



Proactive by Design



WETLAND DELINEATION AND FUNCTION-VALUE ASSESSMENT REPORT

Proposed Continuing Care Retirement Community
Durham, NH

May 2017
04.0190677



PREPARED FOR:
The RiverWoods Group
Durham, New Hampshire

GZA GeoEnvironmental, Inc.

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May 9, 2017
File No. 04.0190677

Ms. Justine Vogel, CEO
The RiverWoods Group
7 RiverWoods Drive
Exeter, New Hampshire 03833

Re: Wetland Function-Value Assessment Report
Stone Quarry Drive (Tax Map 11, Lots 8-1 through 8-15)
Durham, New Hampshire

Dear Ms. Vogel:

GZA GeoEnvironmental, Inc. (GZA) is pleased to submit the attached Wetland Delineation and Function-Value Assessment Report for the proposed Continuing Care Retirement Community located on Stone Quarry Drive in Durham, New Hampshire (i.e. the Site). This report summarizes the results of the field work completed in 2017 to document wetland/surface water delineation, vernal pool identification, and wetland function-value assessment field work conducted by GZA at the Site.

Should you have any questions, please feel free to contact Tracy Tarr at 603-232-8720 or Deborah Zarta Gier 603-232-8718.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Tracy L. Tarr, CWS, CWB, CESSWI
Project Manager

James Long, CWS, CSS
Consultant / Reviewer

Deborah M. Zarta Gier, CNRP
Principle-in-Charge

TLT/JL/DMZ:ttf

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Attachment: Wetland and Surface Water Resources Report



TABLE OF CONTENTS

1.0 INTRODUCTION 19

2.0 PROJECT DESCRIPTION..... 19

 2.1 SCOPE OF WORK..... 19

 2.2 DESCRIPTION OF WORK AREA..... 19

3.0 METHODOLOGY..... 20

 3.1 WETLAND AND SURFACE WATER DELINEATION..... 20

 3.2 WETLAND CLASSIFICATION 21

 3.3 VERNAL POOL IDENTIFICATION..... 21

 3.4 WETLAND FUNCTION-VALUE ASSESSMENT 21

4.0 RESULTS..... 22

 4.1 JURISDICTIONAL WETLANDS/SURFACE WATERS/CLASSIFICATION 22

 4.1.1 Wetland A (R2UB, PFO1/4E)..... 22

 4.1.2 Wetland B (R2UB, PFO1/4E)..... 23

 4.2 VERNAL POOL IDENTIFICATION..... 24

 4.3 WETLAND FUNCTION-VALUE ASSESSMENT 24

 4.3.1 Wetland A..... 24

 4.3.2 Wetland B..... 25

 4.3.3 Regional Natural Resource Significance of the Site..... 25

5.0 FINDINGS AND CONCLUSIONS 26

FIGURES

- FIGURE 1 SITE LOCUS
- FIGURE 2 AERIAL OVERVIEW
- FIGURE 3 PROPOSED SITE PLAN CONCEPT, PREPARED BY ALTUS ENGINEERING, INC.

APPENDICES

- APPENDIX A LIMITATIONS
- APPENDIX B WETLAND FUNCTION-VALUE EVALUATION FORMS
- APPENDIX C NATURAL HERITAGE BUREAU MEMO



1.0 INTRODUCTION

This report presents the results of the wetland delineation and wetland function-value assessment conducted by GZA GeoEnvironmental, Inc. (GZA) for the proposed Continuing Care Retirement Community in Durham, New Hampshire. The property consists of 15 parcels (Tax Map 11, Lots 8-1 through 8-15) totaling approximately 11.30 acres located to the south of Stone Quarry Drive, west of Dover Road (N.H. Route 108), and north of N.H. Route 4.

The RiverWoods Group is proposing to construct a Continuing Care Retirement Community on the Site, including 150 independent living apartments, 24-assisted living apartments, 24 memory-care units, and 24 skilled-nursing units, associated court yards, and parking. This report was prepared to provide an analysis of wetlands and an impact evaluation based on the current project concept. This report is subject to the Limitations in **Appendix A**.

2.0 PROJECT DESCRIPTION

2.1 SCOPE OF WORK

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

- Delineation and classification of State and federal jurisdictional wetland areas, and the evaluation of the presence/absence of vernal pools. The wetland delineation, was completed by New Hampshire Certified Wetland Scientist (CWS) Mr. James H. Long (CWS No. 007) on April 4, 2017.
- Assessment of Wetland Functions and Values. As part of this assessment, GZA reviewed the regional natural resource significance of the property, including comparison to natural resource data available through The Town of Durham Natural Resources Chapter of the Master Plan, and natural resource maps prepared by the Strafford Regional Commission including the Natural Services Network Map, Wetlands map, and the Aquifer & Public Water Supplies map. For additional context, GZA reviewed data available through the New Hampshire Geographically Referenced Analysis and Information Transfer System (GRANIT) including 2015 aerial photography, United States Geologic Service (USGS) topography, and New Hampshire Wildlife Action Plan data published by the New Hampshire Fish and Game Department (NHF&G). Wetland classification, vernal pool assessment, and wetland function-value assessment field work was conducted by CWS Ms. Tracy L. Tarr (CWS No. 281) and Lindsey White, Wetland Scientist Apprentice on April 24, 2017. Ms. Tarr is also a Certified Wildlife Biologist and Mr. Long is a Certified Soil Scientist (CSS No. 15).

2.2 DESCRIPTION OF WORK AREA

The site consists of 11.30 acres is located on Stone Quarry Drive and Dover Road (N.H. Route 108) in Durham, New Hampshire (i.e. Town of Durham Tax Map 11, Lots 8-1 through 8-15; see **Figure 1**, Site Locus). The Site is the location of an existing residence and old field abutting N.H. Route 108. The Site was previously approved as a residential subdivision, although construction did not occur. The majority of the property is currently forested, with the exception of the old field abutting N.H. Route 108. The presence of the old field and abandoned apple trees along



Stone Quarry Drive suggest the property was previously utilized as a farm or homestead. The Site is located to the west of the Town of Durham Public Works facility, and to the north of N.H. Route 4, a four-lane highway.



View of the existing residence, barn, and old field looking southwesterly from Stone Quarry Drive.

3.0 METHODOLOGY

3.1 WETLAND AND SURFACE WATER DELINEATION

The wetland delineation was conducted in accordance with the United States Army Corps of Engineers (ACOE) Wetlands Delineation Manual using the Routine Determinations Method (the Manual), and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual (see each, below) as required by the New Hampshire Department of Environmental Services Wetlands Bureau and the ACOE. The following standards were used to assess jurisdiction under the Manual and to classify the wetland systems on the site.

- Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List: 2016 wetland ratings*; and Phytoneuron 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X; and
- U.S. Army Corps of Engineers, Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi; and
- U.S. Army Corps of Engineers. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*, ed. J. S. Wakely, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center; and
- U.S. Department of Agriculture, Natural Resource Conservation Service, 2016. *Field Indicators of Hydric Soils in the United States*, Version 8.0. L.M. Vasilas, G.W. Hurt, and J.F. Berkowitz (eds.). USDA, NRCS, in cooperation with the National Technical Committee for Hydric Soils.



- Jurisdictional limits of surface waters of the State of New Hampshire were delineated in accordance with their definition in RSA 485-A:2 XIV, 482-A:4 II and New Hampshire Code of Administrative Rules Env-Wt 101.97. Surface waters include locations where fresh water flows or stands and tidal waters. This includes, but is not limited to, rivers, perennial and intermittent streams, lakes, ponds, intertidal zones, and tidal waters. In addition, jurisdiction extends to the portion of any bank or shore which borders such surface waters, and to any swamp or bog subject to periodical flooding by fresh water including the surrounding shore. The limit of jurisdiction for surface water areas was delineated as the top of bank, where a natural bank occurs or its ordinary high water mark where a natural bank is not present.

3.2 WETLAND CLASSIFICATION

Field delineated wetlands were classified according to the *Classification of Wetlands and Deepwater Habitats of the United States*, December 1979, United States Department of the Interior Fish and Wildlife Service FWS/OBS-79/31. For the purpose of this report, wetlands are classified based on their dominant vegetative community and hydrologic regime. See **Table 1** for a listing of each wetland type identified within the study area and its classification.

3.3 VERNAL POOL IDENTIFICATION

The presence of vernal pools was evaluated in accordance with *Identification and Documentation of Vernal Pools in New Hampshire*, 2016 (3rd edition), NHF&G, Nongame and Endangered Wildlife Program and the current New Hampshire Code of Administrative Rules. Vernal pool areas exist as confined basins and exhibit vernal pool criteria outlined in the New Hampshire Code of Administrative Rules, Env-Wt 101.75, 101.86, and 101.106. This assessment was conducted during the active vernal pool season when standing water was present (i.e. April through June); as a result, follow-up surveys are not required.

3.4 WETLAND FUNCTION-VALUE ASSESSMENT

The functions and values of wetlands were assessed by GZA utilizing the ACOE Highway Methodology Workbook Supplement (ACOE September 1999). The functions and values assessed included: groundwater recharge/discharge, floodflow alteration, fish/shellfish habitat, sediment/toxicant retention, nutrient removal, production export, sediment/shoreline stabilization, wildlife habitat, recreation, education/scientific value, visual quality/aesthetics, uniqueness/heritage, and endangered species habitat. Functions and values are considered “principal” if they are determined to be an important physical component of a wetland ecosystem, and/or are considered of special value to society, from a local, regional, and/or national perspective. Functions and values may be considered “capable” if a wetland can provide any given function or value on a limited basis. The rationale for the assignment of functions as principal or capable is based upon professional judgment with guidance provided in a list of considerations outlined in the ACOE methodology.



4.0 RESULTS

4.1 JURISDICTIONAL WETLANDS/SURFACE WATERS/CLASSIFICATION

Two wetland systems totaling 0.63 acres were identified on the Site (see **Table 1**, Wetland Classification Summary Table and **Figure 2**, Aerial Overview). Wetland A is located on the eastern edge of the Site, and consists of a perennial stream that flows under Quarry Drive via a culvert, and flows onto the adjacent Town of Durham Public Works facility Site. Wetland B is also a perennial stream that flows under Quarry Drive in southwesterly direction. Wetland B is highly altered and appears to be previously ditched. The wetland was previously filled near the residence and barn on the property, presumably for access to the adjacent field. The stream is culverted again as it exits the property and flows under N.H. Route 4.

TABLE 1
Wetland Classification Summary Table

Wetland Description	Wetland Classification	Existing Habitat Size (Acres)
Wetland A	R2UB, PFO1/4E	0.45 ac
Wetland B	R2UB, PFO1/4E	0.18 ac
Total Wetland Acreage		0.63 acres

4.1.1 Wetland A (R2UB, PFO1/4E)

Wetland A totals 0.45 acres on-Site and consists of a perennial stream that is classified as a riverine lower perennial system with an unconsolidated bottom system (R2UB). A portion of the wetland flows into the stream channel and is classified as a palustrine forested system that is dominated by broad-leaved deciduous and needle-leaved evergreen vegetation and is seasonally saturated/flooded (PFO1/4E). Dominant vegetation in the wetland includes red maple (*Acer rubrum*), white pine (*Pinus strobus*), multiflora rose (*Rosa multiflora*), glossy buckthorn (*Rhamnus frangula*), speckled alder (*Alnus incana* spp. *rugosa*), highbush blueberry (*Vaccinium corymbosum*), winterberry holly (*Ilex verticillata*), cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*) and jewelweed (*Impatiens capensis*). The wetland is directly bordered by upland forested grading from white pine and red maple to shagbark hickory (*Carya ovata*) and eastern hemlock (*Tsuga canadensis*) in the southern portion of the system.



View of Wetland A looking southerly.

4.1.2 Wetland B (R2UB, PFO1/4E)

Wetland B totals 0.18 acres on-Site and consists of a narrow perennial stream classified as a riverine, lower perennial system with an unconsolidated bottom (R2UB), with bordering palustrine forested wetland (PFO1/4E) on the southern edge of the wetland. Dominant vegetation in the wetland includes red maple, eastern hemlock, white pine, silky dogwood (*Cornus amomum*), gray dogwood (*Cornus racemosa*), speckled alder, purple loosestrife (*Lythrum salicaria*), broad-leaved cattail (*Typha latifolia*), and reed canary grass (*Phalaris arundinacea*). This wetland is located directly adjacent to an existing residence and is highly altered from previous land uses. The channel has been extensively ditched and a portion of the wetland has been filled for previous access to an adjacent field. Multiple culvert restrictions are present on Stoney Quarry Drive, an existing residential driveway, and under Route 4.



View of Wetland B looking southwesterly from Quarry Road.



4.2 VERNAL POOL IDENTIFICATION

No vernal pools were observed during GZA's field work. Also, the site does not contain any documented vernal pools according to available data reviewed as described under Section 2.1 above. The on-site wetlands are perennial stream systems.

4.3 WETLAND FUNCTION-VALUE ASSESSMENT

4.3.1 Wetland A

The principal functions of the wetland system include sediment/shoreline stabilization and wildlife habitat. The banks of the stream are well-stabilized by vegetation, including well-stratified herbaceous, shrub, and tree layers. The presence of an intact channel, as well as forested cover, supports common woodland wildlife species such as white-tailed deer (*Odocoileus virginianus*), black-capped chickadee (*Poecile atricapillus*), and eastern phoebe (*Sayornis phoebe*), which were observed during field work in April. The stream is likely utilized by riverine species such as raccoon (*Procyon lotor*) and potentially river otter (*Lontra canadensis*). However, the stream eventually flows across Route 4, which limits safe passage for area sensitive wildlife species.



View of upper forested wetland portion of Wetland A.

The wetland is also suitable for groundwater discharge, floodflow alteration, fish/shellfish habitat, and production export. The presence of a perennial stream suggests that discharge is occurring in a portion of the wetland. In addition, the presence of year-round flow provides potential habitat to fish species such as blacknose dace (*Rhinichthys atratulus*), which utilize small streams.

No wetland impacts are proposed to this system as part of the project. However, to allow for adequate parking, the project is proposing impacts within the 75' Town of Durham wetland buffer, on the western side of the wetland system (see Proposed Site Plan Concept). To minimize potential indirect impacts to the wetland through construction in the upland buffer, the project is proposing a number of post-construction measures as outlined below.



Design and Post-Construction Measures:

1. The project is minimizing infringement in the buffer through a combination of above ground and underground parking, beneath the facility. Approximately 40% of the required parking will be constructed underground, to minimize above ground parking. The project is also proposing to utilize porous pavement at the exterior parking area located adjacent to Wetland A. The use of porous pavement is designed to maintain infiltration rates, and reduce potential for scouring and erosion of banks from stormwater.
2. Stormwater from the development will be treated via the porous pavement and underground storage.
3. The project is developing a planting plan along the proposing parking area to enhance long-term term shading of the wetland system, and provide supplemental food sources to frugivorous birds.

4.3.2 Wetland B

Wetland B is highly fragmented by existing development including N.H. Route 4, N.H. Route 108, Stone Quarry Drive, and an existing residential property. The principal function of the system is sediment/toxicant retention. The wetland receives direct runoff from multiple roads and detention is artificially created by the old fill associated with the access to the adjacent field.



View of Wetland B looking toward southwesterly toward NH Route 108.

The wetland is also suitable for groundwater discharge, floodflow alteration, nutrient removal, sediment/shoreline stabilization, and wildlife habitat. The banks of the stream contain dense shrub vegetation, which are utilized for nesting and feeding by common songbirds. In addition, although altered, the wetland serves to slow and direct flows associated with a stream channel that flows into the Oyster River.

The project does not propose any direct wetland impacts to this system. A portion of the access to the facility is proposing with the 75' Town of Durham upland buffer, near Stone Quarry Drive. However, all parking and the facility is located outside of the 75' upland buffer.

4.3.3 Regional Natural Resource Significance of the Site

GZA reviewed publicly-available natural resource information published by the NH Fish and Game Department, the Strafford Regional Planning Commission, GRANIT, and the Town of New Durham (e.g. Natural



Resource Chapter in the Master Plan). Based on 2017 Wildlife Action Plan (WAP) maps, prepared by NHF&G, the Site is part of a “supporting landscape,” but does not contain any areas mapped as “Highest Ranked Habitat in New Hampshire” (see Figure 4, **Wildlife Action Plan Habitats**). As a result, there are no regionally significant habitats known to occur on the Site. In addition, there are no areas mapped as “flood storage lands,” “water supply lands,” or “wildlife habitat” on the Site based on the Natural Services Network Plan dated February 25, 2015 prepared by the Strafford Regional Planning Commission. Based on the Natural Services Network Plan, there are “economically important soils” mapped on the Site, which relate to upland soils, as opposed to wetland features. Based on the 2008 Durham Conservation Focus Areas Map, the Site is not considered a Conservation Focus Area.

4.4 RARE SPECIES AND IMPACT ASSESSMENT

GZA queried the NHB to determine if there any known records of rare species or exemplary communities near or on the Site. According to the NHB, the Site is located in the vicinity of a documented New England cottontail (*Sylvilagus transitionalis*) location (see NHB Memo dated April 24, 2017). The New England cottontail is listed as State Endangered. During 2008, a road-killed New England cottontail was observed just east of the Site on N.H. Route 4.

New England cottontail require shrub thickets and young forests (typically less than 25 years old)¹. The home range size of individual cottontails ranges from one-half to eight acres in size. Habitat blocks of at least 25 acres are considered necessary for the survival of this species, although some populations have been observed utilizing patches less than seven acres in size². Where individuals are observed on habitat patches of less than 7.5 acres, patches are generally considered too small and isolated to sustain populations.

The property contains a small field totaling approximately 1.03 acres, and the field is bordered by an old abandoned apple orchard that is roughly 1.48 acres in size. The on-site early successional habitats are too small to support a large sustaining population, based on current habitat management guidance. It is assumed that the documented cottontail was associated with the larger early successional habitats located to the east. The New England cottontail is not considered a wetland-dependent species. As a result, endangered species habitat is not considered a function of the on-site wetlands. However, impacts relative to New England cottontail will be reviewed in consultation with the NHF&G as part of the NH Department of Environmental Services Alteration of Terrain permit for the project. GZA is currently coordinating a review with the NHF&G.

5.0 FINDINGS AND CONCLUSIONS

GZA has completed wetland and surface water delineation including vernal pool identification, and wetland function-value Assessment for The RiverWoods Group proposed Continuing Care Retirement Community project. The following is a summary of our findings and conclusions:

- Two wetland systems totaling 0.63 acres were identified on the Site. The wetlands consist of perennial stream channels and bordering forested wetland.
- Wetland A is bordered by forested cover while Wetland B is highly altered by previous development, with evidence of ditching and filling.

¹ Litvaitis, J. A. 1993. Influence of historic land use on early successional vertebrates. *Conservation Biology* 7:866-873.

² Arbutnot, M. 2008. A Landowner’s Guide to New England Cottontail Habitat Management. Environmental Defense Fund. 36



- Wetland A provides wildlife habitat and sediment/shoreline stabilization as principal functions, while Wetland B provides sediment/toxicant retention as a principal function.
- GZA reviewed state-wide mapping efforts to assess the regional importance of the Site from a natural resource perspective. According to 2017 WAP maps, a portion of the Site is mapped as a supporting landscape. No Highest Ranked Habitat in New Hampshire is mapped on the Site. In addition, the Town of Durham Natural Services Network Map, prepared by the Strafford Regional Planning Commission, maps the Site as having “Economically Important Soils,” but does not depict any areas mapped as “Flood Storage Lands,” “Water Supply Lands, or “Wildlife Habitat” on the Site.
- No vernal pools were observed on the Site.
- The project was designed to avoid all direct wetland impact. No wetland impacts are proposed as part of the project.
- To provide for adequate parking, impacts are required to the Town of Durham 75’ upland buffer.
- Given that both streams are highly fragmented, but eventually drain into the Oyster River, protecting water quality was considered a primary goal of the design relative to wetland functions and values. The design includes the use of underground parking and porous pavement to both treat and infiltrate stormwater.
- Plantings are proposed adjacent to the eastern parking area, to re-plant a portion of the buffer proposed to be altered for parking.
- The NHB has a record of New England Cottontail, a State Endangered upland species, near the Site. The easterly forested areas of the Site do not currently provide potential New England Cottontail habitat. However, the old field provides potential habitat, although at a size typically considered too small to support a sustaining population. GZA is coordinating a review with the NH Fish and Game Department.



REFERENCES

- Colburn, E.A. 2004. Vernal Pools: Natural History and Conservation. The McDonald & Woodward Publishing Company, Blacksburg, Virginia.
- Degraaf, R. M. and M. Yamasaki. 2001. New England Wildlife: Habitat, Natural History, and Distribution. University Press of New England, Hanover, NH.
- Gleason, H.A. and A. Cronquist. 1991. Manual of Vascular Plants of Northeastern United States and Adjacent Canada, 2nd edition. The New York Botanical Garden, Bronx, New York.
- National Geographic Society. 2002. Field Guide to the Birds of North America, 4th edition. National Geographic, Washington, D.C.
- Peterson, R.T. 1980. A Field Guide to the Birds of Eastern and Central North America, 4th edition. Houghton Mifflin Company, Boston, MA.
- Petson, R.T. and M. McKenny. 1968. A Field guide to Wildflowers: Northeastern and Northcentral North America. Houghton Mifflin Company, Boston, MA.
- Petrides, G.A. 1996. A Field Guide to Trees and Shrubs: Northeastern and northcentral United States and southeastern and south-central Canada, 2nd edition. Houghton Mifflin Company, Boston, MA.
- Sperduto, D. D. and W. F. Nichols. 2012. Natural Communities of New Hampshire, 2nd edition. The New Hampshire Natural Heritage Bureau, Concord, NH. Pub. UNH Cooperative Extension, Durham, NH.
- U.S. Army Corps of Engineers, New England District. 1999. Wetland Functions and Values: A Descriptive Approach. NAEEP-360-1-30a.




Figure 1 - Site Locus

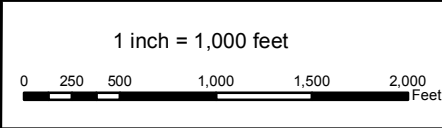


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INDEX MAP
 **SITE PARCEL**
 FIG OR DWG
1
 SHEET NO. 1 OF 1

NOTES:
 1. AERIAL IMAGERY IS DATED TO 2015
 2. LAYERS TITLED "SITE PARCEL" WAS OBTAINED FROM UNH GRANIT



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

THE RIVERWOODS GROUP
STONE QUARRY DRIVE
 SITE LOCUS
 MAY 08, 2017
 DURHAM
 NEW HAMPSHIRE
 Project No.: 04.0190677.00

Provided For:
The RiverWoods Group
 **GZA GeoEnvironmental, Inc.**
Engineers and Scientists
 www.gza.com
 Aerial Imagery: 2015



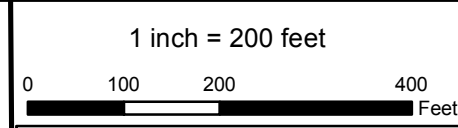
Figure 2 - Site Aerial Overview



WETLANDS
 DOT ROADS
 SITE PARCEL
 PARCEL BOUNDARY

FIG OR DWG
2
 SHEET NO. 1 OF 1

NOTES:
 1. AERIAL IMAGERY IS DATED TO 2015
 2. LAYERS TITLED "DOT ROADS", "SITE PARCELS", AND "PARCEL BOUNDARY" WERE OBTAINED FROM UNH GRANIT
 3. WETLAND POINTS WERE OBTAINED USING EOS ARROW GNSS RECEIVER WITH <2.5M ACCURACY



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THE RIVERWOODS GROUP
STONE QUARRY DRIVE
 AERIAL OVERVIEW
 MAY 08, 2017
 DURHAM
 NEW HAMPSHIRE

Project No.: 04.0190677.00
 Aerial Imagery: 2015

Provided For:
The RiverWoods Group
GZA GeoEnvironmental, Inc.
 Engineers and Scientists
 www.gza.com



**Figure 3 – Proposed Site Plan Concept
(Prepared by Altus Engineering, Inc.)**

ZONING SUMMARY:

PROPERTY REFERENCE MAP 11, LOTS 8-1 THRU 8-15 AND VALBETH LANE AND PORTION OF LOT 8-0
 TOTAL SITE AREA 492,246 S.F. OR 11.30 AC.
 ZONING OFFICE AND RESEARCH DISTRICT- ROUTE 108 (OR)
 (WCO) WETLANDS CONSERVATION OVERLAY DISTRICT
 OWNER: ROCKINGHAM PROPERTIES 1, LTD
 PO BOX 423
 BELMONT, MA 02178

SETBACKS	REQ'D	PROVIDED
FRONT YARD	50'	50'
SIDE YARD	25'	25'
REAR YARD	25'	9'
WETLANDS BUFFER	75'	12'
MAX. IMPERVIOUS	50%	43%

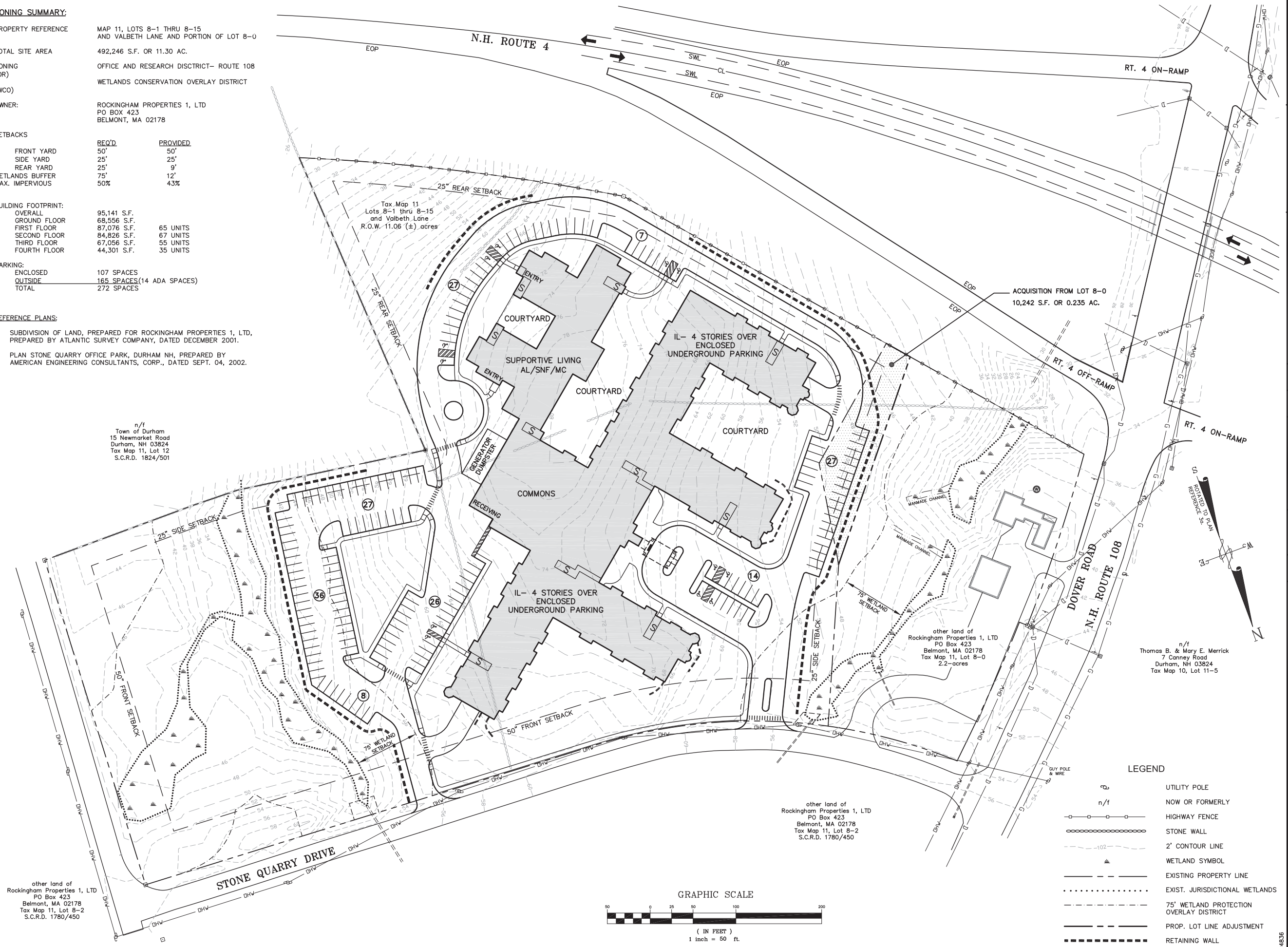
BUILDING FOOTPRINT:	OVERALL	GROUND FLOOR	FIRST FLOOR	SECOND FLOOR	THIRD FLOOR	FOURTH FLOOR
	95,141 S.F.	68,556 S.F.	87,076 S.F.	84,826 S.F.	67,056 S.F.	44,301 S.F.
			65 UNITS	67 UNITS	55 UNITS	35 UNITS

PARKING:	ENCLOSED	OUTSIDE	TOTAL
	107 SPACES	165 SPACES (14 ADA SPACES)	272 SPACES

REFERENCE PLANS:

- SUBDIVISION OF LAND, PREPARED FOR ROCKINGHAM PROPERTIES 1, LTD, PREPARED BY ATLANTIC SURVEY COMPANY, DATED DECEMBER 2001.
- PLAN STONE QUARRY OFFICE PARK, DURHAM NH, PREPARED BY AMERICAN ENGINEERING CONSULTANTS, CORP., DATED SEPT. 04, 2002.

n/f
 Town of Durham
 15 Newmarket Road
 Durham, NH 03824
 Tax Map 11, Lot 12
 S.C.R.D. 1824/501

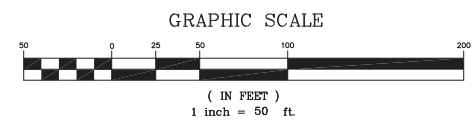


other land of
 Rockingham Properties 1, LTD
 PO Box 423
 Belmont, MA 02178
 Tax Map 11, Lot 8-2
 S.C.R.D. 1780/450

other land of
 Rockingham Properties 1, LTD
 PO Box 423
 Belmont, MA 02178
 Tax Map 11, Lot 8-2
 S.C.R.D. 1780/450

other land of
 Rockingham Properties 1, LTD
 PO Box 423
 Belmont, MA 02178
 Tax Map 11, Lot 8-0
 2.2-acres

n/f
 Thomas B. & Mary E. Merrick
 7 Canney Road
 Durham, NH 03824
 Tax Map 10, Lot 11-5



LEGEND

	UTILITY POLE
	NOW OR FORMERLY
	HIGHWAY FENCE
	STONE WALL
	2' CONTOUR LINE
	WETLAND SYMBOL
	EXISTING PROPERTY LINE
	EXIST. JURISDICTIONAL WETLANDS
	75' WETLAND PROTECTION OVERLAY DISTRICT
	PROP. LOT LINE ADJUSTMENT
	RETAINING WALL

ALTUS ENGINEERING, INC.
 133 COURT STREET PORTSMOUTH, NH 03801
 VOICE: (603) 433-2335
 FAX: (603) 433-4194

THIS DRAWING HAS NOT BEEN RELEASED FOR CONSTRUCTION

ISSUED FOR: REVIEW

ISSUE DATE: APRIL 14, 2017

REVISIONS	NO.	DESCRIPTION	BY	DATE
0	-		JKC	-/-

DRAWN BY: RMB
 APPROVED BY: JKC
 DRAWING FILE: 4836.WORKING.DWG

SCALE: 1" = 50'

OWNER:
ROCKINGHAM PROPERTIES 1, LTD
 P.O. BOX 423
 BELMONT, MA 02178

APPLICANT:
THE RIVERWOODS GROUP
 7 RIVERWOODS DRIVE
 EXETER, NH 03833

PROJECT:
PROPOSED CCRC

**STONE QUARRY DRIVE
 DURHAM, NH**

TITLE:
**PROPOSED SITE
 PLAN CONCEPT**

SHEET NUMBER:
C - 1

P4836



Appendix A – Natural Resource Limitations



NATURAL RESOURCE SURVEY AND ASSESSMENT LIMITATIONS

Use of Report

1. GZA GeoEnvironmental, Inc. (GZA) has prepared this report on behalf of, and for the exclusive use of The RiverWoods Group ("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 – Field Data and Photo Sheets



**THE RIVERWOODS GROUP
CONTINUING CARE RETIREMENT COMMUNITY
STONE QUARRY DRIVE**













DURHAM, NH

File No: 04.0190677.00				WETLAND FUNCTION – VALUE EVALUATION FORM	Date: 4/24/17	
Wetland ID: A					GZA Personnel: TT and LW	
Function/Value	Capability Y N	Criteria	Summary		Principal Yes/No	
Groundwater Recharge/Discharge	X	2, 7, 15	The wetland is associated with a perennial stream.			
Floodflow Alteration	X	3, 5, 7, 9, 11, 13, 17	The stream serves to direct flows and the floodplain provides some detention potential during large rain events.			
Fish and Shellfish Habitat	X	1, 2, 8, 9, 10, 16, 17	The stream channel provides potential habitat to fish associated with small streams (e.g. blacknose dace).			
Sediment/Toxicant Retention		X	1, 2, 4, 10	The wetland is a flow-through system with limited retention.		
Nutrient Removal		X	7, 11	The wetland is a flow-through system with limited retention.		
Production Export	X		1, 2, 4, 13	Some export may be occurring through stream flow.		
Sediment/Shoreline Stabilization	X		1, 2, 4, 6, 9, 14	The wetland contains well-vegetated stream banks.		Yes
Wildlife Habitat	X		1, 7, 8, 17, 18, 19	The wetland contains riparian habitat. Wildlife use was observed.		Yes
Recreation		X	5	The wetland is located on private property and does not provide significant water-based recreation opportunities.		
Educational/Scientific Value		X	2, 5	The wetland is located on private property and is difficult to access, with no public parking.		
Uniqueness/Heritage		X	7, 19	The wetland is not considered unique or rare.		
Visual Quality/Aesthetics		X	8, 11	The wetland does not have open water vistas easily accessible to the public.		
ES Endangered Species Habitat		X		There are no records of rare wetland species on or near the project Site, although New England cottontail, an upland species, was recorded nearby.		

Notes: The stream drains across Stone Quarry Drive before eventually flowing under Route 4, and eventually to the Oyster River.



**THE RIVERWOODS GROUP
CONTINUING CARE RETIREMENT COMMUNITY
STONE QUARRY DRIVE - DURHAM, NH**

File No: 04.0190677.00				WETLAND FUNCTION – VALUE EVALUATION FORM	Date: 4/24/17
Wetland ID: A					GZA Personnel: TT and LW
Function/Value	Capability Y N		Criteria	Summary	Principal Yes/No
 Groundwater Recharge/Discharge	X		2, 7, 15	The wetland is associated with a perennial stream.	
 Floodflow Alteration	X		3, 5, 7, 9, 11, 13, 17	The stream serves to direct flows.	
 Fish and Shellfish Habitat		X	1, 8, 16, 17	The wetland contains multiple culvert restrictions and fill that represent significant barriers to fish.	
 Sediment/Toxicant Retention	X		1, 2, 3, 4, 10, 11	The wetland contains areas of dense vegetation and the channel restrictions provide opportunity for some retention.	Yes
 Nutrient Removal	X		7, 11	Dense vegetation is present although the wetland is primarily a flow through system.	
 Production Export		X	10, 11	Some export may be occurring through stream flow but is limited by culvert restrictions.	
 Sediment/Shoreline Stabilization		X	1, 2, 4, 6, 14	Erosion is present and previous ditching is evident.	
 Wildlife Habitat	X		1, 8, 18, 19	The wetland contains a stream but the wetland is highly disturbed and fragmented.	
 Recreation		X	5	The wetland is located on private property and does not provide any significant water-based recreation opportunities such as boating.	
 Educational/Scientific Value		X	2, 5	The wetland is located on private property, with no public parking.	
 Uniqueness/Heritage		X	19	The wetland is not considered unique or rare.	
 Visual Quality/Aesthetics		X	11	The wetland does not have open water vistas or large marsh areas.	
ES Endangered Species Habitat		X		There are no records of rare wetland species on or near the project Site, although New England cottontail, an upland species, was recorded nearby.	

Notes: The stream drains across Stone Quarry Drive before flowing under Route 4, and eventually to the Oyster River. The wetland contains multiple culvert restrictions and fill at a previous field access location.



Appendix A

Wetland evaluation supporting documentation; Reproducible forms.

Below is an example list of considerations that was used for a New Hampshire highway project. Considerations are flexible, based on best professional judgment and interdisciplinary team consensus. This example provides a comprehensive base, however, and may only need slight modifications for use in other projects.



GROUNDWATER RECHARGE/DISCHARGE— This function considers the potential for a wetland to serve as a groundwater recharge and/or discharge area. It refers to the fundamental interaction between wetlands and aquifers, regardless of the size or importance of either.

CONSIDERATIONS/QUALIFIERS

1. Public or private wells occur downstream of the wetland.
2. Potential exists for public or private wells downstream of the wetland.
3. Wetland is underlain by stratified drift.
4. Gravel or sandy soils present in or adjacent to the wetland.
5. Fragipan does not occur in the wetland.
6. Fragipan, impervious soils, or bedrock does occur in the wetland.
7. Wetland is associated with a perennial or intermittent watercourse.
8. Signs of groundwater recharge are present or piezometer data demonstrates recharge.
9. Wetland is associated with a watercourse but lacks a defined outlet or contains a constricted outlet.
10. Wetland contains only an outlet, no inlet.
11. Groundwater quality of stratified drift aquifer within or downstream of wetland meets drinking water standards.
12. Quality of water associated with the wetland is high.
13. Signs of groundwater discharge are present (e.g., springs).
14. Water temperature suggests it is a discharge site.
15. Wetland shows signs of variable water levels.
16. Piezometer data demonstrates discharge.
17. Other



FLOODFLOW ALTERATION (Storage & Desynchronization) — This function considers the effectiveness of the wetland in reducing flood damage by water retention for prolonged periods following precipitation events and the gradual release of floodwaters. It adds to the stability of the wetland ecological system or its buffering characteristics and provides social or economic value relative to erosion and/or flood prone areas.

CONSIDERATIONS/QUALIFIERS

1. Area of this wetland is large relative to its watershed.
2. Wetland occurs in the upper portions of its watershed.
3. Effective flood storage is small or non-existent upslope of or above the wetland.
4. Wetland watershed contains a high percent of impervious surfaces.
5. Wetland contains hydric soils which are able to absorb and detain water.
6. Wetland exists in a relatively flat area that has flood storage potential.
7. Wetland has an intermittent outlet, ponded water, or signs are present of variable water level.
8. During flood events, this wetland can retain higher volumes of water than under normal or average rainfall conditions.
9. Wetland receives and retains overland or sheet flow runoff from surrounding uplands.
10. In the event of a large storm, this wetland may receive and detain excessive flood water from a nearby watercourse.
11. Valuable properties, structures, or resources are located in or near the floodplain downstream from the wetland.
12. The watershed has a history of economic loss due to flooding.
13. This wetland is associated with one or more watercourses.
14. This wetland watercourse is sinuous or diffuse.
15. This wetland outlet is constricted.
16. Channel flow velocity is affected by this wetland.
17. Land uses downstream are protected by this wetland.
18. This wetland contains a high density of vegetation.
19. Other

FISH AND SHELLFISH HABITAT (FRESHWATER) — This function considers the effectiveness of seasonal or permanent watercourses associated with the wetland in question for fish and shellfish habitat.

CONSIDERATIONS/QUALIFIERS

1. Forest land dominant in the watershed above this wetland.
2. Abundance of cover objects present.

STOP HERE IF THIS WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE

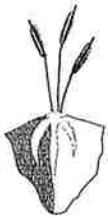
3. Size of this wetland is able to support large fish/shellfish populations.
4. Wetland is part of a larger, contiguous watercourse.
5. Wetland has sufficient size and depth in open water areas so as not to freeze solid and retain some open water during winter.
6. Stream width (bank to bank) is more than 50 feet.
7. Quality of the watercourse associated with this wetland is able to support healthy fish/shellfish populations.
8. Streamside vegetation provides shade for the watercourse.
9. Spawning areas are present (submerged vegetation or gravel beds).
10. Food is available to fish/shellfish populations within this wetland.
11. Barrier(s) to anadromous fish (such as dams, including beaver dams, waterfalls, road crossing) are absent from the stream reach associated with this wetland.
12. Evidence of fish is present.
13. Wetland is stocked with fish.
14. The watercourse is persistent.
15. Man-made streams are absent.
16. Water velocities are not too excessive for fish usage.
17. Defined stream channel is present.
18. Other

Although the above example refers to freshwater wetlands, it can also be adapted for marine ecosystems. The following is an example provided by the National Marine Fisheries Service (NMFS) of an adaptation for the fish and shellfish function.

FISH AND SHELLFISH HABITAT (MARINE) — This function considers the effectiveness of wetlands, embayments, tidal flats, vegetated shallows, and other environments in supporting marine resources such as fish, shellfish, marine mammals, and sea turtles.

CONSIDERATIONS/QUALIFIERS

1. Special aquatic sites (tidal marsh, mud flats, eelgrass beds) are present.
2. Suitable spawning habitat is present at the site or in the area.
3. Commercially or recreationally important species are present or suitable habitat exists.
4. The wetland/waterway supports prey for higher trophic level marine organisms.
5. The waterway provides migratory habitat for anadromous fish.
6. Essential fish habitat, as defined by the 1996 amendments to the Magnuson-Stevens Fishery & Conservation Act, is present (consultation with NMFS may be necessary).
7. Other



SEDIMENT/TOXICANT/PATHOGEN RETENTION — This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens in runoff water from surrounding uplands or upstream eroding wetland areas.

CONSIDERATIONS/QUALIFIERS

1. Potential sources of excess sediment are in the watershed above the wetland.
2. Potential or known sources of toxicants are in the watershed above the wetland.
3. Opportunity for sediment trapping by slow moving water or deepwater habitat are present in this wetland.
4. Fine grained mineral or organic soils are present.
5. Long duration water retention time is present in this wetland.
6. Public or private water sources occur downstream.
7. The wetland edge is broad and intermittently aerobic.
8. The wetland is known to have existed for more than 50 years.
9. Drainage ditches have not been constructed in the wetland.

STOP HERE IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE.

10. Wetland is associated with an intermittent or perennial stream or a lake.
11. Channelized flows have visible velocity decreases in the wetland.
12. Effective floodwater storage in wetland is occurring. Areas of impounded open water are present.
13. No indicators of erosive forces are present. No high water velocities are present.
14. Diffuse water flows are present in the wetland.
15. Wetland has a high degree of water and vegetation interspersion.
16. Dense vegetation provides opportunity for sediment trapping and/or signs of sediment accumulation by dense vegetation is present.
17. Other



NUTRIENT REMOVAL/RETENTION/TRANSFORMATION — This function considers the effectiveness of the wetland as a trap for nutrients in runoff water from surrounding uplands or contiguous wetlands and the ability of the wetland to process these nutrients into other forms or trophic levels. One aspect of this function is to prevent ill effects of nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries.

CONSIDERATIONS/QUALIFIERS

1. Wetland is large relative to the size of its watershed.
2. Deep water or open water habitat exists.
3. Overall potential for sediment trapping exists in the wetland.

4. Potential sources of excess nutrients are present in the watershed above the wetland.
 5. Wetland saturated for most of the season. Ponded water is present in the wetland.
 6. Deep organic/sediment deposits are present.
 7. Slowly drained fine grained mineral or organic soils are present.
 8. Dense vegetation is present.
 9. Emergent vegetation and/or dense woody stems are dominant.
 10. Opportunity for nutrient attenuation exists.
 11. Vegetation diversity/abundance sufficient to utilize nutrients.
- STOP HERE IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE.
12. Waterflow through this wetland is diffuse.
 13. Water retention/detention time in this wetland is increased by constricted outlet or thick vegetation.
 14. Water moves slowly through this wetland.
 15. Other

PRODUCTION EXPORT (Nutrient) — This function evaluates the effectiveness of the wetland to produce food or usable products for humans or other living organisms.



CONSIDERATIONS/QUALIFIERS

1. Wildlife food sources grow within this wetland.
2. Detritus development is present within this wetland.
3. Economically or commercially used products found in this wetland.
4. Evidence of wildlife use found within this wetland.
5. Higher trophic level consumers are utilizing this wetland.
6. Fish or shellfish develop or occur in this wetland.
7. High vegetation density is present.
8. Wetland exhibits high degree of plant community structure/species diversity.
9. High aquatic vegetative diversity/abundance is present.
10. Nutrients exported in wetland watercourses (permanent outlet present).
11. "Flushing" of relatively large amounts of organic plant material occurs from this wetland.
12. Wetland contains flowering plants that are used by nectar-gathering insects.
13. Indications of export are present.
14. High production levels occurring, however, no visible signs of export (assumes export is attenuated).
15. Other

SEDIMENT/ShORELINE STABILIZATION — This function considers the effectiveness of a wetland to stabilize streambanks and shorelines against erosion.



CONSIDERATIONS/QUALIFIERS

1. Indications of erosion or siltation are present.
2. Topographical gradient is present in wetland.
3. Potential sediment sources are present up-slope.
4. Potential sediment sources are present upstream.
5. No distinct shoreline or bank is evident between the waterbody and the wetland or upland.
6. A distinct step between the open waterbody or stream and the adjacent land exists (i.e., sharp bank) with dense roots throughout.
7. Wide wetland (>10') borders watercourse, lake, or pond.
8. High flow velocities in the wetland.
9. The watershed is of sufficient size to produce channelized flow.
10. Open water fetch is present.
11. Boating activity is present.
12. Dense vegetation is bordering watercourse, lake, or pond.
13. High percentage of energy-absorbing emergents and/or shrubs border a watercourse, lake, or pond.
14. Vegetation is comprised of large trees and shrubs that withstand major flood events or erosive incidents and stabilize the shoreline on a large scale (feet).
15. Vegetation is comprised of a dense resilient herbaceous layer that stabilizes sediments and the shoreline on a small scale (inches) during minor flood events or potentially erosive events.
16. Other



WILDLIFE HABITAT — This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species must be considered. Species lists of observed and potential animals should be included in the wetland assessment report.¹

CONSIDERATIONS/QUALIFIERS

1. Wetland is not degraded by human activity.
2. Water quality of the watercourse, pond, or lake associated with this wetland meets or exceeds Class A or B standards.
3. Wetland is not fragmented by development.
4. Upland surrounding this wetland is undeveloped.
5. More than 40% of this wetland edge is bordered by upland wildlife habitat (e.g., brushland, woodland, active farmland, or idle land) at least 500 feet in width.
6. Wetland is contiguous with other wetland systems connected by a watercourse or lake.
7. Wildlife overland access to other wetlands is present.
8. Wildlife food sources are within this wetland or are nearby.
9. Wetland exhibits a high degree of interspersed vegetation classes and/or open water.
10. Two or more islands or inclusions of upland within the wetland are present.
11. Dominant wetland class includes deep or shallow marsh or wooded swamp.
12. More than three acres of shallow permanent open water (less than 6.6 feet deep), including streams in or adjacent to wetland, are present.
13. Density of the wetland vegetation is high.
14. Wetland exhibits a high degree of plant species diversity.
15. Wetland exhibits a high degree of diversity in plant community structure (e.g., tree/shrub/vine/grasses/mosses)
16. Plant/animal indicator species are present. (List species for project)
17. Animal signs observed (tracks, scats, nesting areas, etc.)
18. Seasonal uses vary for wildlife and wetland appears to support varied population diversity/abundance during different seasons.
19. Wetland contains or has potential to contain a high population of insects.
20. Wetland contains or has potential to contain large amphibian populations.
21. Wetland has a high avian utilization or its potential.
22. Indications of less disturbance-tolerant species are present.
23. Signs of wildlife habitat enhancement are present (birdhouses, nesting boxes, food sources, etc.).
24. Other

¹In March 1995, a rapid wildlife habitat assessment method was completed by a University of Massachusetts research team with funding and oversight provided by the New England Transportation Consortium. The method is called WEThings (wetland habitat indicators for non-game species). It produces a list of potential wetland-dependent mammal, reptile, and amphibian species that may be present in the wetland. The output is based on observable habitat characteristics documented on the field data form. This method may be used to generate the wildlife species list recommended as backup information to the wetland evaluation form and to augment the considerations. Use of this method should first be coordinated with the Corps project manager. A computer program is also available to expedite this process.

RECREATION (Consumptive and Non-Consumptive) — This value considers the suitability of the wetland and associated watercourses to provide recreational opportunities such as hiking, canoeing, boating, fishing, hunting, and other active or passive recreational activities. Consumptive opportunities consume or diminish the plants, animals, or other resources that are intrinsic to the wetland. Non-consumptive opportunities do not consume or diminish these resources of the wetland.



CONSIDERATIONS/QUALIFIERS

1. Wetland is part of a recreation area, park, forest, or refuge.
2. Fishing is available within or from the wetland.
3. Hunting is permitted in the wetland.
4. Hiking occurs or has potential to occur within the wetland.
5. Wetland is a valuable wildlife habitat.
6. The watercourse, pond, or lake associated with the wetland is unpolluted.
7. High visual/aesthetic quality of this potential recreation site.
8. Access to water is available at this potential recreation site for boating, canoeing, or fishing.
9. The watercourse associated with this wetland is wide and deep enough to accommodate canoeing and/or non-powered boating.
10. Off-road public parking available at the potential recreation site.
11. Accessibility and travel ease is present at this site.
12. The wetland is within a short drive or safe walk from highly populated public and private areas.
13. Other

EDUCATIONAL/SCIENTIFIC VALUE — This value considers the suitability of the wetland as a site for an “outdoor classroom” or as a location for scientific study or research.



CONSIDERATIONS/QUALIFIERS

1. Wetland contains or is known to contain threatened, rare, or endangered species.
2. Little or no disturbance is occurring in this wetland.
3. Potential educational site contains a diversity of wetland classes which are accessible or potentially accessible.
4. Potential educational site is undisturbed and natural.
5. Wetland is considered to be a valuable wildlife habitat.
6. Wetland is located within a nature preserve or wildlife management area.
7. Signs of wildlife habitat enhancement present (bird houses, nesting boxes, food sources, etc.).
8. Off-road parking at potential educational site suitable for school bus access in or near wetland.
9. Potential educational site is within safe walking distance or a short drive to schools.
10. Potential educational site is within safe walking distance to other plant communities.
11. Direct access to perennial stream at potential educational site is available.
12. Direct access to pond or lake at potential educational site is available.
13. No known safety hazards exist within the potential educational site.
14. Public access to the potential educational site is controlled.
15. Handicap accessibility is available.
16. Site is currently used for educational or scientific purposes.
17. Other

UNIQUENESS/HERITAGE — This value considers the effectiveness of the wetland or its associated waterbodies to provide certain special values. These may include archaeological sites, critical habitat for endangered species, its overall health and appearance, its role in the ecological system of the area, its relative importance as a typical wetland class for this geographic location. These functions are clearly valuable wetland attributes relative to aspects of public health, recreation, and habitat diversity.

CONSIDERATIONS/QUALIFIERS

1. Upland surrounding wetland is primarily urban.
2. Upland surrounding wetland is developing rapidly.
3. More than 3 acres of shallow permanent open water (less than 6.6 feet deep), including streams, occur in wetlands.
4. Three or more wetland classes are present.
5. Deep and/or shallow marsh or wooded swamp dominate.
6. High degree of interspersion of vegetation and/or open water occur in this wetland.
7. Well-vegetated stream corridor (15 feet on each side of the stream) occurs in this wetland.
8. Potential educational site is within a short drive or a safe walk from schools.
9. Off-road parking at potential educational site is suitable for school buses.
10. No known safety hazards exist within this potential educational site.
11. Direct access to perennial stream or lake exists at potential educational site.
12. Two or more wetland classes are visible from primary viewing locations.
13. Low-growing wetlands (marshes, scrub-shrub, bogs, open water) are visible from primary viewing locations.
14. Half an acre of open water or 200 feet of stream is visible from the primary viewing locations.
15. Large area of wetland is dominated by flowering plants or plants that turn vibrant colors in different seasons.
16. General appearance of the wetland visible from primary viewing locations is unpolluted and/or undisturbed.
17. Overall view of the wetland is available from the surrounding upland.
18. Quality of the water associated with the wetland is high.
19. Opportunities for wildlife observations are available.
20. Historical buildings are found within the wetland.
21. Presence of pond or pond site and remains of a dam occur within the wetland.
22. Wetland is within 50 yards of the nearest perennial watercourse.
23. Visible stone or earthen foundations, berms, dams, standing structures, or associated features occur within the wetland.
24. Wetland contains critical habitat for a state- or federally-listed threatened or endangered species.
25. Wetland is known to be a study site for scientific research.
26. Wetland is a natural landmark or recognized by the state natural heritage inventory authority as an exemplary natural community.
27. Wetland has local significance because it serves several functional values.
28. Wetland has local significance because it has biological, geological, or other features that are locally rare or unique.
29. Wetland is known to contain an important archaeological site.
30. Wetland is hydrologically connected to a state or federally designated scenic river.
31. Wetland is located in an area experiencing a high wetland loss rate.
32. Other

VISUAL QUALITY/AESTHETICS — This value considers the visual and aesthetic quality or usefulness of the wetland.



CONSIDERATIONS/QUALIFIERS

1. Multiple wetland classes are visible from primary viewing locations.
2. Emergent marsh and/or open water are visible from primary viewing locations.
3. A diversity of vegetative species is visible from primary viewing locations.
4. Wetland is dominated by flowering plants or plants that turn vibrant colors in different seasons.
5. Land use surrounding the wetland is undeveloped as seen from primary viewing locations.
6. Visible surrounding land use form contrasts with wetland.
7. Wetland views absent of trash, debris, and signs of disturbance.
8. Wetland is considered to be a valuable wildlife habitat.
9. Wetland is easily accessed.
10. Low noise level at primary viewing locations.
11. Unpleasant odors absent at primary viewing locations.
12. Relatively unobstructed sight line exists through wetland.
13. Other

ENDANGERED SPECIES HABITAT — This value considers the suitability of the wetland to support threatened or endangered species.

ES

CONSIDERATIONS/QUALIFIERS

1. Wetland contains or is known to contain threatened or endangered species.
2. Wetland contains critical habitat for a state or federally listed threatened or endangered species.

STONE QUARRY DRIVE

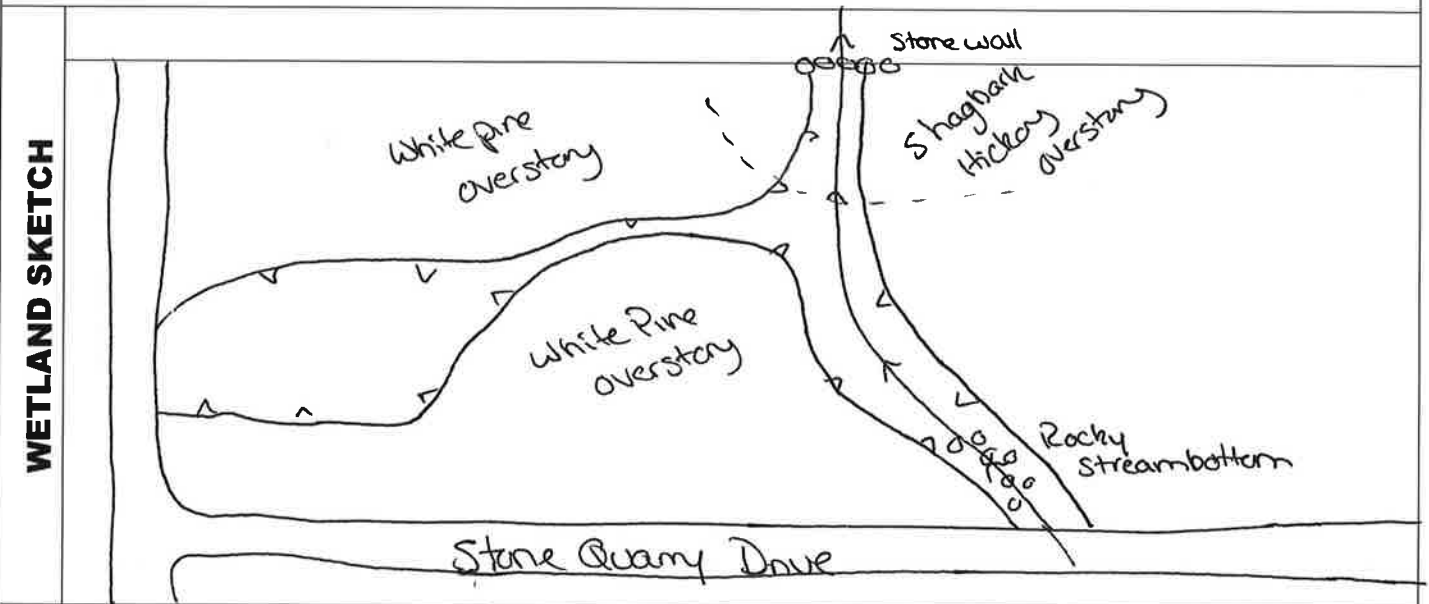
DURHAM
NEW HAMPSHIRE



File No. 04.0190677.00	Date: 04/24/2017	GZA Personnel: TLT & LEW
Wetland ID: A	Soil Notes: A2	Wetland Classification: R2UB/PFO1/4E
Wetland Flag Series: A		
Potential Vernal Pool? N Potential Vernal Pool Flag Series: N/A		
Were photos taken? Y (If yes, please see page 2, and Photo Locations on Sketch, below.)		

DOMINANT VEGETATION	HERBACEOUS	SHRUB	SAPLING	TREE	
	1	Wood anemone	Multiflora rose		White pine
	2	Jewel weed	Bristly dewberry		Red maple
	3	Sensitive fern	Honeysuckle		Red oak
	4	Soft rush	Glossy buckthorn		American basswood
	5	Interrupted fern	Speckled alder		Shagbark hickory
	6	Cinnamon fern	Meadowsweet		
	7	Evergreen woodfern	Red maple		
	8		Musclewood		
	9		High bush blueberry		
	10		Winterberry holly		
	11				
	12				

General Notes: Eastern chipmunks, chipping sparrow, white-tailed deer, Eastern phoebe, black-capped chickadee



STONE QUARRY DRIVE

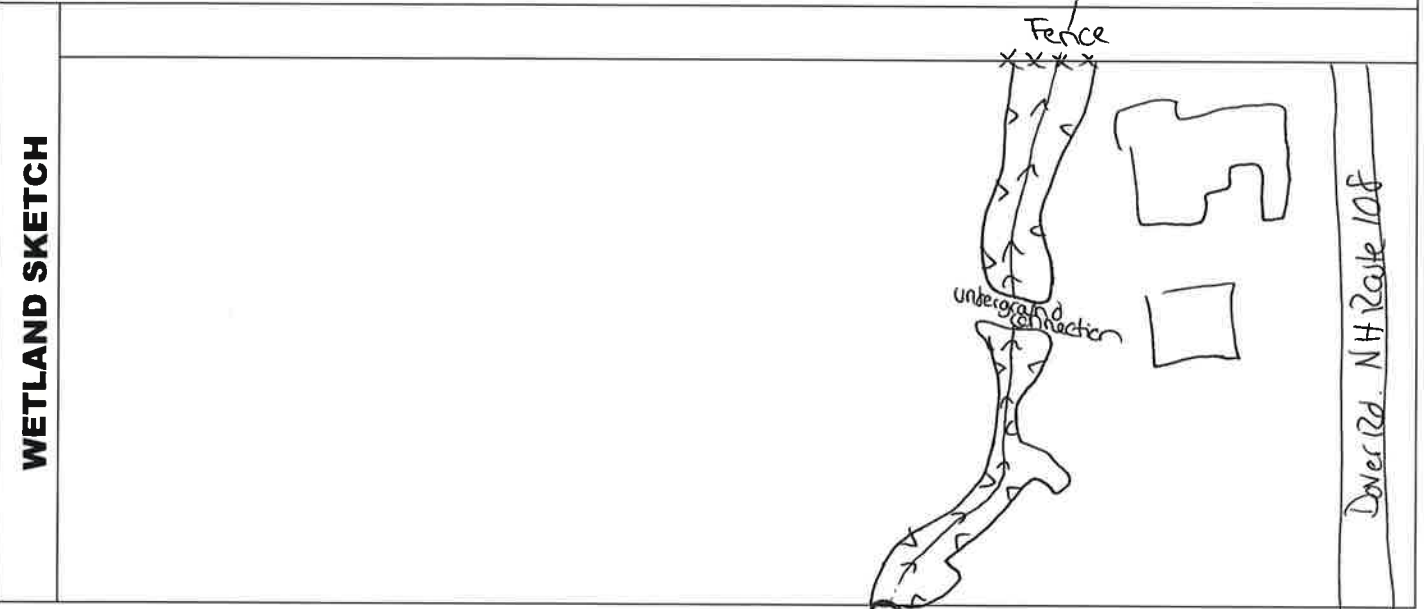
DURHAM
NEW HAMPSHIRE



File No. 04.0190677.00	Date: 04/24/2017	GZA Personnel: TLT & LEW
Wetland ID: B	Soil Notes: A2	Wetland Classification: R2UB/PFO1/4E
Wetland Flag Series: B		
Potential Vernal Pool? N Potential Vernal Pool Flag Series: N/A		
Were photos taken? Y (If yes, please see page 2, and Photo Locations on Sketch, below.)		

DOMINANT VEGETATION	HERBACEOUS	SHRUB	SAPLING	TREE	
	1	Purple loosestrife	Silky dogwood		Red maple
	2	Broad leaved cattail	Multiflora rose		White pine
	3	Golden rod	Speckled alder		Eastern hemlock
	4	Marsh merigold	Privet		
	5	Reed canary grass	Wild raisin		
	6		Gray dogwood		
	7				
	8				
	9				
	10				
	11				
	12				

General Notes: American gold finch, skunk evidence, song sparrow, turkey vulture. ^{culvert}





Appendix C – Natural Heritage Bureau Memo

Memo



NH NATURAL HERITAGE BUREAU
NHB DATACHECK RESULTS LETTER

To: Lindsey White, GZA GeoEnvironmental
5 Commerce Park North
Suite 201
Bedford, NH 03110

From: Amy Lamb, NH Natural Heritage Bureau
Date: 4/24/2017 (valid for one year from this date)

Re: Review by NH Natural Heritage Bureau
NHB File ID: NHB17-1177 Town: Durham
Description: Proposed continuing care retirement community.
cc: Kim Tuttle

Location: Tax Maps: Map 11, lots 8-15

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

Comments: Please contact NH Fish & Game for wildlife recommendations.

Vertebrate species

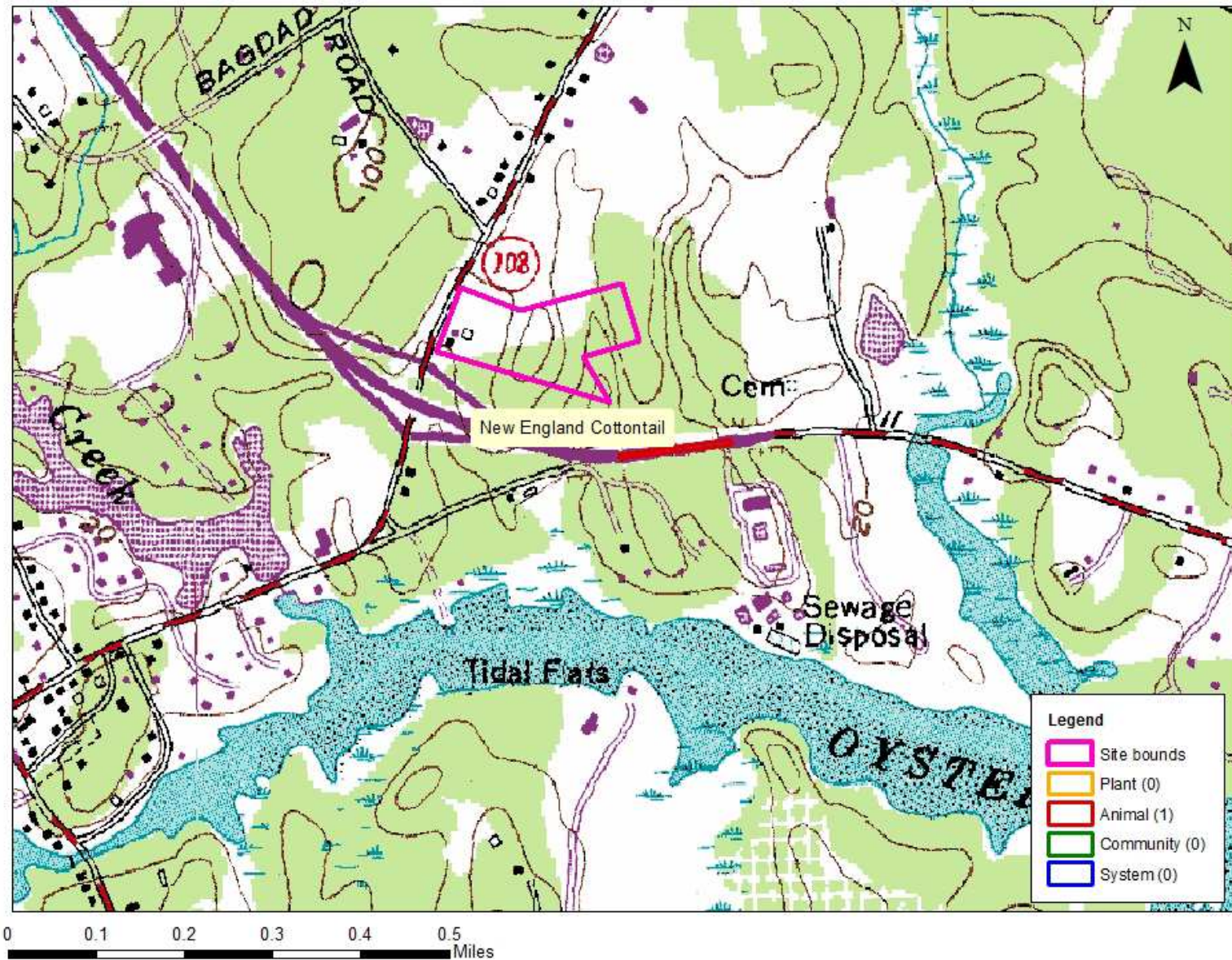
	State ¹	Federal	Notes
New England Cottontail (<i>Sylvilagus transitionalis</i>)	E	--	Contact the NH Fish & Game Dept (see below).

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

Contact for all animal reviews: Kim Tuttle, NH F&G, (603) 271-6544.

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.

NHB17-1177





GZA GeoEnvironmental, Inc.