habitat[1] | Habitat Present | Size (acres) | Associated Listed Wildlife[2] (change to **BOLD** if present) | Comments |
|---|---|---|---|---|
| | | | SGCN Species<br>Alewife floater+ (*Anodonta implicata*)<br>Alewife+ (*Alosa pseudoharengus*)<br>American shad+ (*Alosa sapidissima*)<br>Brook trout (*Salvelinus fontinalis*)<br>Creeper (*Strophitus undulatus*)<br>Eastern pearlshell (*Margaritifera margaritifera*)<br>Rainbow smelt (*Osmerus mordax*)<br>Triangle floater (*Alasmidonta undulata*) | |
| Ponds and lakes | ☒ | 1.2 | American eel (*Anguilla rostrata*)<br>Bald eagle+ (*Haliaeetus leucocephalus*)<br>Banded sunfish+ (*Enneacanthus obesus*)<br>Bank swallow (*Riparia riparia*)<br>Blueback herring+ (*Alosa aestivalis*)<br>Bridle shiner+ (*Notropis bifrenatus*)<br>Burbot (*Lota lota*)<br>Common loon (*Gavia immer*)<br>Eastern pondmussel+ (*Ligumia nasuta*)<br>Finescale dace+ (*Phoxinus neogaeus*)<br>Fowler's toad+ (*Anaxyrus fowleri*)<br>Lake whitefish (*Coregonus clupeaformis*)<br>Northern leopard frog (*Lithobates pipiens*)<br>Northern redbelly dace (*Chrosomus eos*)<br>Redfin pickerel+ (*Esox americanus*)<br>Round whitefish (*Prosopium cylindraceum*)<br>Swamp darter+ (*Etheostoma fusiforme*)<br><br>SGCN Species<br>Alewife floater+ (*Anodonta implicata*)<br>Alewife+ (*Alosa pseudoharengus*)<br>American black duck+ (*Anas rubripes*)<br>Brook trout (*Salvelinus fontinalis*)<br>Creeper (*Strophitus undulatus*)<br>Lake trout (*Salvelinus namaycush*)<br>Mink frog (*Lithobates septentrionalis*)<br>Rainbow smelt (*Osmerus mordax*)<br>Ringed emerald (*Somatochlora albicincta*)<br>Sedge darner (*Aeshna juncea*)<br>Triangle floater+ (*Alasmidonta undulata*) | |
| Developed | ☒ | 17.5 | American bumble bee (*Bombus pensylvanicus*) | |

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| Wildlife Habitat[1] | Habitat Present | Size (acres) | Associated Listed Wildlife[2] (change to **BOLD** if present) | Comments |
|---|---|---|---|---|
| | | | American kestrel (*Falco sparverius*)<br>Cliff swallow (*Petrochelidon pyrrhonota*)<br>Common nighthawk (*Chordeiles minor*)<br>Peregrine falcon (*Falco peregrinus*)<br>Purple martin (*Progne subis*)<br>Rusty-patched bumble bee (*Bombus affinis*)<br>Yellow bumble bee (*Bombus fervidus*)<br>Yellow banded bumble bee (*Bombus terricola*)<br><br><u>SGCN Species</u><br>Chimney swift (*Chaetura pelagica*) | |
| Pine barren | ☐ | | Barrens Itame (*Speranza exonerata*)<br>Barrens xylotype (*Xylotype capax*)<br>Common nighthawk (*Chordeiles minor*)<br>Cora moth (*Cerma cora*)<br>Eastern hognose snake (*Heterodon platirhinos*)<br>Eastern whip-poor-will (*Antrostomus vociferus*)<br>Edward's hairstreak (*Satyrium edwardsii*)<br>Fowler's toad (*Anaxyrus fowleri*)<br>Frosted elfin butterfly (*Callophrys iris*)<br>Karner blue butterfly (*Lycaeides Melissa samuelis*)<br>Little brown bat (*Myotis lucifugus*)<br>Phyllira tiger moth (*Grammia phyllira*)<br>Pine pinion moth (*Lithophane lepida lepida*)<br>Vesper sparrow (*Pooecetes gramineus*)<br><br><u>SGCN Species</u><br>Black-billed cuckoo (*Coccyzus erythropthalmus*)<br>Blue-winged warbler (*Vermivora cyanoptera*)<br>Broad-lined catopyrrha (*Catopyrrha coloraria*)<br>Brown thrasher (*Toxostoma rufum*)<br>Eastern towhee (*Pipilo erythrophthalmus*)<br>Field sparrow (*Spizella pusilla*)<br>Graceful clearwing (*Hemaris gracilis*)<br>New Jersey tea spanworm (*Apodrepanulatrix liberaria*)<br>Noctuid Moth (*Mesogona olivata*)<br>Persius duskywing skipper (*Erynnis persius*)<br>Pinion moth (*Lithophane lepida lepida*)<br>Prairie warbler (*Setophaga discolor*)<br>Sleepy duskywing (*Erynnis brizo*) | |

| Wildlife Habitat[1] | Habitat Present | Size (acres) | Associated Listed Wildlife[2] (change to **BOLD** if present) | Comments |
|---|---|---|---|---|
| | | | Twilight moth (*Lycia rachelae*)<br>Zale sp. 1 nr. Lunifera (*Zale lunifera*) | |
| Grassland | ☐ | | American bumble bee (*Bombus pensylvanicus*)<br>American kestrel (*Falco sparverius*)<br>American pipit (*Anthus rubescens*)<br>Bank swallow (*Riparia riparia*)<br>Cliff swallow (*Petrochelidon pyrrhonota*)<br>Eastern box turtle (*Terrapene carolina carolina*)<br>Eastern meadowlark (*Sturnella magna*)<br>Grasshopper sparrow (*Ammodramus savannarum*)<br>Horned lark (*Eremophila alpestris*)<br>Northern black racer (*Coluber constrictor*)<br>Northern harrier* (*Circus cyaneus*)<br>Northern leopard frog (*Lithobates pipiens*)<br>Purple martin (*Progne subis*)<br>Rusty-patched bumble bee (*Bombus affinis*)<br>Smooth green snake (*Liochlorophis vernalis*)<br>Upland sandpiper (*Bartramia longicauda*)<br>Vesper sparrow (*Pooecetes gramineus*)<br>Wood turtle (*Glyptemys insculpta*)<br>Yellow banded bumble bee (*Bombus terricola*)<br>Yellow bumble bee (*Bombus fervidus*)<br><br><u>SGCN Species</u><br>Bobolink (*Dolichonyx oryzivorus*)<br>Monarch (*Danaus plexippus*)<br>Ruffed grouse (*Bonsai umbrellas*) | |
| Shrubland | ☒ | 8.2 | American bumble bee (*Bombus pensylvanicus*)<br>American kestrel (*Falco sparverius*)<br>Eastern box turtle (*Terrapene carolina carolina*)<br>Eastern hognose snake (*Heterodon platirhinos*)<br>Eastern whip-poor-will (*Antrostomus vociferus*)<br>Fowler's toad (*Anaxyrus fowleri*)<br>New England cottontail (*Sylvilagus transitionalis*)<br>Northern black racer (*Coluber constrictor*)<br>Northern harrier (*Circus cyaneus*)<br>Northern leopard frog (*Lithobates pipiens*)<br>Rusty-patched bumble bee (*Bombus affinis*)<br>Smooth green snake (*Liochlorophis vernalis*)<br>Timber rattlesnake (*Crotalus horridus*) | |

| Wildlife Habitat[1] | Habitat Present | Size (acres) | Associated Listed Wildlife[2] (change to **BOLD** if present) | Comments |
|---|---|---|---|---|
| | | | Wood turtle (*Glyptemys insculpta*)<br>Yellow banded bumble bee (*Bombus terricola*)<br>Yellow bumble bee (*Bombus fervidus*)<br><br><u>SGCN Species</u><br>American woodcock (*Scolopax minor*)<br>Black-billed cuckoo (*Coccyzus erythropthalmus*)<br>Blue-winged warbler (*Vermivora cyanoptera*)<br>Brown thrasher (*Toxostoma rufum*)<br>Eastern towhee (*Pipilo erythrophthalmus*)<br>Field sparrow (*Spizella pusilla*)<br>Golden-winged warbler (*Vermivora chrysoptera*)<br>Moose (*Alces alces*)<br>Prairie warbler (*Setophaga discolor*)<br>Ruffed grouse (*Bonsai umbrellas*) | |
| Southern NH sandy habitat | ☐ | | Eastern hognose snake (*Heterodon platirhinos*) | |
| Alpine | ☐ | | American pipit (*Anthus rubescens*)<br>White mountain arctic (*Oeneis melissa semidea*)<br>White mountain fritillary (*Boloria titania montinus*)<br><br><u>SGCN Species</u><br>Ringed emerald (*Somatochlora albicincta*) | |
| Caves and Mines | ☐ | | Eastern small-footed bat (*Myotis leibii*)<br>Little brown bat (*Myotis lucifugus*)<br>Northern long-eared bat (*Myotis septentrionalis*)<br>Tricolored bat (*Perimyotis subflavus*)<br><br><u>SGCN Species</u><br>Big brown bat (*Eptesicus fuscus*) | |
| Rocky Ridge/Cliff/Talus | ☐ | | Common nighthawk (*Chordeiles minor*)<br>Eastern small-footed bat (*Myotis leibii*)<br>Golden eagle (*Aquila chrysaetos*)<br>Northern black racer (*Coluber constrictor*)<br>Peregrine falcon (*Falco peregrinus*)<br>Smooth green snake (*Liochlorophis vernalis*)<br>Timber rattlesnake (*Crotalus horridus*)<br><br><u>SGCN Species</u> | |

| Wildlife Habitat[1] | Habitat Present | Size (acres) | Associated Listed Wildlife[2] (change to **BOLD** if present) | Comments |
|---|---|---|---|---|
| | | | Eastern towhee (*Pipilo erythrophthalmus*) | |
| Salt marsh | ☐ | | Common tern (*Sterna hirundo*)<br>Northern harrier (*Circus cyaneus*)<br>Purple martin (*Progne subis*)<br>Red knot (*Calidris canutus*)<br>Roseate tern (*Sterna dougallii*)<br>Saltmarsh sparrow (*Ammodramus caudacutus*)<br>Seaside sparrow (*Ammodramus maritimus*)<br>Willet (*Tringa semipalmata*)<br><br><u>SGCN Species</u><br>Marsh wren (*Cistothorus palustris*)<br>Nelson's sparrow (*Ammodramus nelsoni*)<br>Sanderling (*Calidris alba*)<br>Semipalmated sandpiper (*Calidris pusilla*)<br>Whimbrel (*Numenius phaeopus*) | |
| Dune | ☐ | | American pipit (*Anthus rubescens*)<br>Fowler's toad (*Anaxyrus fowleri*)<br>Horned lark (*Eremophila alpestris*)<br>Least tern (*Sterna antillarum*)<br>Piping plover (*Charadrius melodus*)<br>Red knot (*Calidris canutus*)<br>Saltmarsh tiger beetle (*Cicindela marginata*)<br>Willet (*Tringa semipalmata*)<br><br><u>SGCN Species</u><br>Ruddy turnstone (*Arenaria interpres*)<br>Sanderling (*Calidris alba*)<br>Semipalmated sandpiper (*Calidris pusilla*)<br>Whimbrel (*Numenius phaeopus*) | |
| Coastal island | ☐ | | Common tern (*Sterna hirundo*)<br>Red knot (*Calidris canutus*)<br>Roseate tern (*Sterna dougallii*)<br><br><u>SGCN Species</u><br>Purple sandpiper (*Calidris maritima*)<br>Ruddy Turnstone (*Arenaria interpres*)<br>Sanderling (*Calidris alba*)<br>Semipalmated sandpiper (*Calidris pusilla*)<br>Whimbrel (*Numenius phaeopus*) | |

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| Wildlife Habitat[1] | Habitat Present | Size (acres) | Associated Listed Wildlife[2] (change to **BOLD** if present) | Comments |
|---|---|---|---|---|
| Estuarine | ☐ | | Atlantic sturgeon (*Acipenser oxyrinchus*)<br>Blueback herring (*Alosa aestivalis*)<br>Red knot (*Calidris canutus*)<br>Sea lamprey (*Petromyzon marinus*)<br>Shortnose sturgeon (*Acipenser brevirostrum*)<br>Willet (*Tringa semipalmata*)<br><br><u>SGCN Species</u><br>American black duck (*Anas rubripes*)<br>American oyster (*Crassostrea virginica*)<br>American shad (*Alosa sapidissima*)<br>Rainbow smelt (*Osmerus mordax*)<br>Ruddy turnstone (*Arenaria interpres*)<br>Sanderling (*Calidris alba*)<br>Semipalmated sandpiper (*Calidris pusilla*)<br>Whimbrel (*Numenius phaeopus*) | |
| Marine | ☐ | | Atlantic sturgeon (*Acipenser oxyrinchus*)<br>Blueback herring (*Alosa aestivalis*)<br>Fin whale (*Balaenoptera physalus*)<br>North Atlantic right whale (*Eubalaena glacialis*)<br>Sea lamprey (*Petromyzon marinus*)<br>Shortnose sturgeon (*Acipenser brevirostrum*)<br><br><u>SGCN Species</u><br>American shad (*Alosa sapidissima*)<br>Atlantic sea scallop (*Placopecten magellanicus*)<br>Horseshoe crab (*Limulus polyphemus*)<br>Humpback whale (*Megaptera novaeangliae*)<br>Northern shrimp (*Pandalus borealis*)<br>Rainbow smelt (*Osmerus mordax*)<br>Softshell clam (*Mya arenaria*) | |

[1]Wildlife habitat classifications and associations are derived from the NH Wildlife Action Plan, published by NH Fish & Game (2015).

[2]Listed wildlife species are federally threatened (FT), federally endangered (FE), state threatened (SC), state endangered (SE), state special concern (SC), or Species of Greatest Conservation Need (SGCN).

*Northern harrier maintains a winter range of predominantly coastal wetlands and a breeding range confined to the northern and coastal portions of the state.

+Also present in large warmwater rivers

**This form was developed based on the draft created this form was developed based on the draft "Wildlife Habitat Assessment Field Data Form" developed by the NH Fish and Game Department (NHFG), NH Audubon, and UNH Cooperative Extension. GZA updated the list of habitats based on information in the 2020 NHFG Wildlife Action Plan and habitat associations reported in New England Wildlife: Habitat, Natural History, and Distribution (DeGraaf and Yamasaki 2001).**

# Appendix D – Qualified Wildlife Biologist Resumes

RESUME

# Tracy L. Tarr, CWS, CESSWI

Associate Principal

## Summary of Experience

Tracy is an environmental consultant that specializes in wildlife assessment, natural resource identification, and permitting. She manages field teams and oversees complex natural resource data collection and permitting efforts. She specializes in a variety of ecological assessment services including protected species surveys, wetland function-value assessment, vernal pool assessments, wetland delineation, natural community mapping, wildlife habitat assessments, watershed planning, mitigation design, and construction monitoring. She has permitted a diversity of projects at the local, state, and federal level including residential projects, commercial developments, municipal infrastructure projects, and utility corridors. Tracy also specializes in municipal projects that integrate natural resource assessment and planning. Tracy previously served as the Chair of the Gilmanton Conservation Commission and as the Secretary of the NH Association of Conservation Commissions. She is currently a member of the NH Association of Natural Resource Scientists Legislative Committee and serves as the northern New England technical practice lead for ecological services at GZA.

### Education

B.S., Wildlife Management
University of New Hampshire, 1997
M.S., Natural Resources: Wildlife Ecology
University of New Hampshire, 2000

### Licenses & Registrations

New Hampshire Certified Wetland Scientist, CWS #281)
Certified Erosion, Sediment and Stormwater Inspector, #388

### Affiliations

- New Hampshire Association of Natural Resource Scientists
- Gilmanton Conservation Commission, Past Chair

### Areas of Specialization

- Wildlife Habitat Evaluation
- Wetland Permitting
- Invasive Species Mapping
- Mitigation Design
- Rare Species Assessment
- Vernal Pool Identification & Evaluation
- Construction Monitoring
- G.I.S. Mapping

## Relevant Project Experience

**WILDLIFE AND RARE SPECIES ASSESSMENT**

**Wildlife Biologist, HSR, Illinois.** Completed meander surveys for ornate box turtle and trapping surveys for Blanding's turtle. Led multi-state field team.

**Wildlife Biologist/Wetland Scientist, Project Manager, Round Pond Dam Expansion Project, New Hampshire.** Completed a multi-year trapping and radio-telemetry study of Blanding's turtle (*Emydoidea blandingii*), a State Endangered species, to model and predict impacts of a proposed reservoir expansion project. Ms. Tarr provided wildlife evaluations, rare species documentation, habitat mapping, wetland delineation, function-value assessments, and impact analysis for a proposed water reservoir expansion project at Round Pond. The project was specifically designed to assess the potential impacts of raising the outlet elevation of Round Pond by approximately 10 feet.

**Wildlife Biologist, Mike Eon Associates, Biddeford, Maine.** Completed wildlife habitat mapping field work and impact assessment evaluations for Blanding's turtle.

**Wildlife Biologist, Groundwater Exploration, Bethel, Connecticut.** Completed construction surveys for eastern box turtle (*Terrapene Carolina carolina*), bog turtle (*Glyptemys muhlenbergii*), spotted turtle (*Clemmys guttata*), and wood turtle (*Glyptemys insculpta*). Oversaw electrofishing effort to characterize fisheries on Site.

**Wildlife Biologist, South Coast Rail, Berkeley, Massachusetts.** Sub-permittee for construction surveys for eastern box turtle. Oversaw implementation of turtle monitoring.

**Erosion Control Monitor for the P145 Transmission Line, Concord, New Hampshire**. Provided construction monitoring services and assessed drill locations for the State Endangered Blanding's turtle.

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**Wildlife Biologist/Associate Principal, Winchester Economic Development Authority, Winchester, New Hampshire.** Completed a multi-season survey for black racer (*Coluber constrictor*) as part of Alteration of Terrain permitting for the project. Responsible for developing methods and coordination with the New Hampshire Fish and Game Department.

**Project Manager, Eastman Development, LLC, Brookline, New Hampshire.** Completed a survey for eastern hognose snake (*Heterodon platirhinos*) and black racer on a 40-acre Site.

**Wetland Scientist/Associate Principal, Town of Exeter, Exeter, New Hampshire**. Completed a peer review of rare species, exemplary community and vernal pool surveys.

**Wildlife Biologist, Battis Farm, Amesbury, Massachusetts**. Completed a survey for bobolink (*Dolichonyx oryzivorus*) and prepared a grassland bird management plan for the Battis Barm Conservation Property.

**Project Manager, Riverwoods at Durham, Durham, New Hampshire.** Oversaw and completed a winter pellet survey for New England cottontail (*Sylvilagus transitionalis*).

**Wildlife Biologist/Associate Principal, Commercial Development, Seabrook, New Hampshire.** Responsible for the development of wetland mitigation enhancement plan and overseeing wildlife relocation measures during construction including relocation of turtles, amphibians and fish. Documented new location of a special concern fish species.

**Wildlife Biologist, BlueWave, Naples, Maine.** Completed a deer wintering habitat survey, amphibian egg mass counts, and talus rock survey for bats.

**Wildlife Biologist/Project Manager, Substation, New Hampshire.** Assessed common raven (*Corvus corax*) habitat use and behavior over approximately five square miles, and developed a management plan for reducing power outages caused by ravens.

**Wildlife Biologist, Waste Management of New Hampshire, Inc., Rochester, New Hampshire.** Completed a Phase 1 bat assessment on a 598 acre commercial property to evaluate habitat suitability for the northern log-eared bat (*Myotis septentrionalis*), a federally Threatened species. Ms. Tarr completed all field work, report preparation, and coordination with the U.S. Fish and Wildlife Service.

**Wildlife Biologist, Thermogen Industries, Eastport, Maine.** Completed wildlife habitat assessment, rare species documentation, natural community mapping, intertidal and subtidal field surveys, wetland delineation, shoreland/surface water delineation, wetland functions and values assessment, and preliminary natural resource impact evaluation for a proposed 200- to 300-thousand metric-ton-per-year torrefied wood production facility on the site. Ms. Tarr worked directly with State regulators including fisheries biologists to identify permitting needs and options for the proposed facility.

**Wildlife Biologist, Pats Peak, Henniker, New Hampshire.** Completed biomonitoring evaluations spanning the course of 10 years in Cascade Brook to assess the potential impacts of water withdrawal for snowmaking. Ms. Tarr completed biomonitoring evaluations including macroinvertebrate sampling, electrofishing evaluations, and habitat assessments. Ms. Tarr worked directly with the New Hampshire Department of Environmental Services (NHDES) to properly identify the implications of the data and highlight other contributing landscape factors to the data.

**Project Manager, Town of Merrimack, New Hampshire.** Prepared the first documented town-wide Comprehensive Beaver Management Plan in New Hampshire. The Plan was designed to minimize flood impacts caused by beaver, maintain important natural resources associated with beaver ponds, and minimize long-term municipal infrastructure maintenance costs. As part of this work, Ms. Tarr evaluated beaver activity at over 35 locations, developed a Beaver Habitat Suitability Model, identified appropriate best management practices for water level control, obtained cost estimates and bids, and completed construction monitoring.

**Wildlife Biologist, Sunningdale Residential Development, Somersworth, New Hampshire.** Completed a wildlife assessment to document wildlife habitats and species, and identify best management practices to maintain and manage wildlife habitats.

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Coordinated a review for grassland birds and New England cottontail. Developed a Conservation Easement Baseline Documentation report.

**Wildlife Biologist, North Keene Substation, Keene, New Hampshire.** Prepared a wildlife assessment to document wildlife habitats, species, and best management practices.

**RARE PLANT SURVEYS**

**Project Manager,340 and 386 Distribution Line Project, Rochester, New Hampshire.** Completed natural resource evaluation and permitting for the reconstruction of two distribution lines. Also completed survey for six State Threatened/Endangered species including button sedge (*Carex bullata*), clustered sedge (*Carex cumulata*), dwarf huckleberry (*Gaylussacia bigeloviana*), long's bulrush (*Scirpus longii*), nuttall's reed grass (*Calamagrostis cinnoides*), and variable sedge (*Carex polymorpha*).Flagged populations and monitored during construction.

**Project Manager, 324 Distribution Line Project, Bedford and Manchester, New Hampshire**. Completed surveys for river birch (*Betula nigra*) and long-leaved bluet (*Houstonia longifolia*). Coordinated survey data with the Natural Heritage Bureau.

**Wetland Scientist, H141/R193 Transmission Line Uprate Project, Danville, Sandown, Chester, Fremont, and Exeter, New Hampshire.** Completed survey for fringed gentian (*Gentianopsis crinita*), a State Threatened plant species. Mapped rare plant locations, completed local permitting, and completed construction monitoring. Documented wood turtle in the utility corridor.

**Project Manager, BCS Environmental & Land Law, LLC, New Durham, New Hampshire.** Completed survey for small-whorled pogonia.

**Wetland Scientist, BlueWave, Naples, Maine**. Completed and oversaw surveys for small-whorled pogonia.

**Wetland Scientist, E194/U181 Transmission Line, Greenland and Portsmouth, New Hampshire.** Oversaw surveys for great bur-reed (*Sparganium eurycarpum*), and development of best management practices to protect plants during construction.

**WETLAND DELINEATION, ASSESSMENT & PERMITTING**

**Wetland Scientist, Town of Webster Wetland Assessment, Webster, New Hampshire.** Developed a town-wide wetland assessment and ranked 25 wetlands using the NH Method to assist the Town in the development of a wetland ordinance template and town-wide wetland maps.

**Wetland Scientist, Various Utility Corridors (e.g., L163 Transmission Line, W185 Distribution Line), New Hampshire.** Completed wetland delineation field work and mapping. Oversaw the development of wetland permitting and access plans.

**Wetland Scientist, Martin Meadow Dam, Lancaster, New Hampshire.** Completed shoreland assessment and wetland function-value assessment field work in support of the upgrades to Martin Meadow Dam. Coordinated reviews with federal and state agencies, and permitted the reconstruction of the dam.

**Project Manager, City of Portsmouth Athletic Fields, Portsmouth, New Hampshire.** Completed wetland function-value assessment, vernal pool surveys, and permitting for the construction of three new municipal athletic fields. Coordinated local, state, and federal permitting, completed agency and municipal permitting meetings, and developed the mitigation plan for the project.

**Wetland Scientist, James Pond, Exeter/Richmond, Rhode Island.** Completed wetland delineation field work and documentation on approximately 900 acres of predominantly wooded and remote terrain. Prepared a beaver management plan and modeled habitat suitability of the Site.

**Wetland Scientist, Plymouth Village Water & Sewer District, Plymouth, New Hampshire.** Completed wetland delineation, assessment, and permitting for the replacement of a force main sewer line and access culverts along approximately 3,600 linear feet bordering the Baker River.

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**Wetland Scientist, Marsh Property, Greenland, New Hampshire.** Completed wetland assessment field work and permitting for a bank stabilization project on Great Bay. Designed a joint planting stabilization plan.

**Wetland Scientist, Albacore Park, Portsmouth, New Hampshire.** Completed wetland delineation and wetland function-value assessment field work in support of the upgrades to the Albacore Park facility and associated submarine basin.

**Project Manager, Town of Merrimack, New Hampshire.** Completed wetland delineation on town conservation property in support of a trail parking lot project. Also, prepared the first documented town-wide Comprehensive Beaver Management Plan in New Hampshire. The Plan was designed to minimize flood impacts caused by beaver, maintain important natural resources associated with beaver ponds, and minimize long-term municipal infrastructure maintenance costs. As part of this work, Ms. Tarr evaluated beaver activity at over 35 locations, developed a Beaver Habitat Suitability Model, identified appropriate best management practices for water level control, obtained cost estimates and bids, and completed construction monitoring.

**Wetland Scientist, Dartmouth College, New Hampshire.** Completed wetland function-value assessment field work along 1.25-miles of a proposed alternative energy pipeline route. Wetlands were assessed utilizing the U.S. Army Corps of Engineers' Highway Methodology Workbook Supplement (ACOE, September 1999). Ms. Tarr also prepared GIS overlays of wetlands, conservation lands, wildlife habitats, and recreation areas to identify ecologically sensitive areas and assist with project scoping and impact minimization.

**Wetland Scientist, Lomastro Property, Dover, New Hampshire.** Completed state and local permitting for a permeable paver and retaining wall project on the Bellamy River. Successfully obtained state wetlands permit and local conditional use permit for work within 50-feet of saltmarsh habitat.

**Wetland Scientist, Island Path Property, Hampton, New Hampshire**. Completed wetland assessment field work, as well as local, state, and federal permitting for a residential project located in the tidal buffer zone of Great Bay.

**Wetland Scientist, Public Service Company of New Hampshire.** Completed wetland delineation and natural resources assessment on a 75-acre mitigation property. Wetland boundaries were delineated in accordance with the 1987 ACOE Wetlands Delineation Manual and the January 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region. A global positioning system (GPS) was used to locate and map wetlands on the site. Ms. Tarr also identified potential vernal pools and rare species habitats, and completed wetland function-value assessment field work. Ms. Tarr prepared the project report and completed GIS overlays to document the natural resource values of the targeted mitigation property.

**WETLAND RESTORATION DESIGN AND MONITORING**

**Wetland Scientist, South Coast Rail, Berkeley, Massachusetts.** Prepared an invasive species management plan for four wetland mitigation areas, and oversaw wetland mitigation construction monitoring and remedial measures.

**Wildlife Biologist, Maverick Development, Auburn, New Hampshire.** Completed vernal pool assessment field work and prepared a Vernal Pool Creation Plan as part of project mitigation.

**Wetland Scientist, Ball Hill Wind Energy, Hanover, New York**. Developed mitigation plans for a wetland mitigation site. Completed wetland delineation, wildlife documentation, and plan preparation.

**Wetland Scientist, City of Keene, New Hampshire.** Developed stream and wetland restoration plans to improve wetland functions including flood protection, sediment retention, nutrient removal and wildlife habitat. Completed wetland permitting and construction monitoring for a one-acre wetland restoration area. Oversaw plant selection and installation in the restoration area.

**Wetland Scientist, Portsmouth Development Authority, Portsmouth, New Hampshire.** Completed wetland mitigation monitoring for a wetland buffer enhancement project associated with the South Entrance Multi-use Path project. Responsible for native plant selection, and planting plan development and contractor oversight.

## Tracy L. Tarr, CWS, CESSWI

Associate Principal

**UTILITY CORRIDOR ASSESSMENT AND PERMITTING**

**Project Manager, L176 Transmission Line Rebuild Project, Franklin, Tilton, Belmont, and Laconia, New Hampshire.** Completed natural resource data collection, as well as local, state, and federal permitting for the rebuild of a 13.5-mile transmission line. Presented the project at local River Advisory Committee, Conservation Commission, Planning Board, and Zoning Board of Adjustment hearings. Successfully acquired state wetland permit, shoreland permits, PUC water crossing permit, DOT permits, and conditional use permits.

**Senior Project Manager, H123 Transmission Line, Merrimack and Litchfield, New Hampshire.** Oversaw data collection and local, state, and federal permitting for the rebuild of the transmission line.

**Project Manager, Y151 Transmission Line, Hudson, New Hampshire.** Completed data collection, wetland assessment, and local, state, and federal permitting for the rebuild of the Y151 Transmission Line.

**Project Manager, 381 Transmission Line, Winchester, New Hampshire.** Completed wetland assessments and local, state, and federal permitting for the rebuild of the 381 Transmission Line and construction of culverts for a permanent access road. Oversaw construction monitoring.

**Project Manager, 379 Transmission Line, Hinsdale, Winchester, Richmond, and Troy, New Hampshire.** Oversaw permitting, archeological assessment, and construction monitoring for structure and ground wire replacement work.

**Associate Principal, M127 Transmission Line, Sunapee, Springfield, New London, Wilmot, Andover, and Franklin, New Hampshire.** Oversaw data collection, vernal pool assessment, permitting, tree clearing, and construction monitoring for the project.

**Project Manager, 346X2 Distribution Line Project, Tuftonboro, New Hampshire.** Completed vernal pool assessment, wetland function value assessment, permitting, and construction monitoring for the construction of a new distribution line.

**Project Manager, Q166 Transmission Line, Fitzwilliam and Troy, New Hampshire.** Completed natural resource data collection, as well as local, state, and federal permitting for the construction of a new transmission line. Also, completed construction monitoring.

**Project Manager, L163 and K174 Transmission Line TRRP Projects, New Hampshire.** Completed natural resource data collection and permitting review for multiple Transmission ROW Reliability Projects. Oversaw field oversight during project implementation.

**Project Manager, J147 Transmission Line, Danville and Kingston, New Hampshire.** Completed data collection, local/state/federal permitting, and construction monitoring for structure and davit arm replacement work.

**Wetland Scientist, Peaslee Tap, Danville, New Hampshire**. Completed local permitting for the construction of the Peaslee Tap.

**Project Manager, South Peterborough Substation, Peterborough, New Hampshire.** Completed wetland function-value assessment, state permitting, and construction monitoring for the re-construction of a distribution line at the substation.

**WATERSHED MANAGEMENT**

**Project Manager, City of Biddeford, Biddeford, Maine.** Worked directly with the City of Biddeford and Maine Department of Environmental Protection (DEP) to prepare a Watershed Management Plan for Thatcher Brook. The brook is listed on DEP's Impaired Water Bodies list for primary and secondary contact recreation impairment (bacteria) and aquatic life use violations due to macroinvertebrate impairments. Previous studies of the brook yielded limited macroinvertebrate samples. Ms. Tarr developed a specific macroinvertebrate and habitat evaluation for Thatcher Brook to enhance and supplement existing biomonitoring data. These data were used to develop habitat restoration recommendations and structural retrofit recommendations with the goal of improving the water quality of the brook to meet Class B water quality criteria.

**Project Manager, Long Creek Watershed Management District, Maine.** Hired as a sole-source contractor to review the Long Creek Watershed Management Plan and recommend possible changes in data collection, monitoring, and habitat/retrofit implementation in the watershed.

## Tracy L. Tarr, CWS, CESSWI

Associate Principal

**INVASIVE SPECIES MANAGEMENT PLAN DEVELOPMENT & MONITORING**

**Wetland Scientist for the Whittier Bridge, I-95 Improvement Project, Newburyport, Amesbury, and Salisbury, Massachusetts.** Mapped invasive plants along 4-miles of highway and prepared GIS and map overlaps for invasive species management. Worked with the MassDOT and the contractor to develop an Invasive Plant Management Plan.

**Wetland Scientist,Swanzey Roundabout Construction, Swanzey, New Hampshire.** Developed the invasive species management plan for the project and completed construction monitoring.

**Wetland Scientist, Essential Power, Newington, New Hampshire.** Oversaw wetland delineation and the development of special permits to support vegetation and invasive species management.

**CONSTRUCTION MONITORING**

**Erosion Control Inspector, Y170 Transmission Line and 386/386A/340 Distribution Line Project, Farmington, Milton, and Rochester, New Hampshire.** Provided full-time construction monitoring services over the course of six months for an 8-mile power line project involving four overlapping existing and new lines. Ms. Tarr prepared the Stormwater Pollution Prevention Plan (SWPPP) and provided SWPPP monitoring services, erosion control inspections, wetland delineation, and rare species and exemplary community mapping. Ms. Tarr worked daily with contractors to address local, state, and federal environmental permitting requirements.

**Erosion Control Inspector, Merrimack Valley Reliability Project, Tewksbury and Dracut Massachusetts and Hudson, New Hampshire.** Completed erosion control monitoring and contractor training on behalf of the contractor. During construction, completed sweeps for rare turtles and snakes including wood turtle and black racer.

**Erosion Control Inspector, H137 Transmission Line, Bow, New Hampshire.** Provided construction monitoring services and environmental compliance oversight. Conducted weekly and post-storm inspections and interacted with construction managers and operators to implement Best Management Practices (BMPs) for erosion control and sensitive archaeological resources.

**Assistant Project Manager, Public Service Company of New Hampshire.** Prepared Stormwater Pollution Prevention Plans and Notice of Termination documents for multiple transmission line projects.

### Relevant Experience Prior to GZA

**Senior Project Manager/Wildlife Biologist, Stoney Ridge Environmental, LLC (2007 – 2012)**

**NHSC, Inc. (a.k.a. NH Soil Consultants, Inc.) (2000-2002, 2003-2007)**

**Wetland Systems Biologist, New Hampshire Fish & Game Department (2002/2003)**

**Research Technician, University of New Hampshire (1994-1997, 1999-2000)**

- **Lead field technician for southern New Hampshire Blanding's turtle study**
- **UNH Deer Research Facility**
- **UNH Animal Research Laboratory**
- **Technician for Impacts of a Watchable Wildlife Site (completed avian point count surveys, small mammal trapping, and moose behavior assessments)**

**Research Technician, NEIWPCC/EPA, Deformed frog survey (1997)**

# Tracy L. Tarr, CWS, CESSWI

Associate Principal

## Publications

Stone, A.L., Mitchell F., Van de Poll, R., Rendall, N., Leo, M., West, M., Ammann, A., Andrews, C., Tarr, T., Tilton, M.A., Adams, C., et al., "Method for Inventorying and Evaluating Freshwater Wetlands in New Hampshire (NH Method; June 2011 Update)," University of New Hampshire Cooperative Extension, June 2011

Baber, M.J., Fleishman, E., and Babbitt, K.J., and Tarr, T.L. "The relationship between wetland hydroperiod and nestedness patterns in assemblages of larval amphibians and predatory macroinvertebrates," Oikos, 2004

Tarr, T.L., Baber, M.J., and Babbitt, K.J., "Patterns of larval amphibian distribution along a wetland hydroperiod gradient," Canadian Journal of Zoology, 2003

Tarr, T. and Babbitt, K.J., "Effects of habitat complexity and predator identity on predation of *Rana clamitans* larvae," Amphibian-Reptilia, 2002

Tarr, T. and Babbitt, K.J., "First record of *Dibolocelus ovatus* (Coleoptera:Hydrophilidae) in New Hampshire," Entomological News, 2001

# Nyssa Seekamp

Scientist I

## SUMMARY OF EXPERIENCE

Nyssa is an environmental scientist specializing in wildlife and habitat assessment, natural resource identification, and field data collection. Additional areas of experience include avian monitoring, underwater SCUBA research, environmental permitting, and invasive species management. She regularly performs wildlife assessments and assists in all aspects of permitting at a state and local level. Prior to GZA, Ms. Seekamp was involved in the protection, monitoring, and collection of biological data on rare shorebirds, as well as leading field teams, working in a biological laboratory, assisting in wetland delineation and mitigation projects, and conducting public outreach and education. She is currently a member of the NH Association of Natural Resource Scientists and the Association of MA Wetland Scientists. She is actively working towards her Certified Wetland Scientist (CWS) and Certified Wildlife Biologist (CWB) and has goals of obtaining a Federal Bird Banding and Marking Permit.

### Education

B.S., Marine, Estuarine and Freshwater Biology, University of New Hampshire, 2018

### Licenses & Registrations

AAUS Scientific Diver
Open Water SCUBA Diver

### Affiliations

- New Hampshire Association of Natural Resource Scientists
- Association of Massachusetts Wetland Scientists

### Areas of Specialization

- Wildlife Habitat Evaluation
- Rare Species Assessment
- Environmental Permitting
- GIS Mapping and Analysis
- Biological Data Analysis
- Wetland Delineation & Mitigation
- Public Outreach and Involvement
- Tree and Shrub Identification
- Invasive Species Mapping & Mitigation
- Shorebird, Coastal & Aquatic Species Identification
- Avian & Reptile Surveys
- Limnological & Underwater Data Collection

## GZA PROJECT EXPERIENCE

### Wildlife and Rare Species Assessment

**Wildlife Biologist, Ducal Development, Wildlife Assessment, Hollis, New Hampshire.** Assisted in identifying and documenting the presence of wildlife species to support the permitting of a proposed 14-lot residential subdivision, with an emphasis on use by endangered, threatened and special concern species in NH. Visual and audio assessments for avian and mammal species were conducted along random traverse routes throughout the property to characterize utilization of the parcel by local fauna.

**Wildlife Biologist, Meadowbrook Drive Site Development, Wildlife Assessment, Barrington, New Hampshire.** Assisted in identifying and documenting the presence of wildlife species to support the permitting of a proposed residential subdivision containing 12 lots, with an emphasis on use by endangered, threatened and special concern species in NH. Visual and audio assessments for avian and mammal species were conducted along random traverse routes throughout the property to characterize utilization of the parcel by local fauna.

**Wildlife Biologist, Mountain Road Site Development, Deer Wintering Areas & Wildlife Assessment, Newbury, New Hampshire.** Assisted in identifying and documenting the presence of wildlife species to support the permitting of a proposed four-lot residential subdivision, with an emphasis on use by endangered, threatened and special concern species in NH. Conducted a deer wintering area survey and identified potential deer wintering areas based on a minimum of 50% canopy closure of softwood vegetation. Visual and audio assessments for avian and mammal species were conducted along random traverse routes throughout the property to characterize utilization of the parcel by local fauna.

**Wildlife Biologist, Key Collision of Rochester, 400 North Main Street, Wildlife Assessment, Rochester, New Hampshire.** Identified and documented the presence wildlife species to support the permitting of a proposed auto dealership, with an emphasis on use by endangered, threatened and special concern species in NH. Visual

**Nyssa Seekamp**
Scientist I

and audio assessments for avian and mammal species were conducted along random traverse routes throughout the property to characterize utilization of the parcel by local fauna. Prepared a wildlife report with BMP recommendations for proposed construction and future land use.

**Wildlife Biologist, Key Collision of Rochester, 401 North Main Street Expansion Project, Wildlife Assessment, Rochester, New Hampshire.** Identified and documented the presence of wildlife species to support the permitting of a proposed auto dealership expansion, with an emphasis on use by endangered, threatened and special concern species in NH. Visual and audio assessments for avian and mammal species were conducted along random traverse routes throughout the property to characterize utilization of the parcel by local fauna. Prepared a wildlife report with BMP recommendations for proposed construction and future land use.

**Wildlife Biologist, Key Collision of Rochester, Farmington Road Expansion Project, Wildlife Assessment, Rochester, New Hampshire.** Identified and documented the presence of wildlife species to support the permitting of a proposed auto dealership expansion, with an emphasis on use by endangered, threatened and special concern species in NH. Visual and audio assessments for avian and mammal species were conducted along random traverse routes throughout the property to characterize utilization of the parcel by local fauna. Prepared a wildlife report with BMP recommendations for proposed construction and future land use.

**Wildlife Biologist, Belle Isle Utility Line Connection Project, Wildlife Assessment, Portsmouth, New Hampshire.** Identified and documented the presence of wildlife species to support the permitting of proposed island re-development and underwater utility line beneath the Piscataqua River, with an emphasis on use by endangered, threatened, and special concern species in NH. Visual and audio assessments for avian and mammal species were conducted along random traverse routes throughout the property to characterize utilization of the parcel by local fauna. Prepared a wildlife report with BMP recommendations for proposed construction and future land use.

**Wildlife Biologist, Greeley Street Residential Subdivision, Wildlife Assessment, Hudson, New Hampshire.** Identified and documented the presence of wildlife species to support the permitting of a proposed residential subdivision containing 2 lots, with an emphasis on use by endangered, threatened and special concern species in NH. Visual and audio assessments for avian and mammal species were conducted along random traverse routes throughout the property to characterize utilization of the parcel by local fauna. Prepared a wildlife report with BMP recommendations for proposed construction and future land use.

**Wildlife Biologist, Dover Waterfront Development Site, Wildlife Assessment, Dover, New Hampshire.** Identified and documented the presence of wildlife species, with an emphasis on use by endangered, threatened and special concern species in NH. Assessment supported the permitting of proposed redevelopment of a former contaminated site to a public park and mixed-use residential units. Visual and audio assessments for avian and mammal species were conducted along random traverse routes throughout the property to characterize utilization of the parcel by local fauna. Prepared a wildlife report with BMP recommendations for proposed construction and future land use.

**Wildlife Biologist, Eversource Energy, D121 Transmission Line Structure Replacement and OPGW Project, Wildlife Assessment, Bow, Hooksett and Manchester, New Hampshire.** Assisted in identifying and documenting the presence of wildlife species, with an emphasis on use by endangered, threatened and special concern species in NH. Assessment supported the permitting of proposed optical ground wire (OPGW) replacement and select utility structure replacements along approximately 11 miles of the D121 Transmission Line. Visual and audio assessments for avian and mammal species were conducted along random traverse routes throughout the property to characterize utilization of the parcel by local fauna. Prepared a wildlife report with BMP recommendations for proposed construction and future land use.

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**Wildlife Biologist, Hannaby Homes, Wildlife Assessment, Auburn, New Hampshire.** Assisted in identifying and documenting the presence of wildlife species to support the permitting of a proposed residential subdivision containing 19 lots, with an emphasis on use by endangered, threatened and special concern species in NH. Prepared a wildlife report with BMP recommendations for proposed construction and future land use.

**Wildlife Biologist, Subcom – Piscataqua Drive, Wildlife Assessment, Newington, New Hampshire.** Assisted in identifying and documenting the presence of wildlife species to support the permitting of a proposed commercial building addition and parking lot, with an emphasis on use by endangered, threatened and special concern species in NH. Prepared a wildlife report with BMP recommendations for proposed construction and future land use.

### Rare Species Surveys

**Wildlife Biologist, BlueWave Solar Development, Black Racer Survey, Sanford, Maine.** Collected biological data on black racer (*Coluber constrictor*). Visual and audio assessments were conducted along random traverse routes throughout the property to characterize presence or absence of the species.

**Wildlife Biologist, Eversource Energy, L163 Transmission Line, Common Nighthawk Survey, Keene, New Hampshire.** Collected biological data on common nighthawk (*Chordeiles minor*). Visual and audio assessments were conducted in four potential sites throughout the L163 Transmission Line in Keene to characterize presence or absence of the species. Prepared a common nighthawk report with survey results to provide information about utilization of the parcel.

### Water Quality Monitoring

**Wildlife Biologist, BJ's Wholesale Club, Turbidity Monitoring, Seabrook, New Hampshire.** Utilize the Turbidity Monitoring Plan prepared by GZA in accordance with the requirements in the Water Quality Certificate. Collect water quality data and assess wetland turbidity after rain events through the collection and analysis of water samples. Prepared a turbidity monitoring report with each sampling event to provide information about construction compliance.

### Natural Resource Assessment

**Scientist I, Eversource Energy, L163 & X104 Transmission Line Structure Replacement Project, Keene, Antrim, Nelson, Stoddard and Sullivan New Hampshire.** Assisted in peatland review and vegetation inventory of delineated wetlands to assist permitting requirements of proposed work areas of structure and copperweld wire replacements.

### Natural Resource Permitting

**Scientist I, Eversource Energy, L163/X104/373/D108/K174/379/367/D121 Transmission Line OPGW & Structure Replacement Projects, New Hampshire.** Assisted in the preparation of federal, state, and local permitting efforts including Federal Avian Administration (FAA) notification, Request for Project Review (RPR) and Statutory Permit by Notification (SPN) prior to optical ground wire and structure replacement.

**Scientist I, Dorchester Yacht Club, Harbor Dredging Project, Dorchester, Massachusetts.** Prepared federal, state and local permitting including an Environmental Notification Form (ENF) under the Massachusetts Environmental Policy Act (MEPA), Chapter 91 Permit, and Notice of Intent (NOI).

## Nyssa Seekamp

Scientist I

**Scientist I, Newburyport Harbor, NFS Permitting of Dredge Spoil Beneficial Use, Newburyport, Massachusetts.** Prepared federal, state and local permitting including an Environmental Notification Form (ENF) under the Massachusetts Environmental Policy Act (MEPA), 401 Water Quality Certification (401 WQC), and Notice of Intent (NOI). Coordination with the U.S. Army Corps of Engineers' (USACE) regarding collection of dredge material and subsequent placement on North Point for beach nourishment.

## EXPERIENCE PRIOR TO GZA

### Rare Species Surveys

**Conservation Biologist I, Shorebird Monitoring, MA Department of Conservation and Recreation, Salisbury, Newburyport and Ipswich Massachusetts.** Monitored and collected biological data on endangered and threatened shorebird species, including piping plover (*Charadrius melodus*), least tern (*Sternula antillarum*) and American oystercatcher (*Haematopus palliatus*). Supervisory experience training and managing field assistants on shorebird monitoring practices in the field. Working knowledge of the Endangered Species Act (ESA), MA Endangered Species Act (MESA), and the Marine Mammal Protection Act (MMPA). Proper coordination with wildlife rehabilitators and regulatory agencies in the area for hazardous or toxic marine life and distressed mammals and migratory birds. Educated the public about environmental stewardship, conservation and protecting rare species.

**Associate Wetland Scientist, Turtle Monitoring, Seekamp Environmental Consulting, Inc., Georgetown, Massachusetts.** Conducted Blanding's and Wood turtle sweeps within the erosion control boundaries of an active construction site for a residential subdivision in Georgetown, MA. Prepared and provided informational brochure and educational packet on rare species protocol for both contractors working on Site and for homeowners living in the new subdivision. Worked under supervisor with Natural Heritage Scientific Collection Permit to ensure proper removal of turtles if found within Site boundary.

**Scientist Aide/Laboratory Technician, *Mya* Clam Survey, Normandeau Associates, Hampton, New Hampshire.** Collection and identification of adult and spat *Mya* clams.

### Habitat Conservation Management

**Conservation Biologist I, Salisbury Beach State Reservation, Operations and Maintenance Plan, MA Department of Conservation and Recreation, Salisbury, Massachusetts.** Prepared the operations and maintenance plan (OMP) for Salisbury Beach State Reservation in concurrence with Massachusetts and federal guidelines for coastal wetland resource areas and rare species habitat protection.

**Conservation Biologist I, MA Statewide Operations and Maintenance Plan, MA Department of Conservation and Recreation, Massachusetts.** Prepared the statewide OMP for all Massachusetts beaches in concurrence with Massachusetts and federal guidelines for coastal wetland resource areas and rare species habitat protection.

**Conservation Biologist I, MA Habitat Conservation Plan, MA Department of Conservation and Recreation, Salisbury, Massachusetts.** Expanded the MA Habitat Conservation Plan (HCP) with Certificates of Inclusion (COI) for Revere, Nahant, Winthrop, Salisbury, Newburyport-Plum Island and Sandy Point State Reservation. Plans in concurrence with Massachusetts and federal guidelines for coastal wetland resource areas and rare species habitat protection.

**Associate Wetland Scientist, Open Meadow Pollinator Habitat Plan, Seekamp Environmental Consulting, Inc., Newburyport, Massachusetts.** Prepared an open meadow pollinator habitat plan to preserve approximately 11 acres to develop and maintain pollinator meadows and develop early successional rabbit habitat in Newburyport, MA.

# Nyssa Seekamp

Scientist I

## Invasive Species Management

**Conservation Biologist I, Nahant Beach Reservation, Invasive Species Management, MA Department of Conservation and Recreation, Nahant, Massachusetts.** Designed and proposed management plan to remove Japanese knotweed (*Reynoutria japonica*), spotted knapweed (*Centaurea maculosa*) and pepperweed (*Lepidium latifolium*) on Nahant Beach Reservation.

## Wetland Projects

**Associate Wetland Scientist, Wetland Delineation & Mitigation Projects, Seekamp Environmental Consulting, Inc., New Hampshire & Massachusetts.** Performed wetland delineations in the field under the direction of a CWS. Defended wetland line to conservation commissions in MA and NH. Completed multiple wetland mitigation/restoration design projects from the planning and design phase to the execution of field work (tree and shrub planting) and follow-up monitoring.

**Associate Wetland Scientist, Wetland Permitting Projects, Seekamp Environmental Consulting, Inc., New Hampshire & Massachusetts.** Prepared Stormwater Prevention Pollution Plans (SWPPP), NOI's, Abbreviated Notice of Resource Area Delineation (ANRAD), and Shoreland Permit by Notification (PBN) forms. Interpreted federal, state and local regulations in MA and NH.

## Laboratory Experience

**Scientist Aide/Laboratory Technician, Sample Sorting, Normandeau Associates, Seabrook, New Hampshire.** Experience sorting marine planktonic and macroalgal samples from four sample locations in Seabrook, NH. Proper handling, labeling and storage of scientific samples. Worked closely with project managers to change the standard of protocol for laboratory techniques to accommodate an influx of non-native, invasive algal species. Identified marine algae by scientific name.

## Volunteer Activities

- Blue Ocean Society – Trash cleanup at Odiorne Point State Park, Rye, NH.
- Ocean Discovery Day, UNH – Explain health benefits of seaweed and the importance of protecting seaweed aquaculture.

## Nyssa Seekamp
Scientist I


## EDUCATION

### University of New Hampshire – B.S., Marine, Estuarine and Freshwater Biology

### Related Coursework

- Marine Biology, Aquatic Botany, Animal Physiology, Ecology, Evolution, Applied Biostatistics, Molecular and Cellular Biology, Evolutionary Biology, Microbiology, Genetics, General Chemistry, Biological Chemistry, Organic Chemistry, Physics.

### Academic Projects

**Underwater Research, *Comparing Ascidian Settlement on Multiple Substrates in Bab's Cove: The Isles of Shoals*, New Hampshire.** Conducted preliminary underwater research to formulate a project proposal for studying the substrate preference and substrate orientation of two invasive colonial ascidians (*Botrylloides violaceus* & *Didemnum vexillum*) in the Gulf of Maine. Completed a technical report and written proposal on preliminary research.

- Instruments used: SCUBA, dive flashlight, transect, quadrat, underwater field notebook.

**Aquaculture, *Arctic Char (Salvelinus alpinus) Enterprise Report*, New Hampshire.** Developed mock aquaculture business plan for Arctic Char farming. Performed water quality testing (salinity, temperature, dissolved oxygen, pH, ammonia, nitrite, alkalinity, carbon dioxide, hardness), fin clip analysis, and observed culture methods (strip spawning). Completed a written proposal for my business plan.

- Instruments used: Salinometer, thermometer, ODO sensor, pH meter, nitrite colorimeter, water hardness monitor.

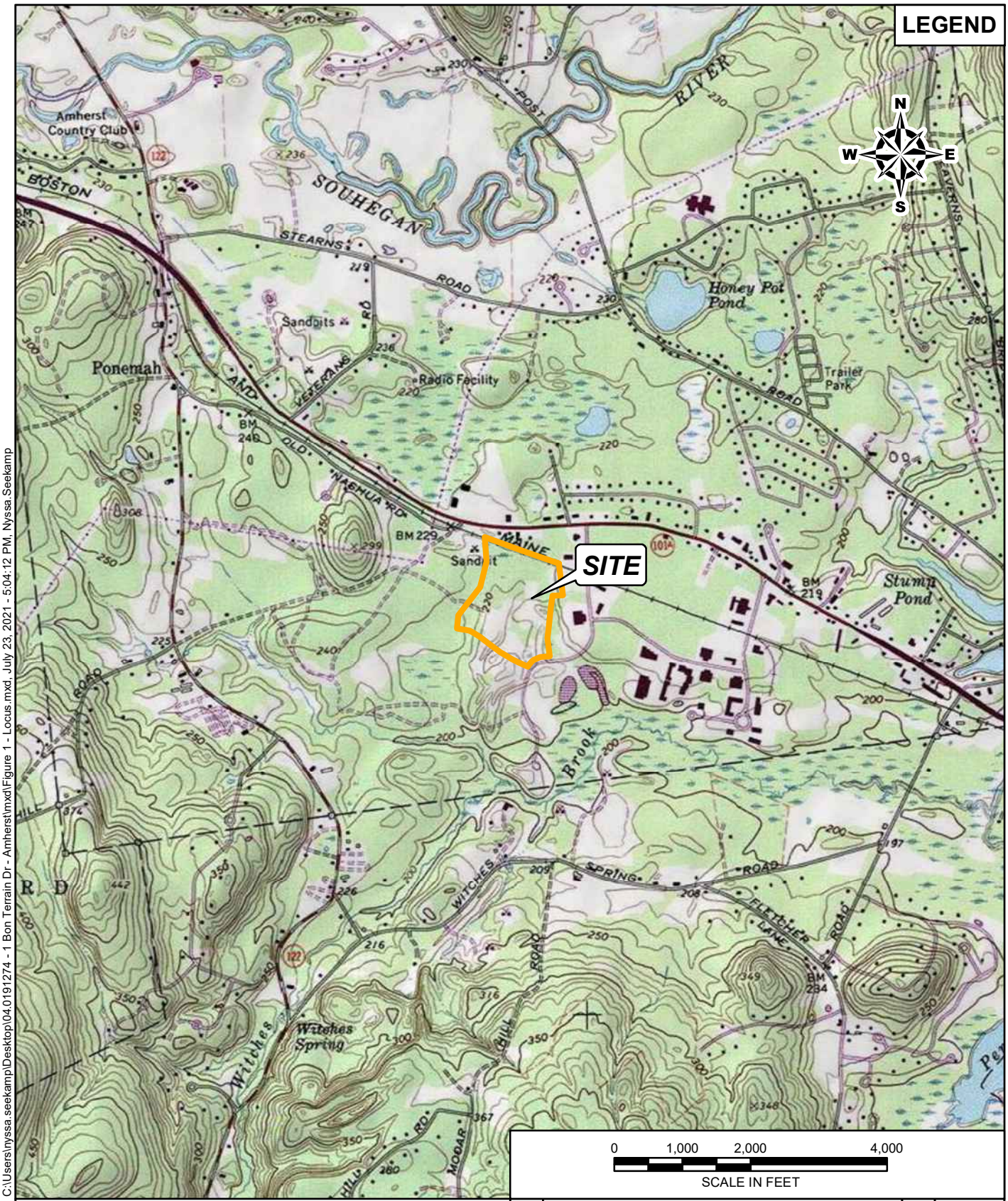
**Biological Oceanography, *The Recruitment of Barnacle Nauplii (Semibalanus balanoides) in Response to Changes in Temperature and Salinity in Portsmouth Harbor*, New Hampshire.** Studied biological processes of the ocean, trophodynamics, plankton diversity and ecology, ecosystems, and global ocean dynamics. Conducted marine zooplankton counts and temperature and salinity measurements in the Gulf of ME to determine community recruitment of fouling species. Compared 2018 results with previous years data to complete an extensive technical report on my research.

- Instruments used: Bongo net tow, Henson-stemple piston sampler, compound microscope.

**Limnology, *Plankton trophic structure, eutrophication and crepuscular vertical migration of phantom midge larvae (Chaoborus) in York Pond causes shifts in cyanobacterial toxins*, New Hampshire.** Investigated eutrophication, acidification, biodiversity, trophic structure and biotoxins in multiple NH lakes. Completed an independent limnology study of York Pond, in Berlin, NH and submitted a written manuscript for publication. Used modern field and lab methods for lake studies, analysis and interpretation of data.

- Instruments used: Lowrance HDS-5 Gen 2 Lake Insight Transducer, Multiparameter probe (YSI model EXO 2), Integrated tube vertical net tow, Zooplankton and Phytoplankton Phototactic response (LIMTEX), Secchi disk, LI-COR Quantum DataLogger LI-1400, Schindler-Patalis trap (Aquatic Research Instruments), plankton vertical net tow, Henson-stemple piston sampler, compound microscope.

**Figures**



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TAX MAP 2, BLOCK 26, LOT 4
1 BON TERRAIN DRIVE
AMHERST, NEW HAMPSHIRE

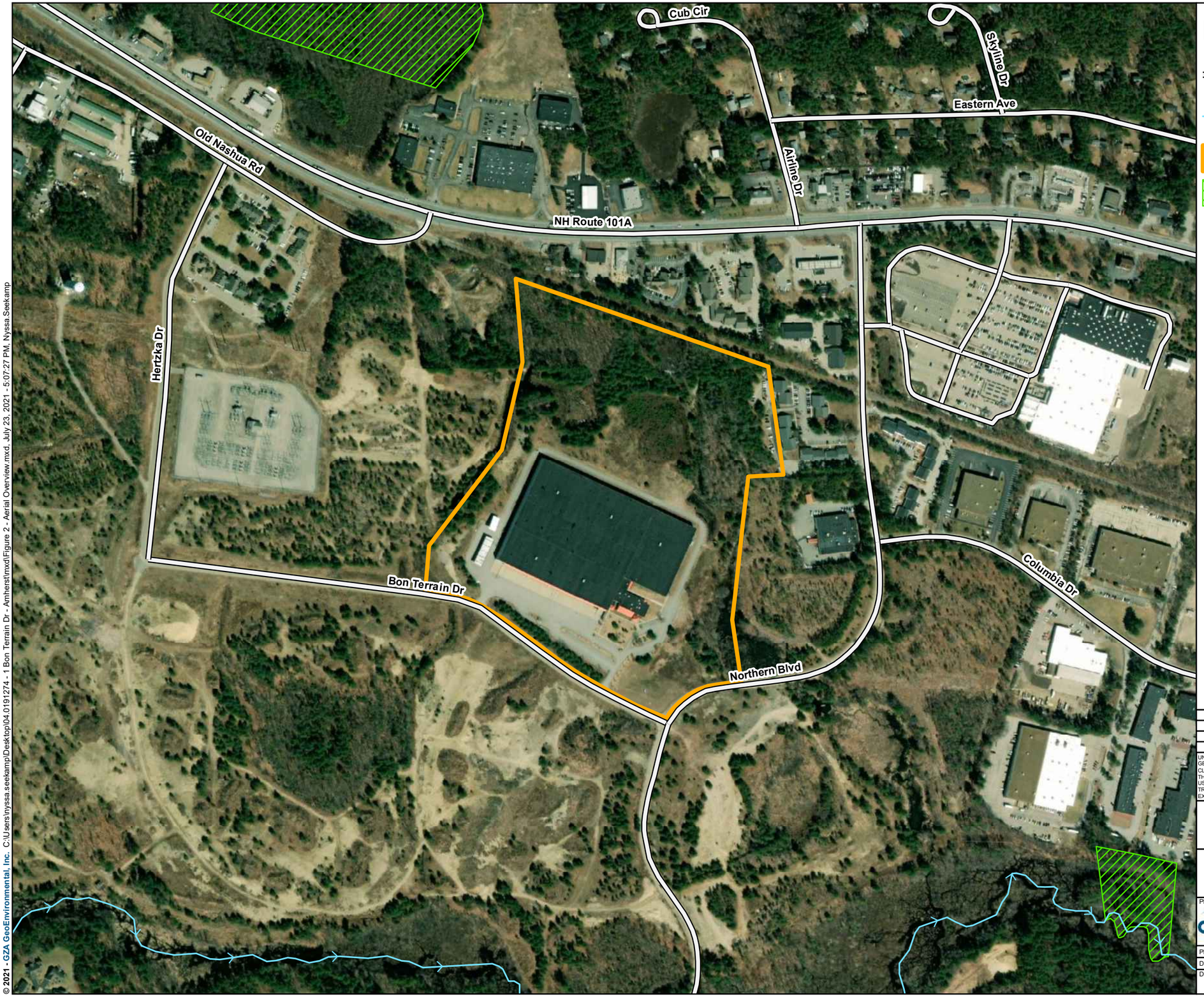
LOCUS PLAN

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

PREPARED FOR:
EIP ONE BON TERRAIN DRIVE, LLC

| | | | | | |
|---|---|---|---|---|---|
| PROJ MGR: | LTY | REVIEWED BY: | TLT | CHECKED BY: | DMZ |
| DESIGNED BY: | NS | DRAWN BY: | NS | SCALE: | 1 in = 2,000 ft |
| DATE: | 09/13/2021 | PROJECT NO: | 04.0191274.00 | REVISION NO: | |

FIG 1
SHEET NO: 1 OF 6




# LEGEND

- DOT Roads
- NH National Hydrography Dataset (NHD) Flowline
- Site Boundary
- Conservation and Public Lands

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0 210 420 840
SCALE IN FEET

**NOTES:**
1. AERIAL IMAGERY FROM ESRI WORLD IMAGERY BASEMAP.
2. DOT ROADS WERE OBTAINED FROM THE UNH GRANIT GIS CLEARINGHOUSE AND SHOULD BE CONSIDERED APPROXIMATE.
3. SITE BOUNDARY WAS APPROXIMATED BASED ON PARCEL DATA OBTAINED FROM THE UNH GRANIT GIS CLEARINGHOUSE AND SHOULD BE CONSIDERED APPROXIMATE.

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TAX MAP 2, BLOCK 26, LOT 4
1 BON TERRAIN DRIVE
AMHERST, NEW HAMPSHIRE

## AERIAL OVERVIEW

| PREPARED BY: | | PREPARED FOR: | |
|---|---|---|---|
| GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com | | EIP ONE BON TERRAIN DRIVE, LLC | |
| PROJ MGR: LTY | REVIEWED BY: TLT | CHECKED BY: DMZ | FIG 2 |
| DESIGNED BY: NS | DRAWN BY: NS | SCALE: 1 in = 417 ft | |
| DATE: 09/13/2021 | PROJECT NO: 04.0191274.00 | REVISION NO: | SHEET NO: 2 OF 6 |


## LEGEND

- DOT Roads
- Site Boundary
- Photo Points

### Land Cover Type

- Appalachian Oak-Pine
- Developed
- Marsh and Shrub Wetland
- Pond
- Potential Vernal Pool
- Shrubland
- Temperate Swamp

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0 100 200 400
SCALE IN FEET

**NOTES:**

1. AERIAL IMAGERY FROM ESRI WORLD IMAGERY BASEMAP.
2. DOT ROADS WERE OBTAINED FROM THE UNH GRANIT GIS CLEARINGHOUSE AND SHOULD BE CONSIDERED APPROXIMATE.
3. SITE BOUNDARY WAS APPROXIMATED BASED ON PARCEL DATA OBTAINED FROM THE UNH GRANIT GIS CLEARINGHOUSE AND SHOULD BE CONSIDERED APPROXIMATE.

| NO. | ISSUE / DESCRIPTION | BY | DATE |
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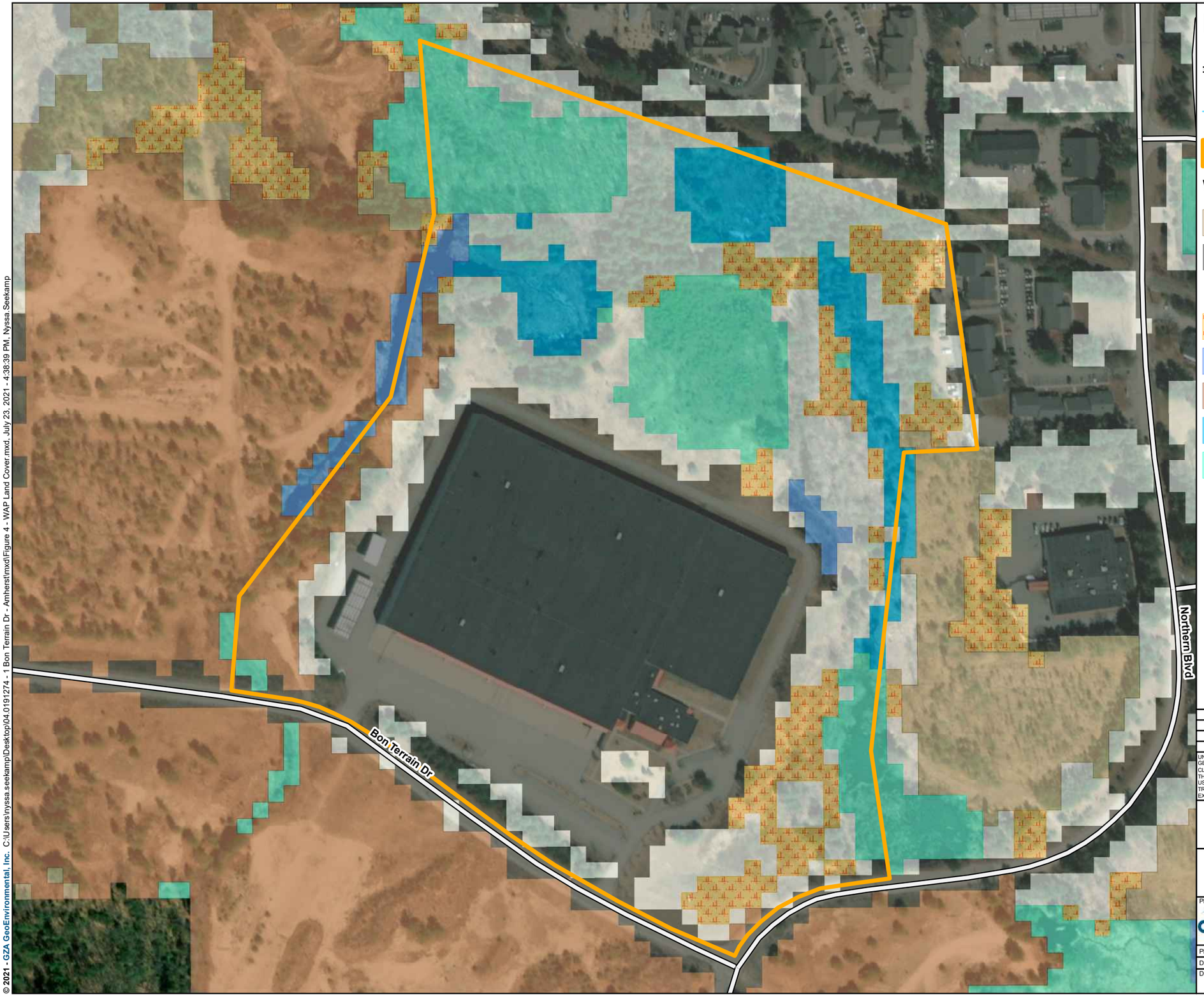
TAX MAP 2, BLOCK 26, LOT 4
1 BON TERRAIN DRIVE
AMHERST, NEW HAMPSHIRE

# LAND COVER TYPE

| | | | |
|---|---|---|---|
| PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com | | PREPARED FOR: EIP ONE BON TERRAIN DRIVE, LLC | |
| PROJ MGR: LTY | REVIEWED BY: TLT | CHECKED BY: DMZ | FIG 3 |
| DESIGNED BY: NS | DRAWN BY: NS | SCALE: 1 in = 203 ft | |
| DATE: 09/13/2021 | PROJECT NO: 04.0191274.00 | REVISION NO: | SHEET NO: 3 OF 6 |




# LEGEND

- DOT Roads
- NH National Hydrography Dataset (NHD) Flowline
- Site Boundary

## WAP Habitat

- Appalachian oak-pine
- Developed Impervious
- Developed or Barren land
- Grassland
- Open water
- Sand/Gravel
- Temperate swamp
- Marsh and shrub wetland

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0 100 200 400
SCALE IN FEET

**NOTES:**
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TAX MAP 2, BLOCK 26, LOT 4
1 BON TERRAIN DRIVE
AMHERST, NEW HAMPSHIRE

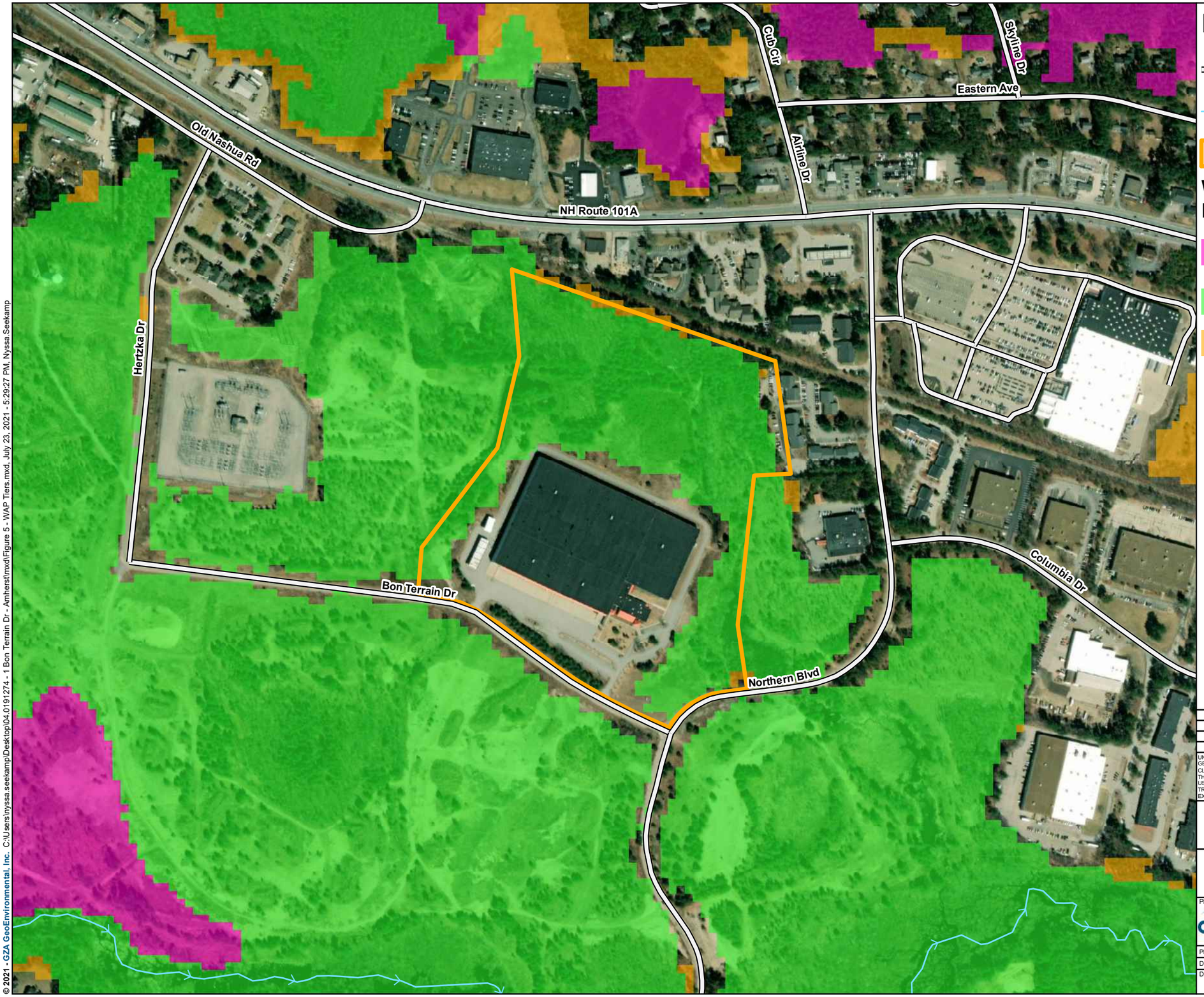
# WILDLIFE ACTION PLAN 2020
# LAND COVER

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

PREPARED FOR:
EIP ONE BON TERRAIN DRIVE, LLC

| | | | |
|---|---|---|---|
| PROJ MGR: LTY | REVIEWED BY: TLT | CHECKED BY: DMZ | FIG 4 |
| DESIGNED BY: NS | DRAWN BY: NS | SCALE: 1 in = 200 ft | |
| DATE: 09/13/2021 | PROJECT NO: 04.0191274.00 | REVISION NO: | SHEET NO: 4 OF 6 |

 C:\Users\nyssa.seekamp\Desktop\04.0191274 - 1 Bon Terrain Dr - Amherst\mxd\Figure 4 - WAP Land Cover.mxd, July 23, 2021 - 4:38:39 PM, Nyssa.Seekamp




# LEGEND

- DOT Roads
- NH National Hydrography Dataset (NHD) Flowline
- Site Boundary

## Wildlife Action Plan (WAP) 2020 Habitat Tiers

- 1 Highest Ranked Habitat in New Hampshire
- 2 Highest Ranked Habitat in Biological Region
- 3 Supporting Landscapes

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0 200 400 800
SCALE IN FEET

**NOTES:**
1. AERIAL IMAGERY FROM ESRI WORLD IMAGERY BASEMAP.
2. DOT ROADS WERE OBTAINED FROM THE UNH GRANIT GIS CLEARINGHOUSE AND SHOULD BE CONSIDERED APPROXIMATE.
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| NO. | ISSUE / DESCRIPTION | BY | DATE |
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TAX MAP 2, BLOCK 26, LOT 4
1 BON TERRAIN DRIVE
AMHERST, NEW HAMPSHIRE

# WILDLIFE ACTION PLAN 2020 HABITAT TIERS

| PREPARED BY: | | PREPARED FOR: | |
|---|---|---|---|
| GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com | | EIP ONE BON TERRAIN DRIVE, LLC | |
| PROJ MGR: LTY | REVIEWED BY: TLT | CHECKED BY: DMZ | FIG 5 |
| DESIGNED BY: NS | DRAWN BY: NS | SCALE: 1 in = 400 ft | |
| DATE: 09/13/2021 | PROJECT NO: 04.0191274.00 | REVISION NO: | SHEET NO: 5 OF 6 |

 C:\Users\nyssa.seekamp\Desktop\04.0191274 - 1 Bon Terrain Dr - Amherst\mxd\Figure 5 - WAP Tiers.mxd, July 23, 2021 - 5:29:27 PM, Nyssa.Seekamp

DETAILED SITE PLAN 1

BIORETENTION SYSTEM 2
RIPRAP SPILLWAY
INFILTRATION BASIN
HEADWALL (TYP.)
CHECK DAM (TYP.)
SEDIMENT FOREBAY
SEDIMENT FOREBAY
RETAINING WALL
12" HDPE
55'
10'
195'
12" HDPE
12" HDPE
BIORETENTION SYSTEM 3
SEDIMENT FOREBAY
24" HDPE
STORMTECH CHAMBER SYSTEM 1
MONITORING WELL HTMW-2
WETLANDS (TYP.)
100' WETLAND BUFFER (TYP.)
PERIMETER EROSION CONTROL (TYP.)
100-FOOT WETLAND BUFFER DISTURBANCE AREA 2=16,295 SF
9'
30'
18'
15" HDPE
100-FOOT WETLAND BUFFER DISTURBANCE AREA 1=7,740 SF
SEDIMENT FOREBAY
15" HDPE CULVERT INV.=214.31
PLUG 15" HDPE OUTLET PIPE AND REROUTE 15" HDPE
CAPE COD BERM (TYP.)
CATCH BASIN CB2 (DOUBLE CB)
BIORETENTION SYSTEM 1
OUTLET STRUCTURE (TYP.)
DMH#2 RIM=218.66 INV=214.51
50'
200'
200'
50'
CATCH BASIN CB1
BUILDING ADDITION FFE=219.35 FOOTPRINT=30,000 SF
12" HDPE
15" HDPE
REROUTE EXISTING 12" HDPE ROOF DRAIN TO CB1
60'
GRAVEL
GRASS
DOOR
F.F.=219.38
DMH#1 RIM=218.61 INV(a)=214.65(15"HDPE) INV(b)=214.76(15"HDPE) INV(c)=214.60(24"HDPE)
DOOR
F.F.=219.35
F.F.=219.35
OVERHEAD DOOR
F.F.=219.31
DMH#3 RIM=214.21 INV(a)=210.56(12"HDPE) INV(b)=210.86(15"HDPE) INV(c)=209.91(24"HDPE)
INFILTRATION TRENCH
STORMTECH CHAMBER SYSTEM 2
ASPHALT
MATCH EXISTING GRADE
DOOR
F.F.=219.40
AREA OF RILLING TO BE RESTORED WITH NEW ENGLAND WILDFLOWER MIX SUPPLIED BY NEW ENGLAND WETLAND PLANTS, INC. OR EQUAL
APPROXIMATE TENANT SEPARATION WALL (SEE ARCHITECTURAL PLANS)
SEE DETAILED SITE PLAN 2

GRAPHIC SCALE
30 15 0 30 60 90
IMPERIAL: 1:30 (IN:FT)


MERIDIAN LAND SERVICES, INC.
ENGINEERING | SURVEYING | PERMITTING
SOIL & WETLAND MAPPING | SEPTIC DESIGN
31 OLD NASHUA ROAD, AMHERST, NH 03031 TEL: 603-673-1441
MERIDIANLANDSERVICES.COM FAX 603-673-1564


STATE OF NEW HAMPSHIRE
BRADLEY J. PASPERSON
No. 6674
LICENSED PROFESSIONAL ENGINEER

| REV. | DATE | DESCRIPTION | DR | CK |
|---|---|---|---|---|
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| B | --- | --- | --- | --- |
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DETAILED SITE PLAN 1

AUGUST 2, 2021

N E FACILITIES SOLUTIONS CORP.
1 BON TERRAIN DRIVE
TAX MAP 2 LOT 26-4
AMHERST, NEW HAMPSHIRE

SCALE: 1" = 100'

SP-2
SHEET

FILE: 4760115.dwg
PROJECT 4760.15
SHEET NO. 4 OF 7


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