



ENVIRONMENTAL IMPACT STATEMENT
Harsanyi Property Oxbow Lake
October 2020



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ENVIRONMENTAL SOLUTIONS INC.



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October 22, 2020
RS# 2019-189

Tom Harsanyi
c/o John Gallagher
John P. Gallagher & Associates
24 Hibberd Rd, Huntsville Ontario
P1H 1C9

**SUBJECT: Environmental Impact Assessment and Soil Report, Harsanyi Property,
Oxbow Lake, Township of Lake of Bays**

Dear Mr. Harsanyi,

RiverStone Environmental Solutions Inc. is pleased to provide you with the attached report.

Please contact us if there are any questions regarding the report, or if further information is required.

Best regards,

RiverStone Environmental Solutions Inc.

Report prepared by:

Al Shaw, M.Sc.
Principal / Senior Ecologist

ENVIRONMENTAL ASSESSMENT NON-TECHNICAL SUMMARY

Type of Study Environmental Impact Assessment (EIA) and Soil Report		Date October 22, 2020
Project Manager Al Shaw	Legal Description Part of Lot 3, Concession 6, Sinclair-Finlayson Ward, Township of Lake of Bays.	Development Proposed Plan of Subdivision application, six (6) new lots with one (1) retained lot, on Lake Trout Lake at Capacity
	Planning Authorities Township of Lake of Bays /District of Muskoka	Owner/Agent Tom Harsanyi / John Gallagher
<u>Report Summary</u> <p>The purpose of this study was to address municipal, provincial, and federal requirements pertaining to the protection of significant natural heritage features such habitat of Endangered and Threatened species, and fish habitat. Based on both desktop and an on-site investigation, RiverStone has determined that</p> <ol style="list-style-type: none"> 1. The property is fronted by primarily Type 2 fish habitat, with a reach of Type 1 fish habitat associated with the outlet of a permanent undisturbed watercourse. 2. Potential habitat of Endangered and Threatened Species was limited subject property and adjacent lands and can be protected with mitigation measures related to directing where the proposed constructed feature be built, setbacks, and construction practices <p>To ensure that significant features are protected, RiverStone has offered a number of recommendations in Section 4 of this report that are reiterated below.</p>		

RECOMMENDATIONS***Site Specific Soils***

In conditions where the site specific soils are present and lot creation is approved on Lake Trout lakes at capacity, the LCAH has a series of recommendations to ensure that the septic system functions properly, stormwater is considered in the development plan, and data is collected for scientific purposes. These recommendations would form part of the approval for the current proposal, and are as follows:

- **design of the septic system shall include pump-dosing or equivalent technology to uniformly distribute septic effluent over the tile bed;**
- **no add-on system components such as water-softening apparatus, to ensure the proper functioning of the septic tank-tile bed system over the long-term;**
- **provision of a 30-metre minimum undisturbed shoreline buffer and soil mantle, with the exception of a pervious pathway (the 30 m buffer also applies to the identified watercourse in the central portion of the property);**

- **preparation of a stormwater management report and a construction mitigation plan (including phosphorus attenuation measures such as directing runoff and overland drainage from driveways, parking areas, other hard surfaces to soak away pits, infiltration facilities);**
- **location of the tile bed for each of the proposed lots should be as shown in Figure 3, in accordance with the recommendations of the site-specific soils investigation;**

In addition to the above recommendations from the LCAH, it is our recommendation that an additional step be taken to further protect water quality in Oxbow Lake. The LCAH recognizes the ability of the native soils below a septic bed to bind phosphorus in specific conditions (unsaturated, high iron and aluminum concentrations, low calcium carbonate concentration). RiverStone recommends that these conditions also be present in the material that is used to construct the septic bed, as noted in Section J.8 of the Township Official Plan. As such, RiverStone further recommends:

- **All imported soils used for leaching bed construction should be silt free, fine to medium grained non-calcareous soils, having the presence of iron and aluminum. Native soils removed for the placement of a dwelling may also be used should they meet all criteria noted above and those for septic use as noted in the Ontario Building Code.**
- **The final design and installation of any septic system be completed by a licenced installer.**

Fish Habitat and Water Quality

To ensure that fish habitat in Oxbow Lake is not negatively impacted by the placement of in-water structures and that the proposed development is in compliance with the *Fisheries Act*, RiverStone recommends the following measures:

- **All new development be set back 30 m from Oxbow Lake, excluding the proposed docking structures to be constructed at the locations shown on Figure 3. These docking locations are conceptual and represent suitable areas, which can be moved as long as they remain outside of identified area of Type 1 Fish habitat and comply with the sideyard setback requirements of the Township.**
- **All new development be set back 30 m from Oxbow Lake, excluding the proposed docking structures to be constructed at the locations shown on Figure 3. These docking locations are conceptual and represent suitable areas, although they can be moved as long as they remain outside of identified Type 1 Fish habitat and comply with the sideyard setback requirements of the Township.**
- **Vegetation within 25 m of Oxbow Lake and 15 m from the tributary to Oxbow Lake will be maintained in its natural state. Access to the shoreline of Oxbow Lake for all proposed lots will be via a pathway a maximum width of 2 m, meandering, and be constructed of permeable substances (i.e., clean gravel, mulch) where required. Trees will not be cut within the setback unless they are a safety hazard and debris from clearing or materials to be used in construction will not be placed within the setback.**
- **Placement of docking facilities should be excluded from area fronting the watercourse and identified as Type 1 Fish Habitat. Conceptual docking envelopes are shown on Figure 3, but may be moved, with the area of Type 1 fish habitat as the primary constraint.**

- **DFO should be notified immediately if a situation occurs or if there is imminent danger of an occurrence that could cause harmful alteration disruption or destruction of fish habitat. If there is an occurrence, corrective measures must be implemented.**
- **Construction of the in-water portion of docking structures and associated in-water works are not to be completed between May 1 and July 15 to avoid potential impacts to fish during the warm-water spawning season. Lake Trout habitat does not exist along the frontage, therefore the coldwater timing restriction is not necessary to apply.**
- **All in-water habitat features, including aquatic vegetation, natural woody debris and boulders should be left in their current locations in the nearshore area unless with approvals through MNRF.**
- **Vegetation within the shoreline buffer area should be left in its current state, without any thinning of trees, unless they are a safety hazard.**

To ensure that water quality and fish habitat are not negatively impacted by stormwater runoff during construction activities (e.g., land clearing and grubbing, dwelling and septic system construction, driveway construction), RiverStone recommends the following measures:

- **When the native soil is exposed, sediment and erosion control work, in the form of heavy-duty sediment fencing, be positioned along the downgradient edge of any construction envelopes adjacent to water bodies, wetlands, or watercourses.**
- **Temporary storage locations of aggregate materials will be located outside the 30 m of the setback from Oxbow Lake as identified on Figure 3. This material is to be contained by heavy-duty sediment fencing.**
- **Storage of any construction material or debris will be located outside the 30 m of the setback from Oxbow Lake as identified on Figure 3. This material is to be contained by heavy-duty sediment fencing.**
- **Sediment fencing must be constructed of heavy material and solid posts to ensure its integrity and be properly installed (trenched in) to maintain its integrity during inclement weather events.**
- **Additional sediment fencing and appropriate control measures (e.g., straw bales) be stockpiled on site so that any breach can be immediately repaired through construction of check dams.**
- **Regular inspection and monitoring will be necessary to ensure that the structural integrity and continued functioning of the sediment control measures is maintained (i.e., proper installation is not the only action necessary to satisfy the mitigation requirements).**
- **Inspections of sediment and erosion control measures be completed within 24 hours of the onset of a storm event.**
- **Sediment control measures be maintained in good working order until vegetation has been established on the exposed soils.**

In order to prevent impacts upon the habitat of Endangered, Threatened and Special Concern bats that may be utilizing the forest communities on the Subject Property for maternal roosting habitat, RiverStone recommends the following;

- **Tree clearing for the purposes of development on each proposed lot only occur in the fall, winter and early spring (from October 15 to April 15). This timeframe is outside of the maternal roosting period.**
- **In the event that tree clearing must occur between April 15 and October 15, a qualified professional should complete a combination of snag surveys and acoustic monitoring, with technical guidance from the MNRF, for the area where tree clearing is proposed. If snag trees are found within the clearing area, bat exit surveys may be required.**

In regard to the potential for Eastern Hog-nosed Snake, they do not tend to travel, migrate or position themselves in particular habitats throughout their lifecycle. They are described as a highly mobile species and somewhat generalist with respect to habitat preferences (Kraus 2011). The primary habitats noted in the recovery strategy are hibernation and oviposition sites, which are described as mixed intolerant upland forests and beach or sandy soils, respectively. As a result of Eastern Hog-nosed snakes being present on the subject lands, RiverStone recommends the following measures:

- **The number and length of roads servicing proposed lots be minimized as a means of reducing the potential for road mortality.**
- **Removal of terrestrial vegetation should be limited outside of the development envelopes.**

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1 **BACKGROUND**

RiverStone Environmental Solutions Inc. (hereafter “RiverStone”) was retained by Tom Harsanyi, through John P. Gallagher & Associates, to complete both an environmental impact assessment (EIA) and a soil report for a waterfront property in the Township of Lake of Bays (hereafter “Township”). The subject property is approximately 8.575 ha (21.19 ac) in area and 1012.46 m (3321.72 ft) frontage on Oxbow Lake. Legally, the property is described as Part Lot 3, Concession 6, Geographic Township of Finlayson, Township of Lake of Bays, District Municipality of Muskoka (**Figure 1**).

The development proposal will include an Application for a Plan of Subdivision to allow the creation of six (6) new shoreline lots and one (1) retained lot, covering the entire property. The lots will be developed as waterfront residential lots with a dwelling, individual septic system, access drive, and all other accessory structures permitted within the Waterfront Residential zone in the Township of Lake of Bays. The subject lands are currently designated Waterfront Residential within the Development Permit Bylaw (By-Law 2004-180). A review of the Townships Official Plan indicated that the Province of Ontario has designated Oxbow Lake as being at capacity and unable to sustain further lot creation, as listed in Appendix A of the Township’s Official Plan. This EIA includes a site specific soils assessment following provincial guidelines for documenting soil properties on the property. The results of this investigation are compliant with the Lakeshore Capacity Assessment Handbook (MECP 2010) and show that the property soil characteristics meet the provincial requirements, making the lots suitable for development without any impacts on water quality in Oxbow Lake.

Consultation with the Township planning department resulted in the requirement for both an EIA and a site specific soils investigation, to provide the Township with information necessary to consider the eligibility of an application for plan of subdivision to create a total of six (6) new lots and one (1) retained lot. This EIA includes information related to specific natural heritage features of concern including fish habitat, Species at Risk (i.e., Endangered and Threatened species), watercourses, and lake water quality.

2 **APPROACH AND METHODS**

The general approach used to carry out this EIA involved the following:

1. Assemble background information to identify the existing biophysical features and functions of the subject property prior to the site investigation.
2. Conduct a site investigation to field-verify the biophysical features and functions identified during background information gathering and to collect additional field data (e.g., habitat information, etc.) that will assist with completing the report.
3. Complete a site specific soil investigation in the location of proposed septic locations.
4. Determine the extent to which existing biophysical features and functions constrain the property as it relates to the proposed development.
5. Provide an overall assessment of conformance of the proposed development with all applicable municipal, provincial, and federal environmental requirements.

2.1 Information Sources Used to Assess Site Conditions

Information pertaining to the biophysical features and functions of the subject property and surrounding lands was obtained from the following sources:

- **Township of Lake of Bays Zoning By-Law** (2004-181) (Consolidated November 18, 2010) for applicable zoning and Environmental Protection areas mapping
 - Schedule A – Sinclair and Finlayson Wards East
- **Township of Lake of Bays Development Permit By-Law** (2004-181) (Consolidated November 18, 2010) for applicable mapping of land use and development on waterfront properties
 - Schedule A – Sinclair and Finlayson Wards East
- **Ministry of Natural Resources and Forestry (MNRF) Parry Sound District information request** for occurrences of species at risk and fisheries data in and adjacent to Oxbow Lake.
- **Species at Risk (SAR) by Township** tool provided by Parry Sound District MNRF (“SAR in PS District v7.0.xls”) regarding the SAR potentially occurring in the geographic township of interest (December 2016).
- **MNRF Natural Areas Mapping** from the Natural Heritage Information Centre (NHIC) regarding information on occurrences of species of conservation interest on or adjacent to the subject property, as well as significant natural areas (accessed June 2020)
http://www.giscoeapp.lrc.gov.on.ca/web/MNR/NHLUPS/NaturalHeritage/Viewer/Viewer.html?utm_source=MNRCentral&utm_medium=Twitter&utm_term=natural%2Bheritage&utm_content=natural%2Bheritage%2Bbiodiversity&utm_campaign=Biodiversity
- **MNRF Lakeshore Capacity Assessment Handbook** 2010)
- **Ontario Breeding Bird Atlas (OBBA) Online Database** and Atlas of the Breeding Birds of Ontario, 2001–2005 (Cadman et al. 2007) regarding birds that were documented to be breeding in the vicinity of the subject lands during the 2001–2005 period (atlas square numbers: 17PL53)
<http://www.birdsontario.org/atlas/squareinfo.jsp>
- **Species at Risk: Potentially Suitable Habitat Mapping** (Glenside Ecological Services Limited (2009) regarding species at risk habitat in the District Municipality of Muskoka.
- **Natural Heritage Evaluation of Muskoka** (Reid and Bergsma (1994) regarding Natural Heritage Areas in the District Municipality of Muskoka.
- **Great Lakes Conservation Blueprint for Terrestrial Biodiversity, Volume 2** (Henson and Brodribb (2005) regarding terrestrial biodiversity within Ecodistrict 5E-8 (Huntsville).
- **Great Lakes Conservation Blueprint for Aquatic Biodiversity, Volume 2** (Phair et al. 2005) regarding aquatic biodiversity within tertiary watershed 2EC (Black River – Lake Simcoe).
- **Quaternary Geology of the Huntsville-Penetanguishene Area, Central Ontario** (Bajc 1994) to ascertain the surficial deposits of the subject property.
- **Oxbow Lake Fact Sheet** (OMNR, 2010) to collect background information on the fish community in Oxbow Lake.
- **Digital Ontario Base Maps** (OBMs; 1:10,000) to ascertain topography.
- **Colour aerial photography** of the property (digital orthophotos: leaf-off, spring 2008).

- RiverStone’s **in-house databases and reference collections**.
- On-site investigations by RiverStone staff (see **Section 2.2**)

2.2 Site Investigation

2.2.1 General Approach

The background biophysical information gathered as outlined in **Section 2.1** helped direct data collection activities associated with a site investigation carried out during multiple site visits on December 3, 2019, May 6, 2020, July 25, 2020 and September 4, 2020. Data collection focused on: (1) topography and drainage, (2) soils, (3) fish habitat, (4) vegetation communities, (5) habitat for Endangered and Threatened species, and (6) significant wildlife habitat (“SWH”). Representative site photos taken during this investigation are assembled in **Appendix 1**. Overall, the level of effort expended on-site was appropriate to document the features and functions with recognized status, given the location and scale of the proposed development.

Although observations of fauna and flora of interest were recorded, they are not reported unless the observation was important for the determination of (1) habitat potential for Endangered or Threatened species, or (2) potential SWH. Evidence for the presence of a species or use of an area was determined from visual and/or auditory observation (*e.g.* song, call) and observation of nests, tracks, burrows, browse, skins and scats. Ecological Land Classification (“ELC”) vegetation mapping that was completed also provides information regarding the likelihood that plant species of conservation interest may be present (for example, most rare plants have strong affinities for specific ecological communities). Additionally, if a potentially rare plant not in flower was encountered, then a second site visit was conducted during the appropriate season for flowering or fruiting to confirm identification. This approach acceptably minimizes the risk that rare plant species would go undetected.

Features of conservation interest were identified during background information-gathering and were then field-verified. Additional significant features not identified during background information-gathering, as well as mitigation measures to limit impacts associated with the proposed development, were also identified during the site investigation (where applicable). Natural features of interest (*e.g.*, SAR habitat, vegetation community boundaries) were delineated in the field with a tablet with highly accurate built in GPS. Features of interest were photographed, and all information collected was catalogued for future reference. Photos representative of onsite conditions are provided in **Appendix 1**.

2.2.2 Terrain, Drainage, and Soils

Geology is a significant factor in the formation of soil, the physical characteristics of a watershed, and ultimately surface water quality. The bedrock and overlying deposits influence surface runoff and infiltration, directly influencing the nutrient balance of receiving water bodies. Knowledge of the existing terrain in a study area is important in understanding how a property and its associated natural environment will respond to development pressures. The geophysical setting of the property was reviewed using OBMs, soils mapping, and aerial photography, and subsequently verified on-site.

The soil conditions onsite directly affect the potential for development. Following the Provincial Policy, Section D.123 of the Township Official Plan states that new lot creation on Lake Trout lakes classified as at capacity (Oxbow Lake) will not be permitted, unless one of four criteria is confirmed. These criteria directly follow the Lakeshore Capacity Assessment Handbook (MOECC 2010). Section

5.2 of the Lakeshore Capacity Assessment Handbook (LCAH) describes four development situations in which a municipality can allow development to occur on a lake classified as at capacity. These are as follows:

- to separate existing habitable dwellings on lots each of which is capable of supporting an approved independent sewage disposal system provided that the land use will not change;
- new leaching beds on each lot are located so that they will drain into a waterbody other than those identified on Appendix “A”;
- new leaching beds for each lot will be setback at least 300 metres (984 feet) from the normal or controlled high water mark of the lake, or so that the drainage from each leaching bed will flow at least 300 metres to the normal or controlled high water mark of the lake or direct tributary; or
- it is demonstrated through the submission of a site specific soils investigation prepared by a qualified professional in accordance with provincial requirements as set out in Appendix A that the proposal will not negatively impact lake trout habitat including water quality, and provided the associated implementation requirements of Sections J.8 and J.9 are met. The minimum lot area for each lot shall be 0.8 ha (2 acres).

The following additional site-specific criteria can be applied where new development is proposed on at-capacity lakes and where certain municipal planning tools and agreements are in place such as a Development Permit System under the *Planning Act*, and/or site plan control under the *Planning Act*, and site alteration and tree-cutting by-laws under the *Municipal Act* (also found in Appendix A of the Official Plan):

- where a site-specific soils investigation prepared by a qualified professional has been completed showing the following site conditions:
 - the site where the septic tile-bed is to be located, and the region below and 15 metres down-gradient of this site, toward the lakeshore or a permanently-flowing tributary, across the full width of the tile bed, consist of deep (more than three metres), native and undisturbed, non-calcareous (<1% CaCO₃ equivalent by weight) overburden with acid-extractable concentrations of iron and aluminum of >1% equivalent by weight (following Robertson 2005, 2006, Appendix B). Soil depth shall be assessed with test pits and/or boreholes at several sites. Samples for soils chemistry should be taken at a depth adjacent to, or below, the proposed tile bed; and
 - an unsaturated zone of at least 1 ½ metres depth exists between the tile bed and the shallowest depth (maximum) extent of the water table. The position of the water table shall be assessed with test pits during the periods of maximum soils saturation (e.g., in the spring, following snowmelt, or late fall).

The site specific soils investigation, as described above, was completed for the subject lands and is presented in the .

2.2.3 Vegetation Communities

All natural vegetation communities within the Subject Property were mapped according to the Great Lakes-St. Lawrence (GLSL) Ecosite Fact Sheets (Wester *et al.* 2015), otherwise known as the “Provincial” ELC system. The GLSL Ecosite factsheets represent refinements and a synthesis of several different protocols for describing vegetation communities (primarily forests) within Ecoregions

4 and 5 previously prepared by MNRF in the 1990's. ELC defines ecological units or "Ecosites" based on a hierarchy of influence involving several physical factors including climate (temperature, precipitation), flooding, disturbance regimes, and substrate (depth, texture, moisture, nutrients). ELC provides a common language to describe vegetation communities, which in turn facilitates the identification of vegetation communities likely to support features or functions of conservation interest.

The boundaries of each ELC community were completed during site investigations through transects across the subject property. Data collected was georeferenced and amalgamated with aerial photographs to delineate the community.

Plant nomenclature is generally consistent with the Southern Ontario Vascular Plant Species List, Third Edition (Bradley 2013) except where updates that postdate publication of the list are noted in the Integrated Taxonomic Information System database.

2.2.4 Features and Functions of Conservation Interest

2.2.4.1 Habitat-based Approach

Properly assessing whether an area is likely to contain species of conservation interest for the purposes of determining whether a proposed development is likely to have a negative impact is becoming more difficult as the number of listed species increases. Approaches that depend solely on documenting the presence of individuals of a species in an area almost always underrepresent the biodiversity actually present because of the difficulty of observing species that are usually few in number, or well-camouflaged.

Given these difficulties, and the importance of protecting habitats of SAR, fish, and other species of conservation interest, RiverStone's primary approach to site assessment is habitat-based. This means that our field investigations focus on *evaluating the potential for features within an area of interest to function as habitat for species considered potentially present, rather than searching for live specimens*. An area is considered potential habitat if it satisfies multiple criteria, usually specific to a species, but occasionally characteristic of a broader group (*e.g.* several turtles of conservation interest use sandy shorelines for nesting, numerous fish species use areas of aquatic vegetation for nursery habitat).

Physical attributes of a site that can be used as indicators of its potential to function as habitat for a species include structural characteristics (*e.g.* physical dimensions of rock fragments or trees, water depth), ecological community (*e.g.* meadow marsh, rock barren, coldwater stream), and structural connectivity to other habitat features required by the species. Species-specific habitat preferences and/or affinities are determined from status reports produced by the Committee on the Status of Endangered Wildlife in Canada ("COSEWIC"), Cadman *et al.* (2007), published and unpublished documents, and direct experience.

Application of a habitat-based approach affords protection to ecological features that have the potential to function as habitat for Endangered or Threatened species without relying on surveys that have low likelihood of detecting scarce or cryptic species. Excluding development and site alteration from these features provides a highly conservative approach to ensuring compliance with the *ESA*.

In instances where habitat features are such that either (i) a species presence cannot be easily determined through an assessment of habitat feature alone, or (ii) habitat features are such that they suggest a species may be present in an area where development is proposed and impacts are likely,

RiverStone adds an additional level of rigour to its work by completing further species-specific assessments (*e.g.* Blanding's Turtle visual surveys, Whip-poor-will call surveys, Massasauga hibernation/gestation surveys, Bat Acoustic surveys) in accordance with industry-standard methods and protocols.

2.2.4.2 *Fish Habitat*

As noted above, our field approach is habitat-based. That is, we do not conduct site visits to observe fish use of the shoreline habitat over their entire life cycle in order to conclude whether the habitat is used or not. Instead, we conduct a series of site visits during the time of year when habitat features are visible, to document feature characteristics and types (**Table 1**).

While some habitats are specifically used by individual species at key times in their life history (*e.g.* rocky wind-swept shoals exposed to wind used by lake trout for spawning), other habitats are used by several species at various important times in their development (*e.g.* aquatic vegetation is used by various species for spawning, nursery, and/or feeding habitat). Characteristics of the lake shoreline that relate to habitat use by fish include: substrate type, slope / water depth, presence of woody debris / fallen trees and large boulders, aquatic vegetation, confluence with watercourses, and exposure to the wind. During our assessment, these features are surveyed from land and/or the water, taking note of the key habitat features described above.

Existing information on Lake of Bays was reviewed based on data published through the District's Watershed Council Water Web, which included lake data provided by the MNRF. Discussions directly with MNRF also occurred on several occasions specifically to discuss fish habitat in relation to key species and habitats throughout the Lake.

The key habitat features, along with the state of the riparian vegetation, are documented and recorded during onsite assessments and compared with the specific and general habitat requirements of the fish that are known to occur, in order to establish the fish habitat type (**Table 1**). Where available, our classification is compared with that of the MNRF. For the Subject Property, mapping provided by the MNRF identified the shoreline as Type 1 (Critical) fish habitat (**Figure 2**).

Table 1. Classification of Fish Habitat Types.

Classification Type	Description
Type 1	Habitats have high productive capacity, are rare, in space and/or time, are highly sensitive to development, or have a critical role in sustaining fisheries (<i>e.g.</i> , spawning and nursery areas for some species, and ground water discharge areas for summer and/or winter thermal refuges).
Type 2	Habitats are moderately sensitive to development and, although important to the fish population, are not considered critical (<i>e.g.</i> , feeding areas and open water habitats of lakes).
Type 3	Habitats have low productive capacity or are highly degraded, and do not currently contribute directly to fish productivity. They often have the potential to be improved significantly (<i>e.g.</i> , a portion of a waterbody, a channelized stream that has been highly altered physically).

Generally, where watercourses are encountered, they are assessed for several important characteristics, including the physical dimensions of the channel, substrates, invertebrates, thermal regime, groundwater sources and adjacent vegetation; however, there were no features that could be classified

as watercourses on the Subject Property. Therefore, we have not elaborated on these assessment methods. Similarly, there are no internal wetland features that could be considered as habitat for fish.

2.2.4.3 *Endangered and Threatened Species*

As noted above, RiverStone's primary approach to assessment of species at risk is habitat-based. This means that our field investigations focus on evaluating the potential for features within an area of interest to function as habitat for species considered potentially present, rather than searching for live specimens. An area is considered potential habitat if it satisfies a number of criteria, usually specific to a species, but occasionally characteristic of a broader group (e.g., several turtles of conservation interest use sandy shorelines for nesting). Physical attributes of a site that can be used as indicators of its potential to function as habitat for a species include structural characteristics (e.g., physical dimensions of rock fragments or trees, water depth), ecological community (e.g., meadow marsh, rock barren, coldwater stream), and structural connectivity to other habitat features required by the species. Species-specific habitat preferences and/or affinities are determined from status reports produced by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), Cadman et al. (2007), published and unpublished documents, and direct experience.

For the purposes of identifying species that warrant consideration during design and implementation of the proposed development plan, endangered and threatened species include those designated as "endangered" or "threatened" under O. Reg. 230/08 pursuant to the provincial *Endangered Species Act, 2007*. The results of these assessments are provided in **Appendix 2**. Features that provide potential to function as habitat for SAR are associated with the island shoreline and beaches, existing buildings, and forest communities across the Subject Property (**Figure 3**).

2.2.5 Significant Wildlife Habitat

The Provincial Policy Statement (PPS) protects SWH from development and site alteration unless it can be demonstrated that no negative impacts on the feature or its function will occur. As outlined in the SWH Technical Guide (OMNR 2000) and supporting Ecoregion Criteria Schedules (OMNRF 2015a, 2015b, 2015c), SWH is composed of four principal components:

1. Seasonal concentration areas of animals;
2. Rare vegetation communities or specialized habitats;
3. Habitat of species of conservation concern; and
4. Animal movement corridors.

The process for identifying SWH is outlined in s. 9.2.3 of the *Natural Heritage Reference Manual* (OMNR 2010a). **Step 1** considers the nature of the development application proposed and involves the assembly of background ecological information for the Subject Property and adjacent lands. If the application triggers a need to protect SWH (e.g. a change in land use that requires approval under the *Planning Act*), a more thorough investigation of potential SWH features on the Subject Property or adjacent lands must occur. Any confirmed SWH for the Subject Property and adjacent lands as identified in relevant planning documents or by the MNRF should be noted at this stage ("Adjacent" can include proximate parts of the mainland where there could be a connection between features important to a species of concern).

Where a need to protect SWH is triggered, **Step 2** involves undertaking a more thorough analysis of features, functions, and habitats on the Subject Property *via* ELC (see **Section 3.3**). The list of ELC Ecosite codes generated for the Subject Property is compared to those codes considered candidate SWH in the relevant Ecoregion Criterion Schedule (*i.e.* 5E, 6E, or 7E) in **Step 3**. Where a positive match between an ELC Ecosite and candidate SWH exists, the area is considered candidate SWH.

In **Step 4**, two options are available for candidate SWH:

1. the area may be protected without further study, or
2. the area may be evaluated to ascertain whether confirmed SWH is present. Evaluation may involve generating more detailed maps of vegetation cover, or conducting surveys of the wildlife population within the candidate SWH including reproductive, feeding, and movement patterns.

If the area is confirmed SWH, the final step in the process (**Step 5**) is the completion of an impact assessment to demonstrate that no negative impacts to the confirmed SWH or its function will occur. The impact assessment process is assisted by SWH Mitigation Support Tool (OMNRF 2014).

RiverStone employed the approach as outlined above (*i.e.* **Steps 1-5**) in assessing the potential for SWH to exist on the Subject Property. Technical results of our assessment are provided in **Appendix 3**, with additional discussion in **Section 3.4.3**.

2.3 Impact Assessment and Mitigation Measures

To carry out a defensible ecological assessment of potential impacts associated with implementation of the proposed development, RiverStone employs the following approach:

1. *Predict* impacts to existing biophysical features and functions on site based on the proposed development plan (from construction to post-completion), including both direct (e.g., vegetation clearance, etc.) and indirect (e.g., light pollution, encroachment post-development, impacts).
2. *Evaluate the significance* of predicted impacts to existing biophysical features and functions based on their spatial extent, magnitude, timing, frequency (how often), and duration (how long).
3. *Assess the probability or likelihood* that the predicted impacts will occur at the level of significance expected (*i.e.*, high, medium, low probability).
4. Where the potential for negative impacts exists, ecologically meaningful *mitigation measures* are offered to avoid such impacts first, and where impacts cannot be fully avoided to minimize and/or compensate such impacts as appropriate.

2.4 Applicable Environmental Legislation and Policies

To assess whether the application satisfies relevant municipal, provincial, and federal requirements with respect to the natural environment, the following policies (e.g., statutes, regulations, plans, guidance documents, etc.) that may be applicable to the proposed application and were considered during both the field investigations and the impact analysis:

- *Provincial Policy Statement*, 2020, pursuant to the *Planning Act*, R.S.O. 1990, c. P.13, including:
 - Significant Wildlife Habitat Technical Guide (OMNR 2000)

- Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005 (OMNR 2010)
- Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E, January 2015 (OMNRF 2015a)
- Provincial *Endangered Species Act* (ESA), S.O. 2007, c. 6, including:
 - Ontario Regulation 230/08: Species at Risk in Ontario List
 - Ontario Regulation 242/08 – General (i.e. “Exemption Regulation”)
- Federal *Fisheries Act*, R.S.C. 1985, c. F-14, amended on 2019-08-28 including:
 - *Applications for Authorization under Paragraph 35(2)(b) of the Fisheries Act Regulations*, S.O.R/2013-191
 - Fish and Fish Habitat Protection Policy Statement (August 2019)
- Federal *Migratory Birds Convention Act*, S.C. 1994, c. 22, including:
 - Migratory Birds Regulations, C.R.C., c. 1035
- District Municipality of Muskoka *Official Plan* (consolidation October 3, 2014)
- Township of Lake of Bay *Official Plan* (Consolidated July, 2016), including:
 - Schedule C1: Wetlands and Natural Heritage, Schedule C2: Fish and Wildlife Habitat, Schedule C3: Lake Categories
- Township of Lake of Bays *Comprehensive Zoning By-law 2004-181* (December 7, 2004, Consolidated November 18, 2010), including
 - Schedule A – Sinclair Finlayson Wards EAST
- Township of Lake of Bays *Development Permit By-law 2014-180* (Consolidation November 18, 2010)
 - Schedule A – Sinclair Finlayson Wards EAST

3 BIOPHYSICAL FEATURES AND FUNCTIONS

3.1 General Site Conditions

The subject lands were examined in the field on December 3, 2019, May 6, 2020, July 25 and September 4, 2020. During the site visits, details of the subject lands were collected for the EIA as well as the soils assessment, included in the Section to confirm the conditions for development on a lake trout lake at capacity have been met. The subject lands are located on the east side of the peninsula in the south portion of Oxbow Lake and accessed via West Oxbow Lake Road. At the time of the site visit one (1) structure was observed in the south portion, the dock is located in the south portion of the property and the owner of the property were unaware of its existence. This dock is likely used to access water access properties. Currently the entirety property is in a forested state (**Figure 2**). Representative photographs taken during the site investigations are provided in **Appendix 1**.

3.2 Terrain, Drainage, and Soils

The subject lands and surrounding lands lie within the Central Gneiss Belt of the Grenville Province on the Canadian Shield. Migmatites and gneisses dominate the underlying bedrock in the area. Common local rock types include quartzofeldspathic gneisses, orthogneisses, and paragneisses (Ontario Geological Survey 2011). The subject lands also lie within the Algonquin Highlands, a distinct physiographic region covering most of central Ontario (Chapman and Putnam 2007). The topography in this region is rough, with prominent rock ridges and knobs occurring throughout (Chapman and Putnam 1984).

The quaternary deposit on the subject lands are a result of the advance and retreat of the last continental glaciation of North America (12,000 years before present). Soils in the area are dominated by shield-derived silty to sandy till and glaciofluvial deposits (Ontario Geological Survey 2010). These soils are the focus of our investigation into the suitability of the lots to have additional shoreline development without negatively impacting water quality and Lake Trout habitat.

Although no surveyed topographic information is available for the subject property, the 1:10,000 Ontario Base Map (OBM) supplemented with field observations from site visits reveals that the subject lands have varying slopes. The vast majority of the lands have gentle slopes between 0% and 10%. Moderate slopes (> 10%-15%) blended with areas of strong (>30%) slopes stretch across south portions of the subject lands. Extreme slopes (>45%) were observed in the south most portion of the property. In general, overland drainage is directed toward Oxbow Lake from the west property line where the elevation peaks at 405 m above sea level compared to a shoreline elevation of approximately 379 m above sea level resulting in an elevation change of approximately 26 m. All of the proposed lots will have building envelopes outside of extreme slopes.

Review of data sourced from OBMs, Township of Lake of Bays Development Permit Bylaw, MNR Natural Heritage Information Center, and aerial photography, revealed that there were no watercourses present on the subject lands; however, during site investigations a watercourse was noted flowing in a west to east direction through the central portion of the subject property into Oxbow Lake. The watercourse is not considered as fish habitat as it is ephemeral and steep at the shoreline.

3.2.1 Site Specific Soils Study

Our detailed soils investigation was conducted in late fall (December 3rd, 2019), during the high groundwater period. The methodology applied onsite met the criteria specified in the LCAH and Township Official Plan. The location of soil test pits was determined based initially on the proposed lot layout. Pits were excavated on each lot with the purpose of determining the depth of soil, depth to the water table, and collection of representative samples for chemical analysis (**Figure 3**).

An excavator was used to dig the test pits in the location of the proposed septic envelope (>30 m from the shoreline), for each of the proposed seven total (7) lots. A measuring tape was used to measure pit depth and a GPS was used to collect location data for each test pit. Three soil samples were collected from the B Horizon of each pit using a clean trowel and placed in a locking plastic bag marked with the test pit location. Each pit was visually inspected for signs of water infiltration in the soil layers during excavation. Representative photographs are included in **Appendix 1**.

In order to meet the LCAH soil criteria, native soil depth must be greater than 3.0 m, with a 1.5 m unsaturated zone between the top of the water table and the native soil surface. Details for each of the

soil test pits excavated are presented in **Table 2**. Refusal was not met in any of the soil pits while excavating to a minimum of 3 m deep.

Based on our investigation, the soil profile within 3.0 m of the surface consists mainly of moderately compacted sand with coarse fragments (cobble). The B Horizon soil, which is of particular importance to phosphorus adsorption, consists of reddish-brown, fresh, moderately coarse sand with a minor component of silt, pebble, and cobble. This layer ranges in depth from 0.05 m to 0.55 m and is found beneath a humus-enriched A Horizon. The native soil profile would be best classified in the podzol order with high concentrations of acid extractable iron and aluminum (Soil Classification Working Group 1998).

The water table was encountered in proposed Lot 3 at 2.0 m below the surface. Water had pooled at the base of the pit (3.30 m) during the excavation process. Mottling was not observed within the test pits. Bedrock knobs are relatively rare on the subject lands and do not visibly occur in the vicinity of the chosen septic envelopes suggesting uniform soil depths in the vicinity of each pit.

Soil samples were collected from the sidewalls of the large test pits excavated in each of the proposed septic system locations. Three samples were collected from each pit and submitted for chemical analyses. In all cases, material was taken from the upper, mid and lower B Horizon and mixed to create a single representative composite sample. Composite samples were submitted to an accredited laboratory to determine the content of extractable aluminium, extractable iron, and calcium carbonate (CaCO_3); laboratory certificates of analysis are provided in **Appendix 4** and summarized in **Table 3**.

Table 2. Soil test pit descriptions and measurements, Oxbow Lake, Township of Lake of Bays.

Lot No.	Test pit No.	General site description	Distance from Oxbow Lake (m)	Depth below grade to water table or saturated soils (m)*	Depth of test pit (m)
Lot 1	H#1	Septic Envelope	53 m	Not Encountered	3.0 m
Lot 2	H#2	Septic Envelope	91 m	Not Encountered	3.1 m
Lot 3	H#3	Septic Envelope	86 m	Not Encountered	3.0 m
Lot 4	H#4	Septic Envelope	80 m	Not Encountered	3.1 m
Lot 5	H#5	Septic Envelope	80 m	Not Encountered	3.0 m
Lot 6	H#6	Septic Envelope	76 m	Not Encountered	3.0 m
Lot 7	H#7	Septic Envelope	56 m	Not Encountered	3.1 m

* Test pits were visually inspected for groundwater infiltration during excavation and 1 week following.

In order to meet the LCAH soil chemistry criteria, the native soil beneath the proposed septic bed location must have acid extractable concentrations of iron and aluminum greater than 1% equivalent by weight and calcium carbonate less than 1% equivalent by weight. All samples tested well above 1% by weight for iron and aluminum, results are shown in **Table 3**.

Surrogate tests are routinely used to estimate CaCO_3 content in soil. For the current study, total inorganic carbon (% by weight) was used to determine the maximum potential amount of CaCO_3 in the soil samples collected. This method assumes that all of the inorganic carbon is present in the form of carbonate (CO_3). Soil samples collected at all of the seven (7) total proposed lots AGAT Environmental Laboratories (hereafter AGAT). Based on the analysis completed by AGAT, all of the results complied with the LCAH soil chemistry criteria. It should be known that the initial sample submitted for Lot #3 had an iron concentration less than the 1% by weight criteria (0.805 %). A second

sample was submitted, that was collected during the same time (December 6, 2019) in the same location, which resulted in results that were above the criteria.

The results indicate that the target soil chemistry criteria were attained for the proposed severed and retained lots. All samples showed the deep reddish-brown colour associated with iron enrichment; however, the actual concentration of iron and aluminum varied between samples.

Table 3. Soil Chemistry Results, Oxbow Lake, Township of Lake of Bays.

Sample Date	Lot No.	Sample Location	Sample ID [†]	UTM Coordinates	Fe (% by wt)	Al (% by wt)	Ca* (% by wt)
Target Soil Chemistry Criteria (OMNR 2010)					>1	>1	< 1
2019-12-06	Lot #1		777489		2.36	1.66	<0.02
2019-12-06	Lot #2		777491		1.6	1.58	<0.02
2019-12-06	Lot #3		777492		1.35	0.805	<0.02
			1137895		2.22	1.37	
2019-12-06	Lot #4		777493		1.79	1.37	<0.02
2019-12-06	Lot #5		1137934		2.68	1.70	<0.02
2019-12-06	Lot #6		1137935		2.03	1.55	<0.02
2019-12-06	Lot #7		1137936		2.32	1.80	0.03

Grey highlighted results indicate samples that meet the LCAH soil chemistry criteria.

[†] Refers to field identification number shown on laboratory Certificates of Analysis

* Caduceon Labs reported total inorganic carbon (TIC), not CaCO₃. TIC was measured as a conservative surrogate for CaCO₃ % by wt. TIC may include other inorganic carbon compounds in addition to CaCO₃. Where TIC is less than 1%, CaCO₃ is assuredly also less than 1% as required.

3.3 Vegetation Communities

Ecological communities were characterized and delineated through a combination of aerial photography analysis and field investigations. These communities are mapped on **Figure 2**.

Existing vegetation communities within the subject property were assessed during the on-site investigation. A desktop exercise was undertaken to map vegetation community boundaries using background information sources and current aerial photographs; the mapped vegetation communities were then ground-truthed and refined during the site investigation. Vegetation communities on the subject property were according to the Great Lakes-St. Lawrence (GLSL) Ecosite Fact Sheets (Wester *et al.* 2015), otherwise known as the “Provincial” ELC system. A description of each community follows, with all communities illustrated on **Figure 2**.

3.3.1 Terrestrial Vegetation Communities

G051 Dry to Fresh, Coarse: Hemlock-Cedar Conifer

Eastern Hemlock (*Tsuga canadensis*) dominated forest community is located as a strip along the shoreline of Oxbow Lake in the north portion of the subject property and extends to west property boundary in the south portion. Soil conditions are variable across the property with relatively deep conditions in the north portion and shallower in the south. Overall conditions are dry to moist with only a small wet area at the shoreline at the narrowest point on the property. The north portion of this community becomes very rocky with area of exposed bedrock outcrops. In addition to Eastern

Hemlock being present, associated species include Eastern White Cedar (*Thuja occidentalis*), Balsam Fir (*Abies balsamea*), Yellow Birch (*Betula allegheniensis*), White Birch (*Betula papyrifera*), Red Maple (*Acer rubrum*) regeneration, Striped maple (*Acer pensylvanicum*), Common Winterberry (*Ilex verticillate*), Hobble Bush (*Viburnum lantanoides*), Beaked Hazelnut (*Corylus cornuta*), Wild Sarsaparilla (*Aralia nudicaulis*), Canada Yew (*Taxus canadensis*), Lowbush Blueberry (*Vaccinium angustifolium*), Canada Mayflower (*Maianthemum canadense*), Northern Starflower (*Trientalis borealis*), Interrupted Fern (*Osmunda claytoniana*), Bearded Shorthusk (*Brachyelytrum erectum*), American Fly Honeysuckle (*Lonicera canadensis*), trillium species (*Trillium sp.*), Goldthread (*Coptis trifolia*), Bluebead Lily (*Clintonia borealis*), Eastern Teaberry (*Gaultheria procumbens*), Spinulose Wood Fern (*Dryopteris carthusiana*), Cucumber Root (*Medeola virginiana*) and Bearberry (*Arctostaphylos uva-ursi*). Along the shoreline additional species associated with wetlands are scattered along the upland and shoreline transition. These species include: Northern Beech Fern (*Phegopteris connectilis*), Spotted Jewelweed (*Impatiens capensis*), Jack-in-the-pulpit (*Arisaema triphyllum*), Fringe Sedge (*Carex crinita*) and Leatherleaf (*Chamaedaphne calyculata*).

G058 Dry to Fresh, Coarse: Mixedwood

The majority of the subject property is dominated by upland Sugar Maple (*Acer saccharum*) forest. Extending from the west property boundary towards the east and transitioning into Eastern Hemlock dominated forest along Oxbow Lake. Soil depths are relatively deep with pockets of deeper moisture soils along the Eastern Hemlock dominated transition. The shrub and groundcover layers are sparse with more understory diversity along the community transition. Species present in this community include, American Beech (*Fagus grandifolia*), Ironwood (*Ostrya virginiana*), American Basswood (*Tilia americana*), White Birch (*Betula papyrifera*), Yellow Birch, and Balsam Fir. Understory species include, Canada Yew, Hobble Bush, Stripe maple, Northern Starflower, Canada Mayflower, Bearded Shorthusk, Wild Sarsaparilla, Spinulose Wood Fern, Dutchman's Breeches (*Dicentra cucullaria*), Red Trillium (*Trillium erectum*), White Trillium (*Trillium grandiflorum*), Yellow Trout Lily (*Erythronium Americanum*) and Carolina Springbeauty (*Claytonia caroliniana*).

3.4 Features and Functions of Conservation Interest

The following features of conservation interest may have potential to be, or have been confirmed, on the Subject Property.

3.4.1 Fish Habitat

The existing information from the MNRF indicates that Oxbow Lake is approximately 170 ha in area, with a maximum depth of 34 m and an average depth of 11 m. The lake watershed is approximately 30.5 km² in area, receiving flow from North Dotty Lake and Dotty Lake immediately to the north. Oxbow lake drains south through the Oxbow River to Oxtongue Lake and eventually into the Oxtongue River and west to Lake of Bays. Lake water levels are not regulated in the watershed until Lake of Bays, where water levels are regulated at the Baysville Dam.

Oxbow Lake supports a diverse community with coldwater and warmwater fish species that include, Lake Trout, Lake Whitefish (*Coregonus clupeaformis*), Brook Trout (*Salvelinus fontinalis* – remnant), Smallmouth Bass (*Micropterus dolomieu*), Burbot (*Lota lota*), Cisco (*Coregonus artedii*), Northern Pike (*Esox lucius*), Round Whitefish (*Prosopium cylindraceum*), Rainbow Smelt (*Osmerus mordax*), Yellow Perch (*Perca flavescens*), White Sucker (*Catostomus commersonii*), Pumpkinseed (*Lepomis gibbosus*), Brook Stickleback (*Culaea inconstans*), Fathead Minnow (*Pimephales promelas*), Northern Redbelly Dace (*Chrosomus eos*) and Rock Bass (*Ambloplites rupestris*) (OMNR 2010). Lake Trout are

the species of key concern in regard to lake capacity and targeted species for fishing. Oxbow Lake is a put-and-grow lake stocking of Lake Trout completed every two (2) years. The purpose of a PGT fishery is to direct fishing effort to lake where fish are stocked, easing the fishing pressure on native Lake Trout lakes. Additional studies by MNRF have shown that many of the stocked trout migrate to nearby Dotty Lake. Evidence that natural reproduction still occurs in Oxbow Lake has not been verified, with stocking continuing to occur.

During our site investigations, the shoreline of the property was reviewed from onshore. Nearshore areas consists primarily of low to shallow slopes along the entire shoreline fronting the subject property with the exception of the extreme south portion where steeper terrain was noted. Slopes that extend from the onshore into the nearshore are also primarily shallow, with a consistent slope extending towards the back of the property. In the central and south portions of the property the backlot area becomes steeper and a bit more rugged with bedrock outcrops present. Within the nearshore area, fish habitat was quite consistent, characterized by dense overhanging trees with a mix of sand, gravel and cobble substrates. These characteristics continued along the majority of the property frontage and extending well into the lake. Limited areas of open bedrock along the shoreline were noted on the south portion of the frontage. Aquatic vegetation was observed in scattered locations in the central and south portion of the subject property, but was considered sparse in most locations. Species present included pipewort species (*Eriocaulon* sp.), Burweed and Pickerelweed (*Pontederia cordata*). In addition to the abundant overhanging vegetation, fine and coarse woody debris was observed along the shoreline. The largest area of aquatic vegetation was located in a small bay in the central portion of the subject property associated with the outlet of a watercourse. The shallow water depths in this area allows for the accumulation of organic material, woody debris and growth of aquatic vegetation. The area provides habitat for various species of fish and is considered Type 1 Habitat.

The watercourse is characterized as having a moderate slope, steep enough to form a step-pool type morphology (**Appendix 1**), with rocks and tree roots creating many small waterfalls, up to 30 cm in height. This formation creates a barrier to fish movement, not allowing fish to migrate upstream from the lake. During our assessment, water depths varied along the length of the watercourse, from small pooled areas, approximately 10 cm in depth, to wider areas expanding to approximately 45 cm and 5 cm water depth. The confluence of the watercourse and the lake was characterized by Beech Fern and Jewelweed along the shoreline, with sedges and large woody debris within the lake. The watercourse is entirely natural without any manipulation, connecting the upland area to the lake. The assessment of fish habitat and the watercourse was completed in early September, 2020, suggesting that the flow regime is likely permanent and that given the very small watershed area draining into the creek, it very likely has a coldwater thermal regime from groundwater inputs.

Vegetation along the shoreline is extensively treed with a band of conifer along the shoreline and deciduous forest extending beyond. Limited amounts of wetland plant species are scattered along the shoreline. Riparian vegetation includes Eastern White Cedar, Eastern Hemlock, Balsam Fir, White Birch, Balsam Fir, Sweet Gale (*Myrica gale*), Interrupted Fern, Sensitive Fern (*Onoclea sensibilis*), Marsh St. Johnwort (*Triadenum fraseri*), Royal Fern (*Osmunda regalis* var. *spectabilis*), Spotted Jewelweed, Leathleaf, Fringe Sedge and Common Winterberry (*Ilex verticillate*). The watercourse identified along the eastern shoreline, approximately midpoint along the frontage, was found to drain lands immediately to the west, on the eastern portion of the peninsula.

3.4.2 Endangered and Threatened Species

Based on the initial steps of our desktop analysis and contact with the MNRF, eleven (11) endangered or threatened species had the potential to occur on the property or on adjacent lands. Following review of the aerial photography and our on-site assessment, three (3) endangered or threatened species (Eastern Hog-nosed Snake, Little Brown Myotis and Northern Long-eared Myotis) have the potential to use features found on the subject property. Features with the highest potential to provide habitat for species at risk were associated with the mosaic of forest communities (**Figure 2**) having the potential to function as habitat. There were no areas that provided a higher likelihood of use than others and potential habitat extends to the adjacent properties. See **Appendix 2** for a detailed technical description of RiverStone's assessment.

3.4.3 Significant Wildlife Habitat

The results of RiverStone's desktop, habitat-based, and targeted assessments of potential features and communities that could function as SWH *per* Provincial policies is provided in **Appendix 3**. Three (3) communities or features with the potential to be identified as SWH were identified: Seasonal Concentration Areas of Animals, Rare Vegetation Communities, and Habitat for Species of Conservation Concern, as described below.

3.4.3.1 Seasonal Concentration Areas of Animals

Bat Maternal Colonies

Tree roosting bats, including Big Brown Bat (*Eptesicus fuscus*), Northern Long-eared Bat (*Myotis septentrionalis*) and Silver-haired Bat (*Lasionycteris noctivagans*), have range overlaps with the Subject Property. During the site investigations, suitable dead or dying trees (snags), and trees with loose bark or tree cavities, were observed across the treed vegetation communities of the property. These trees may provide suitable maternal colony habitat. These habitats very much overlap with the potential habitat for the three Endangered species noted above - Little Brown Bat, Northern Long-eared Bat and Silver-haired Bat.

3.4.3.2 Habitat for Species of Conservation Concern (excluding Endangered or Threatened Species)

Special Concern and Rare Wildlife Species

Based on the initial steps of our desktop analysis, six (6) Special Concern species had the potential to occur on the property or on adjacent lands. Following review of the aerial photographs and our site assessment, three (3) Special Concern species, Snapping Turtle (*Chelydra serpentina*), Wood Thrush (*Hylocichla mustelina*) and Eastern Wood Pewee (*Contopus virens*) have potential to be present or to use features found on the subject property or adjacent lands. Of the identified species with the potential to be present or confirmed to be present on the subject property, these species were associated with open water, wetland and forest habitats. These species are considered further in the impact assessment section below (see **Section 4.4**) and mitigation measures were developed. See **Appendix 3** for a detailed technical description of RiverStone's assessment.

4 **IMPACT ASSESSMENT AND RECOMMENDATIONS**

Based on the results of the assessment conducted, a number of features and functions of conservation interest have been identified. **Figure 3** illustrates the features and functions of conservation interest and any protective measures (municipal and those recommended by RiverStone). **Figure 3** presents the proposed development plan overlaid on these features.

The current property owners intend to submit an application for plan of subdivision to create six (6) new lots and one (1) retained lot. All proposed lots will have frontage along Oxbow Lake. Proposed lots are shown on **Figure 3**. Development areas for the proposed lots will be accessed via a common use road off West Oxbow Lake Road having individual access driveways connect to the common road. The proposed lots will meet the minimum area and frontage requirements under the development permit bylaw for the Waterfront Residential Area (**Table 4**).

Table 4. Dimensions of proposed lots, Oxbow Lake

Lot #	Area		Frontage	
	Hectares	Acres	Metres	Feet
1	1.009	2.49	122	400
2	1.142	2.82	122	400
3	1.265	3.13	122	400
4	1.176	2.91	122	400
5	1.320	3.26	178	584
6	1.469	3.63	122	400
7	1.284	3.17	229	751

For the purposes of the impact assessment below, the development envelopes presented on **Figure 3** are provided to demonstrate the development potential of the proposed lots based on ecological and planning constraints and should be considered the only developable areas on the lots. The area provided within these example development envelopes are intended to show that there is sufficient room to facilitate construction of a dwelling and septic system. During RiverStone's on-site assessment, care was taken to identify a development envelope that represents the lowest potential to result in negative impact to the ecological features and functions of the new proposed lots. Portions of the proposed severed lot 5 contains a watercourse and associated Type 1 fish habitat (to be zoned EP) along the shoreline.

RiverStone has reviewed the existing zoning and our impact assessment takes into consideration the activities that are permissible within the context of the proposed development. Our determination of whether the risk of potential impacts on a specific feature is acceptable relies upon the relevant policies and legislation referenced in **Section 2.3**, as well as our assessment of the significance or quality of the particular feature.

4.1 **Site Specific Soils Study**

As previously stated, the LCAH suggests that only four circumstances exist under which the MECP and MNRF would be satisfied that new lot creation or other planning approvals could be approved on a Lake Trout lake at capacity. Based on our study, the subject property on the shoreline of Oxbow Lake, does meet the site specific soil criteria established in Section 5.2 of the LCAH for deep native soils,

having a low water table, high concentrations of iron and aluminum, and low concentrations of calcium carbonate.

In our experience, non-calcareous soils with high iron and aluminum concentrations are common throughout the Canadian Shield, and are generally relegated to a relatively thin B horizon; however, soil depths greater than 3 m with an unsaturated zone of at least 1.5 m are quite uncommon and even more rare adjacent to lakes. The subject property on the shoreline of Oxbow Lake represents a relatively deep deposit of native soil that exceeds the site specific soils criteria established by the MECP and MNR. We have reviewed similar conditions within the same chain of lakes in the Limberlost Road general area, where there seems to be a large deposit of sandy soils with similar chemical composition. On sites with these specific soil characteristics, the LCAH policy allows lot creation to occur on lakes that are at capacity for development based on high phosphorus or low dissolved oxygen concentrations.

In conditions where the site specific soils are present and lot creation is approved on Lake Trout lakes at capacity, the LCAH has a series of recommendations to ensure that the septic system functions properly, stormwater is considered in the development plan, and data is collected for scientific purposes. These recommendations would form part of the approval for the current proposal, and are as follows:

- **design of the septic system shall include pump-dosing or equivalent technology to uniformly distribute septic effluent over the tile bed;**
- **no add-on system components such as water-softening apparatus, to ensure the proper functioning of the septic tank-tile bed system over the long-term;**
- **provision of a 30-metre minimum undisturbed shoreline buffer and soil mantle, with the exception of a pervious pathway (the 30 m buffer also applies to the identified watercourse in the central portion of the property);**
- **preparation of a stormwater management report and a construction mitigation plan (including phosphorus attenuation measures such as directing runoff and overland drainage from driveways, parking areas, other hard surfaces to soak away pits, infiltration facilities);**
- **location of the tile bed for each of the proposed lots should be as shown in Figure 3, in accordance with the recommendations of the site-specific soils investigation;**

The LCAH also notes the recommendation to undertake long-term monitoring of the septic effluent for research purposes. In recent discussions with the MECP, there has been any program set up within that organization to collect and analyse monitoring data. It was noted that they were included in a local approval for development on a lake trout lake at capacity that met the necessary soil conditions, and they did not include the long term monitoring as a condition of approval (Victor Castro, MECP, personal communication). Therefore we have not included this monitoring as a condition of approval here.

In addition to the above recommendations from the LCAH, it is our recommendation that an additional step be taken to further protect water quality in Oxbow Lake. The LCAH recognizes the ability of the native soils below a septic bed to bind phosphorus in specific conditions (unsaturated, high iron and aluminum concentrations, low calcium carbonate concentration). RiverStone recommends that these conditions also be present in the material that is used to construct the septic bed, as noted in Section J.8 of the Township Official Plan. As such, RiverStone further recommends:

- **All imported soils used for leaching bed construction should be silt free, fine to medium grained non-calcareous soils, having the presence of iron and aluminum. Native soils removed for the placement of a dwelling may also be used should they meet all criteria noted above and those for septic use as noted in the Ontario Building Code.**
- **The final design and installation of any septic system be completed by a licenced installer.**

4.2 Water Quality and Fish Habitat

As a result of recent regulatory changes to the *Fisheries Act*, Fisheries and Oceans Canada (DFO) have reverted back to a prohibition of causing the harmful alteration, disruption or destruction of fish habitat. From DFO, the fish and fish habitat protection provisions of the *Fisheries Act* are the authorities for the regulation of works, undertakings or activities that risk harming fish and fish habitat. Specifically, they include the two core prohibitions against persons carrying on works, undertakings or activities that result in the “death of fish by means other than fishing” (subsection 34.4(1)), and the “harmful alteration, disruption or destruction of fish habitat” (subsection 35(1)). The fish and fish habitat protection provisions are applied in conjunction with other applicable federal laws and regulations related to aquatic ecosystems, including the *Species at Risk Act*:

With respect to the harmful alteration, disruption or destruction (HADD) of fish habitat, DFO notes that proponents are responsible for planning and implementing works, undertakings or activities in a manner that avoids harmful impacts, specifically the death of fish and the harmful alteration, disruption or destruction of fish habitat. Proponents and their consultants are directed to review and implement DFO’s measures to protect fish and fish habitat, summarized as follows;

- Prevent the death of fish
- Maintain riparian vegetation
- Carry out works, undertakings and activities on land
- Maintain fish passage
- Ensure proper sediment control
- Prevent entry of deleterious substances in water.

The development proposal, if approved, would include the construction of several dwelling, docking structures, septic systems and accessory structures, all of which could possibly impact fish habitat. which will be considered in the impact assessment below as well as any implications under the *Fisheries Act*.

In the nearshore area across the frontage of the subject property, Type 1 (sensitive) Fish Habitat includes areas used for spawning and as nursery habitat for fish. These areas are generally incompatible with development, where harmful alteration of fish habitat may occur if docking/boathouse structures are constructed. The Type 1 Fish Habitat identified fronts an undisturbed, permanently flowing, coldwater creek, providing suitable fish habitat for a variety of species (**Figure 3**). Type 2 (general) Fish Habitat does not contain specialized habitat for fish and is typically used outside of the sensitive spawning seasons for general life history requirements (general feeding, refugia, *etc.*). Restricting the placement of in-water structures to areas of Type 2 habitat ensures that Type 1 critical habitat is maintained.

To ensure that fish habitat in Oxbow Lake is not negatively impacted by the placement of in-water structures and that the proposed development is in compliance with the *Fisheries Act*, RiverStone recommends the following measures:

- **All new development be set back 30 m from Oxbow Lake, excluding the proposed docking structures to be constructed at the locations shown on Figure 3. These docking locations are conceptual and represent suitable areas, which can be moved as long as they remain outside of identified area of Type 1 Fish habitat and comply with the sideyard setback requirements of the Township.**
- **All new development be set back 30 m from Oxbow Lake, excluding the proposed docking structures to be constructed at the locations shown on Figure 3. These docking locations are conceptual and represent suitable areas, although they can be moved as long as they remain outside of identified Type 1 Fish habitat and comply with the sideyard setback requirements of the Township.**
- **Vegetation within 25 m of Oxbow Lake and 15 m from the tributary to Oxbow Lake will be maintained in its natural state. Access to the shoreline of Oxbow Lake for all proposed lots will be via a pathway a maximum width of 2 m, meandering, and be constructed of permeable substances (i.e., clean gravel, mulch) where required. Trees will not be cut within the setback unless they are a safety hazard and debris from clearing or materials to be used in construction will not be placed within the setback.**
- **Placement of docking facilities should be excluded from area fronting the watercourse and identified as Type 1 Fish Habitat. Conceptual docking envelopes are shown on Figure 3, but may be moved, with the area of Type 1 fish habitat as the primary constraint.**
- **DFO should be notified immediately if a situation occurs or if there is imminent danger of an occurrence that could cause harmful alteration disruption or destruction of fish habitat. If there is an occurrence, corrective measures must be implemented.**
- **Construction of the in-water portion of docking structures and associated in-water works are not to be completed between May 1 and July 15 to avoid potential impacts to fish during the warm-water spawning season. Lake Trout habitat does not exist along the frontage, therefore the coldwater timing restriction is not necessary to apply.**
- **All in-water habitat features, including aquatic vegetation, natural woody debris and boulders should be left in their current locations in the nearshore area unless with approvals through MNRF.**
- **Vegetation within the shoreline buffer area should be left in its current state, without any thinning of trees, unless they are a safety hazard.**

As part of the impact analysis, potential impacts on water quality and fish habitat were assessed. In general, negative impacts on water quality and fish habitat can result via the following processes:

- stormwater runoff during construction activities
- modification of drainage patterns or flow rates
- inappropriately located sewage treatment systems that increase nutrient (phosphorous) loading to water bodies

- increased runoff due to an increase in the extent of hard surfaces (e.g., rooftops, driveways, patios)
- construction of in-water structures (e.g., culverts, docks, bridges)
- changes to in-water structural features (e.g., substrates, woody debris, aquatic vegetation)
- changes to onshore structural features (e.g., removal of vegetation or soil, importation of aggregates)

Although the land use changes that are proposed have the potential to have negative impacts on water quality and fish habitat, it is RiverStone's opinion that the mitigation measures recommended below can reduce the risk of negative impacts to an acceptable level. Several of the mitigation measures relate to establishing vegetated shoreline buffers or setbacks. Within vegetated buffers, trees, shrubs, ground cover, and associated leaves and twigs slow rainfall and surface-water flows to water bodies and thus allow additional time for water to soak into the ground. This facilitates nutrient uptake and provides less opportunity for erosion by stabilizing shoreline soils. The retention of vegetation allows for a continual source of woody debris and leaves, while increasing the uptake of phosphorus from overland run off prior to it entering a water body. Because primary productivity in most lakes depends on phosphorus input (Schindler 1977), limiting the amount that reaches the water body reduces the occurrence of algae growth in the nearshore areas.

To ensure that water quality and fish habitat are not negatively impacted by stormwater runoff during construction activities (e.g., land clearing and grubbing, dwelling and septic system construction, driveway construction), RiverStone recommends the following measures:

- **When the native soil is exposed, sediment and erosion control work, in the form of heavy-duty sediment fencing, be positioned along the downgradient edge of any construction envelopes adjacent to water bodies, wetlands, or watercourses.**
- **Temporary storage locations of aggregate materials will be located outside the 30 m of the setback from Oxbow Lake as identified on Figure 3. This material is to be contained by heavy-duty sediment fencing.**
- **Storage of any construction material or debris will be located outside the 30 m of the setback from Oxbow Lake as identified on Figure 3. This material is to be contained by heavy-duty sediment fencing.**
- **Sediment fencing must be constructed of heavy material and solid posts to ensure its integrity and be properly installed (trenched in) to maintain its integrity during inclement weather events.**
- **Additional sediment fencing and appropriate control measures (e.g., straw bales) be stockpiled on site so that any breach can be immediately repaired through construction of check dams.**
- **Regular inspection and monitoring will be necessary to ensure that the structural integrity and continued functioning of the sediment control measures is maintained (i.e., proper installation is not the only action necessary to satisfy the mitigation requirements).**
- **Inspections of sediment and erosion control measures be completed within 24 hours of the onset of a storm event.**
- **Sediment control measures be maintained in good working order until vegetation has been established on the exposed soils.**

- **Should the proposed access road cross the watercourse, the road should be crossed perpendicular to the watercourse with the appropriately sized culvert.**

4.3 Endangered and Threatened Species

Appendix 2 presents our assessment of potential impacts on species and ecological communities of conservation interest and **Figure 3** outlines the features and functions of conservation interest and recommendations. Potential habitat for two (2) Endangered bats, Little Brown Bat and Northern Long-eared Bat is located across the Subject Property in all forested vegetation communities. In each of these communities, there are potential snag trees that could support maternal roosting habitat for each of the Endangered Bats.

Pregnant and lactating females will move from roost to roost each morning in responses to changes in thermal conditions and prey (insect) availability. Areas containing a high density of snags increases the chances of use by Endangered Bats as these areas provide a variety of microhabitat conditions. Changes within the forest community adjacent to maternal roosts have the potential to reduce the suitability of a given snag or cavity tree by changing the extent of shading by adjacent trees, which can result in changes to thermal conditions within the roost. Additionally, as roosting trees inherently exhibit some level of decay, removal of trees surrounding roosts may increase the potential for wind-throw of both the roost itself and surrounding trees, thereby damaging or destroying the habitat feature.

Habitat for Endangered or special concern bats is prevalent throughout Muskoka. As a predominantly forested area, habitat for maternal roosting bats is not limited across the landscape. The primary reason for these species of bats being listed under the *ESA* is the prevalence of White-nose Syndrome, which is a fungus that infects bats as they hibernate over winter. This fungus grows on their muzzle, ears and wing-membranes, continually waking them from hibernation and causing dehydration, resulting in mortality.

In order to prevent impacts upon the habitat of Endangered, Threatened and Special Concern bats that may be utilizing the forest communities on the Subject Property for maternal roosting habitat, RiverStone recommends the following;

- **Tree clearing for the purposes of development on each proposed lot only occur in the fall, winter and early spring (from October 15 to April 15). This timeframe is outside of the maternal roosting period.**
- **In the event that tree clearing must occur between April 15 and October 15, a qualified professional should complete a combination of snag surveys and acoustic monitoring, with technical guidance from the MNRF, for the area where tree clearing is proposed. If snag trees are found within the clearing area, bat exit surveys may be required.**

In regard to the potential for Eastern Hog-nosed Snake, they do not tend to travel, migrate or position themselves in particular habitats throughout their lifecycle. They are described as a highly mobile species and somewhat generalist with respect to habitat preferences (Kraus 2011). The primary habitats noted in the recovery strategy are hibernation and oviposition sites, which are described as mixed intolerant upland forests and beach or sandy soils, respectively. As a result of Eastern Hog-nosed snakes being present on the subject lands, RiverStone recommends the following measures:

- **The number and length of roads servicing proposed lots be minimized as a means of reducing the potential for road mortality.**
- **Removal of terrestrial vegetation should be limited outside of the development envelopes.**

4.4 Significant Wildlife Habitat

The following sections contain the results of the impact assessment and recommendations for avoidance and minimization of potential impacts to the ecological form and function of candidate SWHs identified during the initial stages of RiverStone's SWH assessment. Details of the initial stages of the assessment are provided in **Appendix 3** and have been summarised above in **Section 3.4.3**.

4.4.1 Seasonal Concentration Areas of Animals

4.4.1.1 Bat Maternal Colonies

As noted above in Section 3.4.2, RiverStone noted the potential habitat for roosting bats on the subject property. Potential roosting habitat is likely present with a large amount of forested area and mitigation measures listed above, including the timing restriction for vegetation clearing outside of May 1 to September 30 and maintaining snag and cavity trees, will protect the ecological form and function of potential roosting habitat on the subject property.

4.4.2 Habitat for Species of Conservation Concern (excluding Endangered or Threatened Species)

4.4.2.1 Special Concern and Rare Wildlife Species

Results of RiverStone's habitat based assessment for Special Concern Species on the subject property and adjoining lands identified the potential for Snapping Turtle, Wood Thrush and Eastern Wood Pewee to utilize portions of the subject property. Habitat for these species are primarily associated with the lake shoreline and forest communities along on the subject property. Following the recommendations already noted for the protection of water quality, fish habitat and Endangered Species, related to development setbacks from the lake / watercourse and maintenance of vegetation, are sufficient to maintain the ecological form and function of the property that may be suitable for these species.

5 CONFORMANCE WITH APPLICABLE ENVIRONMENTAL POLICIES

The following sections summarize the municipal, provincial, and federal environmental policies that are relevant to the development plan proposed and describe how the recommendations provided in this report will ensure the development plan conforms with these policies (where applicable).

5.1 Township of Lake of Bays Development Permit By-Law (04-180) (Consolidated November 18, 2010)

The Township's Development Permit Bylaw incorporates the zoning, site plan and minor variance processes into a single system. The guiding principles of the Permit By-law, as taken from Section H20 of the Official Plan, form the basis for the Permit By-law:

Schedule C – Criteria for variations from standards

- the natural waterfront will prevail with built form blending into the landscape and shoreline;
- natural shorelines will be retained or restored;
- disturbance on lots will be limited and minimized;
- vegetation will be substantially maintained on skylines, ridge lines or adjacent to the top of rock cliffs;
- native species will be used for buffers or where vegetation is being restored;
- rock faces, steep slopes, vistas and panoramas will be preserved to the extent feasible; and
- building envelopes and the associated activity area will be defined and the remainder of the property shall remain generally in its natural state.

Following the recommendations provided herein, the development proposed will comply with these principles. Each of the proposed lots will require development permits, given their location in the waterfront area where the Permit By-law is applicable. The proposed configuration of each lot along with the setbacks, vegetation maintenance and construction controls, will be compliant with the Development Permit By-law.

5.2 Township of Lake of Bays Zoning By-Law (2004-181) (Consolidated November 18, 2010)

The proceeding sections discuss how the proposed land use change would comply with federal and provincial legislation and policy, as well as the policies of the District Municipality of Muskoka. Many of the policies addressed are similar to those set out in the Town's Official Plan. Specifically, issues pertaining to the protection of, Fish Habitat and Endangered and Threatened Species Habitat as per the requirements and recommendations of the Official Plan have been addressed.

5.3 Township of Lake of Bays Official Plan (Consolidated January 12, 2016)

The Township's OP also has several policies related to the identification and protection of natural heritage features. Particularly, Section D Environment, contains policies related to natural features of importance and development principals to maintain those features.

A number of the policies directly apply to this proposed development application, including D18 that requires shoreline structures be built in a manner that considers natural features such as fish and wildlife habitat, natural landscapes and terrain. In addition, there are a number of policies that discuss the importance of water quality and using advanced septic systems to limit phosphorus input into lakes.

Sections D99 and D100 discuss the requirement for an impact assessment should lot creation be contemplated as well as the planning means to implement recommendations from an impact assessment for protection of important features. Sections D. 122 outlines the required 30 m setback from a cold water stream and section D 123 and 124 identify sensitive Lake Trout lakes and the required minimum 30 m setback from the high water mark for these lakes.

Measures to implement all of these policies have been recommended within this EIS and as part of the proposed development of the Subject Property. It is RiverStone's opinion that this EIS meets the policies within the Township Official Plan as it relates to natural heritage feature assessment and protection.

5.4 District of Muskoka Official Plan (2019 Office Consolidation)

The Muskoka Official Plan provides recommendations regarding the protection of the natural environment across the District of Muskoka. Many of the recommendations parallel the requirements

set out in the ESA, *Fisheries Act*, and PPS; consequently, the preceding discussion of how a development on the subject property would comply with those requirements similarly applies to policies in the Muskoka Official Plan.

5.5 Provincial Policy Statement, pursuant to the *Planning Act*, R.S.O. 1990, c. P. 13

The significant natural features documented on this property are a cold water stream, potential habitat for endangered and threatened species, and fish and fish habitat. Based on these identified features the following provisions from Section 2.1 of the 2020 PPS are relevant to this assessment:

2.1.2 The diversity and connectivity of natural features in an area, and the long-term *ecological function* and biodiversity of *natural heritage systems*, should be maintained, restored or, where possible, improved, recognizing linkages between and among *natural heritage features and areas, surface water features and ground water features*.

RiverStone has included recommendations to protect the features with the highest ecological value along the shoreline and maintain connectivity. Surface water and groundwater features must be protected through the detailed site servicing and sediment and erosion control plans. Provided these recommendations are incorporated into the development plan the natural features in this area will be maintained.

2.1.5 *Development and site alteration shall not be permitted in:*

d) *significant wildlife habitat;*

...unless it has been demonstrated that there will be no *negative impacts* on the natural features or their *ecological functions*. **Appendix 3** and **Sections 3.4** and **4.3**, provide our assessment of the likelihood that the development and site alteration proposed on the subject property would negatively impact features that could potentially qualify as Significant Wildlife Habitat. Based on the assessment provided therein, it is our conclusion that development and site alteration that would be permissible would be consistent with policy 2.1.5., as long as the recommended mitigation measures are followed.

2.1.6 *Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.*

2.1.7 *Development and site alteration shall not be permitted in habitat of endangered species and threatened species, except in accordance with provincial and federal requirements.*

Excluding development and site alteration from the areas shown in **Figure 3** will ensure that these activities do not occur in areas that could be considered fish habitat or habitat of endangered or threatened species which is consistent with policies 2.1.6 and 2.1.7.

2.1.8 *Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5 and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.*

The extent of the area evaluated for negative impacts on potentially significant natural heritage features as described in **Section 2.2** and in **Section 3** are more than sufficient to ensure that impacts on Adjacent Lands were appropriately assessed. Careful evaluation of the ecological function of the lands potentially affected by the permissible development and site alteration on the subject property indicates that the activities will be consistent with policy 2.1.8, as long as the recommended mitigation measures are followed.

5.6 Provincial Endangered Species Act, S.O. 2007, c. 6

The *Endangered Species Act, 2007* (ESA) came into effect June 30, 2008 and replaced the previous provincial *Endangered Species Act*. The following excerpt from the explanatory note provided with the Act summarizes the protection afforded to species:

If a species is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species, the Bill prohibits killing, harming, harassing, capturing, taking, possessing, transporting, collecting, buying, selling, leasing, trading or offering to buy, sell, lease or trade a member of the species, or selling, leasing, trading or offering to sell, lease or trade anything that is represented to be a member of the species.

Protection afforded to habitats of species is described as follows:

If a species is listed on the Species at Risk in Ontario List as an endangered or threatened species, the Bill prohibits damaging or destroying the habitat of the species. This prohibition also applies to an extirpated species if the species is prescribed by the regulations. The regulations may specifically prescribe an area as the habitat of a species but, if no habitat regulation is in force with respect to a species, “habitat” is defined to mean an area on which the species depends, directly or indirectly, to carry on its life processes. With respect to certain species that were classified before first reading of the Bill, the prohibition on damaging or destroying habitat does not apply until the earlier of the date a regulation prescribing the habitat of the species comes into force and the fifth anniversary of the date the requirement to establish the Species at Risk in Ontario List comes into existence.

Appendix 2 lists the species protected under provisions of the ESA that have the potential to occur in the area of interest or on the adjoining lands. As detailed therein, the likelihood of contravening the ESA, should the proposed activities be implemented, can be reduced to an acceptable level by following RiverStone’s recommended mitigation measures.

5.7 Federal Fisheries Act (R.S.C., 1985, amended 2013-11-25)

The *Federal Fisheries Act* states that:

35. (1) No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery.

Recent regulatory changes to the *Fisheries Act* require under subsection 35(1) that project activities be reviewed to determine if they have the potential to result in *serious harm to fish* that are part of a commercial, recreational, or Aboriginal fishery, or to fish that support such a fishery. Based on guidance documents provided by DFO, *serious harm to fish* includes:

- direct fish mortality,
- the permanent alteration of fish habitat at a spatial scale, duration or intensity that negatively impacts habitat used to carry out one or more of their life processes (i.e., spawning, nursery, or rearing grounds, food supply areas, mitigation corridors, etc.), and
- destruction of fish habitat at a spatial scale, duration or intensity such that fish can no longer utilize habitats necessary to carry out one or more of their life processes (i.e., spawning, nursery, or rearing grounds, food supply areas, mitigation corridors, etc.).

As long as the recommendations herein are followed, it is the opinion of RiverStone that activities proposed on this property will not contravene Section 35 (1) of the *Fisheries Act*, and that an authorization under the Section 35(2) is not likely required. Should however, during the course of this project, situations arise and lead to occurrences that result in “*serious harm to fish*”, persons responsible for the project have a “duty to notify” DFO, take corrective actions, and provide written reports under Section 38 of the *Act*.

5.8 Federal Migratory Birds Convention Act, S.C. 1994, c. 22

Section 6 of the Migratory Birds Regulations under the MBCA makes it an offence to “disturb, destroy or take a nest, egg, nest shelter, eider duck shelter or duck box of a migratory bird.”

Restricting clearing of vegetation for the proposed development to times outside of the period May 1 to July 31, will prevent contravention of Section 6 of the regulations.

If development and site alteration is going to occur during this period, a nest survey should be conducted by a qualified avian biologist prior to commencement of construction activities to identify and locate active nests of migratory bird species covered by this Act. If a nest is located or evidence of breeding noted, then a mitigation plan should be developed to address any potential impacts on migratory birds or their active nests. Mitigation may require establishing appropriate buffers around active nests or delaying construction activities until the conclusion of the nesting season.

6 CONCLUSIONS

Based upon the findings presented in this report and contingent upon the implementation of the recommendations made herein, it is our conclusion that the activities permissible on the proposed lots will have a low likelihood of negatively impacting any significant natural heritage features or their functions and can be acceptably minimized. We advise that the recommendations in this report be incorporated into the development and site plan agreements for the lots. Finally, these conclusions are also dependent upon the recommended preventative measures being implemented through site plan control that is subsequently enforced with appropriate by-laws.

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Appendix 1. Select Photos from Site Visit.





Photo 1. Hemlock dominated forest (G051) located along the shore of the subject property (Sept 4, 2020).



Photo 2. Mixedwood (G058) forest community covering the majority of the subject property (September 4, 2020).



Photo 3. Watercourse in central portion of subject property with step pool morphology (September 4, 2020).



Photo 4. Approximate location of proposed access road crossing over watercourse in central portion of subject property (September 4, 2020).



Photo 5. Existing dock structure located in the south portion of the subject property (May 6, 2020).



Photo 6. Representative shoreline photo of dense, overhanging vegetation along shoreline (September 4, 2020).



Photo 7. Representative shoreline photo with overhanging tree along most of the shoreline (September 4, 2020).



Photo 8. Lot #1 soil excavation pit (December 12, 2019).



Photo 9. Lot #2 soil excavation pit (December 12, 2019).



Photo 10. Lot #3 soil excavation pit (May 6, 2020).



Photo 11. Lot #4 soil excavation pit (May 6, 2020).



Photo 12. Lot #5 soil excavation pit (May 6, 2020).



Photo 13. Lot #6 soil excavation pit (May 6, 2020).



Photo 14. Lot #7 soil excavation pit (May 6, 2020).

Appendix 2. Assessment of Endangered and Threatened Species.

Habitat-based Approach

Properly assessing whether an area is likely to contain Endangered or Threatened species for the purposes of determining whether a proposed development is likely to have a negative impact is becoming more difficult as the number of listed species increases. Approaches that depend solely on documenting the presence of individuals of a species in an area almost always underrepresent the biodiversity actually present because of the difficulty of observing species that are usually rare and well camouflaged. Given these difficulties, and the importance of protecting habitats of Endangered and Threatened species, RiverStone's primary approach to site assessment is habitat-based. This means that our field investigations focus on *evaluating the potential for features within an area of interest to function as habitat for species considered potentially present, rather than searching for live specimens*. An area is considered potential habitat if it satisfies a number of criteria, usually specific to a species, but occasionally characteristic of a broader group (e.g., several turtles use sandy shorelines for nesting, multiple bat species use dead or dying trees for roosting habitat). Physical attributes of a site that can be used as indicators of its potential to function as habitat for a species include structural characteristics (e.g., physical dimensions of rock fragments or trees, water depth), ecological community (e.g., meadow marsh, rock barren), and structural connectivity to other habitat features required by the species. Species-specific habitat preferences and/or affinities are determined from status reports produced by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), Cadman et al. (2007), published and unpublished documents, and direct experience.

Table 1 provides RiverStone's desktop screening and on-site assessment for Endangered and Threatened species. RiverStone measures species- and feature-specific distances from the boundaries of proposed lots or development area(s)—rather than from the boundary of the significant natural heritage feature—and refers to this area as *adjoining lands* (AL). Evaluating the likelihood of species' presence and the potential for negative impacts using this approach ensures that the Adjacent Lands test of the PPS will be met.

For the purposes of RiverStone's assessment, the *subject property* as shown in **Figure 1** is referred to as the Area of Interest (AOI) and the adjoining lands (AL) extents were measured from the boundaries of the AOI.

Section 4.2 of the report outlines RiverStone's recommended mitigation measures, and a determination of whether the likelihood or risk of negative impacts is acceptable after considering all relevant factors (e.g., sensitivity to disturbance).

Appendix 2: Table 1. Results of desktop screening and on-site assessment for species and ecological communities of conservation interest.

Common Name ¹	Scientific Name	Step 1 (Desktop): Rationale for considering	Step 2 (Desktop): Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from aerial photography and other information sources indicate that potential habitat or communities might be present?	Area of Interest (AOI) Adjoining Lands (AL)	Step 3 (On Site): Potential and/or confirmed habitat documented during on-site assessment	Step 4: Is there potential for the species, its habitat, or ecological community to be negatively impacted by the activities that would be permissible within the AOI?
Endangered & Threatened (Provincially): status from Species at Risk in Ontario List (O Reg 230/08); updated January 2018						
Eastern Hog-nosed Snake	<i>Heterodon platirhinos</i>	SAR by Geo-Township Tool (MNR)	YES, although habitat potential is deemed low because of extent of forest cover, the openings in the forest canopy on the AOI may be sufficient to support a local population.	YES, although habitat potential is deemed low because of extent of forest cover, the openings in the forest canopy on the AL may be sufficient to support a local population.	YES, although area is predominantly forested with few gaps in the canopy, foraging habitat may be present.	YES, impacts in the form of road mortality possible.
Eastern Whip-poor-will	<i>Caprimulgus vociferus</i>	SAR by Geo-Township Tool (MNR)	NO, suitably sized openings in forest canopy are absent.	NO, suitably sized openings in forest canopy are absent.	NO, suitably sized openings in forest canopy are absent.	NO, see steps 2 and 3.
Bobolink	<i>Dolichonyx oryzivorus</i>	OBBA	NO, suitable grassland or agricultural communities are absent.	NO, suitable grassland or agricultural communities are absent.	NO, suitable grassland or agricultural communities are absent.	NO, see steps 2 and 3.
Least Bittern	<i>Ixobrychus exilis</i>	OBBA	NO, suitable wetland communities (e.g., cattail marsh) are absent.	NO, suitable wetland communities (e.g., cattail marsh) are absent.	NO, suitable wetland communities (e.g., cattail marsh) are absent.	NO, see steps 2 and 3.
Chimney Swift	<i>Chaetura pelagica</i>	SAR by Geo-Township Tool (MNR)	NO, dark sheltered hollow vertical structures (chimneys, smoke stacks, silos, large trees with cavities and rock crevices) suitable for nesting or roosting are absent.	NO, dark sheltered hollow vertical structures (chimneys, smoke stacks, silos, large trees with cavities and rock crevices) suitable for nesting or roosting are absent.	NO, dark sheltered hollow vertical structures (chimneys, smoke stacks, silos, large trees with cavities and rock crevices) suitable for nesting or roosting are absent.	NO, see steps 2 and 3.
Barn Swallow	<i>Hirundo rustica</i>	SAR by Geo-Township Tool (MNR)	NO, man-made or natural structures suitable for nesting are absent.	NO, man-made or natural structures suitable for nesting are absent.	NO, man-made or natural structures suitable for nesting are absent.	NO, see steps 2 and 3.
Eastern Meadowlark	<i>Sturnella magna</i>	OBBA	NO, suitable grassland or agricultural communities are absent.	NO, suitable grassland or agricultural communities are absent.	NO, suitable grassland or agricultural communities are absent.	NO, see steps 2 and 3.
Bank Swallow	<i>Riparia riparia</i>	SAR by Geo-Township Tool (MNR)	NO, man-made or natural structures suitable for nesting are absent.	NO, man-made or natural structures suitable for nesting are absent.	NO, man-made or natural structures suitable for nesting are absent.	NO, see steps 2 and 3.
Eastern Small-footed Myotis	<i>Myotis leibii</i>	SAR by Geo-Township Tool (MNR)	NO, potential habitat not observed; no talus slopes or table rocks suitable for roosting observed.	NO, potential habitat not observed; no talus slopes or table rocks suitable for roosting observed.	NO, potential habitat not observed; no talus slopes or table rocks suitable for roosting observed.	NO, see steps 2 and 3.
Little Brown Bat	<i>Myotis lucifugus</i>	SAR by Geo-Township Tool (MNR)	YES, dark sheltered hollow vertical structures (e.g., large trees with cavities or rock crevices) suitable for gestating or roosting may be present.	YES, dark sheltered hollow vertical structures (e.g., large trees with cavities or rock crevices) suitable for gestating or roosting may be present.	YES, dark sheltered hollow vertical structures (e.g., large trees with cavities or rock crevices) suitable for gestating or roosting may be present.	YES, development and site alteration has the potential to damage habitat.
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	SAR by Geo-Township Tool (MNR)	YES, dead or partially-decayed trees with crevices beneath exfoliating/peeling bark may be present.	YES, dead or partially-decayed trees with crevices beneath exfoliating/peeling bark may be present.	YES, dead or partially-decayed trees with crevices beneath exfoliating/peeling bark are present.	YES, development and site alteration has the potential to damage habitat.

¹Shaded rows denote species or communities for which negative impacts have been deemed possible.

Appendix 3. Assessment of Candidate Significant Wildlife Habitat



Ecoregion 5E	Candidate Significant Wildlife Habitat*	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Seasonal Concentration Areas of Animals			
Waterfowl Stopover and Staging Areas (Terrestrial)	Fields with sheet water during Spring (mid March to May)	These field/meadow ELC ecosites with appropriate soils and vegetation: G060-062, G077-079, G093-095, G109-111	NO, the assessment area and surrounding lands do not contain fields or agricultural areas
	Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl.	Plus evidence of annual spring flooding from melt water or run-off.	
	Agricultural fields with waste grains are commonly used by waterflow , these are not considered SWH unless they have spring sheet water available.		
Waterfowl Stopover and Staging Areas (Aquatic)			
	Ponds, marshes, lakes, bays, coastal inlest, and watercourses used during migration.	ELC Ecosites: G142-G152	NO, the subject property does not contain the appropriate communities associated with Waterfowl Stopover and Staging. No waterfowl were documented in the subject property during the site visits . It is unlikely that the shoreline will be used as a stopover.
	Sewage treatment Ponds and storm water Ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify.		
	These habitats have an abundance food supply (mostly aquatic invertebrates and vegetation in shallow water)		
Shorebird Migratory Stopover Areas			
	Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats.	ELC Ecosites: G005-G006, G160-G162, G170-G172, G176-G178, G186-G188, G204-G214	NO, while the assessment area has frontage on Oxbow Lake, the subject property does not contain the appropriate vegetation community and the shoreline is extremely well vegetated with abundant overhangind trees suggesting area is unsuitable for use by shorebirds.
	Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October.		
	Sewage treatment ponds and storm water ponds do not qualify as a SWH.		
Raptor Winter Feeding and Roosting Areas			
	The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors.	A combination of meadow/field and forest/woodland ecosites.	NO, the subject property contains G051 and G058 ELC Ecosites associated with this SWH type, however there is a lack of fields on adjacent lands to provide foraging habitat.
	Raptor wintering sites need to be > 20 ha with a combination of forest and upland.	Need to have a forest ELC Ecosite: G011-G19, G023-G028, G033-G043, G048-G059, G064-G076, G081-G092, G097-G108, G133-G125 or Central Ontario FEC Ecosites	
	Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands	ES11–ES35	
	Field area of the habitat is to be wind swept with limited snow depth or accumulation.	AND a meadow/field ELC Ecosite: G020-022, G029-G032, G044-G047, G060-G063, G077-080, G093-096, G109-G112	

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E (January 2015)

Ecoregion 5E		Candidate Significant Wildlife Habitat*	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Bat Hibernacula		<p>Hibernacula may be found in caves, mine shafts, underground foundations and Karsts.</p> <p>Active mine sites are not SWH.</p> <p>The locations of bat hibernacula are relatively poorly known.</p>	<p>Bat Hibernacula may be found in association with components of cliffs and rock talus in these ELC Ecosites: G158-G159, G164, G180-G181</p> <p>Or Central Ont. FEC: ES4, ES5</p> <p>Note: buildings are not considered to be SWH</p>	<p>NO, while the assessment area contains steep slopes, rock crevices, caves, and mine shafts suitable for use as hibernation sites are absent.</p>
Bat Maternal Colonies		<p>Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH).</p> <p>Maternity roosts are not found in caves and mines in Ontario</p> <p>Maternity colonies located in Mature (dominant trees > 80yrs old) deciduous or mixed forest stands with >10/ha large diameter (>25cm dbh) wildlife trees</p> <p>Female Bats prefer wildlife trees (snags) in early stages of decay, class 1-3 .</p> <p>Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred.</p>	<p>Maternity colonies considered SWH are found in forested Ecosites.</p> <p>ELC Ecosites: G016-G019, G028, G040-G043, G055-G059, G070-G076, G088-G092, G103-G108, G118-G125</p> <p>or:</p> <p>Central Ontario Forest Ecosites: ES14, ES17, ES18, ES23, ES24, ES25, ES26, ES27, ES28, ES29, ES30</p>	<p>YES, forest community present on the subject property has the potential to contain mature trees containing snags, surveys for snags and cavity trees that would provide suitable habitat for bat maternal colonies.</p>
Turtle Wintering Areas		<p>-For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates.</p> <p>-Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen</p> <p>-Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH.</p>	<p>For Snapping and Midland Painted turtles; ELC Ecosites: G128- G135 G140-G152</p> <p>For Northern Map Turtle - Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.</p>	<p>NO, substrates documented along the shoreline of the assessment area did not contain soft mud substrates and waterlevels were shallow. In addition, wetland communities are absent from the assessment area. Therefore, it is unlikely that this area contains turtle wintering habitat.</p>

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E (January 2015)

Ecoregion 5E		Candidate Significant Wildlife Habitat*	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Snake Hibernaculum		<p>-For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of features that go below frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH.</p> <p>-Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line</p> <p>-Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover.</p> <p>-Five-lined skink prefer mixed forests with rock outcrop openings providing cover rock overlaying granite bedrock with fissures.</p>	<p>For all snakes, habitat may be found in any forested ecosite in central Ontario other than very wet ones. Talus, Rock Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats.</p> <p>The existence of rock piles or slopes, stone fences, and crumbling foundations assist in identifying candidate SWH.</p> <p>For Five-lined Skink; Central Ontario Forest Ecosites: ES14.2, ES17 – ES20, ES23 – ES30 Or; ELC Ecosites: G056-G059 G070-G076 G087-G092 G103-G108 G118-G125</p>	<p>NO, while the assessment area contains steep slopes, it lacks piles of loose rock and areas of rock crevices that may provide suitable hibernation habitat for snakes.</p>
Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)		<p>-Any site or areas with exposed soil banks, sandy hills, borrow pits, steep slopes, and sand piles that are undisturbed or naturally eroding that is not a licensed/permitted aggregate area.</p> <p>-Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles.</p> <p>-Does not include a licensed/permitted Mineral Aggregate Operation.</p>	<p>Eroding banks, sandy hills, borrow pits, steep slopes, sand piles, cliff faces, bridge abutments, silos, barns.</p> <p>Habitat found in the following ELC Ecosites: G001-G004 G007-G008 G020-G021 G029-G031 G044-G046 G060-G062 G077-G079 G093-G095 G109-G111 G173-G175 G201-G203 G210-G212</p>	<p>NO, while the assessment area and adjacent lands contain steep slopes, these areas are forested and do not provide opportunities for bank and cliff nesting avian species.</p>
Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)		<p>-Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used.</p> <p>-Most nests in trees are 11 to 15 m from ground, near the top of the tree.</p>	<p>ELC Ecosites: G064-G076 G081-G092 G097-G108 G113-G125 G128-G136</p> <p>Central Ontario Forest Ecosites: ES11.2 ES12.2 ES13.2 ES14.2 ES15.2 ES16.2 ES17.2 ES18.2 ES19.2 ES20.2 ES21.2 ES23.2 ES24.2 ES25.2 ES26.2 ES27.2 ES28.2 ES29.2 ES30.2 ES31 ES32 ES33 ES34 ES35</p>	<p>NO, no large stick nests were identified during on site assessments.</p>

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E (January 2015)

Ecoregion 5E		Candidate Significant Wildlife Habitat*	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Colonially - Nesting Bird Breeding Habitat (Ground)		<p>-Nesting colonies of gulls and terns are on islands or peninsulas (natural or artificial) associated with open water, marshy areas, lake or large river (two-lined on a 1:50,000 NTS map).</p> <p>-Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands.</p>	<p>Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map).</p> <p>Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer’s Blackbird) G001-G004 G007-G008 G020-G021 G029-G031 G044-G046 G060-G062 G077-G079 G093-G095 G109-G111 G142-G145</p>	<p>NO, while on-site assessments were not completed during the breeding bird season, no evidence of colonial nesting was documented in the assessment area or adjacent lands.</p>
Deer Yarding Areas		<p>-Deer wintering areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two areas referred to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20 cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30 cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter.</p> <p>-The Core of a deer yard (Stratum I) is located within Stratum II and is critical for deer survival in areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60%.</p> <p>-OMNRF determines deer yards following methods outlined in “Selected Wildlife and Habitat Features: Inventory Manual”.</p> <p>-Woodlots with high densities of deer due to artificial feeding are not significant.</p>	<p>May be found in all Tall Treed forest and swamp ELC Ecosites; G12-G15 G23-G27 G33-G38 G48-G54 G64-G69 G81-G87 G97-G103 G113-G118 G128-G129</p> <p>Central Ontario Forest Ecosites: ES11 ES14 ES16 ES18 ES20 ES21 ES22 ES27 ES28 ES30 ES31 ES32 ES33 ES34</p> <p>Note: OMNRF to determine this habitat.</p>	<p>NO, deer wintering area has been identified on the assessment area and adjacent lands by OMNRF.</p>
Rare Vegetation Communities				
Beach / Beach Ridge / Bar / Sand Dunes		<p>Vegetation can vary from patchy and barren to tree cover but less than 60%. Characterised by unstable sand.</p> <p>Indicator Spp. Marram Grass (<i>Ammophila breviligulata</i>), Beach Pea (<i>Lathyrus japonicus</i>)</p>	<p>Central Ontario FEC: ES1, ES2 ELC Ecosites: G005-G006, G166-G168, G182-G184, G213-G214</p>	<p>NO, communities characterized by unstable sand with less than 60% vegetation cover were identified on the assessment area or adjacent lands.</p>
Shallow Atlandtic Coastal Marsh		<p>Shallow marsh occurs on shallow mineral (sand) or mineral organic (sandy peat) shoreline subject to low wave energy, on inland lakes and beaver ponds particularly those that experience fluctuating water levels from year to year (i.e. some years with exposed shorelines in summer /fall).</p> <p>Indicator Spp.: Virginia Meadowbeauty (<i>Rhexia virginica</i>)</p> <p>Other Associated Spp: <i>Rhynchospora capitellata</i>, <i>Xyris difformis</i>, <i>Panicum spretum</i>, <i>Triadenum virginicum</i>, <i>Polygonum careyi</i> and <i>Juncus militaris</i> .</p>	<p>ELC Ecosites: G143-G145, G148-G152</p>	<p>NO, while the assessment area includes frontage on Oxbow Lake; however, no indicator or associated species were documented during on-site investigations.</p>

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E (January 2015)

Ecoregion 5E	Candidate Significant Wildlife Habitat*	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Cliffs and Talus Slopes	Vegetation can vary from patchy and barren to tree cover but less than 60%.	ELC Ecosites: G158-G159, G166-G168, G173, G175, G182-G184, G201-G203	NO, the assessment area does not contain cliffs.
	Cliffs and talus slopes in 5E are primarily Precambrian rock and are typically sparsely vegetated.		
	Characteristic flora for cliffs and talus slopes include: lichen, such as Rock Tripe <i>Umbilicaria</i> spp., and ferns <i>Polypodium virginianum</i> , <i>Cystopteris fragilis</i> and <i>Woodsia ilvensis</i> , <i>Cryptogramma stelleri</i> , <i>Woodsia alpina</i> , and <i>Saxifraga paniculata</i> .		
Rock Barren	Vegetation can vary from patchy and barren to tree cover but less than 60% . Rock barrens are characterized by extensive areas of exposed granitic rock bedrock sparsely vegetated.	ELC Ecosites: G163-G165, G179-G181 Central Ontario Forest Ecosites: ES8	NO, the assessment area does not contain rock barren communities.
	Characteristic flora for Rock Barrens include: lichens <i>Cladina</i> spp. and mosses <i>Polytrichum</i> spp.), sparse grasslands of <i>Danthonia spicata</i> and <i>Deschampsia flexuosa</i> , low shrubs (<i>Juniperus communis</i> , <i>Vaccinium angustifolium</i> , <i>Comptonia peregrina</i> , and stunted open grown trees <i>Quercus alba</i> , <i>Quercus rubra</i> and <i>Pinus strobus</i> . Also, <i>Pteridium aquilinum</i> , <i>Aralia hispida</i> , <i>Spiranthes casei</i> , <i>Saxifraga virginienensis</i> , <i>Gaylussacia baccata</i> , <i>Corydalis sempervirens</i> , <i>Prunus pensylvanica</i> , and <i>Comandra umbellata</i> .		
Sand Barren	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. They have little or no soil and the underlying rock protrudes through the surface. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered but less than 60%.	ELC Ecosites: G007, G215 Central Ontario Forest Ecosite: ES10	NO, communities characterized by exposed sand were not documented in the assessment area or adjacent lands.
	Characteristic plant species of sand barrens in 5E include: <i>Cladina</i> spp., <i>Carex houghtoniana</i> , <i>Carex merrittfermaldii</i> , <i>Comptonia peregrina</i> , <i>Rubus flagellaris</i> , <i>Selaginella rupestris</i> , and <i>Viola labradorica</i> , <i>Polygonella articulata</i> , and <i>Stipa spartea</i> .		
Alvar	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars may be complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover. 5E Alvar Plant Indicator species: <i>Penstemon hirsutus</i> , <i>Panicum philadelphicum</i> , <i>Scutellaria parvula</i> , <i>Rhus aromatica</i> , <i>Monarda fistulosa</i> , <i>Senecio pauperculus</i> .	Southern Ontario ELC Ecosites: ALO1, ALS1, ALT1, FOC1, FOC2, CUM2, CUS2, CUT2-1, CUW2 Central Ontario Forest Ecosites on very shallow soils: ES13.1, ES14.1, ES16.1, ES21.1, ES9	NO, alvar communities were not documented in the assessment area or adjacent lands.

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E (January 2015)

Ecoregion 5E	Candidate Significant Wildlife Habitat*	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Old Growth Forest	Old Growth forests are characterized by exhibiting the greatest number of old-growth characteristics, such as mature forest with large trees that has been undisturbed. Heavy mortality or turnover of overstorey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.	Long-lived forest spp. within these Central Ontario Forest Ecosites: ES11, ES12, ES14, ES20, ES21, ES22, ES23, ES24, ES25, ES26, ES27 ES28 ES29 ES30 or ELC Ecosites: G011-G15, G017-G018, G023, G027, G033, G036, G039-G042, G048, G051, G054-G058, G064, G066, G069, G071-G075, G081, G084, G087, G089-G091, G103, G105-G107, G113, G115, G118, G120-G124.	NO, based on a review of available background documentation, old growth forest communities were not present on the assessment area. This was supported by conditions documented during on-site review (i.e., trees observed were of insufficient size).
Bog	Bogs are nutrientpoor, acid peatlands dominated by peat mosses (Sphagnum sp.), ericaceous shrubs and sedges (Cyperaceae). The water table is at or near the surface in spring and slightly lower the remainder of the year and is virtually isolated from mineral soil waters.	ELC Ecosites: G126, G137-G138	NO, communities characterised by nutrient poor peatlands with a high water table were absent from the assessment area and adjacent lands.
Tallgrass Prairie	Tallgrass Prairie is an open vegetation with less than < 25% tree cover, and dominated by prairie species, including grasses. Indicator Spp. <i>Andropogon gerardii</i> and <i>Spartina pectinata</i> Characteristic Spp. <i>Bromus kalmii</i> , <i>Ceanothus herbaceus</i> , <i>Lechea intermedia</i> , <i>Monarda fistulosa</i> , <i>Penstemon hirsutus</i> , <i>Polygala polygama</i> , <i>Rudbeckia hirta</i> , <i>Sorghastrum nutans</i> , <i>Viola fimbriatula</i> .	Southern ELC Ecosites: TPO1, TPO2 Central Ontario Ecosite: ES10	NO, communities dominated by prairie species with less than 25% tree cover were not documented in the assessment area or adjacent lands.
Savannah	A Savannah is related to tallgrass prairie, but includes trees, which vary from 25 – 60% canopy cover. The open areas between the trees are dominated by prairie species, while forest species are found beneath the tree canopy .	Southern ELC Ecosites: TPS1, TPS2, TPW1, TPW2, CUS2	NO, communities dominated by prairie species were not documented in the assessment area or adjacent lands.
Rare Forest Type - Red Spruce	Red Spruce is a valued wildlife cover tree. Historically red spruce was much more abundant then it is now within the Ecoregion 5e forests. Red spruce is a shade tolerant conifer that evolved within tolerant hardwood forests. Red spruce grows best in a cool, moist climate. It will grow in shallow, till soils (ave. of 46 cm) and may grow on sites unfavourable for other species such as organic soils over rock, steeper slopes, and wet bottomlands, although poorly drained sites will inhibit growth.	ELC Ecosites: G036, G051, G066, G084, G086, G100, G102, G116, G117 Central Ontario Forest Ecosites: ES 30.1, ES 30.2	NO, Red Spruce were not documented in the assessment area.
Rare Forest Type - White Oak	White oak is a valued wildlife mast producing tree. The mast produced by the white oak tree is often preferred over the more common red oak acorn. Forest stands containing white oak trees are uncommon in the Great Lakes St. Lawrence Forest.	ELC Ecosites: G017, G041, G057, G072, G090, G106, G121 Central Ont. FEC: ES 14.1, ES14.2	NO, White Oak were not documented in the assessment area.

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E (January 2015)

Ecoregion 5E		Candidate Significant Wildlife Habitat*	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Specialized Habitats for Wildlife				
Waterfowl Nesting Area	A waterfowl nesting area extends 120 m from a wetland (> 0.5 ha) or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur.		All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: G129-G135, G142-G152 Note: includes adjacency to provincially Significant Wetlands	NO, wetland communities are not present on or adjacent to the assessment area.
	Upland areas should be at least 120 m wide so that predators such as raccoons, skunks, and foxes have difficulty finding nests.			
	Wood Ducks, Bufflehead, Common Goldeneye and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites.			
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water.		Forest communities directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	NO, stick nests were not documented in the assessment area or along the shoreline of adjacent lands
	Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree’s canopy.			
	Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms).			
Woodland Raptor Nesting Habitat	All natural or conifer plantation woodland/forest stands.		May be found in all forested ELC Ecosites in Community Class: TR	NO, stick nests were not documented in the assessment area. Trees with cavities suitable to function as nesting habitat for owls were not documented.
	Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Merlin or Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands.		May also be found in the forested swamp ELC Ecosites: G128-G133	
	Includes nest sites within tree cavities for Barred Owl and sometime Great Horned Owls and Merlin.			
Turtle and Lizard Nesting Areas	In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest.			
	Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals.		Turtle Nesting areas may be adjacent to these ELC Ecosites: G138, G140-149	NO, the assessment area does not contain features that are suitable to function as nesting habitat for turtles. Open areas containing sand or gravel suitable for excavation of nests are absent as well. While the property does contain numerous stumps and logs, these are located within the forest community that lacks sufficient openings in the canopy to provide areas suitable for use by lizards for nesting.
	For an area to function as a turtle nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH.		For Five-lined Skink - Central Ontario Forest Ecosites: ES14.2, ES17–ES20, ES23–ES30 or; ELC Ecosites: G056-G059, G070-G076, G087-G092, G103-G108, G118-G125	
	Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.			
	Skinks will nest under logs, in stumps or under loose rock in partially wooded areas.			

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E (January 2015)

Appendix 2: Table 1. Results of desktop screening and on-site assessment for Significant Wildlife Habitat.

Ecoregion 5E	Candidate Significant Wildlife Habitat*		ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Seeps and Springs	Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.		Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system. Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species.	NO, watercourses or areas of groundwater upwellings were not documented in the assessment area.
Aquatic Feeding Habitat	MNRF maps these location on Crown land and rates the site on a scale of 0 – 4, with 4 being the best. Feeding sites classed 3 or 4 are potential/candidate significant. Where Moose Aquatic Feeding Areas (MAFA) habitat is in low supply, class 2 MAFA habitat could also be considered potential/candidate significant. Wetlands and isolated embayments in rivers or lakes which provide an abundance of submerged aquatic vegetation such as pondweeds, water milfoil and yellow water lily are preferred sites. Adjacent stands of lowland conifer or mixed woods will provide cover and shade.		4 Habitat may be found in all forested ecosites adjacent to water.	NO, while the assessment area does contain frontage on Cox Bay, Lake Joseph, no areas of wetlands or isolated embayments containing submerged aquatic vegetation were documented.
Mineral Lick	This habitat component is found in upwelling groundwater and the soil around these seepage areas. It typically occurs in areas of sedimentary and volcanic bedrock. In areas of granitic bedrock, the site is usually overlain with calcareous glacial till.		Habitat may be found in all forested ecosites.	NO, groundwater upwellings nor seepage areas were not identified on the assessment area which suggests that mineral licks are absent as well.
Denning Sites and Mink, Otter, Martin, Fisher, and Eastern Wolf	Mink prefer shorelines dominated by coniferous or mixed forests with dens usually underground. Mink will sometimes use old muskrat lodges. Otters prefer undisturbed shorelines along water bodies that support productive fish populations with abundant shrubby vegetation and downed woody debris for denning. They often use old beaver lodges or log jams and crevices in rock piles. Marten and fisher share the same general habitat, requiring large tracts of coniferous or mixed forests of mature or older age classes. Denning sites are often in cavities in large trees or under large downed woody debris.		Habitat may be found in all forested ecosites.	NO, features potentially functioning as denning sites were not documented in the assessment area; no dens or excavated areas were documented. There is a low likelihood that the assessment area functions as denning habitat for these species.
Amphibian Breeding Habitat (Woodland)	Presence of a wetland or pond >500 m ² (about 25 m diameter) within or adjacent (within 120m) to a woodland (no minimum size). The wetland, lake or pond and surrounding forest, would be the Candidate SWH. Some small wetlands may not be mapped and may be important breeding pools for amphibians. Breeding ponds within the woodland or the shortest distance from forest habitat are more significant because of reduced risk to migrating amphibians and more likely to be used. Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat.		All forested, ELC Ecosites; The wetland breeding ponds (including vernal pools) may be permanent, seasonal, ephemeral, large or small in size and could be located within or adjacent to the woodland.	NO, while the onsite assessment was not completed during the amphibian breeding season, slopes on the assessment area suggest that water does not pool in areas on the lot for any time during the year (i.e., vernal pools are absent). In the absence of vernal pools, there is a very low likelihood that woodland amphibian breeding habtiat is present.

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E (January 2015)

Ecoregion 5E		Candidate Significant Wildlife Habitat*	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Amphibian Breeding Habitat (Wetlands)		<p>Wetlands and pools (including vernal pools) >500 m² (about 25 m diameter), supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats.</p> <p>Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators.</p>	<p>ELC Ecosites: G129-G135,G142-G152</p> <p>Typically these wetland ecosites will be isolated (>120 m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g., Bull Frog) may be adjacent to woodlands.</p>	<p>NO, wetland communities are not present on the assessment area.</p>
Mast Producing Areas		<p>Most important areas are mature forests >0.5 ha containing numerous large beech and red oak trees that supply the energy-rich mast that wildlife prefer.</p> <p>Other significant tree species include hickory, basswood, black cherry, ironwood, mountain ash, pin cherry, and butternut. Significant shrub species include blueberries, wild black berry, serviceberry, raspberry, beaked hazel, choke cherry and hawthorn.</p> <p>Sites providing long-term, relatively stable food supplies, forest openings or barrens >1 ha provide excellent sites for mast producing shrubs. Sites such as clear-cuts or burns are temporary source of food and are less significant.</p>	<p>ELC Ecosites: G015, G017, G019, G027-G028, G041-G043, G057, G059, G072, G090, G106, G108, G121,</p> <p>Central Ontario Forest Ecosites: ES14, ES17.1, ES23, ES24, ES25, ES26</p>	<p>NO, even though the subject property contains Dry to Fresh, Coarse: Mixedwood (G059) mixedwood forest community, large Beech are in limited amounts. Hardwood species are dominated by Sugar Maple.</p>

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E (January 2015)

Ecoregion 5E	Candidate Significant Wildlife Habitat*	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Habitat for Species of Conservation Concern (not including Endangered or Threatened Species)			
Marsh Bird Breeding Habitat	Nesting occurs in wetlands.	ELC Ecosites: G138-G152	NO, the subject property does not contain any of the ELC Ecosites associated with this SWH type.
	All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present.	For Green Heron: above Ecosites plus G129-G136.	
	For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water.		
Open Country Bird Breeding Habitat	Large grassland areas (includes natural and cultural fields and meadows) >30 ha Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e., no row cropping or intensive hay or livestock pasturing in the last 5 years).	ELC Ecosites: G008-G009, G020-G021, G029-G031, G044-G046, G060-G062, G077-G079, G093-G095, G109-G111	NO, open grassland areas such as natural or cultivated fields are not present in the assessment area.
	Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older.		
	The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species.		
Shrub/Early Successional Bird Breeding Habitat	Large field areas succeeding to shrub and thicket habitats >30 ha in size. Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e., no row-cropping, haying or livestock pasturing in the last 5 years).	ELC Ecosites: G009-G010, G021-G022, G031-G032, G046-G047, G062-G063, G079-G080, G095-G096, G111-G112, G134-G135	NO, the assessment area does not contain, nor is it adjacent to, large field communities that are succeeding into shrub and thicket habitats.
	Larger shrub thicket habitats (>30 ha) are most likely to support and sustain a diversity of these species.	Patches of shrub ecosites can be complexed into a larger habitat for some bird species.	
	Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or lightly grazed pasturelands.		
Special Concern and Rare Wildlife Species	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species.	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or Provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites	See Table 2
	All plant and animal element occurrences (EO) within a 1 or 10 km grid.		
	Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy		
Animal Movement Corridors			

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E (January 2015)

Ecoregion 5E	Candidate Significant Wildlife Habitat*	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Amphibian Movement Corridors	Corridors may be found in all ecosites associated with water.	Movement corridors between breeding habitat and summer habitat.	NO, given that breeding habitat was not identified on or adjacent to the assessment area, there is a low likelihood that the assessment area contains movement corridors for amphibians.
	Corridors will be determined based on identifying the significant breeding habitat	Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Amphibian Breeding Habitat –Wetland (see above)	
Cervid Movement Corridors	Movement corridor must be determined when Deer Wintering Habitat is confirmed as SWH (see above), Moose Aquatic Feeding Area, or Mineral Lick Habitat are identified.	Corridors may be found in all forested ecosites.	NO, given the lack of identified deer wintering area on the subject property, movement corridors for cervids are not presentmay be present.
	A deer wintering habitat identified by the OMNRF as SWH will have corridors that the deer use during fall migration and spring dispersion.		
	Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges).		
	Corridors will be multifunctional (i.e., these will function for any smaller mammal species as well).		
Furbearer Movement Corridor	Mink and Otter den sites are typically found within a riparian area of a lake, river, stream or wetland. The den site will potentially have a movement corridor associated with it. All Mink or Otter den sites identified under the habitat of Denning Sites for Mink, Otter, Marten Fisher and Eastern Wolf (see above) are to be considered for an animal movement corridor.	All Forested Ecosite Codes adjacent to or within shoreline habitats.	NO, as features potentially functioning as denning sites were not documented in the assessment area there is a low likelihood that the assessment area contains movement corridors for burbearers.

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E (January 2015)

Appendix 4. Soil Sample Analyses (AGAT Laboratories)

CLIENT NAME: RIVERSTONE ENVIRONMENTAL SOL. INC.

**47 Quebec Street
BRACEBRIDGE, ON P1L2A5
(705) 645-9887**

ATTENTION TO: AI Shaw

PROJECT: 2019-189 Harsani

AGAT WORK ORDER: 19T552947

SOIL ANALYSIS REVIEWED BY: Jacky Zhu, Spectroscopy Technician

DATE REPORTED: Dec 13, 2019

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

***NOTES**

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories (V1)

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.

*Results relate only to the items tested. Results apply to samples as received.
All reportable information as specified by ISO 17025:2017 is available from AGAT Laboratories upon request*

Page 1 of 5



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19T552947

PROJECT: 2019-189 Harsani

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: RIVERSTONE ENVIRONMENTAL SOL. INC.

SAMPLING SITE: Part Lot3, Concession 6 Findayson

ATTENTION TO: Al Shaw

SAMPLED BY: Craig Mann

Metal Scan in Soil						
DATE RECEIVED: 2019-12-06			DATE REPORTED: 2019-12-13			
SAMPLE DESCRIPTION:						
SAMPLE TYPE: Soil						
DATE SAMPLED: 2019-12-03						
G / S RDL						
Parameter	Unit	H #1	H #2	H #3	H #4	
		Soil	Soil	Soil	Soil	
		2019-12-03	2019-12-03	2019-12-03	2019-12-03	
		777489	777491	777492	777493	
Aluminum	%	1.66	1.58	0.805	1.37	
Iron	%	2.36	1.92	1.35	1.79	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

777489-777493 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.
Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Quality Assurance

CLIENT NAME: RIVERSTONE ENVIRONMENTAL SOL. INC.

AGAT WORK ORDER: 19T552947

PROJECT: 2019-189 Harsani

ATTENTION TO: AI Shaw

SAMPLING SITE: Part Lot3, Concession 6 Findayson

SAMPLED BY: Craig Mann

Soil Analysis

RPT Date: Dec 13, 2019			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Metal Scan in Soil															
Aluminum	778056		1.38	1.35	2.2%	< 0.0005	100%	70%	130%	107%	80%	120%	75%	70%	130%
Iron	778056		2.11	2.09	1.0%	< 0.005	102%	70%	130%	111%	80%	120%	129%	70%	130%

Certified By:



Method Summary

CLIENT NAME: RIVERSTONE ENVIRONMENTAL SOL. INC.

AGAT WORK ORDER: 19T552947

PROJECT: 2019-189 Harsani

ATTENTION TO: AI Shaw

SAMPLING SITE: Part Lot3, Concession 6 Findayson

SAMPLED BY: Craig Mann

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Iron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS



AGAT

Sm Blue
Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Laboratory Use Only

Work Order #:

19T552947

Cooler Quantity:

1

Arrival Temperatures:

8.0 7.3 2.1

Custody Seal Intact:

☐ Yes ☐ No

Notes:

N/A

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Report Information:

Company: River Stone
Contact: Joel Granthier
Address: 47 Quebec St.
Bracebridge ON
Phone: 705.645.9887 Fax:
Reports to be sent to:
1. Email: AL@rsenviro.ca
2. Email: Joelg@rsenviro.ca

Project Information:

Project: 2019-189 Harsanyi
Site Location: Part Lot 3, Concession 6, Finlayson
Sampled By: Craig Mann
AGAT Quote #: PO:

Invoice Information:

Company:
Contact:
Address:
Email:

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04 ☐ Sewer Use ☐ Regulation 558

Table - Indicate One

☐ Ind/Com ☐ Sanitary

☐ Res/Park ☐ Storm

☐ Agriculture ☐ Storm

Soil Texture (Check One)

☐ Coarse ☐ Fine

Region - Indicate One

☐ Other ☐ Other

Report Guideline on Certificate of Analysis

Is this submission for a

Record of Site Condition?

☐ Yes ☒ No

Sample Matrix Legend

B Biota
GW Ground Water
O Oil
P Paint
S Soil
SD Sediment
SW Surface Water

Metals and Inorganics

All Metals ☐ 153 Metals (excl. Hydrides)
Hydride Metals ☐ B-HWS ☐ C ☐ CN
ORPs ☐ EC ☐ FOC ☐ Hg
pH ☐ SAR

Regulation/Custom Metals

Nutrients: ☐ TP ☐ NH₃ ☐ TKN
☐ NO₃ ☐ NO₂ ☐ NO₃+NO₂

Volatiles

☐ VOC ☐ BTEX ☐ THM

CCME Fractions 1 to 4

ABNs ☐ PAHs ☐ PCBs: ☐ Total ☐ Aroclors

Organochlorine Pesticides

TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ BAP ☐ PCBs

Sewer Use

☐ Aluminum ☐ TIC ☐ Lead

Sample Identification

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments
H #1	Dec 03	pm	2	S	% by weight
H #2	Dec 03	pm	2	S	% by weight
H #3	Dec 03	pm	2	S	% by weight
H #4	Dec 03	pm	2	S	% by weight

Samples Relinquished By (Print Name and Sign):

Joel Granthier

Samples Relinquished By (Print Name and Sign):

Joel Granthier

Samples Relinquished By (Print Name and Sign):

Joel Granthier

Date

Dec 03

Time

Am

Samples Relinquished By (Print Name and Sign):

Joel Granthier

Samples Relinquished By (Print Name and Sign):

Joel Granthier

Date

Dec 03

Time

9:20

Date

Dec 03

Time

9:20

Date

Dec 03

Time

9:20

Date

Dec 03

Time

9:20

Date

Dec 03

Time

9:20

CLIENT NAME: RIVERSTONE ENVIRONMENTAL SOL. INC.**47 Quebec Street
BRACEBRIDGE, ON P1L2A5
(705) 645-9887****ATTENTION TO: Craig Mann****PROJECT: 2019-189 Harsani****AGAT WORK ORDER: 20T603631****SOIL ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer****DATE REPORTED: May 29, 2020****PAGES (INCLUDING COVER): 5****VERSION*: 1**

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes*Disclaimer:**

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days following analysis, unless expressly agreed otherwise in writing. Please contact your Client Project Manager if you require additional sample storage time.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 20T603631

PROJECT: 2019-189 Harsani

CLIENT NAME: RIVERSTONE ENVIRONMENTAL SOL. INC.

SAMPLING SITE:

ATTENTION TO: Craig Mann

SAMPLED BY:

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

Metal Scan in Soil						
DATE RECEIVED: 2020-05-21			DATE REPORTED: 2020-05-29			
SAMPLE DESCRIPTION:						
SAMPLE TYPE: Soil						
DATE SAMPLED: 2020-05-06						
Parameter	Unit	G / S	RDL	Soil lot #3 2020-05-06 1137895	Soil lot #5 2020-05-06 1137934	Soil lot #6 2020-05-06 1137935
Aluminum	%	0.005	1.370	1.370	1.700	1.550
Iron	%	0.05	2.22	2.22	2.68	2.03
						2.32
						1137936

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
1137895-1137936 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range or reduce matrix interference.
Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Yris Verastegui

Quality Assurance

CLIENT NAME: RIVERSTONE ENVIRONMENTAL SOL. INC.

AGAT WORK ORDER: 20T603631

PROJECT: 2019-189 Harsani

ATTENTION TO: Craig Mann

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date: May 29, 2020			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Metal Scan in Soil

Aluminum	1137676		0.5940	0.5760	3.1%	< 0.0005	105%	70%	130%	109%	80%	120%	108%	70%	130%
Iron	1137676		1.0600	1.0500	0.9%	<0.005	106%	70%	130%	105%	80%	120%	130%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:


Method Summary

CLIENT NAME: RIVERSTONE ENVIRONMENTAL SOL. INC.

AGAT WORK ORDER: 20T603631

PROJECT: 2019-189 Harsani

ATTENTION TO: Craig Mann

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Iron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS



Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Laboratory Use Only

Work Order #: 207 603 631

Cooler Quantity: 15 Blue

Arrival Temperatures: 20.4 | 20.5 | 20.9

Custody Seal Intact: ☐ Yes ☐ No

Notes: NO ICE

☐ N/A

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: River Stone Environmental
Contact: Craig Mann
Address: 47 Quebec Street
Brazelbridge On.
705-645-9887 Fax:
Phone: A1@senviro.ca
Reports to be sent to:
1. Email: Craig@senviro.ca
2. Email:

Project Information:

Project: 2019-189 Harsanyi
Site Location: Part lot 3 Concession Co Finlayson
Sampled By: Craig Mann TSP
AGAT Quote #: PO:

Invoice Information:

Company: _____
 Contact: _____
 Address: _____
 Email: _____

Sample Matrix Legend

Sample	Biota	Ground Water	Oil	Paint	Soil	Sediment	Surface Water
B							
GW							
O							
P							
S							
SD							
SW							

Is this submission for a
Record of Site Condition?

Yes	No	Yes	No
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

<input type="checkbox"/> Regulation 153/04	<input type="checkbox"/> Sewer Use	<input type="checkbox"/> Regulation 558								
<hr/>										
<table><tr><td>Table</td><td>Indicate One</td></tr><tr><td><input type="checkbox"/> Ind/Com</td><td><input type="checkbox"/> Sanitary</td></tr><tr><td><input type="checkbox"/> Res/Park</td><td><input type="checkbox"/> Storm</td></tr><tr><td><input type="checkbox"/> Agriculture</td><td></td></tr></table>	Table	Indicate One	<input type="checkbox"/> Ind/Com	<input type="checkbox"/> Sanitary	<input type="checkbox"/> Res/Park	<input type="checkbox"/> Storm	<input type="checkbox"/> Agriculture			<input type="checkbox"/> CCME
Table	Indicate One									
<input type="checkbox"/> Ind/Com	<input type="checkbox"/> Sanitary									
<input type="checkbox"/> Res/Park	<input type="checkbox"/> Storm									
<input type="checkbox"/> Agriculture										
<hr/>										
<table><tr><td>Soil Texture (Check One)</td></tr><tr><td><input type="checkbox"/> Coarse</td></tr><tr><td><input type="checkbox"/> Fine</td></tr></table>	Soil Texture (Check One)	<input type="checkbox"/> Coarse	<input type="checkbox"/> Fine	Region	<input type="checkbox"/> Prov. Water Quality Objectives (PWQO)					
Soil Texture (Check One)										
<input type="checkbox"/> Coarse										
<input type="checkbox"/> Fine										
	Indicate One	<input type="checkbox"/> Other								
<hr/>										
		Indicate One								
	<input type="checkbox"/> MISA									

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT

*TAT is exclusive of weekends and statutory holidays

For 'Same Day' analysis, please contact your AGAT CPM

AGAT Quote #:		PO:		Please note: If quotation number is not provided, client will be billed full price for analysis.	
Invoice Information: Company: _____ Contact: _____ Address: _____ Email: _____					
Sample Matrix Legend B Biota GW Ground Water O Oil P Paint S Soil SD Sediment SW Surface Water					
Bill To Same: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>					
Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions
Soil lot # 3	May 6	PM	2	S	% by weight
Soil lot # 5	May 6	PM	2	S	% by weight
Soil lot # 6	May 6	PM	2	S	% by weight
Soil lot # 7	May 6	PM	2	S	% by weight
Field Filtered - Metals, Hg, CrVI Y / N					
Metals and Inorganics <input type="checkbox"/> All Metals <input type="checkbox"/> 153 Metals (excl. Hydrides) <input type="checkbox"/> Hydride Metals <input type="checkbox"/> 153 Metals (incl. Hydrides)					
ORPs: <input type="checkbox"/> B-HWS <input type="checkbox"/> Cl ⁻ <input type="checkbox"/> CN ⁻ <input type="checkbox"/> Cr ⁶⁺ <input type="checkbox"/> EC <input type="checkbox"/> FOC <input type="checkbox"/> Hg <input type="checkbox"/> pH <input type="checkbox"/> SAR					
Full Metals Scan Regulation/Custom Metals Nutrients: <input type="checkbox"/> TP <input type="checkbox"/> NH ₃ <input type="checkbox"/> TKN <input type="checkbox"/> NO ₃ <input type="checkbox"/> NO ₂ <input type="checkbox"/> NO ₂ +NO ₃					
Volatiles: <input type="checkbox"/> VOC <input type="checkbox"/> BTEX <input type="checkbox"/> THM					
PHCs F1 - F4 ABNs PAHs PCBs: <input type="checkbox"/> Total <input type="checkbox"/> Aroclors Organochlorine Pesticides TCLP: <input type="checkbox"/> M&I <input type="checkbox"/> VOCs <input type="checkbox"/> ABNs <input type="checkbox"/> B(a)P <input type="checkbox"/> PCBs					
Sewer Use					
TIC % wt Aluminum Iron					

Samples Relinquished By (Print Name and Sign):	<i>Craig Mann</i>	Time	<i>May 21/20</i>	Date	<i>May 21/20</i>	Time	<i>9:30 am</i>
Samples Relinquished By (Print Name and Sign):		Date		Samples Received By (Print Name and Sign):	<i>SIM RAN</i>	Date	
Samples Relinquished By (Print Name and Sign):		Date		Samples Received By (Print Name and Sign):		Date	

Page 1 of 1

No: **T 062082**



August 13, 2021

Ms. Emily Crowder
District Planner
70 Pine St.
Bracebridge, ON
P1L 1N3
Via email: Emily.crowder@muskoka.on.ca

Dear Ms. Crowder:

Re: Peer Review of Environmental Impact Statement – Harsanyi Property Oxbow Lake, October 2020

In this letter we provide our peer review of the Environmental Impact Statement (EIS) prepared by RiverStone Environmental Solutions Inc. (RiverStone) for the proposed development of 6 new lots and 1 retained lot on Oxbow Lake which is listed as an at capacity lake that is unable to sustain further lot creation per provisions in the Township's Official Plan.

We have reviewed the 2020 EIS to evaluate its methodology, conclusions, and recommendations, exclusive of species at risk issues (i.e., habitat of endangered and threatened species), which we understand will be reviewed by the Ministry of Environment, Conservation and Parks. Our approach to the peer review focuses on determining whether the EIS

- ❖ contains sufficient information on the natural environment of the area (including detailed documentation of natural features, ecological functions, environmental sensitivities and constraints, and potential impacts of the proposed development on them);
- ❖ uses the correct methodologies to gather the information (e.g., that follow industry standards and apply appropriate scientific approaches); and
- ❖ makes sound conclusions and recommendations based on the best available information, so that the development proposal avoids negative impacts on significant natural heritage features and their ecological functions and conforms with applicable environmental policies and legislation.

As part of our peer review, we conducted a site visit on July 23, 2021 to independently assess environmental conditions.

1.0 Peer Review

1.1 Summary of EIS

RiverStone completed an EIS and soil report in support of 6 new shoreline lots and 1 retained lot. The Township Official Plan indicates that the Province has designated Oxbow Lake as being at capacity and unable to sustain further lot creation so the EIS included a site-specific soil assessment following provincial

guidelines. The EIS also includes information related to natural heritage features of concern, including fish habitat, Species at Risk, watercourses and lake water quality.

The soils investigation included characterization of soils at each proposed septic location. Soil chemistry results indicated that all samples met Lakeshore Capacity Assessment Handbook soil chemistry criteria. Documentation of site conditions also included a description of two ELC communities, type 1 fish habitat, three endangered or threatened species which have the potential to occur on the subject property (Eastern Hog-nosed Snake, Little Brown Myotis and Northern Long-Eared Myotis) and potential Significant Wildlife Habitats (bat maternity colonies, habitat for three special concern species: Snapping Turtle, Wood Thrush and Eastern Wood Pewee).

An impact assessment was completed, and it was determined that the proposed development of 6 new and 1 retained lot could be completed if several recommended mitigation measures were implemented. Lastly, relevant environmental policies were reviewed, and justification was provided as to how the development would adhere to the components of each applicable policy.

1.2 Specific Comments

Pertinent sections of the EIS are provided in *italics* to provide the context for our peer review comments.
Issue #1

In order to meet the LCAH soil chemistry criteria, the native soil beneath the proposed septic bed location must have acid extractable concentrations of iron and aluminum greater than 1% equivalent by weight and calcium carbonate less than 1% equivalent by weight. All samples tested well above 1% by weight for iron and aluminum, results are shown in Table 3. (p. 10)

It should be known that the initial sample submitted for Lot #3 had an iron concentration less than the 1% by weight criteria (0.805%). A second sample was submitted, that was collected during the same time (December 6, 2019) in the same location, which resulted in results that were above the criteria. (p. 11)

Comment #1

The continued submission of samples until specific criteria are met and then reliance on the preferred result is not an appropriate approach to characterizing environmental conditions. We appreciate that the approach was transparent and recognize that variability exists in soil chemistry but cannot support that approach. An evaluation of the appropriateness of 0.805% aluminum in terms of phosphorus attenuation should be completed as part of a conservative approach. For example, aluminum concentrations reported in Robertson et al. (2019) should be considered in relation to phosphorus removal % that were measured in the drain field and the plume.

Issue #2

Composite samples were submitted to an accredited laboratory to determine the content of extractable aluminum, extractable iron, and calcium carbonate (CaCO₃); laboratory certificates of analysis are provided in Appendix 4 and summarized in Table 3. (p. 11)



Comment #2

Data on CaCO₃ (or TIC) are not included in the appendices. Please provide those data.

Issue #3

*The EIA includes information related to specific natural heritage features of concern including fish habitat, Species at Risk (i.e. Endangered and Threatened species), watercourses, and **lake water quality**. (p. 1)*

Comment #3

Lake water quality is not presented or discussed in the report. The Province has focused the determination of development capacity and shoreline development impacts on phosphorus loads from septic systems through application of the Lakeshore Capacity Model. The Lakeshore Capacity Assessment Handbook contains provisions for a site-specific soils investigation that can be used to determine the appropriateness of new development on at-capacity lakes, provisions that were utilized to scope the soils investigation presented in the EIS. Development does however result in a greater variety of impacts than solely phosphorus loading from septic systems (e.g., chloride from road salts, sediment disturbance from boating, etc.) and the level of these impacts is often dependant on the sensitivity of the adjacent waterbody. Although it is challenging to project or quantify these impacts, it would be beneficial to assess lake water quality to help characterize the sensitivity of Oxbow Lake to additional development. The evaluation should include temporal evaluation of measured total phosphorus and mean volume weighted hypolimnetic dissolved oxygen data through comparison to relevant guidelines, as well as a review of previous documented algal blooms on the lake. This additional line of evidence would help support the assessment of an at capacity Lake Trout lake, which are highly protected in the Province.

Issue #4

The vast majority of the lands have gentle slopes stretching across south portions of the subject lands. Extreme slopes (>45%) were observed in the south most portion of the property. (p. 10)

In the central and south portions of the property the backlot area becomes steeper and bit more rugged with bedrock outcrops present. (p. 14)

Comment #4

Steep slopes were present on the subject property and were noted on Lots 4 and 5 during our field investigation but the steep slopes were not included or discussed as constraints to future development. We recognize that each lot contains sufficient gently sloping land to provide appropriate building envelopes but the establishment of a driveway within the steep lands could necessitate the maintenance and establishment of tree and shrub cover as appropriate in those areas and as dictated by the District's OP. Please address the issue of steep slopes in the EIS.

Issue #5

The watercourse is not considered fish habitat as it is ephemeral and steep at the shoreline (p. 10)



The assessment of fish habitat and the watercourse was completed in early September, 2020, suggesting that the flow regime is likely permanent and that given the very small watershed area draining into the creek, it very likely has a coldwater thermal regime from groundwater inputs. (p. 14)

Vegetation within...15 m from the tributary to Oxbow Lake will be maintained in its natural state. (p. 19)

30 m watercourse buffer (Figure 3)

Comment #5

Conflicting/Contradictory statements were included in the EIS regarding the watercourse that was located on site. Please clarify the permanency of the watercourse to help determine the appropriateness of the natural buffer and setback. Based on the mapping and documentation on page 19 we have assumed that a 30 m setback has been proposed which includes a 15 m naturalized buffer but please indicate if this is accurate.

During our field investigation we noted that the downstream portion of the watercourse becomes braided and fans out wider than the upstream more channelized section (Photograph 1). Please indicate if the setback and buffer will be measured from the edge of the braided stream in this area.



Photograph 1. A view of a portion of the braided stream/wetted area located downstream of the channelized portion of the watercourse.



Issue #6

The water table was encountered in proposed lot 3 at 2 m below the surface. Water had pooled at the base of the pit (3.3 m) during the excavation process. (p. 11)

Comment #6

The water table was not discussed in relation to the other pits. Please clarify if water was encountered during excavation of the other pits or if evidence was encountered suggesting the location of the water table within the other soil pits.

Issue #7

As a result of Eastern Hog-nosed snakes being present on the subject lands, RiverStone recommends the following measures:

- *The number and length of roads servicing proposed lots be minimized as a means of reducing the potential for road mortality*
- *Removal of terrestrial vegetation should be limited outside of the development envelopes. (p. 21)*

Results of RiverStone's habitat-based assessment for Special Concern Species on the subject property and adjoining lands identified the potential for Snapping Turtle, Wood Thrush and Eastern Wood Pewee to utilize portions of the subject property. Habitat for these species are primarily associated with the lake shoreline and forest communities along the subject property. Following the recommendations already noted for the protection of water quality, fish habitat and Endangered Species, related to development setbacks from the lake/watercourse and maintenance of vegetation, are sufficient to maintain the ecological form and function of the property that may be suitable for these species. (p. 22)

Comment #7

The mitigation measures designed to minimize impacts to Eastern Hog-nosed snakes are ambiguous and difficult to enforce through planning mechanisms. Construction should be scheduled for times of the year that avoid or minimize wildlife disturbance.

Amphibian and reptile populations are active from March to October in southern Ontario. It is recommended that construction activities be scheduled outside of these periods in areas close to, or including, potential habitat (such as wetlands, ditches and upland woodland habitat) to avoid disturbance of these species, and their habitats and movement corridors. For example, adult Snapping Turtles migrate from winter hibernation sites to summer habitat in April and May, while hatchlings move to water in early fall. Amphibian species generally breed from mid-March to the end of July.

The federal *Migratory Birds Convention Act (1994)* protects the nests, eggs and young of most bird species from harm or destruction. The breeding bird season for the area generally extends from May 1 through late August for most species (ECCC 2017). As a result, any development activities that could disturb breeding birds, such as clearing of vegetation should be scheduled outside of these periods.

If construction is planned during sensitive wildlife periods, such as the active period for amphibians and reptiles (generally March through October) and/or the bird breeding season (e.g., May through late August), exclusion fencing should be installed to minimize disturbance to these wildlife species. Exclusion fencing



should be used during the construction phase to separate the development zone from surrounding habitat. This fencing is important both for preventing direct mortality to wildlife, and for preventing wildlife from using the construction zone as nesting habitat. Many turtle and snake species, for example, lay eggs in soft substrate, and may thus be attracted to any sand fill used during the construction phase. Best practices for exclusion fencing are described in MNRF (2013), including selection of fence type based on target species and choice of layout to maintain habitat connectivity. In general, fencing should be installed during the winter while reptiles and amphibians are still hibernating (i.e., November – March) and should be surveyed immediately after installation to ensure no individuals have become trapped. Exclusion fencing should be installed prior to amphibian and reptile emergence from hibernation in spring (i.e., prior to March). The enclosed areas should be surveyed immediately after installation, and then daily during the amphibian/reptile active season (March-October).

Conclusions

We identified several issues in our peer review of the EIS related to the following:

- ❖ Consideration of conservative soil chemistry results for aluminum;
- ❖ Lack of laboratory data for TIC;
- ❖ Consideration of lake water quality;
- ❖ Examination of steep slopes;
- ❖ Details regarding the watercourse buffer;
- ❖ Discussion of water table depths; and
- ❖ Consideration of additional mitigation measures related to construction timing and/or exclusion fencing.

We believe that addressing these issues will improve the EIS so that it is based on the best available information, follows industry standards, and conforms with applicable policies to avoid negative impacts on significant natural heritage features and functions.

Sincerely,
per. Hutchinson Environmental Sciences Ltd.



Andrea L. Smith, Ph.D.
Senior Scientist



Brent Parsons, M.Sc.
Senior Aquatic Scientist





RIVERSTONE

ENVIRONMENTAL SOLUTIONS INC.

September 21, 2021
RS# 2019-2189

Ms. Emily Crowder
District Planner
70 Pine Street
Bracebridge, ON

Via email: emily.crowder@muskoka.on.ca

SUBJECT: Response to Hutchinson Environmental Sciences Ltd. Peer Review Comments – Environmental Impact Study Report, Muskoka Lakeside Property, Oxbow Lake, October 2020.

Dear Ms. Crowder:

RiverStone Environmental Solutions Inc. (hereafter RiverStone) has prepared the following responses to comments from Hutchinson Environmental Sciences Ltd. (hereafter Hutchinson) regarding the Environmental Impact Study (EIS) report for the Harsanyi Property in the Township of Lake of Bays.

This letter addresses comments that were provided by the District of Muskoka via email, from Hutchinson in a letter dated August 13, 2021. These comments relate to clarifications around soil chemistry, lake water quality, the watercourse buffer, and mitigation measures.

The following responses address the comments provided to RiverStone, in the order they were presented by Hutchinson.

Comment #1 The continued submission of samples until specific criteria are met and then reliance on the preferred result is not an appropriate approach to characterizing environmental conditions. We appreciate that the approach was transparent and recognize that variability exists in soil chemistry but cannot support that approach. An evaluation of the appropriateness of 0.805% aluminum in terms of phosphorus attenuation should be completed as part of a conservative approach. For example, aluminum concentrations reported in Robertson et al. (2019) should be considered in relation to phosphorus removal % that were measured in the drain field and the plume.

RiverStone Response:

Samples collection was meant to be transparent and they do recognize the variability in soil conditions. When samples were collected initially, a large volume of soil was collected and submitted for analysis, which resulted in the 0.805% aluminum by weight for Lot 3. Upon receipt of analysis that was less than 1%, new samples were not collected, instead, more soil of the same sample was submitted to the lab for analysis and the results were 1.37% aluminum by weight. Our opinion would be that on average, the same sample had aluminum concentrations of greater than 1% aluminum by weight ($(0.805+1.37)/2= 1.09\%$). This approach has been used on previous

submissions to the Township of Lake of Bays for similar projects on Dotty and Rebecca Lakes. These studies were also peer reviewed and the approach was deemed acceptable as a suitable method for characterizing soil related to phosphorus attenuation, and acknowledgement of the variability on soil chemistry.

Comment #2 Data on CaCO₃ (or TIC) are not included in the appendices. Please provide those data.

RiverStone Response:

Acknowledged. Total Inorganic Carbon analyses were requested as part of the submission to the AGAT Labs.

Lot #1
 Lot #2
 Lot# 3 - <0.02%
 Lot #4
 Lot #5 - <0.02%
 Lot #6 - <0.02%
 Lot #7 – 0.03%

The requirement for TIC according to the Lakeshore Capacity Assessment Handbook is <1% by weight, which these samples meet. Data sheets from AGAT are appended to this letter.

Comment #3 Lake water quality is not presented or discussed in the report. The Province has focused the determination of development capacity and shoreline development impacts on phosphorus loads from septic systems through application of the Lakeshore Capacity Model. The Lakeshore Capacity Assessment Handbook contains provisions for a site-specific soils investigation that can be used to determine the appropriateness of new development on at-capacity lakes, provisions that were utilized to scope the soils investigation presented in the EIS. Development does however result in a greater variety of impacts than solely phosphorus loading from septic systems (e.g., chloride from road salts, sediment disturbance from boating, etc.) and the level of these impacts is often dependant on the sensitivity of the adjacent waterbody. Although it is challenging to project or quantify these impacts, it would be beneficial to assess lake water quality to help characterize the sensitivity of Oxbow Lake to additional development. The evaluation should include temporal evaluation of measured total phosphorus and mean volume weighted hypolimnetic dissolved oxygen data through comparison to relevant guidelines, as well as a review of previous documented algal blooms on the lake. This additional line of evidence would help support the assessment of an at capacity Lake Trout lake, which are highly protected in the Province.

RiverStone Response:

As noted above, the requirements of the Province to approve additional development on Lake Trout lakes at capacity must follow one of four (4) possible scenarios: to separate existing habitable dwellings that exist on a single lot, where new septic systems would drain into a drainage basin that is not at capacity, where new septic systems would be set back at least 300 m from the lake shoreline (or drainage from the septic system would flow at least 300 m to the lake), or a site specific soil investigation is completed and meets the criteria established in the manual related to

components of iron, aluminum, CaCO_3 and depth to the water table. The material submitted by RiverStone was intended to follow the requirements of the handbook to consider the property as suitable for lot creation. These are the only circumstances where new lot creation and other planning approvals can occur. As such, it is expected that if one of the four criteria have been met, then the province is satisfied that the water quality of these sensitive lakes will be protected while development occurs, regardless of current / historical phosphorus and dissolved oxygen measurements.

Regardless of the above, the peer reviewer is correct that development can cause other impacts related to water quality than just phosphorus from septic systems. Our EIS contemplated the impact of development on water quality as it relates to sediment/erosion and fish habitat. Section 4.2 in the EIS provides a number of recommendations to prevent sediment and erosion from entering the lake and negatively impacting lake water quality and fish habitat. It is suggested that chloride from road salts or sediment from boating are impacts that could have been discussed, but also that these other water quality impacts can be more or less impactful, based on the sensitivity of the lake, and that the sensitivity is related to the historical water quality data.

We did reach out to the MNRF and MECP (lake partner program) to better understand historical water quality in the lake. In regard to Total Phosphorus, Oxbow lake has been regularly sampled through the lake partner program (MECP) with the results presented in the table below. Two stations have been sampled since 2002 (Sites 1 and 3) having an average of 5.38ug/L and 6.5ug/L respectively. Values do show variability, ranging from 0.2 ug/L (likely an error) to 7.2 ug/L for Site 1 and 3.8 ug/L to 11.2 ug/L for Site 3. These concentrations are indicative of oligotrophic lakes, or slightly mesotrophic where over 10 ug/L. According to the District of Muskoka water sampling program, the 10 year average total phosphorus concentration is 6.1 ug/L which is quite comparable to that described for the Lake Partner Program. The District of Muskoka also notes that the lake is not considered vulnerable. These concentrations are too low to expect algae blooms of species that are dependent on water quality (phosphorus) alone.

Calcium concentrations were also collected through the Lake Partner program. Although the change in concentration would not be statistically significant, the concentration of calcium does seem to be lower for Site 1 between 2008 and 2020; however, Site 3 does not show any discernable trend. Chloride, which would relate to road salts, also does not show any distinct trend between stations or over time. The relative concentration of chloride is quite low compared to the Canadian Water Quality Guideline for the protection of freshwater aquatic life (120 mg/L).

The MNRF provided dissolved oxygen data between 2003 and 2017 for basin 1, with calculated values for minimum volume-weighted dissolved oxygen (MVWHDO). The provincial criteria for MVWHDO for Lake Trout Lakes is 7.0 mg/L. This concentration of oxygen allows for the trout to carry out physiological processes effectively. Values collected and calculated for Oxbow Lake range from 2.0 mg/L in 2006 to 6.6 mg/L in 2012. All values were under the provincial criteria and therefore the lake is considered at capacity for development.

In regard to the sensitivity of the lake for further development, it is loss of oxygen in the deep water in lake summer that is the primary focus. Additional development can lead to more phosphorus getting into the lake, resulting in more plant growth and ultimately loss of oxygen as increased plant and algae growth decomposes on the lake bottom. The increased depth of soil and chemical composition of the soil to retain phosphorus was documented for each of the proposed lots and is expected to retain phosphorus and other nutrients in the soil, not allowing increased concentrations in the lake.

Table 1. Water Quality Data, Lake Partner Program, Oxbow Lake

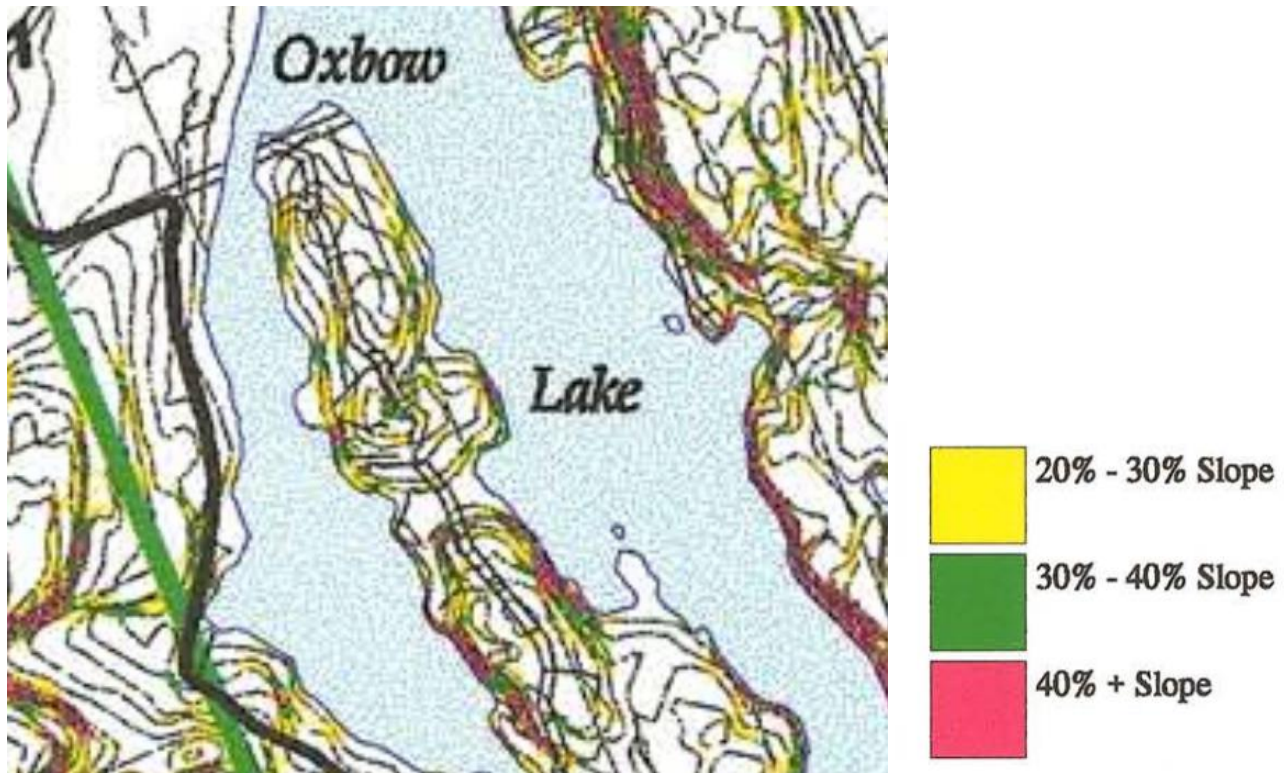
STN	Site ID	Site Description	Date	Total Phosphorus Sample 1 (µg/L)	Total Phosphorus Sample 1 (µg/L)	Total Phosphorus Average	Calcium	Chloride
4213	1	Mid Lake-Smaller Arm	05-May-02	6.5	5.7	6.1		
4213	1	Mid Lake-Smaller Arm	03-May-03	4.7	4.8	4.8		
4213	1	Mid Lake-Smaller Arm	08-May-04	4.3	4.1	4.2		
4213	1	Mid Lake-Smaller Arm	08-May-05	5.5	7.1	6.3		
4213	1	Mid Lake-Smaller Arm	29-Apr-06	5.3	4.5	4.9		
4213	1	Mid Lake-Smaller Arm	06-May-07	5.6	4.7	5.1		
4213	1	Mid Lake-Smaller Arm	11-May-08	4.5	7.1	5.8	2.2	
4213	1	Mid Lake-Smaller Arm	03-May-09	5.5	0.2	2.9	1.9	
4213	1	Mid Lake-Smaller Arm	18-Apr-10	5.4	5.8	5.6	1.9	
4213	1	Mid Lake-Smaller Arm	07-May-11	7.2	6.6	6.9	1.8	
4213	1	Mid Lake-Smaller Arm	14-Apr-12	6.4	7	6.7	1.8	
4213	1	Mid Lake-Smaller Arm	18-May-13	5.8	5.4	5.6	1.5	
4213	1	Mid Lake-Smaller Arm	17-May-14	6.8	5.2	6	2	
4213	1	Mid Lake-Smaller Arm	30-May-15	4.6	5.4	5		
4213	1	Mid Lake-Smaller Arm	30-Apr-16	5.4	5.6	5.5	1.8	0.81
4213	1	Mid Lake-Smaller Arm	09-May-17	4.4	4.6	4.5	1.8	0.72
4213	1	Mid Lake-Smaller Arm	20-May-18	5.2	5.2	5.2	1.9	0.74
4213	1	Mid Lake-Smaller Arm	12-May-19	4.8	5	4.9	1.8	0.8
4213	1	Mid Lake-Smaller Arm	05-May-20	6.2	6.2	6.2	1.8	0.9
4213	2	N end, deep spot	24-May-02	8.9	7.5	8.2		
4213	3	Long Arm, E end	13-Jul-03	3.9	3.8	3.8		
4213	3	Long Arm, E end	06-May-04	8.8	10.6	9.7		
4213	3	Long Arm, E end	14-May-05	5	6.1	5.5		
4213	3	Long Arm, E end	06-May-06	5.1	5.8	5.4		
4213	3	Long Arm, E end	04-May-07	8.2	7.2	7.7		
4213	3	Long Arm, E end	26-Jul-08	5.5	5.2	5.3		
4213	3	Long Arm, E end	03-May-09	6.5	5.8	6.1		
4213	3	Long Arm, E end	02-Apr-10	9	4.8	6.9	1.6	
4213	3	Long Arm, E end	23-May-11	7.6	7.2	7.4		
4213	3	Long Arm, E end	28-Apr-12	5.2	5.6	5.4	1.9	
4213	3	Long Arm, E end	30-Jun-13	6.4	7.2	6.8	1.6	
4213	3	Long Arm, E end	30-May-14	5	4	4.5	2	
4213	3	Long Arm, E end	16-May-15	7.4	9.4	8.4	1.5	0.77
4213	3	Long Arm, E end	08-Jun-16	11.2	9.2	10.2	1.8	0.94
4213	3	Long Arm, E end	05-Sep-17	5.6	5.8	5.7		
4213	3	Long Arm, E end	12-May-18	7	5.4	6.2	1.7	0.69
4213	3	Long Arm, E end	12-May-19	6	5.2	5.6	1.8	0.7

Comment #4 Steep slopes were present on the subject property and were noted on Lots 4 and 5 during our field investigation but the steep slopes were not included or discussed as constraints to future development. We recognize that each lot contains sufficient gently sloping land to provide appropriate building envelopes but the establishment of a driveway within the steep lands could necessitate the maintenance and establishment of tree and shrub cover as appropriate in those areas and as dictated by the District's OP. Please address the issue of steep slopes in the EIS.

RiverStone Response:

As noted by the peer reviewer, steep slopes do occur on the property and are outlined on Schedule D1 of the Official Plan (clip presented below), ranging from 0-40%+. The official plan also has policies

related to development proposed on steep slope in Sections E1 through E6. As noted on the clip below, steeper slopes occur to the south of the subject property, corresponding to proposed Lots 3 and 4, north of the location of the watercourse draining west to east. During our site walk with Township and District planning staff, the steeper slopes were noted and discussed in regard to development and the potential for erosion. As a result of our discussions on these particular lots, an increased setback was recommended and accepted for the frontage of Lot 3 and the southern portion of proposed Lot 4. The revised EIS Figure 3 is attached for consideration.



Comment 5. Conflicting/Contradictory statements were included in the EIS regarding the watercourse that was located on site. Please clarify the permanency of the watercourse to help determine the appropriateness of the natural buffer and setback. Based on the mapping and documentation on page 19 we have assumed that a 30 m setback has been proposed which includes a 15 m naturalized buffer but please indicate if this is accurate.

During our field investigation we noted that the downstream portion of the watercourse becomes braided and fans out wider than the upstream more channelized section (Photograph 1). Please indicate if the setback and buffer will be measured from the edge of the braided stream in this area.

RiverStone Response:

The peer reviewer is correct in following the mapping on Figure 3 for the appropriate setback. We intended that the watercourse would have a 30 m development setback with a 15 m natural buffer as required by Policy D.122 in the Official Plan.

In regard to the braided nature of the downstream portion of the watercourse near the shoreline, the location of the buffer edge can be considered from the outer edge of the braids. Regardless, the 30 m shoreline setback from the lake also protects the final 30 m of watercourse before it reaches the shoreline where the braided channel exists.

Comment 6. The water table was not discussed in relation to the other pits. Please clarify if water was encountered during excavation of the other pits or if evidence was encountered suggesting the location of the water table within the other soil pits.

RiverStone Response:

The peer reviewer is correct in their assumption that the water table would have been discussed if it were encountered above the depth of the test pit. The water table was not encountered in any of the proposed lots other than Lot 3 where it was noted to be at 2 m.

Comment 7. The mitigation measures designed to minimize impacts to Eastern Hog-nosed snakes are ambiguous and difficult to enforce through planning mechanisms. Construction should be scheduled for times of the year that avoid or minimize wildlife disturbance.

Amphibian and reptile populations are active from March to October in southern Ontario. It is recommended that construction activities be scheduled outside of these periods in areas close to, or including, potential habitat (such as wetlands, ditches and upland woodland habitat) to avoid disturbance of these species, and their habitats and movement corridors. For example, adult Snapping Turtles migrate from winter hibernation sites to summer habitat in April and May, while hatchlings move to water in early fall. Amphibian species generally breed from mid-March to the end of July.

The federal Migratory Birds Convention Act (1994) protects the nests, eggs and young of most bird species from harm or destruction. The breeding bird season for the area generally extends from May 1 through late August for most species (ECCC 2017). As a result, any development activities that could disturb breeding birds, such as clearing of vegetation should be scheduled outside of these periods.

If construction is planned during sensitive wildlife periods, such as the active period for amphibians and reptiles (generally March through October) and/or the bird breeding season (e.g., May through late August), exclusion fencing should be installed to minimize disturbance to these wildlife species. Exclusion fencing should be used during the construction phase to separate the development zone from surrounding habitat. This fencing is important both for preventing direct mortality to wildlife, and for preventing wildlife from using the construction zone as nesting habitat. Many turtle and snake species, for example, lay eggs in soft substrate, and may thus be attracted to any sand fill used during the construction phase. Best practices for exclusion fencing are described in MNR (2013), including selection of fence type based on target species and choice of layout to maintain habitat connectivity. In general, fencing should be installed during the winter while reptiles and amphibians are still hibernating (i.e., November – March) and should be surveyed immediately after installation to ensure no individuals have become trapped. Exclusion fencing should be

installed prior to amphibian and reptile emergence from hibernation in spring (i.e., prior to March). The enclosed areas should be surveyed immediately after installation, and then daily during the amphibian/reptile active season (March-October).

RiverStone Response: Although ambiguous, recommendations related to Eastern Hog-nosed snakes have been recommended many times in previous EIS documents and have been accepted by the MECP in their review. Hog-nosed snakes are not like other snakes, such as Massasaugas, that have a set pattern of habitat preference for various parts of their life cycle. Instead, Hog-nosed snakes are not specific with habitat choices, particularly on the shield. This is the reason why there is no general habitat description published by the province as there has been for other snake species. The reason for limiting road length is the consideration around road mortality. The length of road has been reduced through the development planning process as there is no longer a full connection of the road through the property, leaving the portion over the watercourse open as shown in the updated Figure 3.

In regard to amphibian and reptile habitat, development will not be occurring in the watercourse, braided channel or lake shoreline at all, which includes the 30 m setback. This corresponds to the majority of the habitats noted by the peer reviewer for these species. We did include a timing restriction for the removal of trees related to bats (April 15th - October 15th). Should tree removal be contemplated during this time, additional studies may be required to meet the requirements of the *Endangered Species Act*. We did neglect to include the same wording related to breeding birds, which are also active during this time. Additional recommendation related to breeding birds should be included as follows:

- **Clearing of vegetation should be restricted to times outside of the period April 15 to October 15. If development and site alteration must occur within the period of April 15 to Oct 15, a nest survey should be conducted by a qualified avian biologist prior to commencement of construction activities to identify and locate active nests of migratory bird species covered by the *Migratory Birds Convention Act* or *Fish and Wildlife Conservation Act*. If a nest is located or evidence of breeding noted, then a mitigation plan should be developed to address any potential impacts on migratory birds or their active nests. Mitigation may require establishing appropriate buffers around active nests or delaying construction activities until the conclusion of the nesting season.**

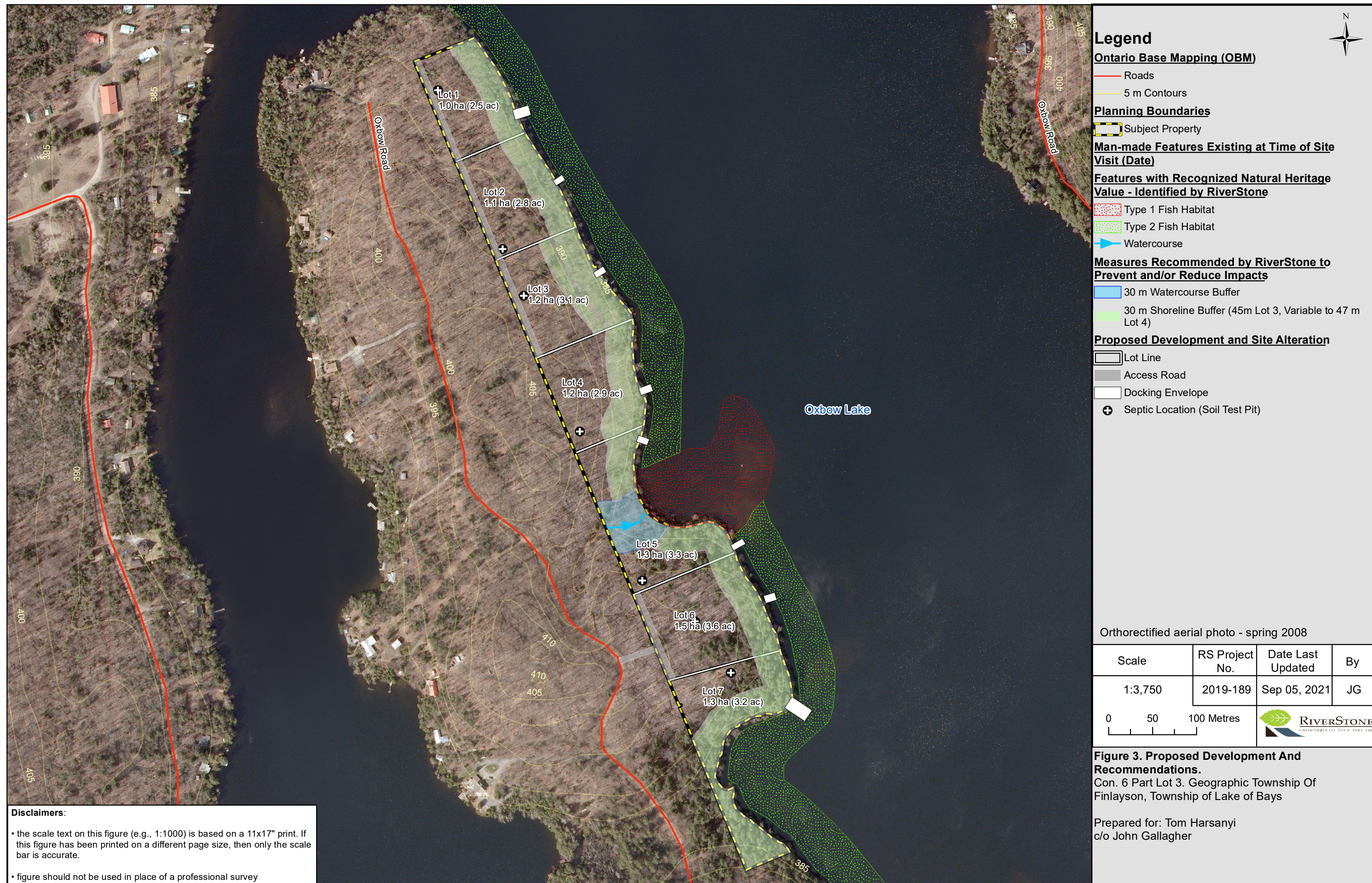
We thank the peer reviewer for their diligent review and insightful comments, and trust the responses provided address the comments from Hutchinson Environmental Sciences Ltd. Please contact us if there are any questions regarding the details above, or if further information is required.

Best regards,

RiverStone Environmental Solutions Inc.



Al Shaw M.Sc.
Senior Ecologist / Principal





October 18, 2021

Ms. Emily Crowder
District Planner
70 Pine St.
Bracebridge, ON
P1L 1N3
Via email: emily.crowder@muskoka.on.ca

Dear Ms. Crowder:

Re: Peer Review of Environmental Impact Statement – Harsanyi Property Oxbow Lake, October 2020

In this letter we provide our updated peer review of the Environmental Impact Statement (EIS) prepared by RiverStone Environmental Solutions Inc. (RiverStone) for the proposed development of 6 new lots and 1 retained lot on Oxbow Lake.

The RiverStone EIS was prepared in October 2020. In our initial peer review, completed on August 13, 2021, we identified several concerns relating to

- ✿ Consideration of conservative soil chemistry results for aluminium;
- ✿ Lack of laboratory data for TIC;
- ✿ Consideration of lake water quality;
- ✿ Examination of steep slopes;
- ✿ Details regarding the watercourse buffer;
- ✿ Discussion of water table depths; and
- ✿ Consideration of additional mitigation measures related to construction timing and/or exclusion fencing.

RiverStone provided a response to our initial peer review, dated September 21, 2021. We thank them for this additional information. We have reviewed the response and find that most of our comments have been satisfactorily addressed. However, we present our outstanding concerns relating to comments #2 and 7 below.

1. Initial Peer Review Comment #2

Data on CaCO₃ (or TIC) are not included in the appendices. Please provide those data.

Summary of RiverStone Response:

TIC values were provided for Lots #3,5,6 and 7. The response stated that data sheets from AGAT Labs were appended to the letter.

HESL Assessment:

We note that data are not presented for Lots #1, #2 and #4 and that data sheets from AGAT were not appended to the letter as indicated. Please provide those data.

More importantly, the selection of Total Inorganic Carbon (TIC) as a surrogate for the assessment of CaCO₃ underestimates the amount of CaCO₃ as indicated by the extremely low values presented (0.03% and <0.02%) and may risk classifying calcareous soils as non-calcareous soils. Total Inorganic Carbon (TIC) measurements just include carbonate with no consideration of how much of the carbonate is associated with calcium versus magnesium or other cations. TIC is therefore under-representative of CaCO₃. Measurements must include both the cation and the anion. Previous guidance we have received from MECP has been to utilize %Ca as it aligns with results published in related peer-reviewed science (e.g., Robertson 2019) and is a more accurate representation of related phosphorus attenuation.

2. Initial Peer Review Comment #7

The mitigation measures designed to minimize impacts to Eastern Hog-nosed snakes are ambiguous and difficult to enforce through planning mechanisms. Construction should be scheduled for times of the year that avoid or minimize wildlife disturbance.

Amphibian and reptile populations are active from March to October in southern Ontario. It is recommended that construction activities be scheduled outside of these periods in areas close to, or including, potential habitat (such as wetlands, ditches and upland woodland habitat) to avoid disturbance of these species, and their habitats and movement corridors. For example, adult Snapping Turtles migrate from winter hibernation sites to summer habitat in April and May, while hatchlings move to water in early fall. Amphibian species generally breed from mid-March to the end of July.

The federal *Migratory Birds Convention Act (1994)* protects the nests, eggs and young of most bird species from harm or destruction. The breeding bird season for the area generally extends from May 1 through late August for most species (ECCC 2017). As a result, any development activities that could disturb breeding birds, such as clearing of vegetation should be scheduled outside of these periods.

If construction is planned during sensitive wildlife periods, such as the active period for amphibians and reptiles (generally March through October) and/or the bird breeding season (e.g., May through late August), exclusion fencing should be installed to minimize disturbance to these wildlife species. Exclusion fencing should be used during the construction phase to separate the development zone from surrounding habitat. This fencing is important both for preventing direct mortality to wildlife, and for preventing wildlife from using



the construction zone as nesting habitat. Many turtle and snake species, for example, lay eggs in soft substrate, and may thus be attracted to any sand fill used during the construction phase. Best practices for exclusion fencing are described in MNRF (2013), including selection of fence type based on target species and choice of layout to maintain habitat connectivity. In general, fencing should be installed during the winter while reptiles and amphibians are still hibernating (i.e., November – March) and should be surveyed immediately after installation to ensure no individuals have become trapped. Exclusion fencing should be installed prior to amphibian and reptile emergence from hibernation in spring (i.e., prior to March). The enclosed areas should be surveyed immediately after installation, and then daily during the amphibian/reptile active season (March-October).

Summary of RiverStone Response:

The internal road has been modified to minimize mortality risk to wildlife by reducing its length and avoiding crossing the watercourse (as shown on Figure 3). Amphibian and reptile habitat in the watercourse, braided channel and lake shoreline will be protected through a 30 m setback. A timing restriction for tree removal (relating to bats) was recommended in the EIS which would extend from April 15th to October 15th. RiverStone has provided an additional recommendation related to breeding birds which stated that

Clearing of vegetation should be restricted to times outside of the period April 15 to October 15. If development and site alteration must occur within the period of April 15 to Oct 15, a nest survey should be conducted by a qualified avian biologist prior to commencement of construction activities to identify and locate active nests of migratory bird species covered by the Migratory Birds Convention Act or Fish and Wildlife Conservation Act. If a nest is located or evidence of breeding noted, then a mitigation plan should be developed to address any potential impacts on migratory birds or their active nests. Mitigation may require establishing appropriate buffers around active nests or delaying construction activities until the conclusion of the nesting season.

HESL Assessment:

We support the change to the route of the internal road through the property to minimize road mortality risk to wildlife. However, it is not clear from Figure 3 where the access road for Lots #1-4 connects to Oxbow Road. Please indicate that route on the map.

We concur with the additional recommendation to restrict vegetation clearing outside of the period April 15 to October 15 to protect sensitive wildlife, such as breeding birds, bats, amphibians, and reptiles. However, we do not believe it is appropriate to recommend nest surveys if construction activities occur within this period. Nest surveys during the breeding season are generally recommended only for relatively simple habitats (e.g., urban park with lawn and a few scattered trees, a previously cleared area, or a structure such as a bridge), not for areas within complex habitat such as the forest and shoreline found on the subject property¹. Active searching for nests is not recommended because the probability of detecting nests is very low, while the risk of damaging or disturbing nests, causing predation to eggs or young, or causing nest abandonment by adults is very high. Given these constraints, we reiterate our recommendation from our initial comment that any development activities that could disturb breeding birds, such as clearing of vegetation, should be scheduled outside of the breeding bird period.

¹ Government of Canada. 2019. Guidelines to reduce risk to migratory birds. Website: <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/reduce-risk-migratory-birds.html>.



Thank you for the opportunity to conduct this peer review. Please let us know if you have any questions or require additional information.

Sincerely,
per. Hutchinson Environmental Sciences Ltd.



Andrea L. Smith, Ph.D.
Senior Scientist



Brent Parsons, M.Sc.
Senior Aquatic Scientist





RIVERSTONE

ENVIRONMENTAL SOLUTIONS INC.

November 16, 2021
RS# 2021-189

Ms. Emily Crowder
District Planner
70 Pine Street
Bracebridge, ON
P1L1N3

Via email: Emily.crowder@muskoka.on.ca

**SUBJECT: Response to Hutchinson Updated Peer Review Comments –
Environmental Impact Statement, Harsanyi Property, Oxbow Lake, Oct 2020**

Dear Ms. Crowder:

RiverStone Environmental Solutions Inc. (hereafter RiverStone) has prepared the following responses to additional comments from Hutchinson Environmental Sciences Ltd. (hereafter HESL) regarding the Environmental Impact Study (EIS) report for the Harsanyi Property on Oxbow Lake, in the Township of Lake of Bays, as well as our response to peer review comments provided on September 21, 2021.

This letter addresses additional peer review comments that were provided by the District of Muskoka via email, from Hutchinson in a letter dated October 18, 2021. These comments relate to clarifications around soil chemistry and species at risk.

The following responses address the additional comments provided to RiverStone.

COMMENT #1 We note that data are not presented for Lots #1, #2 and #4 and that data sheets from AGAT were not appended to the letter as indicated. Please provide those data.

More importantly, the selection of Total Inorganic Carbon (TIC) as a surrogate for the assessment of CaCO₃ underestimates the amount of CaCO₃ as indicated by the extremely low values presented (0.03% and <0.02%) and may risk classifying calcareous soils as non-calcareous soils. Total Inorganic Carbon (TIC) measurements just include carbonate with no consideration of how much of the carbonate is associated with calcium versus magnesium or other cations. TIC is therefore under-representative of CaCO₃. Measurements must include both the cation and the anion. Previous guidance we have received from MECP has been to utilize %Ca as it aligns with results published in related peer-reviewed science (e.g., Robertson 2019) and is a more accurate representation of related phosphorus attenuation.

RiverStone Response:

Regarding the TIC values for Lots #1, #2 and #4, the lab report is appended to this report.

The comment also includes considerable discussion regarding the use of total inorganic carbon (TIC) as a surrogate for calcium carbonate. It was noted that the use of TIC may underestimate the amount of

carbonate in the soil sample as there is no distinction between how much of the carbonate is associated with calcium as opposed to other cations such as magnesium. The use of TIC as a surrogate was suggested by the analytical laboratory for other similar projects as the test specifically for calcium carbonate was either unavailable or much more costly. In any case, this was a recommendation of the lab. At that time, we did enquire with the lab to ensure that the test would meet the requirements of the analysis. In response to this comment, we again engaged the lab to ensure that we had not misinterpreted their previous response. The AGAT Lab manager confirmed with us that the test for TIC would capture all of the carbonate, whether it was associated with calcium, magnesium or other cations. This would result in a conservative estimate of calcium carbonate. If TIC values met the objective of 1% by weight, then the true value of calcium carbonate would be less. In most cases it will not be much less than TIC, as most of the carbonate in soil is bound to calcium. Also, if the values of TIC measured across all of the lots is somehow underestimated, it would need to be underestimated by almost two orders of magnitude, which is quite extreme.

We have not been privy to the discussions of the peer reviewer with the MECP regarding their preferences for calcium analyses. Unfortunately, we do not still have the soil to complete another analysis for calcium, although we are confident that the analysis completed appropriately characterizes the sample. We will take the recommendation under advisement for future soil analyses.

COMMENTS #2. We support the change to the route of the internal road through the property to minimize road mortality risk to wildlife. However, it is not clear from Figure 3 where the access road for Lots #1-4 connects to Oxbow Road. Please indicate that route on the map.

We concur with the additional recommendation to restrict vegetation clearing outside of the period April 15 to October 15 to protect sensitive wildlife, such as breeding birds, bats, amphibians, and reptiles. However, we do not believe it is appropriate to recommend nest surveys if construction activities occur within this period. Nest surveys during the breeding season are generally recommended only for relatively simple habitats (e.g., urban park with lawn and a few scattered trees, a previously cleared area, or a structure such as a bridge), not for areas within complex habitat such as the forest and shoreline found on the subject property¹. Active searching for nests is not recommended because the probability of detecting nests is very low, while the risk of damaging or disturbing nests, causing predation to eggs or young, or causing nest abandonment by adults is very high. Given these constraints, we reiterate our recommendation from our initial comment that any development activities that could disturb breeding birds, such as clearing of vegetation, should be scheduled outside of the breeding bird period.

RiverStone Response:

Regarding the connection of the proposed access road to Oxbow Road, a modified Figure 3 shows the location at the northern end of the property. At this location there is a municipal road allowance that is currently used for the two shoreline residential lots to the north of the subject lands. The green dots on Figure 3 identifies our tracklog using the road allowance for access during one of our site visits. The access drive will be upgraded within the road allowance to access Lots 1 through 4.

We appreciate the comments from HESL regarding the breeding birds, and the difficulty in identifying nests, while the expectation for damage to habitat can be high in complex habitats. In previous EIS reports we have completed, we have included that same recommendation to exclude tree removal

during the breeding bird season and if not possible, that breeding bird surveys are completed to determine if there is evidence of breeding. This includes not only nest surveys, but other evidence such as observing bird behaviours such as guarding of territories.

It is our opinion that the recommendation can be reworded as follows, to satisfy the peer reviewer comments and still offer the opportunity to clear trees during the breeding bird season.

Clearing of vegetation should be restricted to times outside of the period April 15 to October 15. If development and site alteration must occur within the period of April 15 to Oct 15, a **breeding bird** survey should be conducted by a qualified avian biologist prior to commencement of construction activities to identify and locate active nests or **breeding behaviour** of migratory bird species covered by the *Migratory Birds Convention Act* or *Fish and Wildlife Conservation Act*, **and confirmed with Environment and Climate Change Canada (Canadian Wildlife Service)**. If a nest is located or evidence of breeding noted, then a mitigation plan should be developed to address any potential impacts on migratory birds or their active nests. Mitigation may require establishing appropriate buffers around active nests or delaying construction activities until the conclusion of the nesting season.

(bolded terms are those altered from the original recommendation).

We thank HESL for their thorough review that added value to the assessment and ultimately recommendations to the EIS. We trust the responses provided address the additional comments from HESL so that the EIS can now be considered complete and final. Please contact us if there are any questions regarding the details above, or if further information is required.

Best regards,

RiverStone Environmental Solutions Inc.

A handwritten signature in black ink, appearing to read 'Al Shaw', with a stylized, flowing script.

Al Shaw M.Sc.
Senior Ecologist / Principal

CLIENT NAME: RIVERSTONE ENVIRONMENTAL SOL. INC.
47 Quebec Street
BRACEBRIDGE, ON P1L2A5
(705) 645-9887

ATTENTION TO: Al Shaw

PROJECT: 19T552947

AGAT WORK ORDER: 19T553442

SOLID ANALYSIS REVIEWED BY: Sherin Moussa, Senior Technician

DATE REPORTED: Dec 16, 2019

PAGES (INCLUDING COVER): 6

Should you require any information regarding this analysis please contact your client services representative at (905) 501-9998

*NOTES



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19T553442

PROJECT: 19T552947

5623 McADAM ROAD
MISSISSAUGA, ONTARIO
CANADA L4Z 1N9
TEL (905)501-9998
FAX (905)501-0589
<http://www.agatlabs.com>

CLIENT NAME: RIVERSTONE ENVIRONMENTAL SOL. INC.

ATTENTION TO: AI Shaw

(200-) Sample Login Weight

DATE SAMPLED: Dec 08, 2019

DATE RECEIVED: Dec 09, 2019

DATE REPORTED: Dec 16, 2019

SAMPLE TYPE: Soil

	Analyte:	Sample Login Weight
	Unit:	kg
Sample ID (AGAT ID)	RDL:	0.01
H# 1 (782679)		0.184
H# 2 (782680)		0.212
H# 3 (782681)		0.239
H# 4 (782682)		0.245

Comments: RDL - Reported Detection Limit

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Sherin Moosaj



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19T553442

PROJECT: 19T552947

5623 McADAM ROAD
MISSISSAUGA, ONTARIO
CANADA L4Z 1N9
TEL (905)501-9998
FAX (905)501-0589
<http://www.agatlabs.com>

CLIENT NAME: RIVERSTONE ENVIRONMENTAL SOL. INC.

ATTENTION TO: AI Shaw

(201-037) Total Inorganic Carbon by Coulometer

DATE SAMPLED: Dec 08, 2019

DATE RECEIVED: Dec 09, 2019

DATE REPORTED: Dec 16, 2019

SAMPLE TYPE: Soil

Analyte: Inorganic C

Unit: %

Sample ID (AGAT ID) RDL: 0.02

H# 1 (782679) 0.05

H# 2 (782680) 0.05

H# 3 (782681) 0.02

H# 4 (782682) 0.03

Comments: RDL - Reported Detection Limit

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Sherin Hoossaf



AGAT Laboratories

Quality Assurance - Replicate

AGAT WORK ORDER: 19T553442

PROJECT: 19T552947

5623 McADAM ROAD
MISSISSAUGA, ONTARIO
CANADA L4Z 1N9
TEL (905)501-9998
FAX (905)501-0589
<http://www.agatlabs.com>

CLIENT NAME: RIVERSTONE ENVIRONMENTAL SOL. INC.

ATTENTION TO: AI Shaw

(201-037) Total Inorganic Carbon by Coulometer

Parameter	REPLICATE #1				REPLICATE #2											
	Sample ID	Original	Replicate	RPD	Sample ID	Original	Replicate	RPD								
Inorganic C	782679	0.05	0.05	0.0%	782682	0.03	0.03	0.0%								



AGAT Laboratories

Quality Assurance - Certified Reference materials

AGAT WORK ORDER: 19T553442

PROJECT: 19T552947

5623 McADAM ROAD
MISSISSAUGA, ONTARIO
CANADA L4Z 1N9
TEL (905)501-9998
FAX (905)501-0589
<http://www.agatlabs.com>

CLIENT NAME: RIVERSTONE ENVIRONMENTAL SOL. INC.

ATTENTION TO: AI Shaw

(201-037) Total Inorganic Carbon by Coulometer

Parameter	CRM #1				CRM #2											
	Expect	Actual	Recovery	Limits	Expect	Actual	Recovery	Limits								
Inorganic C	12.66	12.61	99%	90% - 110%	12.66	12.72	100%	90% - 110%								

Method Summary

CLIENT NAME: RIVERSTONE ENVIRONMENTAL SOL. INC.

AGAT WORK ORDER: 19T553442

PROJECT: 19T552947

ATTENTION TO: Al Shaw

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Solid Analysis			
Sample Login Weight	MIN-12009		BALANCE
Inorganic C	MIN-200-12036		COULOMETER



January 21, 2022

Ms. Elizabeth Purcell
Manager of Planning
District Municipality of Muskoka
70 Pine St.
Bracebridge, ON
P1L 1N3
Via email: Elizabeth.Purcell@muskoka.on.ca

Dear Ms. Purcell:

Re: Peer Review of Environmental Impact Statement – Harsanyi Property Oxbow Lake, October 2020

In this letter we provide our updated peer review of the Environmental Impact Statement (EIS) prepared by RiverStone Environmental Solutions Inc. (RiverStone) for the proposed development of 6 new lots and 1 retained lot on Oxbow Lake.

The RiverStone EIS was prepared in October 2020. In our initial peer review, completed on August 13, 2021, we identified several concerns relating to

- ✿ Consideration of conservative soil chemistry results for aluminium;
- ✿ Lack of laboratory data for TIC;
- ✿ Consideration of lake water quality;
- ✿ Examination of steep slopes;
- ✿ Details regarding the watercourse buffer;
- ✿ Discussion of water table depths; and
- ✿ Consideration of additional mitigation measures related to construction timing and/or exclusion fencing.

RiverStone provided a response to our initial peer review, dated September 21, 2021. In our updated peer review, dated October 18, 2021, we indicated that we were satisfied with most of their responses, but had outstanding concerns relating to our original comments #2 (lack of laboratory data and use of TIC for assessment of CaCO₃) and #7 (internal road location and use of nest surveys). RiverStone subsequently responded to our updated peer review on November 16, 2021. We thank them for their response. Our assessment of their response follows.

1. Initial Peer Review Comment #2

We note that the lab report appended to the report includes % Total Inorganic Carbon results that are different from those presented in the Table 3 of the EIS (RiverStone 2020). The lab report shows:

- H# 1 – 0.05%
- H# 2 – 0.05%
- H# 3 – 0.02 %
- H# 4 – 0.03%

while Table 2 in the EIA indicates <0.02% for Lots 1 – 6, and 0.03% for Lot #7. All results appear to indicate that soils are less than the guideline value of <1% CaCO₃ discussed in the Lakeshore Capacity Assessment Handbook (MOE 2010) but we are not certain the results presented in the EIS align with values reported by AGAT Labs. Please provide an explanation.

2. Initial Peer Review Comment #7

We are satisfied with the general route indicated for the internal road. We support the rewording of the recommendation for clearing of vegetation to protect breeding bird activity.

Thank you for the opportunity to conduct this peer review. Please let us know if you have any questions or require additional information.

Sincerely,
per. Hutchinson Environmental Sciences Ltd.



Andrea L. Smith, Ph.D.
Senior Scientist



Brent Parsons, M.Sc.
Senior Aquatic Scientist





RIVERSTONE

ENVIRONMENTAL SOLUTIONS INC.

February 2, 2022
RS# 2019-189

Ms. Emily Crowder
District Planner
70 Pine Street
Bracebridge, ON

Via email: emily.crowder@muskoka.on.ca

**SUBJECT: Final Response to Hutchinson Environmental Sciences Ltd. Peer Review
Comments – Environmental Impact Study Report, Muskoka Lakeside Property,
Oxbow Lake, October 2020.**

Dear Ms. Crowder:

RiverStone Environmental Solutions Inc. (hereafter RiverStone) has prepared the following response to the final comments from Hutchinson Environmental Sciences Ltd. (hereafter Hutchinson) regarding the Environmental Impact Study (EIS) report for the Harsanyi Property in the Township of Lake of Bays.

This letter addresses comments that were provided by the District of Muskoka via email, from Hutchinson in a letter dated January 21, 2022. The letter provided the peer review acceptance of answers provided by RiverStone for the initial comments from Hutchinson on the EIS.

The final comments relate to clarifications around soil chemistry, lake water quality, the watercourse buffer, and mitigation measures.

The following responses address the comments provided to RiverStone, in the order they were presented by Hutchinson.

Comment #1 We note that the lab report appended to the report includes % Total Inorganic Carbon results that are different from those presented in the Table 3 of the EIS (RiverStone 2020). The lab report shows:

- H# 1 – 0.05%
- H# 2 – 0.05%
- H# 3 – 0.02 %
- H# 4 – 0.03%

while Table 2 in the EIA indicates <0.02% for Lots 1 – 6, and 0.03% for Lot #7. All results appear to indicate that soils are less than the guideline value of <1% CaCO₃ discussed in the Lakeshore Capacity Assessment Handbook (MOE 2010) but we are not certain the results presented in the EIS align with values reported by AGAT Labs. Please provide an explanation.

RiverStone Response:

Hutchinson is correct in that the values do not align between the EIS and the laboratory reports; however, they do align with the data presented in the previous response to EIS comments. The only explanation that can be provided is that the table was taken from a previous report, updated for this report with the final column left not updated.

As noted by Hutchinson in the comment above, it is clear that the TIC values are extremely low, well below the upper threshold for acceptable by the province as suitable soil chemistry. 1% is the upper limit for calcium carbonate while the samples are a maximum of 0.05%.

We again thank the peer reviewer for their diligent review and insightful comments, and trust the response provided addresses the comments from Hutchinson. Please contact us if there are any questions regarding the details above, or if further information is required.

Best regards,

RiverStone Environmental Solutions Inc.

A handwritten signature in black ink, appearing to read 'Al Shaw', with a stylized flourish at the end.

Al Shaw M.Sc.
Senior Ecologist / Principal



February 23, 2022

Ms. Elizabeth Purcell
Manager of Planning
District Municipality of Muskoka
70 Pine St.
Bracebridge, ON
P1L 1N3
Via email: Elizabeth.Purcell@muskoka.on.ca

Dear Ms. Purcell:

Re: Peer Review of Environmental Impact Statement – Harsanyi Property Oxbow Lake, October 2020

In this letter we provide our final peer review of the Environmental Impact Statement (EIS) prepared by RiverStone Environmental Solutions Inc. (RiverStone) for the proposed development of 6 new lots and 1 retained lot on Oxbow Lake.

The RiverStone EIS was prepared in October 2020. In our initial peer review, completed on August 13, 2021, we identified several concerns relating to

- ✿ Consideration of conservative soil chemistry results for aluminium;
- ✿ Lack of laboratory data for TIC;
- ✿ Consideration of lake water quality;
- ✿ Examination of steep slopes;
- ✿ Details regarding the watercourse buffer;
- ✿ Discussion of water table depths; and
- ✿ Consideration of additional mitigation measures related to construction timing and/or exclusion fencing.

RiverStone provided a response to our initial peer review, dated September 21, 2021. In our updated peer review, dated October 18, 2021, we indicated that we were satisfied with most of their responses, but had outstanding concerns relating to two of our original comments. RiverStone subsequently responded to our updated peer review on November 16, 2021, and we provided an updated response on January 21, 2022. We have now received RiverStone's final response to our peer review comments, dated February 2, 2022. We thank them for their response and provide our final assessment below.

Initial Peer Review Comment #2

We note that the lab report appended to the report includes % Total Inorganic Carbon results that are different from those presented in the Table 3 of the EIS (RiverStone 2020). The lab report shows:

- H# 1 – 0.05%
- H# 2 – 0.05%
- H# 3 – 0.02 %
- H# 4 – 0.03%

while Table 2 in the EIA indicates <0.02% for Lots 1 – 6, and 0.03% for Lot #7. All results appear to indicate that soils are less than the guideline value of <1% CaCO₃ discussed in the Lakeshore Capacity Assessment Handbook (MOE 2010) but we are not certain the results presented in the EIS align with values reported by AGAT Labs. Please provide an explanation.

RiverStone Response

Hutchinson is correct in that the values do not align between the EIS and the laboratory reports; however, they do align with the data presented in the previous response to EIS comments. The only explanation that can be provided is that the table was taken from a previous report, updated for this report with the final column left not updated.

As noted by Hutchinson in the comment above, it is clear that the TIC values are extremely low, well below the upper threshold for acceptable by the province as suitable soil chemistry. 1% is the upper limit for calcium carbonate while the samples are a maximum of 0.05%.

Hutchinson Response

Soil samples were collected from the seven proposed septic envelopes and analyzed for iron, aluminum, and Total Inorganic Carbon (TIC), but TIC results have only been presented for four of the seven septic envelopes. As part of the Site Plan Control agreement, we recommend that soil samples be collected from the three remaining proposed septic bed locations, analyzed for TIC and compared to the <1% guideline prior to development as part of a conservative approach to developing on an at capacity Lake Trout lake.

Thank you for the opportunity to conduct this peer review. Please let us know if you have any questions or require additional information.

Sincerely,
per. Hutchinson Environmental Sciences Ltd.



Andrea L. Smith, Ph.D.
Senior Scientist



Brent Parsons, M.Sc.
Senior Aquatic Scientist

