



# RIVERSTONE

ENVIRONMENTAL SOLUTIONS INC.

November 3, 2022  
RS#222-245

Henry Wiens  
c/o Marie Poirier  
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Via email: [marie@mpplanning.com](mailto:marie@mpplanning.com)

**SUBJECT: Lake Capacity Review - Wiens Property, Horn Lake Municipality of Magnetawan**

Dear Marie:

Based on our recent discussions, RiverStone Environmental Solutions Inc. (hereafter RiverStone), has completed a review of lake capacity implications for the Wiens consent application on Horn Lake. The Wiens property is legally described as part of Lot 10, Concession 1 (**Figure 1**), in the Municipality of Magnetawan (hereafter ‘subject property’), with a focus on reviewing a potential severance application as it relates to the capacity for further development, including lot creation, on Horn Lake.

### **Lake Capacity – Dissolved Oxygen/Total Phosphorus**

The subject property is located on the southwest shoreline of Horn Lake, which is a cold-water Lake Trout lake. A lake can be classified by the province as “at capacity” based on low dissolved oxygen concentrations or high total phosphorus concentrations.

Lake Trout (*Salvelinus namaycush*) are a sensitive cold water fish species that require high levels of dissolved oxygen in order to maintain healthy populations. The province has established a threshold of 7 mg/L of dissolved oxygen (mean volume-weighted hypolimnetic dissolved oxygen, MVWHDO) which allows Lake Trout to complete all life functions effectively. If during monitoring a lake is found to have less than 7 mg/L, the lake is deemed to be at capacity, and lot creation will not be approved, except under very specific circumstances outlined in the Lakeshore Capacity Assessment Handbook (MNRF 2014).

Elevated concentrations of Total Phosphorus are also a determinant of lake capacity. The Provincial threshold is based on the background concentration within a lake. This is calculated using the Provincial Lake Capacity model. The threshold is based on the background concentration of phosphorus prior to development, plus an additional 50%. If a lake is modeled using its current development level to be above 50% over background, then the lake would be deemed to be at capacity for further development, unless under specific circumstances.

### **Lake Capacity Assessment**

Horn Lake has not been deemed to be at capacity for either dissolved oxygen or total phosphorus, because the lake had never been assessed through the Provincial Lake Capacity Model.

In May of 2018 Hutchinson Environmental Sciences Ltd. (hereafter Hutchinson) completed a Lake Capacity and Fish Habitat Assessment for Horn Lake, related to a development proposal for the property immediately to the west of the Wiens Property. Hutchinson determined that the Lakeshore Capacity Model was not able to accurately predict Total Phosphorus (TP) concentrations to within 20% of the measured value, which indicates that the Lakeshore Capacity Model does not accurately reflect existing conditions in Horn Lake. As dictated by the Ministry of Environment, Conservation and Parks (MECP), in cases where the model does not work, the interim PWQO of 10 µg/L is intended to be used as a measure of capacity for Horn Lake. It was further recommended that the municipality use the Background + 50% threshold as a more conservative management objective. For Horn Lake, the Background + 50% concentration was calculated by Hutchinson to be 4.51 µg/L.

### **Application of Lake Capacity to Current Application**


The results of the Hutchinson study showed that the expected Total Phosphorus concentration in Horn Lake is between 3.68 µg/L and 3.94 µg/L (depending on values used in the model calculations). Hutchinson then used the model to predict how total phosphorus and dissolved oxygen concentrations would change if the proposal of four (4) additional lots were to be approved. The results suggest that the total phosphorus concentration would increase by <0.01 µg/L and the dissolved oxygen concentration would be reduced by <0.01 µg/L. When compared to the guideline of 10 µg/L from the Province for total phosphorus, or the recommended threshold of 4.51 µg/L (background + 50%), Horn Lake can accept the additional development without approaching capacity.


The results of the Hutchinson study for the adjacent property apply to the Wiens property as well. The modeled total phosphorus and dissolved oxygen concentrations expected following development of the four (4) new adjacent lots do not place the lake near capacity. If we assume that no other lots have been created on Horn Lake since that time, and we conservatively assume that the additional lot being proposed for the Wiens Property changes the total phosphorus and dissolved oxygen concentrations as predicted for the adjacent four (4) lots, the lake will remain well under capacity and there should be no measurable changes in water quality as noted in the Hutchinson report.

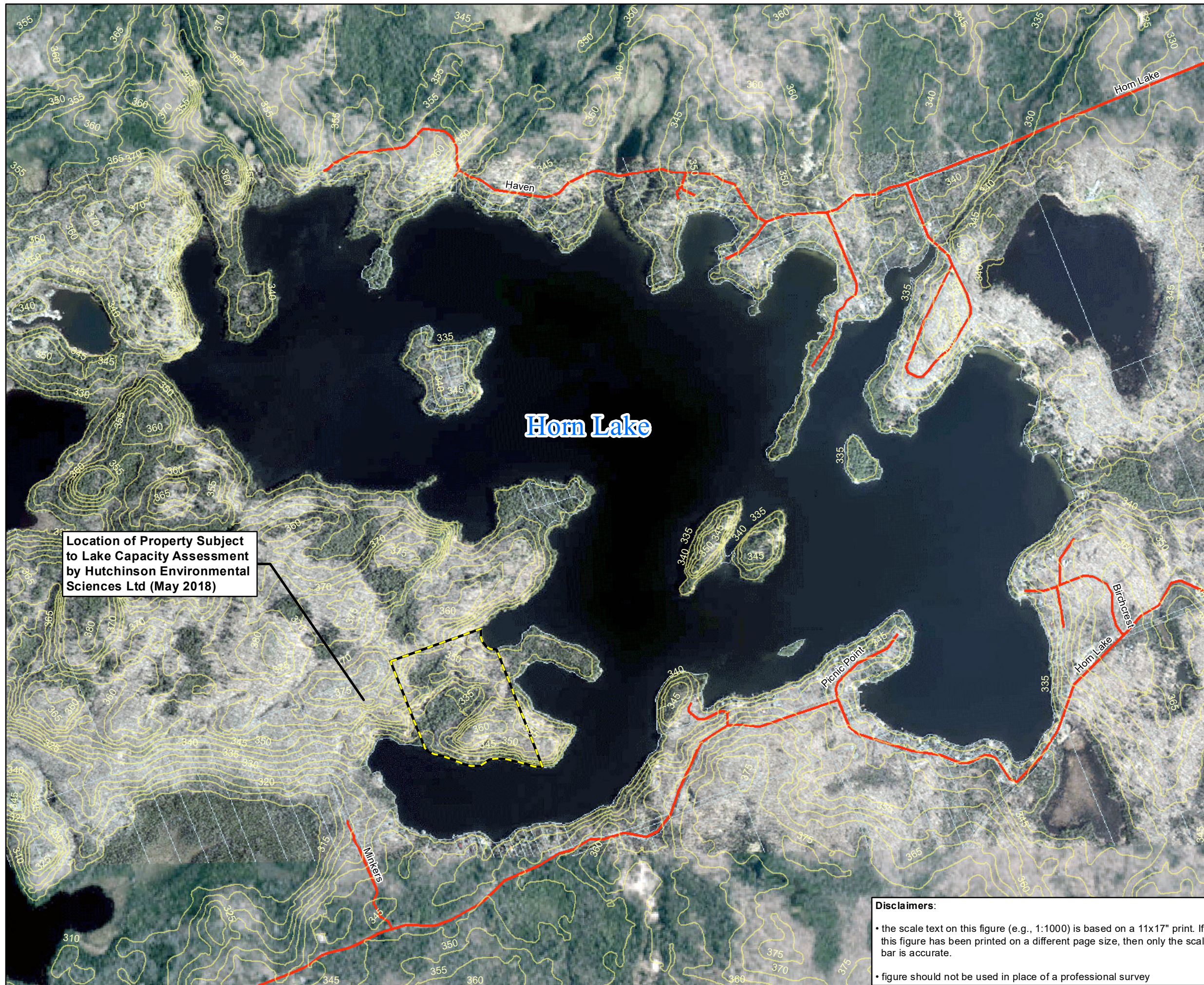
### **Summary**

The proposed consent application for the Wiens property, can be evaluated through the results of the Hutchinson capacity assessment for the neighbouring property, where new four (4) lots were proposed. The capacity model calculations showed that Horn Lake is not at capacity, when compared to a more stringent capacity threshold (background + 50%). The addition of four (4) new lots will change total phosphorus or dissolved oxygen concentrations in such a small amount that it will not be measurable. Similarly, the addition of One (1) new lot as proposed for the Wiens property, will not have any impact on water quality and will not extend Horn Lake beyond capacity as noted by the model calculations of Hutchinson. As a result, the application for consent can be considered by the Township.

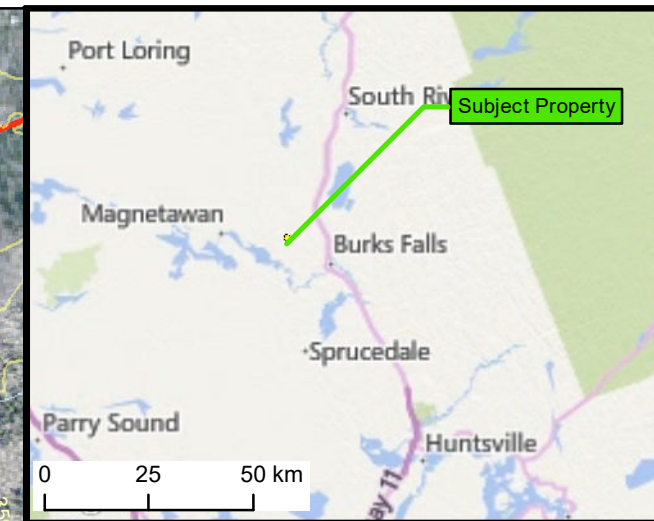
### **RiverStone Environmental Solutions Inc.**

  
Al Shaw, M.Sc.  
Senior Ecologist / Principal

  
Terin Robinson, M.Sc.,  
Aquatic Ecologist



Location of Property Subject to Lake Capacity Assessment by Hutchinson Environmental Sciences Ltd (May 2018)



**Legend**

**Ontario Base Mapping (OBM)**

- Roads
- 5 m Contours

**Planning Boundaries**

- Subject Property

Orthorectified aerial photo - spring 2018

| Scale    | RS Project No. | Date Last Updated | By |
|----------|----------------|-------------------|----|
| 1:15,000 | 2022-245       | Oct 12, 2022      | AS |

0 225 450 Metres

**Figure 1. Location of Subject Property, Horn Lake, Municipality of Magnetawan**

Prepared for: Henry Wiens c/o Marie Poirier Planning and Associates

Inset: Generalized Location of Subject Property

**Disclaimers:**

- the scale text on this figure (e.g., 1:1000) is based on a 11x17" print. If this figure has been printed on a different page size, then only the scale bar is accurate.
- figure should not be used in place of a professional survey