



SPECIES AT RISK ASSESSMENT MUSKOKA ROYALE COLLEGE

BRACEBRIDGE, ONTARIO

Prepared for:

Muskoka Royale Developments Inc.

October 2018



Michalski Nielsen
ASSOCIATES LIMITED

ENVIRONMENTAL PLANNING BIOPHYSICAL ANALYSIS
LAKE CAPACITY ASSESSMENT RESOURCE MANAGEMENT



Michalski Nielsen

ASSOCIATES LIMITED

October 25, 2018

Muskoka Royale Developments Inc.
c/o George Chen
22 Fairway Heights Cres.
Thornhill, ON L3T 1K2

Re: Muskoka Royale; Our File 3517

Mr. George Chen:

Enclosed please find our report entitled **SPECIES AT RISK ASSESSMENT – MUSKOKA ROYALE COLLEGE, BRACEBRIDGE, ONTARIO** (October 2018).

Should you have any questions, or if further clarification is required, do not hesitate to call.

Yours truly,

MICHALSKI NIELSEN ASSOCIATES LIMITED
Per:

Gord Nielsen, M.Sc.
Ecologist
President

GN/be

Enc.

16 Robert Boyer Lane, Bracebridge, Ontario P1L 1R9
(705) 645-1413 Facsimile: (705) 645-1904 www.mnal.ca e-mail: info@mnal.ca

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1 INTRODUCTION

1.1 Background

In September, 2018, Michalski Nielsen Associates Limited prepared an Environmental Impact Study in support of the development of a school campus on a large parcel of land with the Town of Bracebridge, District Municipality of Muskoka. That report was prepared in support of municipal approvals. Portions of the report addressed species protected under the *Endangered Species Act*. The purpose of the present report is to consolidate information on efforts made to review the potential for Endangered and Threatened species, and ensure the protection of these species and their habitat with development of these lands. This report has been prepared specifically for the Ministry of Natural Resources and Forestry (MNRF), as the District of Muskoka has requested that office's review and comment on matters relating to the *Endangered Species Act*. All of the information contained in this report is also found within the broader Environmental Impact Study, which allows the municipalities to review other natural environment issues of relevance to their responsibilities under their respective Official Plans, and their requirements to ensure their decisions are consistent with the Provincial Policy Statement. This includes, for example, matters relating to significant wildlife habitat.

In preparing this correspondence for review by MNRF it is recognized that the Province of Ontario has recently mandated that the *Endangered Species Act* is to fall under the jurisdiction of the Ministry of Environment, Conservation and Parks. However, as it is unclear as to when that transition will occur, or what it will entail, this report is being circulated to the Parry Sound District office of MNRF.

1.2 Lands to be Developed

The Muskoka Royale property is located in the Town of Bracebridge. While the entire property is 345 ha in size, it is the western approximately half of these lands which is to be developed as a school campus, consisting of Lots 6, 7 and 8, and part Lots 9 and 10, Concession 12 (**Figure 1**). The site is located to the east of Stephens Bay Road, south of the Muskoka River. It is contiguous with the eastern portion of the property, which extends to District Road 118. That road is to serve as the access point for an internal roadway and water and sewer services to the school, with the majority of that internal roadway to follow the alignment of the approved but future Bracebridge West Bypass (the approval of that road followed a municipal Class Environmental Assessment process).

The subject lands are within the urban centre boundary for the Town of Bracebridge, an area that is identified as a nucleus for a full range of residential, industrial, commercial and community facilities with

a density that will make the most efficient use of municipal services and facilities. Under the Urban Centre Land Use Schedule (Schedule B) of the Official Plan, the lands to be developed are identified as Open Space.

1.3 Vision for the School

The school is to include a senior school, a student/staff residence complex for that senior school, and a sports complex in its first stage of development. Each of those portions of the school are to occupy separate precincts, and are to be phased to allow for growth. Additional precincts are planned for a future elementary school and a future student/staff residence complex for those elementary students.

On full build-out, all aspects of this development will only occupy about 15% of the western portion of the Muskoka Royale property. This recognizes that there are considerable constraints within this landscape, including substantial areas of wetland and steep slopes. However, it is also purposeful in that it has been designed with this natural setting in mind; it is the intent to build a school campus which is built around the physical and natural beauty of these lands, and its Muskoka setting. In this regard, as the ecological consulting firm with considerable previous experience on this property, our office was invited to provide initial input on how a school campus could be designed to best fit within the landscape, in a manner that avoids more ecologically significant areas, which minimizes the extent of disturbance elsewhere, and which captures all of the diversity and beauty of this landscape. That input contributed to decisions on developing the various aspects of the school within smaller precincts that are distributed over the property, with an opportunity to refine the boundaries of those precincts as we completed our additional work.

1.4 Acknowledgements

Michalski Nielsen Associates Limited has been assisted on this project by Palmer Environmental Consulting Group Inc., who have been responsible for updating much of the information on terrestrial resources, including vegetation surveys, targeted wildlife surveys, a Species at Risk review and snag surveys to assess bat habitat opportunities.

2 METHODS

A screening for potential Species at Risk (SAR) habitat was completed for the subject property through a review of aerial photos and field investigations. The Parry Sound District office of MNRF was consulted for local records and its interpretation of habitat protection requirements. The NHIC database was queried for any known SAR records in the vicinity of the site, to determine possible SAR in the area. Habitat opportunities for SAR on the site were then assessed by comparing habitat preferences of species deemed to have potential to occur against current site conditions. Targeted field surveys were completed for SAR birds.

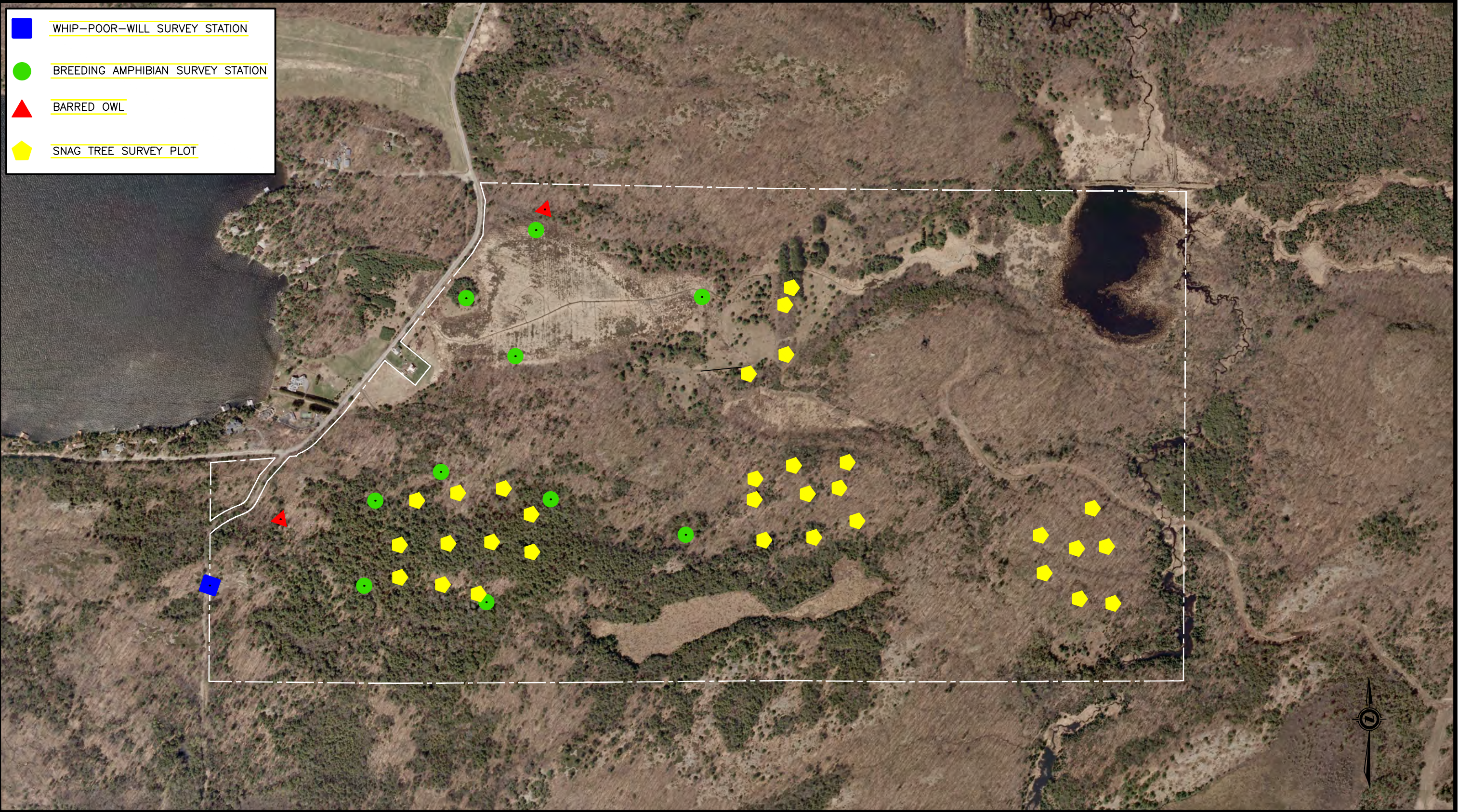
Breeding bird surveys were conducted on the subject property on June 6 and June 21, 2018 to document the bird communities in the following habitats and locations: (i) forest, (ii) meadow and (iii) flyovers and adjacent areas. Surveys were carried out between 5:45 a.m. and 10:00 a.m., to coincide with the dawn chorus. Weather conditions during the surveys were 50-100% overcast, with light breezes, no precipitation and temperatures of between 9°C and 13°C.

Whip-poor-will surveys were conducted in general accordance with the *Guidelines for Conducting Eastern Whip-poor-will Roadside Surveys in Ontario* (Bird Studies Canada, 2014) on June 26, June 28 and July 3, 2018. The survey station was located adjacent to Stagecoach Road to survey rock barren habitat at RB1 (**Figure 2**), which was deemed to have potential suitable habitat. The surveys were conducted on three nights over a one-week period during peak full moon period (June full moon window). The conditions on the survey nights were clear with low cloud cover and low winds, with the survey completed within the identified timeframe (i.e., start half hour after sunset). Surveys were based on auditory observations and were undertaken for between 15 and 30 minutes on each occasion.

A bat maternity roost survey was undertaken based on assessing tree cavities following an approach using methods outlined in the *Survey Protocol for Species at Risk Bats within Treed Habitats* (MNRF, 2017). Given the dominance of forest cover on the subject property it can be assumed that habitat opportunities are available and therefore the objective of the assessment was to identify the extent and quality of potential habitat opportunities for Little Brown Myotis, Northern Myotis and Tri-Colored Bat within each of the proposed development areas.

The specific survey methods based on the 2017 MNRF protocol consisted of:

- Phase I: Bat Habitat Suitability Assessment
- Phase II: Identification of Suitable Maternity Roost Trees



- Phase IV: Snag Density Survey

Surveys were undertaken on April 11 and 12, 2018. The field survey was completed during leaf off conditions. Based on the size of the subject property being >10 ha, survey plots were randomly placed within forest communities associated with each development area. The subject property was surveyed at 31 designated plots on the property for the assessment of tree “snags” within a 12.6 m radius circular plot (**Figure 2**). Plots were randomly chosen in representative vegetation communities for the property. All potential roost trees were recorded that follow the MNRF protocol in the 31 plots. The tree species, diameter at breast height (dbh), snag attributes, snag location, height class, and decay class were recorded for each tree. Estimated snag density per hectare (ha) was based on the recommended calculation using πr^2 with $r = 12.6$ m.

3 BIOPHYSICAL RESOURCES

3.1 Physical Setting

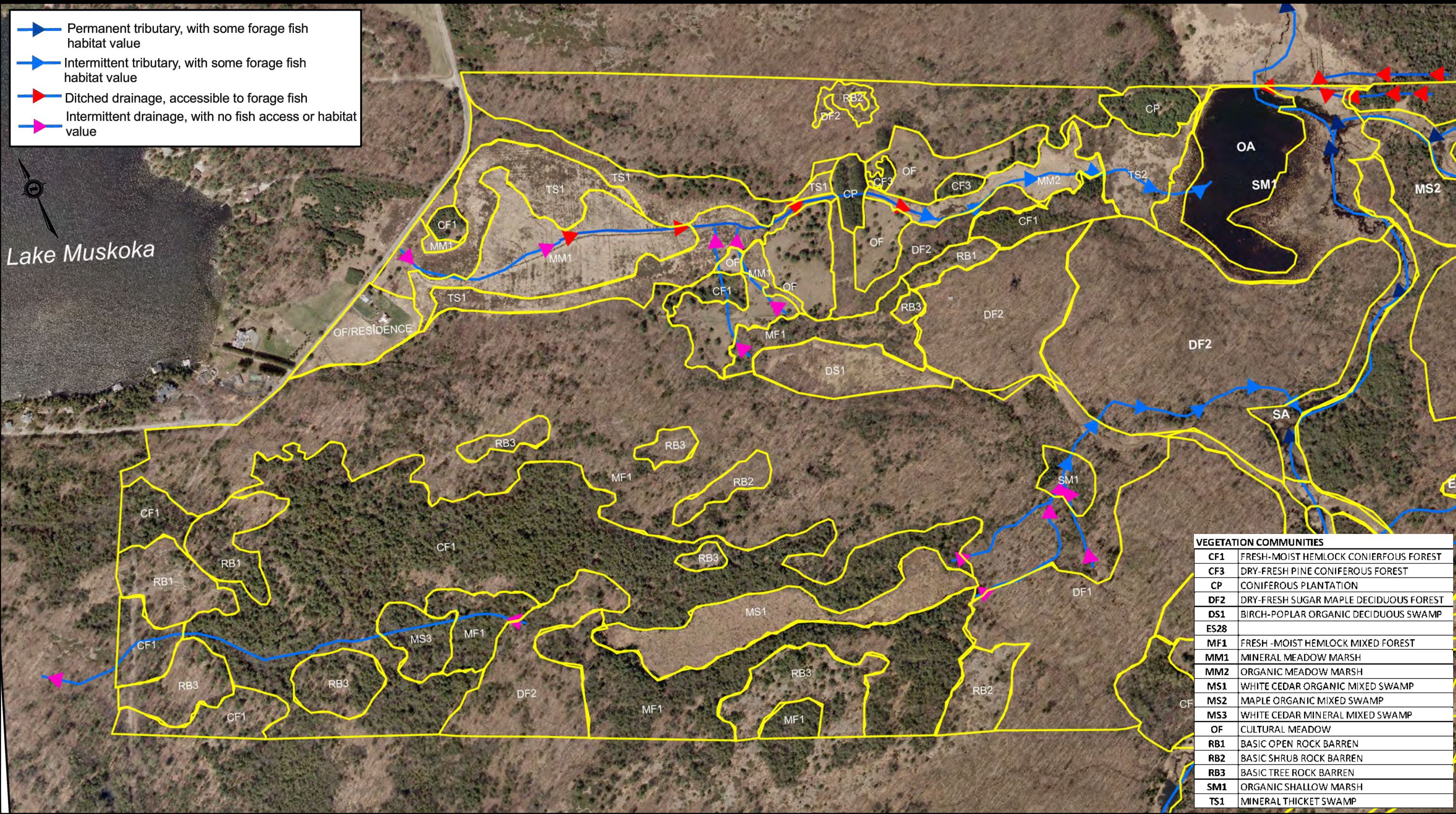
A brief description of the physical characteristics of this report is provided for useful context on Species at Risk potential.

The site ranges from an elevation of approximately 287 metres above sea level (masl) down to 230 masl. While relief is generally moderate, there are localized areas of very steep slope.

Figure 3 shows the distribution of watercourses on the subject property. These drain localized areas of the property, being fed primarily by surface water runoff, but in cases, also by diffuse groundwater discharge (which is generally pinched off during drier periods, when the shallow groundwater table is depressed). All of these drainage courses are small, and many are clearly intermittent in nature. The vast majority of this drainage feeds a small watercourse which flows out of Henry Marsh within the property, emptying into the Muskoka River at Hooey Lane, which flows into Lake Muskoka a few kilometres downstream. A small portion of the property in the southwest corner drains to Lake Muskoka directly, via an intermittent channel.

Consistent with the site's varied topography, most reaches of the property's drainage courses are of low gradient, with broad, shallow valleys; in some instances, the watercourses are poorly channelized through these reaches. However, there are also a number of areas of steep grade drops along these watercourses.

Virtually all of the small watercourses on the property are affected by past and present beaver activity. Beaver dams have resulted in a number of areas of flooded swamp or marsh along their borders. Additionally, areas of wet meadow and swamp thicket occur within many of the low-lying areas affected by past flooding. The resultant areas of flooding contribute to the diversity of wetland conditions through the property, but also act to warm the watercourse and decrease stream flow, by losses to evapotranspiration. As a result, under hot, dry, mid-summer conditions in July of both 1999 and 2018, stream flow in the main tributary branch at the north end (exiting the property) was reduced to a trickle (visually estimated to be less than 0.5 L/s). Water temperatures during the 1999 survey were 30.5°C, matching ambient air temperatures. Similarly, minimal flows and very high water temperatures were seen at several other locations along the main tributary and its various branches.



3.2 Vegetation Characteristics

A brief description of the vegetation characteristics of the property is provided for useful context on Species at Risk potential. Vegetation communities were originally mapped for this property in 1999, then were updated in 2012, in both cases using the **Ecological Classification for Southern Ontario – First Approximation and its Application**. **Figure 3** provides community series information, which are briefly described in the paragraphs following.

Coniferous Forest

This ecological unit is more or less restricted to areas along the edges of permanent tributaries, intermittent drainage channels or on sand-plain flats. Ecosites include fresh-moist hemlock coniferous forest (CF1), fresh-moist white cedar coniferous forest (CF2), and dry-fresh pine coniferous forest (CF3). Eastern hemlock, eastern white cedar and white pine are the dominant canopy tree species. Other associated species include balsam fir, red maple, white birch, and yellow birch.

Mixed Forest

This vegetation type covers a large percentage of the subject property, comparable in coverage to that of the deciduous forest type. One ecosite was identified, the fresh-moist hemlock mixed forest. This unit is dominated by eastern hemlock, with lesser percentages of sugar maple, white birch, white ash, beech, red maple, and red oak. Other conifers include eastern white cedar and white spruce.

Deciduous Forest

This vegetation type covers a relatively large percentage of the property. It lies on the flat to steep-sided bedrock hills. Four ecosite landscape units characterizing this feature include, dry-fresh oak-maple-hickory deciduous forest (DF1); dry-fresh sugar maple deciduous forest (DF2); fresh-moist sugar maple deciduous forest (DF3); and dry-fresh poplar-white birch deciduous forest (DF4). Trees noted in the canopy and understorey of these ecological units include:

<i>Acer saccharum</i>	sugar maple
<i>Fagus grandifolia</i>	beech
<i>Quercus rubra</i>	red oak
<i>Quercus alba</i>	white oak

<i>Prunus serotina</i>	black cherry
<i>Ostrya virginiana</i>	ironwood
<i>Tilia americana</i>	basswood
<i>Fraxinus americana</i>	white ash
<i>Betula papyrifera</i>	white birch
<i>Populus tremuloides</i>	trembling aspen
<i>Populus grandidentata</i>	large-toothed aspen

Rock Barrens

Scattered throughout the forested highlands (bedrock shield) are numerous rock barrens which, during the earlier reviews in 1999 and 2012, were quite sparsely treed, with little to no groundcover vegetation. Three ecological units of this type were identified on the subject property. They are a basic open rock barren (**RB1**), basic shrub rock barren (**RB2**), and a basic treed rock barren (**RB3**). Trees and shrub species typically consist of white pine, red oak, white oak, white ash, hop hornbeam, honeysuckle, common juniper, pin cherry (*Prunus pennsylvanica*), and staghorn sumac. The ground flora contains species typical of basic to acidic rock habitats, with thin soil layers and include the following:

	spikemoss
	lichens
<i>Corydalis sempevirens</i>	pale corydalis
<i>Geranium bicknellii</i>	Bicknell's cranesbill
<i>Danthonia spicata</i>	poverty grass
<i>Deschampsia flexuosa</i>	crinkled hair grass
<i>Pteridium aquilinum</i>	bracken fern
<i>Elymus hystrix</i>	bottlebrush grass
<i>Polypodium virginianum</i>	common polypody
<i>Rumex acetosella</i>	sheep sorrel
<i>Vaccinium angustifolium</i>	low sweet blueberry

Updated vegetation mapping was undertaken in 2018, with vegetation communities further refined following the Ecosite of Ontario (2009) for Great Lakes to St. Lawrence. These community descriptions are shown on **Figure 4**.

There were some discrepancies with the previously mapped rock barrens on the property. In this regard, several rock barrens are now smaller than originally mapped; the mapping has been updated accordingly. This is the result of more extensive vegetation growth into these areas since the last vegetation classification. The rock barrens on the property are a mix of treed (G164Tt/TI) and shrub rock barrens (G164S).

3.3 Wildlife Habitat

3.3.1 General Overview of Wildlife Habitat

A general overview of wildlife habitat is provided for context on Species at Risk.

The upland and lowland forests provide habitat for bird species such as Downy Woodpecker (*Picoides pubescens*), Hairy Woodpecker (*Picoides villosus*), Blue Jay (*Cyanocitta cristata*), Black And White Warbler (*Mniotilta varia*), Red-eyed Vireo (*Dendroica petechia*), Broad-winged Hawk (*Buteo platypterus*), Ruffed Grouse (*Bonasa umbellus*), Eastern Wood-pewee (*Contopus virens*), and Wood Thrush (*Hylocichla mustelina*). Mammal species include Red Squirrel (*Tamiasciurus hudsonicus*), American Porcupine (*Erethizon dorsatum*), Eastern Chipmunk (*Tamias striatus*), White-tailed Deer (*Odocoileus virginianus*), Black Bear (*Ursus americanus*) and Moose (*Alces alces*).

The meadow marsh, shallow marsh, thicket swamps, and treed swamp ecosites provide cover for bird species such as Mallard (*Anas platyrhynchos*), Wood Duck (*Aix sponsa*), Canada Goose (*Branta canadensis*), Great Blue Heron (*Ardea herodias*), Common Grackle (*Quiscalus quiscula*), Red-winged Blackbird (*Agelaius phoeniceus*), Swamp Sparrow (*Melospiza georgiana*), and Northern Flicker (*Colaptes auratus*). Mammals and herpetofauna include River Otter (*Lontra canadensis*), Beaver (*Castor canadensis*), Muskrat (*Ondatra zibethicus*), Raccoon (*Procyon lotor*), Painted Turtle (*Chrysemys picta*), Snapping Turtle (*Chelydra serpentina*), Northern Leopard Frog (*Rana pipiens*), and Green Frog (*Rana clamitans*).

Typical wildlife observed in the grassed field habitats, hedgerows and rock barrens included Black-capped Chickadee (*Parus atricapillus*), Brown-headed Cowbird (*Molothrus ater*), Song Sparrow (*Melospiza melodia*), American Goldfinch (*Carduelis tristis*), Red-tailed Hawk (*Buteo jamaicensis*), Garter Snake (*Thamnophis sirtalis*), Coyote (*Canis latrans*), and Woodchuck (*Marmota monax*).

The hedgerows and the previous access road into the property provide cover for American Goldfinch, Black-capped Chickadee (*Parus atricapillus*), American Crow (*Corvus brachyrhynchos*), Gray Catbird (*Dumetella carolinensis*), and Eastern Cottontail (*Sylvilagus floridanus*).

3.3.2 Breeding Birds

Breeding bird data for the two surveys completed in 2018 are provided in **Appendix A**. A total of 30 bird species were documented on the property during these most recent surveys, including two SAR. Eastern Wood-pewee (*Contopus virens*) were heard singing in the wooded upland area of the property on both site visits. This indicates that these birds were on established territories and probably breeding on the site. The species is listed as Special Concern provincially. One Wood Thrush (*Hylocichla mustelina*) was heard singing in the wooded upland area of the property on both site visits. This indicates that this bird was on established territories and probably breeding on the site. The species is also listed as Special Concern provincially. Both of these species were also recorded on the site in previous surveys.

Most of the birds recorded on the property are considered common. The most frequently observed species found on the property included birds characteristic of woodland areas, such as Red-eyed Vireo (*Vireo olivaceus*) and Ovenbird (*Seiurus aurocapillus*).

Area-sensitive species require large areas of continuous habitat for breeding and foraging. The specific habitat requirements vary by species. Ten area-sensitive species were found on the property. These were Veery (*Catharus fuscescens*), Red-breasted Nuthatch (*Sitta canadensis*), White-breasted Nuthatch (*Sitta carolinensis*), Brown Creeper (*Certhia americana*), Black-and-white Warbler (*Mniotilta varia*), Black-throated Green Warbler (*Dendroica virens*), American Redstart (*Setophaga ruticilla*), Ovenbird, Pine Warbler (*Setophaga pinus*) and Scarlet Tanager (*Piranga olivacea*). Brown Creeper and Black-throated Green Warbler are reported to require at least 30 ha of forest. American Redstart and Black-and-white Warblers requires >100 ha of forest habitat. Ovenbird requires >70 ha of continuous forest. Scarlet Tanager requires at least 20 ha of forest. Veery, Red and White-breasted Nuthatches requiring at least 10 ha of forest.

Broad-winged Hawk and Barred Owl are two additional species which have been identified on the subject lands on other occasions, with locations where Barred Owl were observed shown on **Figure 2**.

The Ontario Breeding Bird Atlas recorded 119 bird species in the 10 km² square 17PK30 that includes the Muskoka Royale property. These species include one additional Species at Risk that the property has suitable habitat for, Canada Warbler (*Wilsonia canadensis*), which requires at least 30 ha of continuous forest. This species was not observed recorded during the field surveys.

No Whip-poor-wills were heard during the targeted field surveys for this species.

3.3.3 Species At Risk

The targeted surveys for SAR completed for the subject property included early morning breeding bird surveys for song birds, nocturnal surveys for screening for Whip-poor-will, and snag tree surveys for bats. **Table 1** provides a review and screening of potential habitat opportunities for 14 species that have been identified by the MNRF as occurring in the general area. A habitat screening and assessment was completed for each of those 14 species, including through vegetation community classification and field investigations for micro-habitat and related features. This included a review of the habitat requirements and current status of each species and whether general habitat or regulated habitat protection applies under Section 10 of the provincial ESA. NHIC records indicate Snapping Turtle and a restricted species have been recorded in the vicinity of the site; although MNRF has not provided any specific information on that restricted record, they have provided information on species known to this locale, as further described in **Table 1**.

Species which are known to occur in the general area include:

Birds

- Barn Swallow (*Hirundo rustica*) – Threatened
- Bank Swallow (*Riparia riparia*) – Threatened
- Eastern Wood Pewee (*Contopus virens*) – Special Concern
- Wood Thrush (*Hylocichla mustelina*) – Special Concern
- Horned Grebe (*Podiceps auritus*) – Special Concern
- Least Bittern (*Ixobrychus exilis*) – Threatened

Reptiles

- Blanding’s Turtle (*Emydoidea blandingii*) – Threatened
- Snapping Turtle (*Chelydra serpentina*) – Special Concern
- Massasauga Rattlesnake (*Sistrurus catenatus*) – Threatened
- Hog-nosed Snake (*Heterodon platirhinos*) – Threatened

Mammals

- Little Brown Myotis (*Myotis lucifugus*) – Endangered
- Northern Myotis (*Myotis septentrionalis*) – Endangered

Table 1. Species at Risk Habitat Asse					
Common and Scientific Name	MNRF Ontario Status (COSSARO)	National (COSEWIC) status	Provincial ESA General or Regulated Habitat	Habitat requirements/description	Habitat Assessment for Subject Property and Mitigation Recommendations
Barn Swallow (<i>Hirundo rustica</i>)	Threatened	Threatened	General habitat protection applies.	Before European colonization, Barn Swallows nested mostly in holes, crevices, caves and ledges in cliff faces. Following European settlement, they shifted to nesting on and in artificial structures, including houses, barns and other outbuildings, garages, road culverts and bridges. Barn Swallows favour various types of open habitats for foraging, including agricultural crops, grassy fields, pastures, cottage areas, lake and river shorelines, cleared rights-of-way, wetlands, farmyards and subarctic tundra (COSEWIC, 2011).	MNRF has identified observations of this species in the vicinity of the property. This property lacks artificial structure such as houses, barns ad other outbuidlings for nesting. There is potential open habitat for foraging at the Open Field (OF) and Meadow Marsh (MM). No Barn Swallows were recorded during the breeding bird surveys. Mitigation: None required.
Bank Swallow (<i>Riparia riparia</i>)	Threatened	Threatened	General habitat protection applies.	The bank swallow breeds in a wide diversity of artificial and natural sites with vertical banks, including lake and ocean bluffs, riverbanks, road cuts, aggregate pits, and stock piles of soil. Bank Swallow prefer sand-silt substrates for excavating nest burrows. Due to the dynamic nature of bank erosion, breeding sites tend to be somewhat ephemeral. Breeding sites are located near open terrestrial habitat for foraging such as meadows, agricultural cropland, grasslands and pastures. Bank Swallow uses large wetlands as communal nocturnal roost sites during migration, post-breedings and wintering periods (COSEWIC, 2013).	MNRF has identified observations of this species in the vicinity of the property. The only potential habitat for this species is the stream on the property. This stream is small with low flow. There were no oberved riparian banks or suitable habitat for Bank Swallow such as the banks with the appropriate soils subtrate and vertical height. This property lacks agricultural cropland and grasslands for foraging. No Bank Swallows were recorded during the breeding bird surveys. Mitigation: None required.
Eastern Wood-Pewee (<i>Contopus virens</i>)	Special Concern	Special Concern	Habitat protection does not apply to Special Concern Species.	In Canada, the Eastern Wood-pewee is mostly associated with the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. It is most abundant in forest stands of intermediate age and in mature stands with little understory vegetation. During migration, a variety of habitats are used, including forest edges, and early successional clearings. (http://www.registrelep-sararegistry.gc.ca/virtual_sara/files/cosewic/sr_Eastern%20Wood-pewee_2013_e.pdf)	MNRF has records in the vicinity of the study area. Eastern Wood-Pewees were heard singing in the wooded upland area of the property on both site visits. This indicates that these birds were on established territories and probably breeding on the site. There is suitable habitat throughout due to the extensive forest. Mitigation : Habitat for this species is well represented locally and in the surrounding area and therefore the primary mitigation is for the protection of nesting birds. Vegetation clearing in suitable habitat areas of the development (ELC communities – MF1, DF1 and DF2; G058Tt/TI, G043Tt/TI) shall occur between late August and late April, which is outside of the breeding and nesting season (note: restrictive windows for other species apply, e.g., SAR bats).
Wood Thrush (<i>Hylocichla mustelina</i>)	Special Concern	Threatened	Habitat protection does not apply to Special Concern Species.	During the breeding season, the Wood Thrush is found in moist, deciduous hardwood or mixed stands, often previously disturbed (e.g., small-scale logging and ice storm damage), with a dense deciduous undergrowth and with tall trees for singing perches (Gauthier and Aubry 1995; Friesen et al. 1999; Holmes and Sherry 2001; Friesen 2007; Evans et al. 2011; Suarez-Rubio et al. 2011). Peck and James (1987) found that in Ontario, the Wood Thrush prefers second-growth over mature forests. (http://www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=D62E83CD-1#_Toc350244571)	MNRF has records in the vicinity of the study area. Wood Thrush was recorded during the most recent field work. One Wood Thrush was heard singing in the wooded upland area of the property on both site visits. This indicates that this bird was on established territories and probably breeding on the site. Mitigation : Habitat for this species is well represented locally and in the surrounding area and therefore the primary mitigation is for the protection of nesting birds. Vegetation clearing in suitable habitat areas of the development (ELC communities – MF1, DF1 and DF2; G058Tt/TI, G043Tt/TI) shall occur between late August and late April, which is outside of the breeding and nesting season (note: restrictive windows for other species apply, e.g., SAR bats).

Horned Grebe (<i>Podiceps auritus</i>)	Special Concern	Special Concern	Habitat protection does not apply to Special Concern Species.	The Horned Grebe breeds predominately in temperate zones such as Parkland Canada and Prairies, but can be found in more subarctic and boreal zones. This bird breeds in freshwater and sometimes in brackish water on permanent or semi-permanent ponds, but also uses shallow bays and marshes on lake borders. Open water rich in emerging vegetation is required for breeding areas, which provides concealment and anchorage, nest materials, and protection for the young (COSEWIC, 2009).	MNRF has identified observations of this species in the vicinity of the property. Given that the summer habitat for this species in Northwestern Ontario and prairie provinces and that the winter habitat is in the southern US, this record is likely during migration. The Shallow Marsh (MS) and Meadow Marsh (MM) on the property may provide migration habitat opportunities. There is no development proposed in areas of meadow marsh or shallow marsh, and all such communities are to be buffered. Mitigation: <i>None required.</i>
Least Bittern (<i>Ixobrychus exilis</i>)	Threatened	Threatened	General habitat protection applies.	In Ontario, the Least Bittern is found in a diversity of wetland habitats, but highly favours cattail marshes with a mix of channels and open pools. The bird builds its nest in dense stands of vegetation above the marsh water, hidden among the cattails. Least Bittern builds nest near open water for easy access to foraging on small fish, aquatic insects and frogs (MNRF, 2018).	MNRF has identified observations of this species in the vicinity of the property. The Shallow Marsh (MS) on the property provides potential nesting habitat on the property although the form and function of the shallow marsh is not ideally suited to the typical habitat requirement of this species. This species was not recorded during the breeding bird surveys and there is no development proposed within the shallow marsh. A substantial buffer will be maintained around the marsh. Mitigation: <i>None Required.</i>
Blanding's Turtle (<i>Emydoidea blandingii</i>)	Threatened	Endangered	General Habitat protection applies. General habitat description on MNR website.	This medium sized turtle inhabits a network of lakes, streams and wetlands, preferring shallow wetland areas with abundant vegetation. It can also spend significant portions of time in upland areas moving between wetlands, In a single season this highly mobile turtle has been known to travel up to seven km in search of food or a mates.	MNRF has indicated that Blanding's Turtle have been identified in some vicinity of the property. A request for the habitat mapping has been made. There have been no observations of this species on site during work completed in 2018, or in previous site investigations dating back to 1999. however detailed, targeted surveys have not been conducted. There are some aquatic environments on the property that may provide habitat opportunities. This includes the large area of shallow marsh, eadow marsh and adjacent thicket swamp to the east of development area C (Henry Marsh). The watercourse feature draining into Henry Marsh could be used as a movement corridor. There were no open, sandy areas or gravelly rock crevices with good thermal exposure that would provide nesting habitat opportunities. Mitigation: <i>Areas of wetlands with potential habitat opportunities will be protected and are removed from proposed development. Any work in proximity to wetlands or crossings of watercourses must include mitigation measures such as barrier fencing to prevent inadvertent encroachment and turtles from accessing the work areas. Information pertaining to Species at Risk that may be encountered will be provided to contractors to provide direction on the appropriate responses if such species are encountered.</i>

Snapping Turtle (<i>Chelydra serpentina</i>)	Special Concern	Special Concern	Habitat protection does not apply to Special Concern Species.	Snapping turtles spend most of their lives in water. They prefer shallow waters so they can hide under the soft mud and leaf litter, with only their noses exposed to the surface to breathe. During the nesting season, from early to mid summer, females travel overland in search of a suitable nesting site, usually gravelly or sandy areas along streams. Snapping turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits. (https://www.ontario.ca/page/snapping-turtle)	MNRF have identified records in the vicinity of the study area. There are some aquatic environments on the property that may provide habitat opportunities. This includes a large area of the meadow marsh and adjacent thicket swamp to the east of Development Area C. The watercourse through the study area could be used as a movement corridor. There were no open, sandy areas or gravelly rock crevices with good thermal exposure that would provide nesting habitat opportunities. Mitigation : <i>Areas of wetlands with potential habitat opportunities will be protected and are removed from proposed development. Any work in proximity to wetlands or crossings of watercourses must include mitigation measures such as barrier fencing to prevent inadvertent encroachment and turtles from accessing the work areas. Information pertaining to Species at Risk that may be encountered will be provided to contractors to provide direction on the appropriate responses if such species are encountered.</i>
Massasauga (Great Lakes- St. Lawrence population) (<i>Sistrurus catenatus</i>)	Threatened	Threatened	General habitat protection as of June 30, 2013.	Massasaugas live in different types of habitats throughout Ontario, including tall grass prairie, bogs, marshes, shorelines, forests and alvars. Within all of these habitats, Massasaugas require open areas to warm themselves in the sun. Pregnant females are most often found in open, dry habitats such as rock barrens or forest clearings where they can more easily maintain the body temperature required for the development of their offspring. Non-pregnant females and males forage and mate in lowland habitats such as grasslands, wetlands, bogs and the shorelines of lakes and rivers. Massasaugas hibernate underground in crevices in bedrock, sphagnum swamps, tree root cavities and animal burrows where they can get below the frost line but stay above the water table. (https://www.ontario.ca/page/massasauga-rattlesnake)	MNRF have identified historical records adjacent to the property. There are rock barrens scattered across the property, they are dominantly treed or shrub covered with some areas supporting dense Common Juniper (RB1-3 communities). Representation of table rocks, crevices and suitable micro habitat features including thermoregulation areas was limited and these areas generally have high shade cover minimizing thermoregulation opportunities. Mitigation : <i>Although unlikely to be present, information pertaining to Species at Risk that may be encountered will be provided to contractors to provide direction on the appropriate responses if such species are encountered.</i>
Eastern Hog-nosed Snake (<i>Heterodon platirhinos</i>)	Threatened	Threatened	General habitat protection as of June 30, 2013.	The Ontario Herpetofaunal Atlas (2006) records for the Eastern Hog-nosed Snake are widespread in Muskoka and Parry Sound Districts, however, they typically occur in low densities. This species is not habitat specific and can be found in dry sandy areas, dry woods, edges of wetlands and fields, wherever it's favourite food (toads) can be found. This species is know to move long distances without showing strong habitat affinity. Snakes have been found to hibernate in a variety of sites including treed slopes in upland-wetland transition areas.	MNRF have identified records in the vicinity of the study area and there are a range of habitat opportunities within the property including forested slopes, rock barrens and wetland edges. The lack of habitat specificity of this species makes it difficult to determine the exact habitat requirements. No specific area on the subject property could conclusive be confirmed as habitat for this species and Hog-nosed Snake was not observed from the property. Mitigation : <i>Species is active from May to October, hibernating from October to April, mating in August and early September and nesting in late June to mid-July. The initial stages of site preparation consisting of tree removal, grubbing and rough grading for roadways and building envelopes should generally be completed between October and April to avoid this species.</i>

Little Brown Myotis (<i>Myotis lucifugus</i>)	Endangered	Endangered	General Habitat Protection as of January 24, 2013.	Bats are nocturnal. During the day they roost in trees and buildings. They often select attics, abandoned buildings and barns for summer colonies where they can raise their young. Little brown bats hibernate from October or November to March or April, most often in caves or abandoned mines that are humid and remain above freezing. (https://www.ontario.ca/page/little-brown-myotis)	<p>MNRF stated there is a high probability for this species on the property. Given the high forest cover of the subject property and representation of cavity trees, it can be assumed that there are habitat opportunities for this species within the subject property. Proximity to wetlands would provide productive insect feeding areas. While these habitats are present, they are very well represented locally and in the surrounding area and therefore the habitat is not limiting to the successful use of the area.</p> <p>Mitigation : As SAR bats hibernate in caves, generally from October to early April, tree removal must occur within this period to avoid harm or impacts to individuals. Specialized bat roosting boxes will be installed to offset localized removal of trees. The methods and approach for bat box installation will be completed in consultation with MNRF.</p>
Northern Myotis (<i>Myotis septentrionalis</i>)	Endangered	Endangered	General Habitat Protection as of January 24, 2013.	Northern long-eared bats are associated with boreal forests, choosing to roost under loose bark and in the cavities of trees. These bats hibernate from October or November to March or April, most often in caves or abandoned mines. (https://www.ontario.ca/page/northern-myotis)	<p>MNRF stated there is a high probability for this species on the property. Given the high forest cover of the subject property and representation of cavity trees, it can be assumed that there are habitat opportunities for this species within the subject property. Proximity to wetlands would provide productive insect feeding areas. While these habitats are present, they are very well represented locally and in the surrounding area and therefore the habitat is not limiting to the successful use of the area.</p> <p>Mitigation : As SAR bats hibernate in caves, generally from October to early April, tree removal must occur within this period to avoid harm or impacts to individuals. Specialized bat roosting boxes will be installed to offset localized removal of trees. The methods and approach for bat box installation will be completed in consultation with MNRF.</p>
Eastern Small-footed Myotis (<i>Myotis leibii</i>)	Endangered	Not listed on COSEWIC website.	General Habitat protection applies. General habitat description on MNR website.	In the spring and summer, eastern small-footed bats will roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees. These bats often change their roosting locations every day. At night, they hunt for insects to eat, including beetles, mosquitos, moths, and flies. In the winter, these bats hibernate, most often in caves and abandoned mines. They seem to choose colder and drier sites than similar bats and will return to the same spot each year. (https://www.ontario.ca/page/eastern-small-footed-myotis)	<p>MNRF stated there is a high probability for this species on the property. Given the high forest cover of the subject property and representation of cavity trees, it can be assumed that there are habitat opportunities for this species within the subject property. Proximity to wetlands would provide productive insect feeding areas. While these habitats are present, they are very well represented locally and in the surrounding area and therefore the habitat is not limiting to the successful use of the area.</p> <p>Mitigation : As SAR bats hibernate in caves, generally from October to early April, tree removal must occur within this period to avoid harm or impacts to individuals. Specialized bat roosting boxes will be installed to offset localized removal of trees. The methods and approach for bat box installation will be completed in consultation with MNRF.</p>

Tri-coloured bat (<i>Perimyotis subflavus</i>)	Endangered	Not listed on COSEWIC website.	General Habitat protection applies. General habitat description on MNR website.	Tri-colored Bat is found in a variety of forested habitats during the summer. It forms day roosts and maternity colonies in older forest and occasionally in barns or other structures. It forages over water and along streams in the forest (SARO website).	<p>MNRF stated there is a high probability for this species on the property. Given the high forest cover of the subject property and representation of cavity trees, it can be assumed that there are habitat opportunities for this species within the subject property. Proximity to wetlands would provide productive insect feeding areas. While these habitats are present, they are very well represented locally and in the surrounding area and therefore the habitat is not limiting to the successful use of the area.</p> <p>Mitigation : As SAR bats hibernate in caves, generally from October to early April, tree removal must occur within this period to avoid harm or impacts to individuals. Specialized bat roosting boxes will be installed to offset localized removal of trees. The methods and approach for bat box installation will be completed in consultation with MNRF.</p>
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- Eastern Small-footed Myotis (*Myotis leibii*) – Endangered

In accordance with the site-specific review that has been completed, those species receiving protection under the *Endangered Species Act* that could be encountered within portions of this property are Least Bittern, Blanding's Turtle, Eastern Hog-nosed Snake, and various protected bat species. The protection of all of these species can be appropriately addressed through:

- protection of wetland habitats and adjacent areas of natural buffer;
- protection of watercourses and adjacent areas of natural buffer;
- the maintenance of large portions of other representative habitat, for example woodlands;
- site-specific construction mitigation measures such as barrier fencing in vicinity of both wetlands and watercourses;
- timing of certain aspects of construction;
- the provision of SAR training to construction personnel; and
- the installation of bat boxes as an offsetting habitat measure for bats.

3.3.4 Treed Habitat Surveys for Bat Maternity Roosts

Based on the MNRF habitat suitability assessment protocol, maternity roosts in treed areas include deciduous, coniferous and mixed forest communities. The ELC vegetation communities identified for the subject property include deciduous forest (DF1 and DF2), mixed forest (MF1) and coniferous forest (CF1), with the presence of larger trees at least 10 cm dbh. Therefore, the great majority of the study area provides potential habitat opportunities for bat maternity roosts.

The property was surveyed for suitable trees for bat maternity roosts based on 31 randomly placed circular plots with a 12.6 m radius. The location of the 31 monitoring plots is shown on **Figure 2**. In addition to determining the tree snag density (discussed below), plot areas of low to high suitability for tree roosting habitat have been identified as a site-specific measure of the quality of potential roost trees for each plot (see **Tables 2 to 5**). This was based on a relative comparison of the recorded number of high quality trees in each plot using the following MNRF parameters provided in **Table 6**.

Table 2. Bat Maternity Roost Habitat Ranking Development Precinct A

Plot Number	Suitable Maternity Roost Relative Quality¹	Number of Snag Trees Recorded
1	High	1
2	N/A	0
3	Medium	2
4	Low	1
5	N/A	0
6	Low	1
7	N/A	0
8	High	2
9	N/A	0
10	Low	1
11	N/A	0

Table 3. Bat Maternity Roost Habitat Ranking Development Precinct B

Plot Number	Suitable Maternity Roost Relative Quality¹	Number of Snag Trees Recorded
12	High	1
13	N/A	0
14	N/A	0
15	High	1
16	Low	1
Plot Number	Suitable Maternity Roost Relative Quality¹	Number of Snag Trees Recorded
17	High	3
18	N/A	0
19	N/A	0
20	N/A	0

Table 4. Bat Maternity Roost Habitat Ranking Development Precinct C

Plot Number	Suitable Maternity Roost Relative Quality¹	Number of Snag Trees Recorded
21	Medium	2
22	Low	1
23	N/A	0
24	N/A	0

Table 5. Bat Maternity Roost Habitat Ranking Development Precinct D

Plot Number	Suitable Maternity Roost Relative Quality¹	Number of Snag Trees Recorded
25	High	1
26	High	2
27	High	2
28	High	2
29	N/A	0
30	N/A	0
31	Medium	2

Note¹: Relative quality based on Table 6 criteria.

Table 6. Criteria for Determining Best Suitable Maternity Roost Trees

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| <ul style="list-style-type: none">• Tallest snag• Snag exhibits cavities/crevices often originating as cracks, scars, knot holes or woodpecker cavities• Snag has the largest dbh (>25 cm)• Snag is within the highest density of snags (e.g., cluster of snags)• Snag has a large amount of loose, peeling bark (naturally occurring or due to decay)• Cavity or crevice is high on the tree (>10 m) or is "chimney like" with a low entrance• Tree is a species known to be rot resistant (e.g., black cherry, black locust)• Tree species provides good cavity habitat (e.g., white pine, maple, aspen, ash, oak)• Snag is located within an area where the canopy is more open• Snag exhibits early stages of decay (Decay Class 1-3) |
|--|

The plots were ranked as low, medium, and high quality habitat. The plots considered high quality, potential maternity roost sites include Plot 1, 8, 12, 15, 17, 25, 26, 27 and 28. The habitat quality for potential maternity roost sites ranked as medium include Plot 3, 21 and 31. The habitat quality for potential maternity roost sites ranked as low include Plot 4, 6, 10, 16 and 22.

The number of trees recorded at each plot ranged from 1 to 3. Oak trees (*Quercus* sp.) are preferred trees for Tri-colored Bats for roosting. There were no dead leaf clusters observed in the Oak trees within the plots, so Oak trees with >25 cm dbh were recorded as prime habitat for Tri-colored Bat. Little Brown Myotis and Northern Myotis prefer loose, peeling bark and cavities to roost. These requirements were considered when selecting the habitat quality ranking for these species described in **Table 6**. This site had abundant trees with peeling bark and a moderate number of cavities observed. Trees with cavities were ranked higher than the peeling bark for roosting habitat according to the MNRF protocol.

The results generally indicate that the medium to higher quality plots were found in deciduous (DF1), mixed forest (MF1) and coniferous forest (CF1), while the lower quality plots were evenly distributed in the forest communities. Development Precinct D has the most abundant snags due to the abundant Sugar Maple and Red Oak trees which often exhibit knot holes and snags. Development Precinct A also exhibited abundant snags due to the old age of the Eastern Hemlock and American Beech trees. Older trees most often have large diameters, and as they age produce cavities for roosting habitat.

Snag Density

The density of trees with snags based on the MNRF protocol is considered a qualitative assessment for identifying potential impacts from proposed activities to SAR bats. Surveys were completed during leaf off conditions, allowing for the best opportunities to observe cavities, cracks and loose bark. Based on the recommended calculation using πr^2 with $r = 12.6$ m, the snag density was determined the number of plots in each development Precincts A to D, as shown in **Table 7**. The results are provided below with 1.3 snags/ha in Area A, 1.5 snags/ha in Area B, 3.8 snags/ha in Area C, and 3.7 snags/ha in Area D. The MNRF considers 10.0 snags per hectare high quality potential maternity roosting habitat.

Table 7. Snag Tree Densities for each Development Precinct

Development Precinct A								
Assessment Area (ha)	# of plots	# of snags	Average # of snags/plot	Average radius (m)	Each plot area (m ²)	Total plot area (m ²)	Total plot area (ha)	Snag density (snag/ha)
Approximate Area (7.57 ha)	11.0	8.0	0.7	12.6	498.8	5,486.3	0.5	1.3
Development Precinct B								
Assessment Area (ha)	# of plots	# of snags	Average # of snags/plot	Average radius (m)	Each plot area (m ²)	Total plot area (m ²)	Total plot area (ha)	Snag density (snag/ha)
Approximate Area (5.56 ha)	9.0	6.0	0.7	12.6	498.8	4,488.8	0.4	1.5
Development Precinct C								
Assessment Area (ha)	# of plots	# of snags	Average # of snags/plot	Average radius (m)	Each plot area (m ²)	Total plot area (m ²)	Total plot area (ha)	Snag density (snag/ha)
Approximate Area (2.4 ha)	4.0	3.0	0.8	12.6	498.8	1,995.0	0.2	3.8
Development Precinct D								
Assessment Area (ha)	# of plots	# of snags	Average # of snags/plot	Average radius (m)	Each plot area (m ²)	Total plot area (m ²)	Total plot area (ha)	Snag density (snag/ha)
Approximate Area (4.22 ha)	7.0	9.0	1.3	12.6	498.8	3,491.3	0.3	3.7

It is noted that snag density surveys were not undertaken within development Precinct E, which was only identified as a development precinct following that initial work. The tree composition in this area is very similar to that within development Precinct C, and a snag density of 3.8 snag/ha is reasonably assumed.

Although the density of snags in the areas to be developed is quite low, the total acreage of required clearing will still result in the loss of opportunities for bat roosting. While surrounding areas of forest will continue to provide such habitat opportunities, it remains prudent to offset these losses with the installation of bat boxes. Timing of tree removals outside of the period of bat use is also critical. Specific prescriptions for both bat box installation and the timing of tree removals are recommended in this report, and will be finalized on the basis of the parallel consultation process with MNRF.

4 CONSTRAINT ANALYSIS

Our constraints analysis is included in this report because the protection of Species at Risk were central to this decisioning process. It must be remembered that this development is unique in several respects, but most notably because it allows for 85% of the landscape to remain intact, and as areas with strong internal and external connections.

As is clear from Section 3, the lands making up the westerly half of the Muskoka Royale property are physically diverse, with that diversity resulting in a broad mosaic of vegetation communities and wildlife habitat. It is very important that the natural area qualities of this property be protected, not only because of their intrinsic values, but also because they are precisely why this property has been chosen as the location for this school campus.

While development always represents a balance between the protection of natural features and allowing some areas to be permanently altered in favour of a land use change, the present application, being one which is not that land consumptive (on full build out it will occupy only approximately 15% of this landscape) creates some fairly unique opportunities to preserve much more of the site than would be the case for many other forms of development. The constraints analysis which has been completed for this property, as described herein, allows for a determination of those portions of the site which are best-suited to development.

The constraints which have been identified include areas of potential importance to Species at Risk, areas potentially contributing to significant wildlife habitat and areas of considerable physical constraint.

The primary constraint associated with this landscape are the numerous wetlands, including some marshy stream corridors which connect such features. Some of these wetlands can contribute to habitat opportunities for Blanding's Turtle, a threatened species which has not been identified on the property but which is known to the broader locale. They are also important habitat features for a variety of other wildlife, including Least Bittern (potentially present in Henry Marsh only), a variety of waterfowl and shorebirds, various reptiles, amphibians and various mammals. As illustrated in **Figure 6**, these are quite prominent components of this landscape. The large area of open marsh along the north boundary of the property (Henry Marsh), and areas of adjacent wetland that are well connected to this marsh, are particularly important.

It is additionally important to ensure connectivity between these wetlands and adjacent terrestrial habitat, as many species of wildlife using such wetlands are also dependent on the surrounding mosaic of habitat. In addition to the protection of stream corridors, this can be achieved in two fundamental ways:

- 1) By leaving large portions of the landscape, including large portions of lands adjacent to wetlands, intact, so that wildlife using wetlands can disperse into those areas; and
- 2) By ensuring a minimum buffer zone around all areas of wetland.

The second mechanism, while important, is not as important in a setting where development is less intensive than one where all lands outside of a wetland and buffer are to be developed, as is the case for most urban development.

In the present instance, we have determined that a 30 m minimum buffer is appropriate to one area of wetland on this property, Henry Marsh. This large area of wetland, which is predominantly open marsh, is used by a variety of wildlife, including many shorebirds and waterfowl. Located just off the Trans Canada Trail, it is locally important as a birding area (and, in combination with some nearby municipal sewage lagoons, has been well-documented for use as a stopover area by waterfowl). Although the composition of wetlands within this property is always changing as a consequence of beaver activity, this wetland has persistently included a large open water component, in combination with adjacent areas of swamp thicket and cedar-dominated mixed swamp. Recognizing that MNRF have documented Blanding's Turtle within this general area, it is the only wetland within the westerly portion of the Muskoka Royale property that would consistently provide for overwintering opportunities for this species.

The remainder of the wetlands on the property can be appropriately protected, in the context of the limited development that is proposed, with a minimum buffer of 15 m.

The proposed wetland buffers are appropriate in addressing the habitat protection requirements of Blanding's Turtle. In this regard, Blanding's Turtle have been previously identified at two locations within 2 km of this property. The first such record is approximately 1 km to the north of the property limits, which is on the north side of the Muskoka River so is likely not that relevant. The second record is nearly 1 km southeast of the Muskoka Royale property as a whole, which would appear to bring it more than 2 km north of the portion of the property under consideration for development, and therefore also of potentially questionable relevance. Regardless, given that Blanding's Turtle are known to this area, and

that some of the wetlands within the subject property could provide overwintering and/or seasonal opportunities for this species, it is important to address this potential. Further, although many visits have been made to this property at times of the year appropriate for visual encounter surveys (warmer spring periods, prior to June 15, which is when this species is most likely to be found on shore basking), the large size of Henry Marsh, difficulties in observing peripheral areas of Henry Marsh where basking may occur due to water levels (which are neither wadable or navigable by canoe), and extensive shrub thicket around it, similarly difficult opportunities for observation elsewhere, and the habits of Blanding's Turtle (which will wander extensively from one area of suitable habitat to another) makes it impossible to rule out the potential for this species to occur within the property. The appropriate conclusion is that if this species is not presently using this property, it may and hopefully will in the future.

MNRF's General Habitat Designation for Blanding's Turtle categorizes the habitat of this species into three categories as follows:

- Category 1 – known nesting sites or overwintering sites, plus lands within 30 m of such areas.
- Category 2 – all suitable wetlands on waterbodies within up to 2 km of a known occurrence, provided these are connected by other suitable wetlands or watercourses no more than 500 m apart, plus lands within 30 m of such areas.
- Category 3 – areas of between 30 m and 250 m around suitable wetlands identified in Category 2, within 2 km of an occurrence.

No Category 1 habitat has been identified on the subject property. Being conservative, we believe Henry Marsh, and the lands within 30 m of it, qualify as Category 2 habitat.

While we acknowledge that some other wetlands or watercourses within the portion of the Muskoka Royale property under consideration for development could potentially be used as stopover areas by Blanding's Turtle under certain seasonal conditions, none of those other areas would appear to provide overwintering opportunities, and their potential habitat contributions to this species appear much more limited. Our proposed strategy of allowing very limited development activities between 15 m and 30 m of some of those other wetlands and watercourses is fully consistent with the need to protect opportunities for Blanding's Turtle within his landscape. So too is the limited scale of overall development within this

landscape (i.e., with approximately 85% of the subject lands to be protected over the long-term). In this regard, the General Habitat Description for Blanding's Turtle provides the following advice with respect to activities in Blanding's Turtle habitat:

Activities in general habitat can continue as long as the function of these areas for the species is maintained and individuals of the species are not killed, harmed, or harassed.

Generally compatible:

- Recreational use of the water such as swimming, boating, and fishing.
- Small-scale alterations to land cover that do not impede overland movements or impair nesting sites.

Generally not compatible:

- Significant draining, infilling, dredging, or other significant alteration of wetlands or other suitable waterbodies.
- Significant alteration of shorelines, especially hardening (e.g., the use of gabion baskets, rip-rap, and rock armour).

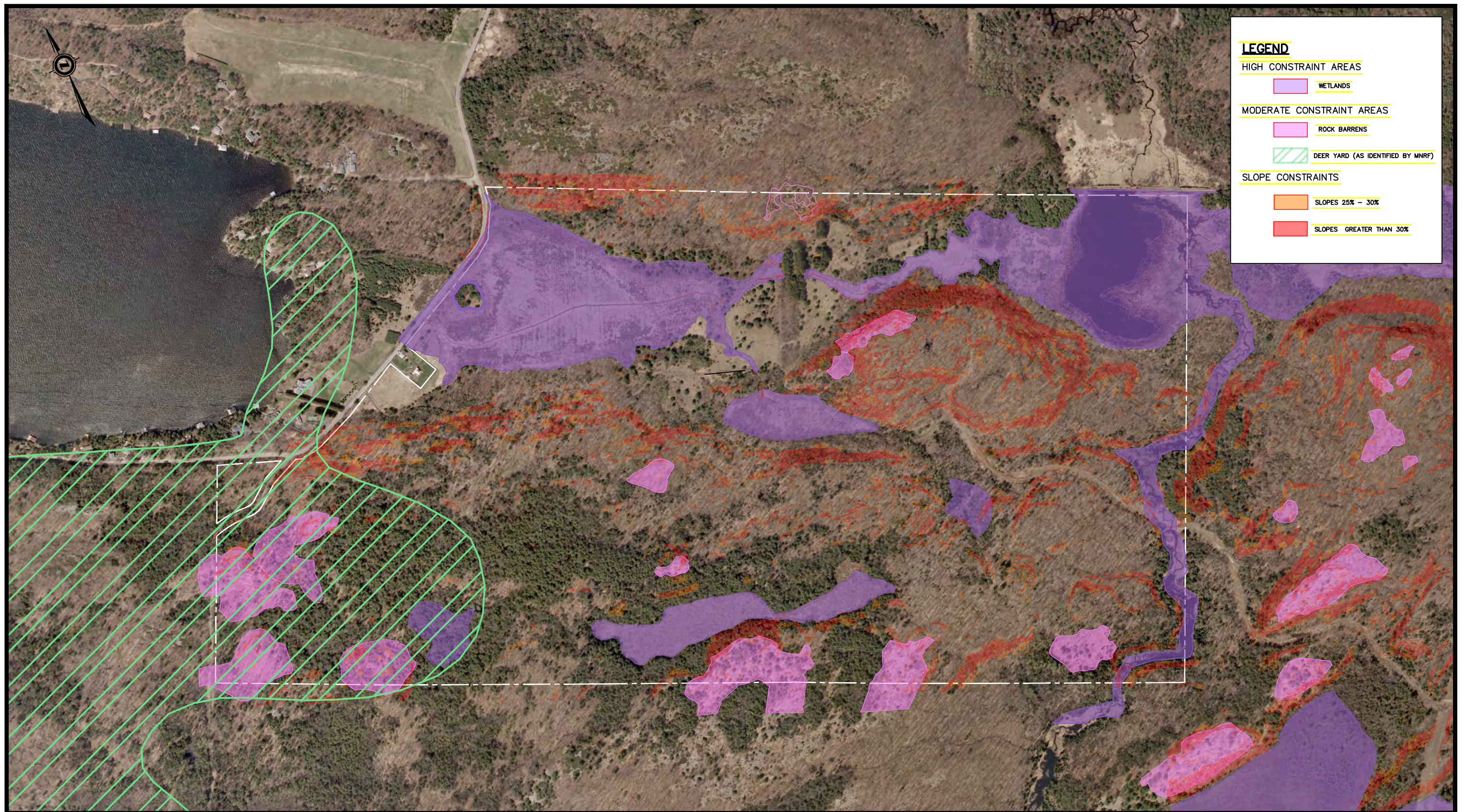
The development strategy being proposed, including the manner in which wetlands and watercourses are being protected and buffered, and which maintains large areas of adjacent upland in a natural condition, is fully responsive to this advice. As previously noted, a parallel process is underway to obtain MNRF comment on this proposal.

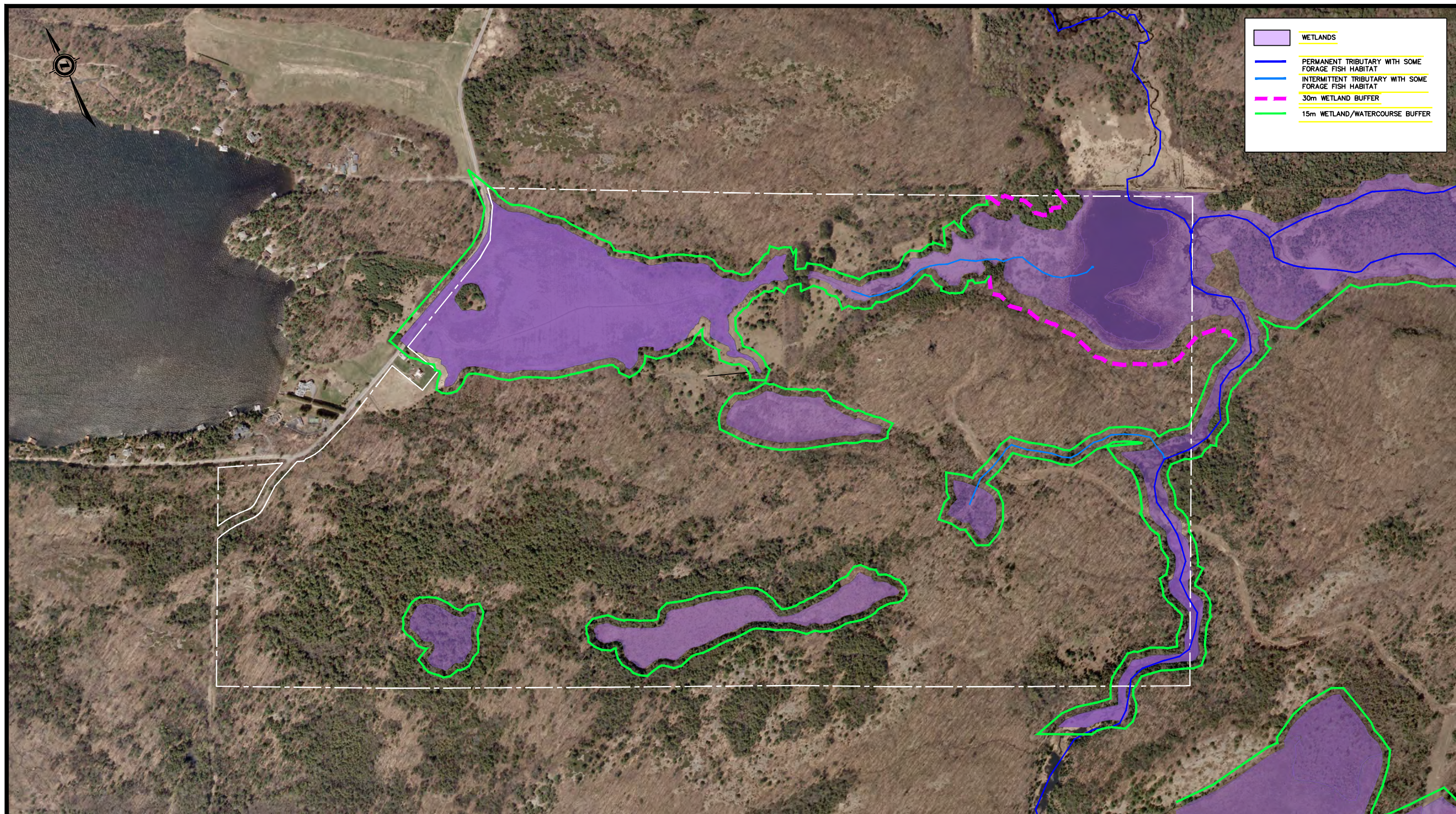
While wetlands and their buffers should be viewed as a primary constraint, where no development other than essential roadways and services should encroach, there are also secondary constraints within this landscape. These included areas that also contribute to the previously discussed significant wildlife habitat opportunities on the property. They are as follows:


- **Rock barrens** contribute to the diversity of habitats within this property, and can provide specialized habitat for various wildlife. That said, the most recent surveys completed on this property indicate that most areas of rock barrens within the lands being considered for the various school precincts are fairly well-vegetated, not providing the size of clearings or open areas of broken rock common to rock barrens in many parts of Muskoka. No whip-poor-will have been documented calling from those areas, nor do these areas provide good basking opportunities for herpetofauna. Accordingly, these areas are considered secondary constraints: while it is important to ensure such features continue to exist and contribute to the diversity of site conditions, it is not necessary to retain every one of these features;

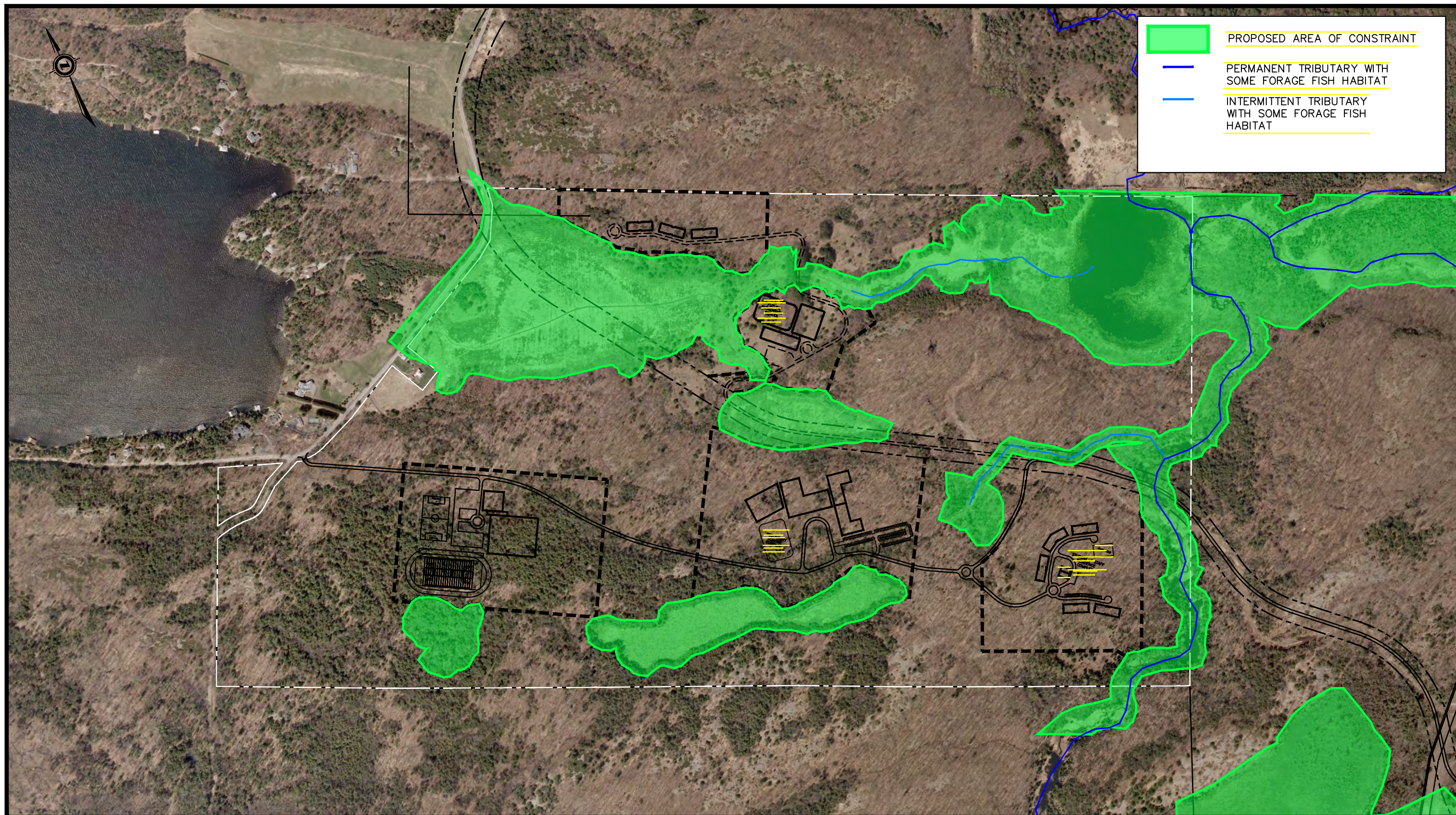
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- Additional **drainage features**, beyond those which have been identified as wetland corridors, occur throughout this portion of the property. While all of these have been classified as intermittent, with limited to no fisheries values, they are nevertheless important to protect. Such protection should typically include 15 m natural buffers, and minimal roadways or service crossings;
 - Areas of **very steep slopes** occur throughout the property. These areas pose physical challenges to development. Any development within such areas would usually require blasting and considerable grading, increasing the overall extent of disturbance. These areas should therefore be avoided, except for necessary components of roadways and services, or where the form of development is compatible with the maintenance of existing slopes;
 - **Deer wintering yards** are broadly identified features on the landscape. Although the issue of deer yard protection is a municipal responsibility, vis a vis the Significant Wildlife Habitat policy of the Provincial Policy Statement, the presence of one such area within a portion of the subject property did guide our constraints analysis, so is discussed herein. A large deer wintering yard extends into the southwest portion of the property, with approximately 90% of that feature being on adjacent lands. Surveys of that portion of this identified area on the property in the late winter and early spring of 2018 indicated that, while appropriate conditions exist for yarding, and extend even further into the property than suggested by MNRF mapping, there was minimal evidence of use (few deer tracks, and even less evidence of scat and browse). Nevertheless, we believe it is important to preserve large portions of the lands providing such habitat potential, and in particular that portion within the most southwesterly portion of these lands, intact.




Each of the above-noted additional types of constraint are shown on **Figure 6**. **Figure 7** shows the primary wetland constraints and associated buffering. This constraint analysis process has led to the identification of the various school precincts shown in **Figure 8**. The preservation of large tracts of existing forest has also been considered in that layout. The resultant development proposal: limits the overall footprint of disturbance; minimizes blasting and grading requirements; avoids all areas of wetland; ensures proper buffering of wetlands; ensures proper protection and buffering of stream corridors; ensures the protection of a broad mosaic of natural areas, with a particular emphasis on doing so around wetland areas; and locates development to those areas best suited for such uses. We note that the main entrance





 Michalski Nielsen ASSOCIATES LIMITED	MUSKOKA ROYALE COLLEGE		PROJECT NO. 3517	
	RECOMMENDED ENVIRONMENTAL PROTECTION AREAS		SCALE: 1:7500	DATE: SEPT 2018
			FIGURE 7	



	PROPOSED AREA OF CONSTRAINT
	PERMANENT TRIBUTARY WITH SOME FORAGE FISH HABITAT
	INTERMITTENT TRIBUTARY WITH SOME FORAGE FISH HABITAT

roadway location is largely fixed, generally following the corridor of the already approved future Bracebridge West Bypass.

The locations and forms of development being considered additionally help to preserve other functions associated with this broader landscape, including by maintaining large tracts of forest habitat for area-sensitive birds, a considerable acreage of forest with snag trees providing summer roosting and maternity habitat opportunities for bats, and many seasonally wet depressions (vernal pools) which, in addition to the wetlands being protected, contribute to the breeding success of some amphibians. This development strategy appropriately responds to the goal of protecting the habitats of threatened and endangered species, as well as the need to protect candidate significant wildlife habitat.

5 OVERVIEW OF *ENDANGERED SPECIES ACT* AND ITS IMPLICATIONS TO THIS PROJECT

The *Endangered Species Act (ESA)* came into effect in Ontario in 2007, and provided for immediate protection of all species on the Species at Risk in Ontario (SARO) list. This protection is afforded under Section 9(1) of the *Act*, which reads:

Prohibition on killing, etc.

9.(1) No person shall,

- a) kill, harm, harass, capture or take a living member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species;
- b) possess, transport, collect, buy, sell, lease, trade or offer to buy, sell, lease or trade,
 - (i) a living or dead member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species;
 - (ii) any part of a living or dead member of a species as referred to in subclause (i),
 - (iii) anything derived from a living or dead member of a species referred to in subclause (i); or
- c) sell, lease, trade or offer to sell, lease or trade anything that the person represents to be a thing described in subclause (b)(i), (ii) or (iii). 2007, c.6, s.9(1).

The *ESA* additionally affords habitat protection to species on the SARO list. The relevant portions of the *Act* are found under Sections 10(1) through 10(3) and are repeated as follows:

Prohibition on damage to habitat, etc.

10(1) No person shall damage or destroy the habitat of,

- (a) a species that is listed on the Species at Risk in Ontario List as an endangered or threatened species; or
- (b) a species that is listed on the Species at Risk in Ontario List as an extirpated species, if the species is prescribed by the regulations for the purpose of this clause. 2007, c.6, s. 10(1).

Also important to this discussion is the definition of habitat under the *Endangered Species Act*, which is described under Section 2(1) as follows:

-
- “Habitat” means,
 - (a) With respect to a species of animal, plant or other organism for which a regulation made under clause 55 (1) (a) is in force, the area prescribed by that regulation as the habitat of the species, or
 - (b) With respect to any other species of animal, plant or other organism, an area on which the species depends, directly or indirectly, to carry on its life processes, including life processes such as reproduction, rearing, hibernation, migration or feeding, and includes places in the area described in clause (a) or (b), whichever is applicable, that are used by members of the species as dens, nests, hibernacula or other residence; (habitat)
 - Definition of “habitat”, cl. (b)
 - (2) For greater certainty, clause (b) of the definition of “habitat” in subsection (1) does not include an area where the species formerly occurred or has the potential to be reintroduced unless existing members of the species depend on that area to carry on their life processes.
- 2007, c. 6, s. 2 (2).

The MNRF has prepared a document entitled *Categorizing and Protecting Habitat under the ESA* that outlines the overall approach and considerations that the MNRF uses in determining whether a proposed activity is likely to damage or destroy habitat protected under subsection 10(1) of the *ESA*. For clarity, the following is provided directly from that document:

Not every activity that occurs within or near habitat will damage or destroy that habitat. Determining whether a proposed activity is likely to damage or destroy the habitat of an endangered or threatened species requires the consideration of the activity details, which parts of habitat are likely to be altered by the activity, and how the alteration may affect the species’ ability to carry out its life processes.

3.1.1 Damaging Habitat

An activity that damages the habitat of a species is one that alters the habitat in ways that impair the function (usefulness) of the habitat for supporting one or more of the species’ life processes.

3.1.2 Destroying Habitat

An activity that destroys the habitat of a species is one that alters the habitat in ways that eliminate the function (usefulness) of the habitat for supporting one or more of the species’ life processes.

*In some cases, the anticipated alteration that a proposed activity will have on habitat may be so minor that the function of the habitat for supporting the species’ life processes will not become impaired or eliminated. In such cases the activity would not contravene subsection 10(1) of the *ESA* and would not require authorization under the Act with*

respect to this provision. In other cases, the alteration may be more significant such that the function of the habitat for supporting one or more of the species' life processes may become impaired or eliminated. Such activities would contravene subsection 10(1) of the ESA and would require authorization under the Act prior to proceeding.

Ensuring compliance with the *Endangered Species Act* is a proponent's responsibility. On a development of this scale, it requires an understanding of what species are known to the broader area, than an assessment of their potential to use the lands to be developed, based on habitat attributes. For some species, this analysis may benefit from targeted field surveys to determine whether a species is using habitat that may be suitable for it; however, as endangered and threatened species are generally difficult to find, and as the mobility of wildlife means that their absence on any given occasion does not discount their potential use, the assessment of habitat potential is always key. MNRF is a resource which can be utilized to obtain information on species known to a certain locale, to assist in scoping investigations, to assist in interpreting results, and to provide guidance on mitigation or avoidance alternatives.

MNRF has a permitting process which allows activities which would otherwise be prohibited under Section 9 or 10 of the *Endangered Species Act*, which is described under Section 17 of the *Act*.

As described earlier in this report, a detailed assessment of Species at Risk potential has been completed for the lands to be developed, and adjacent lands. MNRF has been consulted as part of this process. Potential habitat does exist within or adjacent to areas to be developed for a few animals which receive species and habitat protection under the *Endangered Species Act*. A summary of these species and how they will be protected, is provided as follows:

- | | |
|-------------------|---|
| Blanding's Turtle | <ul style="list-style-type: none">– protection of suitable overwintering habitat and adjacent wetlands and uplands;– protection of other wetland habitats which might be utilized by this species as part of its summer range, as well as movement opportunities within this landscape;– construction timing for tree removal, grubbing and rough grading outside of periods when this species is active;– site specific mitigation measures, such as barrier fencing where work areas are adjacent to lands potentially being used by this species; and– species-specific SAR training for construction personnel. |
|-------------------|---|

Eastern Hog-nosed Snake – protection of much of the habitat that could be utilized by this species, including all wetlands and stream corridors, lands adjacent to those features, and large connected areas of forest habitat and rock barrens;

- construction timing for tree removal, grubbing and rough grading outside of periods when this species is active; and
- species-specific SAR training for construction personnel.

Protected Bat Species – protection of much of the habitat that could be used by these species;

- timing of tree removal activities to period outside of when this species is using protected roosting and maternity trees; and
- offsetting loss of snag trees through the installation of bat boxes.

6 COMMENTS AND RECOMMENDATIONS ON DEVELOPMENT

6.1 Overall Development Plan

The following discussion on the development plan, and our recommendations to mitigate impacts, is pertinent to MNR's review of the additional efforts being made to protect Species at Risk. It has therefore been copied in its entirety from the Environmental Impact Study submitted to the municipalities.

6.1.1 Site Suitability

The western portion of the Muskoka Royale property is, despite once containing a farm, a largely natural/naturalized landscape, with considerable physical and natural area diversity. The majority of this area is forested. It contains abundant wetlands and watercourses, areas of steep slope and some rock barren features. It provides considerable wildlife opportunities, including having some potential to support Species at Risk.

A school development, broken into smaller precincts within some of the least constrained portions of these lands, and which on full build-out will only occupy about 15% of these lands, is an excellent way to ensure the natural area values of this landscape are preserved for the long-term. Construction of an internal roadway, a large portion of which follows the corridor established and approved through a Class EA process for the future Bracebridge West Bypass, provides another good opportunity to minimize impacts on this landscape.

Michalski Nielsen Associates Limited has provided early input to the location and layout of school precincts, and have helped to refine those development footprints in order to ensure these avoid areas of higher natural environment constraint and minimize impacts on areas of secondary constraint. The resultant development concept plan is shown on **Figure 8**, and as an overlay with vegetation conditions on **Figure 9**. Subject to the incorporation of a series of additional best management measures and other mitigation in the build-out of those various precincts, Michalski Nielsen Associates Limited is of the opinion that the proposed development is of an intensity and scale that is appropriate to this setting and will allow for the long-term protection of natural features and functions, including the habitat of endangered and threatened species and candidate significant wildlife habitat. Our more specific comments and recommendations are provided in the sections that follow.

6.1.2 Internal Road Construction

There will be an internal roadway into the property off of District Road 118 (Ecclestone Drive). The main spine of that internal roadway will substantially follow the alignment of the future Bracebridge West Bypass, a road that has been approved through a Class EA Process. The only deviation to this is just off District Road 118, where the alignment of the internal road has been shifted a short distance to the north, (on the north versus south side of the District pumping station). This shift is for traffic safety purposes, moving it further away from the Muskoka Beach Road intersection to the south. From a natural environment perspective, we note this alignment change is largely over previously cleared and filled lands. Where it enters a forested setting, the shift allows avoidance of a wetland, whereas the Bracebridge West Bypass route was proposed to cut across a corner of that feature.

The portion of the internal road network that follows the future Bracebridge West Bypass route generally avoids areas of wetland constraint, except where it occurs within the edge of an area of deciduous swamp (see the area just north of the future elementary school [Precinct D], as shown on **Figures 8 and 9**). That particular section of road was selected through the Class EA process to cut across that small wetland because of adjacent steep slope constraints to either side. However, it is noted that the elementary school campus is not planned to be built in the short-term, with the initial length of this main internal roadway to terminate west of that wetland, with a second internal roadway to the secondary school and sports complex to veer south from it. For this future area of wetland encroachment, Michalski Nielsen Associates Limited recommends that:

- **the project biologist and engineer work together on a design which minimizes the extent of encroachment into the area of deciduous swamp, and a sensitive design through this area.**

A gated emergency exit onto Stagecoach Road is to be constructed at the west end of the second internal roadway, beyond the Sports Complex. There is no intention to construct an internal roadway to follow the west end of the future Bracebridge West Bypass out to Stephenson's Bay Road.

All other areas of the proposed internal roadway avoid areas of wetland constraint and our identified buffers around same.

Although a road design has not yet been advanced by Pinestone Engineering for the internal road, it will be typical of a small private roadway, with a paved surface width of likely 6.5 m, shoulders, and ditching where required. This internal road does cross several small intermittent streams, all of which have been

deemed to be inaccessible to fish. There is a single crossing of a permanent tributary, with some forage fish habitat. For this particular crossing, Michalski Nielsen Associates Limited recommends that:

- **the crossing of the permanent tributary be designed by the project engineer, with input from the project biologist, to avoid interference with fish passage, and to minimize impacts on fish habitat.**

For this and other watercourse crossings, Michalski Nielsen Associates Limited recommends that:

- **all watercourse crossings be designed and implemented to avoid any short-term or longer-term impacts on water quality.**

6.1.3 Construction Phasing and Management

The project is to be implemented in various phases, beginning with a first phase of facilities in three precincts, the secondary school (Precinct A), sports complex (Precinct B) and secondary school residence (Precinct C). The internal roadway to these facilities from District Road 118, together with the gated emergency exit to the junction of Stagecoach Road and Stephen's Bay Road, will also be constructed at that time. Within each of these precincts, construction will be phased in accordance with projected student populations. The development of the elementary school (Precinct D) and associated residence (Precinct E) will follow at a later time.

Each precinct has been sized to be able to allow some potential for future growth. However, each precinct has also been sized such that facilities are not crowded within it, and that the presently forested character of these areas can be maintained.

It is important that construction activities be timed and managed in a manner which avoids potential harm to local wildlife, and which minimizes the potential for adverse physical or water quality impacts on surrounding areas. To this end, Michalski Nielsen Associates Limited recommends that:

- **Species at Risk sensitivity training is to be provided to all contractors before they commence any clearing, grubbing, grading, servicing and other heavy construction activities on this property. That training will focus on those species which they might potentially encounter, dependent on the nature and seasonality of work they are undertaking;**
- **all tree cutting, including that associated with internal roadways, be undertaken between September 30 and April 15, so as to avoid impacts on breeding birds and potential bat roosting and maternity habitat. Tree clearing is also to be phased, to avoid clearing more area than will be worked on during the subsequent construction season;**

-
- within Precinct B, which encroaches into an area of identified Stratum 2 deer winter yard, an effort is to be made to complete tree cutting during the October – November period, before deer are yarding. This additional precaution will minimize the influence of heavy construction activity on any deer yarding in the broader area;
 - prior to any phase of tree-cutting, a site meeting is to be held with the tree removal contractor, architect, project engineer and project biologist to determine the specific limits of these works, and any associated requirements for staging and tree harvesting. A visible barrier, consisting of sediment fence, flagging or snow fencing, is to be used to delineate the specific limits of these works and avoid accidental encroachment into adjacent lands;
 - in clearing along the permanent boundaries of new forest edges, efforts are to be made to stagger the edges, through the selective removal of larger trees, and by maintaining saplings/young trees along these new edges. This is intended to make such new edges more resistant to windthrow and sun-scalding;
 - at the time of determining tree removal requirements, the biologist must calculate, on the basis of the acreage of land to be impacted, the forest community types impacted, and the results of the previous inventories completed on snag tree density, the approximate number of snag trees that will be removed. One bat box is to be installed at a suitable location within/adjacent to this precinct for every four snag trees that will be removed. Bat boxes are to be constructed or purchased and are to be a minimum two chamber, 10" x 10" x 36" sized (or equivalent capacity). Literature on commercial bat boxes indicates that this size of bat box should accommodate up to 300 individuals. There is to be some effort to ensure some variations in the size and design of the bat boxes, while respecting this minimum size standard. Bat boxes are to be installed on either the trunks of mature trees or on poles, all at a height of 15' or higher (at top of box). Bat boxes are to generally be oriented to have some exposure to sun from the south. A biologist will oversee the implementation of these bat boxes, with every effort made to install all or a majority of bat boxes prior to April 15 of the season immediately following tree removals, such that an alternate habitat is available for any bats returning to the site that spring;
 - at the onset of grubbing, and prior to any other earthworks, a heavy-duty silt fence is to be properly installed around the downgradient perimeter of all such works. Sediment fence is to consist of a minimum 4' high heavy duty filter fabric cloth, supported by paige wire affixed to t-bars. The sediment fence is to be properly trenched into the ground, with clear stone used to bury the bottom of the fencing where rock does not allow for such trenching. A qualified individual is to provide certification that the silt fencing has been properly installed. It is noted that by installing sediment fence in this manner, it will also serve as at least a partial barrier against the entry of species such as snakes and turtles into the work area;
 - additional sediment and erosion controls are to be installed, as deemed appropriate by the project engineer, as may be required, including temporary or permanent check dams at appropriate locations on any ditching associated with new roadways, and in areas adjacent to any watercourse crossings;

-
- sediment and erosion controls are to be inspected daily by the contractor, and at least monthly by qualified members of the project team. Any deficiencies in these controls are to be remedied immediately;
 - once an area has been grubbed, works are to progress as quickly as possible, with all disturbed areas to be stabilized by grading, then by seeding or sodding, as soon as can be practically achieved; and
 - sediment and erosion controls are to be left in place and regularly monitored and repaired until such time as the lands which have been disturbed are certified by a qualified individual as being stable.

6.1.4 Stormwater Management

The preliminary servicing report prepared by Pinestone Engineering indicates that a detailed stormwater management plan will be completed for each development precinct. It is anticipated that each precinct will contain a wetland-type stormwater management pond, providing both quality and quantity control, and discharging to existing drainage courses. These facilities will include a forebay for maintenance purposes. A treatment train approach is also proposed, involving lot level and conveyance controls. This generalized strategy is appropriate to the site. Although the overall extent of development on this landscape will be low, there will be substantial changes in landscape permeability within each fully built-out school precinct, and care needs to be taken to provide adequate quantity control to ensure that the small drainage courses which will be receiving flows from these areas are not eroded during larger storm events. To this end, Michalski Nielsen Associates Limited recommends that:

- the project biologist and engineer work together in the final design of stormwater management controls for each precinct, taking maximum advantage of the physical setting, which includes areas of gentle slope, retained forested lands, retained wetlands and retained stream buffers, all of which can be used to compliment and enhance other stormwater controls.
- consideration be given to the components of a treatment train approach that provide quantity control benefits, which could include such measures as roof leaders draining to soakaway pits, additional topsoil depth in all yard areas; conveyance of flows through shallow ditching and bioswales which promote infiltration wherever possible, and discharging the stormwater management pond/wetland via level spreaders or rock fans, into either wetland areas or riparian buffers, both of which will provide detention;
- these same techniques are to be used to ensure that an equivalent of Enhanced (Level 1) water quality treatment is achieved through the treatment train approach.

6.1.5 Water and Sewers

The property will be on full municipal services. A municipal sewer connection is available at District Road 118, where the District of Muskoka has an operating sewage pumping station. Each school precinct will be serviced by private gravity sanitary sewers and forcemains, which will generally be installed within the private roadway corridors. Several private sewage pumping stations will be required as part of this system in order to direct site sewage to the municipal station at District Road 118.

Water supply can be provided by watermain on Stephens Bay Road or District Road 118; the District of Muskoka has indicated a preference to service the development via a connection to the watermain on Stephens Bay Road. Water services internal to the property will be private and, like the sanitary sewers, will generally be installed within the private roadway corridors.

6.2 School Precincts

6.2.1 Precinct A – Secondary School

Figure 9A provides an expanded view of the Secondary School complex. This precinct is located primarily within an area of moderate grades, with mixed forest being the dominant cover. The northern-most portion of the precinct contains steep slopes, grading to the north, which are avoided. The central portion of this precinct contains some north sloping ridge lines, however these are not that high and the building layout has been designed to take advantage of the landscape terracing these provide. The southern-most portion of this precinct contains conifer forest which, although outside of the area of MNRF-identified Stratum 2 deer yard, has characteristics which are suitable for winter deer cover; areas of this precinct providing any such cover opportunities are largely avoided in the layout of facilities and the internal roadway. South of this precinct is a large wetland, consisting of a mixed swamp. Although this wetland area has a high water table, the lack of standing water and very dense rooting of vegetation throughout this feature combines to make it unsuitable for Blanding's Turtle. A 15 m setback from this feature has been used to establish the setback between this wetland and the school precinct boundary, however as all proposed works are further north within this precinct, there are no uses proposed within 30 m of this wetland.

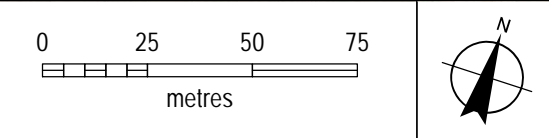
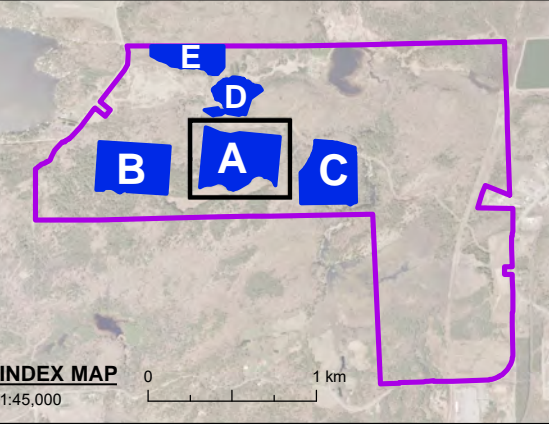
There are no other wetland features within or immediately adjacent to this precinct. There are no rock barrens within this precinct. There are no drainage features apart from two small and intermittent



L E G E N D

- Site Plan
- ELC Community
- Development Area
- Study Area

Terrestrial System
Forest
CF1 – Coniferous Forest, Dry to Fresh, Coarse: Hemlock – Cedar Conifer (G051Tt/TI)
MF1 – Mixed Forest, Dry to Fresh, Coarse: Maple Hardwood (G058Tt/TI)
MF1 – Mixed Forest, Dry, Sandy: Mixedwood (G043Tt/TI)
DF1 and DF2 – Deciduous Forest, Dry, Sandy: Mixedwood (G043Tt/TI)
Cultural (CU)
CP1 - Coniferous Plantation, Red Pine Coniferous Plantation Type (CUP3-1)
OF – Open Field, Cultural Woodland (CUW)
Rock Barren
RB1, RB2 and RB3 – Rock Barren (G164Tt/TI and G164S)



CLIENT: Gord Nielsen			
PROJECT: Muskoka Royale			
PROJECT NO.	160337	REVISION:	2
DATE:	Sep 21/18	SCALE:	1:1800
DRAWN:	BE	DATUM:	NAD83
CHECKED:	DJ	PROJECTION:	UTM 17



Development Area A -
Existing Environmental
Conditions

Figure 9a

drainages from the wetland within the southeast portion of this precinct; the proposed development layout has been sensitive to these features.

In summary, the setting for this secondary school precinct has been carefully selected to avoid areas of substantial biophysical constraint. Internally, the layout has been properly designed to take advantage of site topography and avoid/buffer more sensitive features. Michalski Nielsen Associates Limited supports the location and layout of this precinct.

6.2.2 Precinct B – Sports Complex

Figure 9B provides an expanded view of the sports complex precinct. Although this precinct is located on the very edge of the MNRF-identified Stratum 2 deer yard (approximately the western third of this precinct is within the area identified by MNRF), conifer forest is the dominant forest cover. Much of this area does have characteristics which are suitable for winter deer cover. That being said, there was very little evidence of deer use of this area during the winter of 2017/2018, nor any indications of extensive browse which would suggest it was heavily used in the winters immediately prior to this. Further, it is on the periphery of a deer yard, so does not interfere with deer use of that yard as a whole. Finally, it retains broad areas of conifer cover both within the precinct and to its south, and would not interfere with the movement of deer to the large area of good conifer cover that will be retained.

Apart from this one constraint, this precinct is characterized by gentle to moderate grades, and contains no wetlands, rock barrens or watercourses. There is a modest-sized wetland to the south of the precinct, consisting of mixed swamp. Although this wetland has a high water table, the lack of standing water and a very dense rooting of vegetation throughout this feature combine to make it unsuitable for Blanding's Turtle. A 15 m setback from this location has been used to define the school precinct boundary, however as all proposed works are somewhat further north within this precinct, an average buffer of at least 30 m will be retained along this wetland (with the buffer perhaps being as little as 20 m through one small section).

In summary, the setting for the sports complex precinct has been carefully selected to avoid areas of substantial biophysical constraint. Deer overwintering opportunities will not be substantially diminished within this portion of the property, and will be quite negligibly impacted within the MNRF-identified deer yard as a whole. Other more sensitive uses have been avoided/buffered. Michalski Nielsen Associates Limited supports the location and layout of this precinct.



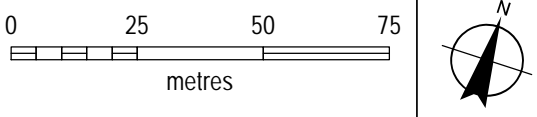
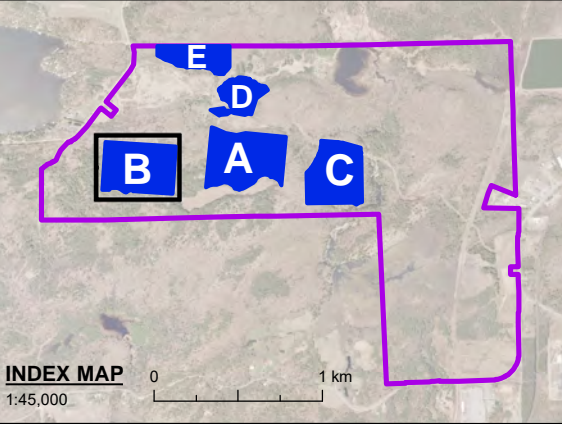
L E G E N D

- Site Plan
- ELC Community
- Development Area
- Study Area

Terrestrial System
Forest
CF1 – Coniferous Forest, Dry to Fresh, Coarse: Hemlock – Cedar Conifer (G051Tt/TI)
MF1 – Mixed Forest, Dry to Fresh, Coarse: Maple Hardwood (G058Tt/TI)
MF1 – Mixed Forest, Dry, Sandy: Mixedwood (G043Tt/TI)
DF1 and DF2 – Deciduous Forest, Dry, Sandy: Mixedwood (G043Tt/TI)

Cultural (CU)
CP1 - Coniferous Plantation, Red Pine Coniferous Plantation Type (CUP3-1)
OF – Open Field, Cultural Woodland (CUW)

Rock Barren
RB1, RB2 and RB3 – Rock Barren (G164Tt/TI and G164S)



CLIENT: Gord Nielsen			
PROJECT: Muskoka Royale			
PROJECT NO.	160337	REVISION:	2
DATE:	Sep 21/18	SCALE:	1:1500
DRAWN:	BE	DATUM:	NAD83
CHECKED:	DJ	PROJECTION:	UTM 17



Development Area B -
Existing Environmental
Conditions

Figure 9b

6.2.3 Precinct C – Secondary School Student/Staff Residence

Figure 9C provides an expanded view of the secondary school residence complex. This precinct is located largely within an area of deciduous forest, with some mixed forest in the southeast and northwest. Slopes are typically moderate, with the building layout designed around some relatively short ridge lines. The southern-most portion of this precinct contains approximately 40% of a rock barren, which has been avoided in the layout of facilities. The precinct has also been laid out to avoid an intermittent drainage on its northwest edge, and to avoid and provide ample buffering of a permanent tributary at its southeast corner. There are no wetland features within this zone.

In summary, the setting for the secondary school residence precinct has been carefully selected to avoid areas of substantial biophysical constraint. Internally, the layout has been properly designed to take advantage of site topography and avoid/buffer more sensitive features. Michalski Nielsen Associates Limited supports the location and layout of this precinct.

6.2.4 Precinct D – Elementary School

Figure 9D provides an expanded view of the elementary school complex, a future component of this development. This development area takes advantage of young successional cultural woodland, in areas that were once farmed, and additionally includes some mixed forest and some pine plantation. However, this area is constrained in size by adjacent wetlands and a stream corridor to the west and north, and by some very steep slopes to the east and southeast. Given these constraints, and as part of the iterative process the project team undertook to ensure natural features within this property were being properly protected, it was decided that the future elementary school residence complex was more appropriately separated from the elementary school itself. That residence was shifted north of the stream and wetland constraints into a new development zone, Precinct E. This ensures that Precinct D is able to maintain substantial buffers from all adjacent wetlands and streams. In this regard, while a setback of 15 m from the adjacent stream corridor and wetlands has been used to establish the precinct boundary, facilities are set further back, providing for an average buffer of at least 30 m. There are no wetlands or watercourses internal to this precinct, nor any rock barrens. Topography is quite gentle throughout.

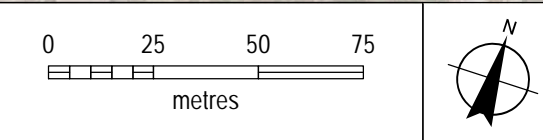
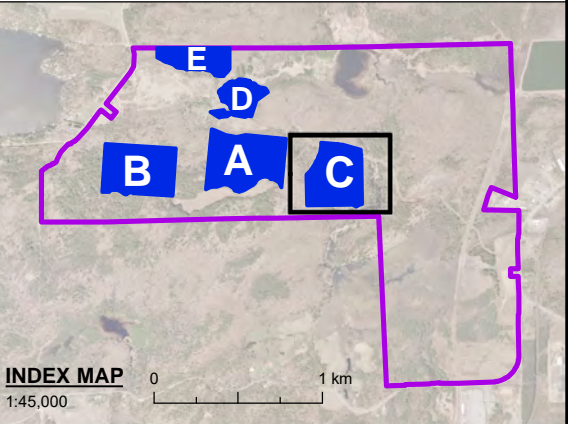
The adjacent wetland areas to Precinct D consist of meadow marsh and shrub thicket swamp. They generally contain too little standing water and are too densely vegetated to support Blanding's Turtle habitat. However, that being said, there is a west to east flowing watercourse on the north side of this



L E G E N D

- Site Plan
- ELC Community
- Development Area
- Study Area

Terrestrial System
Forest
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MF1 – Mixed Forest, Dry to Fresh, Coarse: Maple Hardwood (G058T/TI)
MF1 – Mixed Forest, Dry, Sandy: Mixedwood (G043T/TI)
DF1 and DF2 – Deciduous Forest, Dry, Sandy: Mixedwood (G043T/TI)
Cultural (CU)
CP1 - Coniferous Plantation, Red Pine Coniferous Plantation Type (CUP3-1)
OF – Open Field, Cultural Woodland (CUW)
Rock Barren
RB1, RB2 and RB3 – Rock Barren (G164T/TI and G164S)

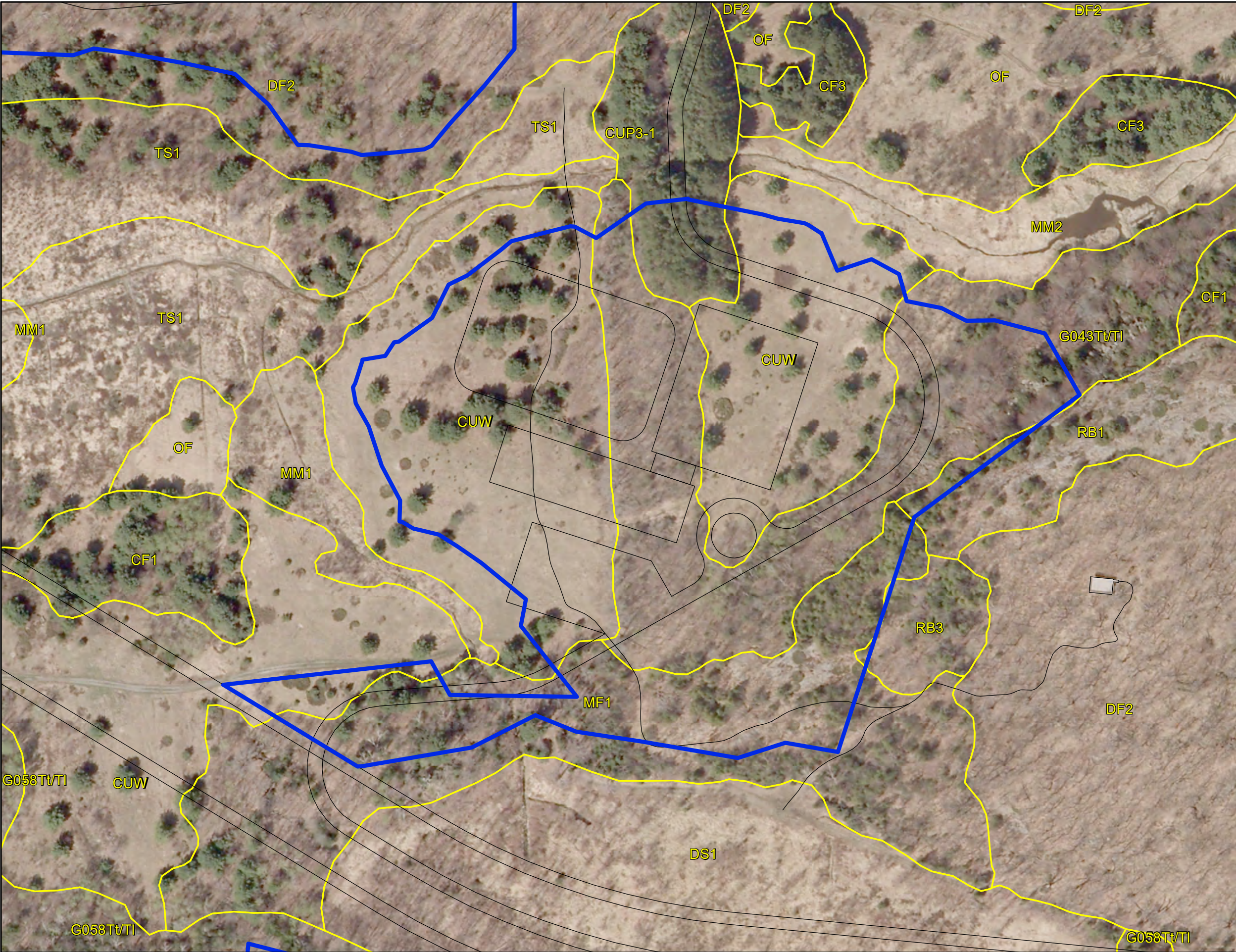


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CHECKED:	DJ	PROJECTION:	UTM 17



Development Area C -
Existing Environmental
Conditions

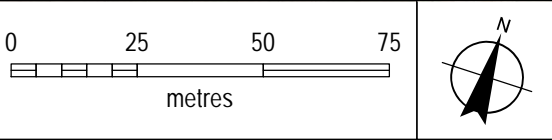
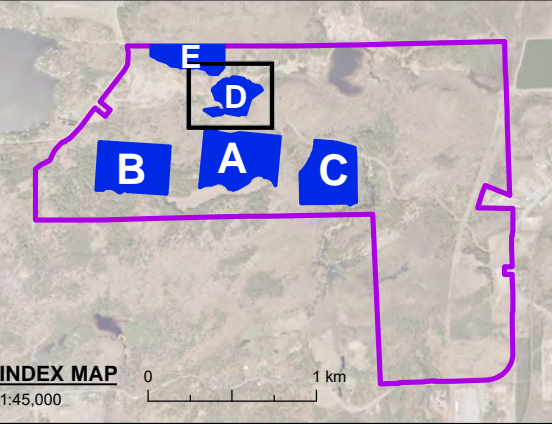
Figure 9c



L E G E N D

- Site Plan
- ELC Community
- Development Area
- Study Area

Terrestrial System
Forest
CF1 – Coniferous Forest, Dry to Fresh, Coarse: Hemlock – Cedar Conifer (G051Tt/TI)
MF1 – Mixed Forest, Dry to Fresh, Coarse: Maple Hardwood (G058Tt/TI)
MF1 – Mixed Forest, Dry, Sandy: Mixedwood (G043Tt/TI)
DF1 and DF2 – Deciduous Forest, Dry, Sandy: Mixedwood (G043Tt/TI)
Cultural (CU)
CP1 - Coniferous Plantation, Red Pine Coniferous Plantation Type (CUP3-1)
OF – Open Field, Cultural Woodland (CUW)
Rock Barren
RB1, RB2 and RB3 – Rock Barren (G164Tt/TI and G164S)



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Development Area D -
Existing Environmental
Conditions

Figure 9d

zone which drains into Henry Marsh, and which has been subject to beaver damming and some corresponding flooding of reaches in the past. There is a potential for Blanding's Turtle to be able to move along this stream corridor from areas of potential overwintering habitat in Henry Marsh and, depending on the extent of beaver flooding within this stream/wetland system in any given year, potentially an opportunity to use locally flooded areas of wetland along this system, at least seasonally. While it is our opinion that far better conditions for Blanding's Turtle are available within Henry Marsh than within this stream and wetland complex, we are also confident that the care that has been taken in avoiding and buffering the watercourse and associated wetlands is fully appropriate in protecting for the potential use of these areas by Blanding's Turtle.

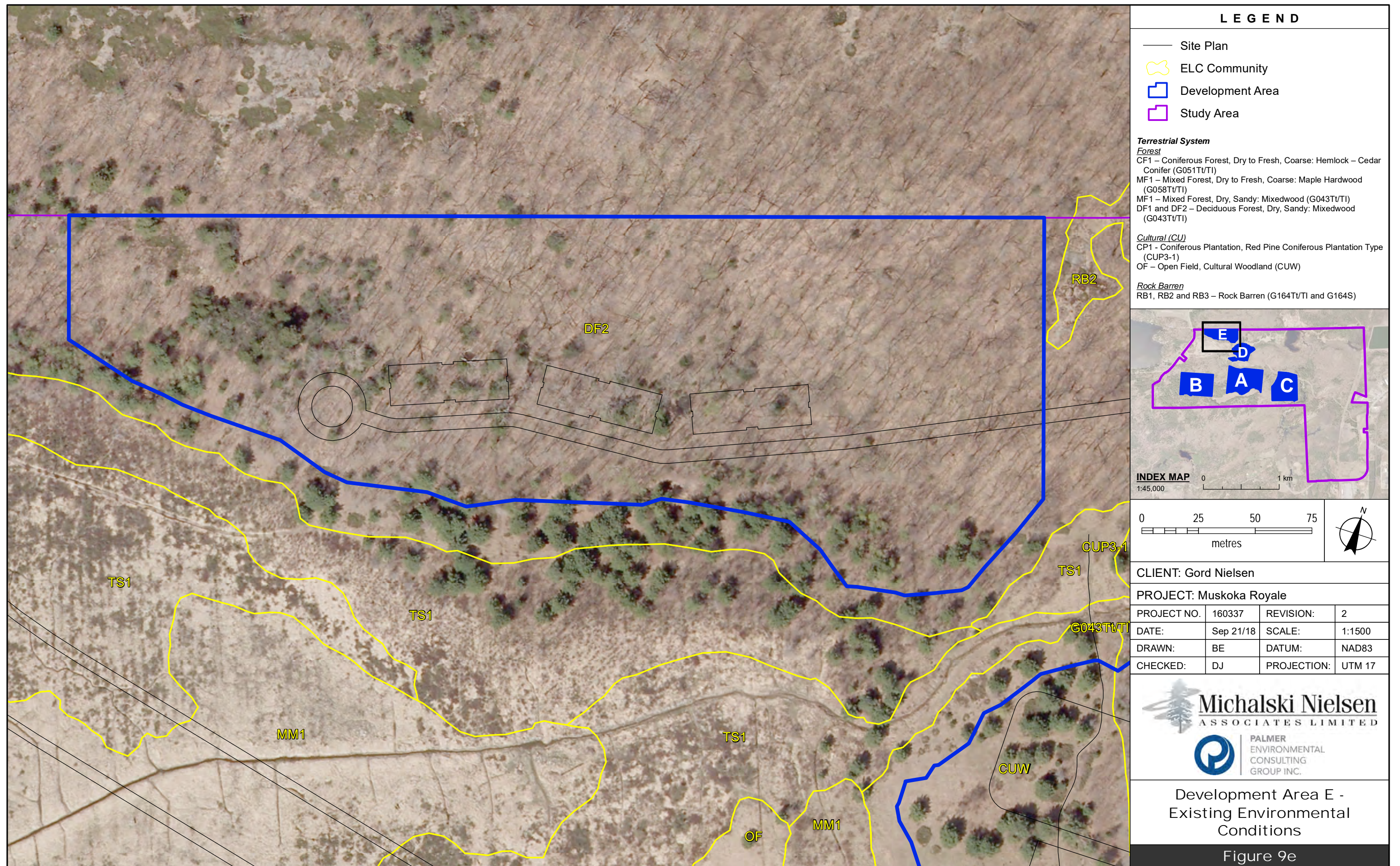
A driveway crossing of the small watercourse north of this precinct is required to connect this future elementary school to the future residence complex (Precinct E). A crossing location has been identified within the area of conifer plantation, where the valleyland is very narrow and there are no opportunities for flooding by beaver. While both Precincts D and E are not to be developed in the immediate future, Michalski Nielsen Associates Limited recommends that at such time as they are to be developed:

- **the project biologist work with the project engineer and architect in designing a crossing of this stream corridor which addresses the function of this stream as a wildlife corridor, including potentially for Blanding's Turtle. A small bridge structure would generally be preferable to a culvert at this location.**

In summary, the setting for this elementary school precinct has been carefully selected to avoid areas of substantial biophysical constraint. Internally, the layout has been properly designed to take advantage of this area's gentle topography and avoid/buffer more sensitive features. There are no concerns that its layout or design will negatively impact on the potential for Blanding's Turtle to use the adjacent stream/wetland corridor for movement and, depending on conditions from one year to the next, possible seasonal use. Michalski Nielsen Associates Limited supports the location and layout of this precinct.

6.2.5 Precinct E – Future Elementary School Student/Staff Residence

Figure 9E provides an expanded view of the Elementary School Student/Staff Residence complex, a future component of this development. This precinct is located entirely along a south-sloping area of deciduous forest, with some mixed forest inclusion. Slopes are generally moderate, with areas of steeper slopes having been avoided in the layout. It occurs to the north of an area of shrub thicket, with a 15 m setback between the edge of the precinct at that wetland boundary. However, as is evident from the extent of white pine within the adjacent edge of shrub thicket, that wetland boundary is itself quite



transitional, with the precinct located more than 30 m away from areas where there is potential for flooding activity by beaver (note from **Figure 9E** the manner in which the stream channel moves away from this precinct the further west one goes). There are absolutely no concerns with development in this precinct and its separation from stream corridor/wetland areas which have limited potential to be used by Blanding's Turtle.

In summary, the setting for this primary school residence precinct has been carefully selected to avoid areas of substantial biophysical constraint. Internally, the layout has been properly designed to take advantage of site topography and avoid/buffer more sensitive features. Michalski Nielsen Associates Limited supports the location and layout of this precinct.

APPENDIX A – 2018 BREEDING BIRD SURVEY RESULTS

Breeding Birds of Muskoka Royale - 2018

[illegible]

[illegible]