

July 4, 2018  
File: 121621999

**Attention: Mr. Brian Lima, P.Eng.**  
Middlesex Centre  
10227 Ilderton Road, RR#2  
Ilderton, Ontario, N0M 2A0

Dear Mr. Lima,

**Reference: Peer Review of Geotechnical Report Regarding Proposed Residential Development at Springer Street, Komoka, Ontario**

## **INTRODUCTION**

It is understood that geotechnical and hydrogeological studies had been conducted to support a proposed residential development at the northeast corner of Springer Street and Glendon Drive, in Komoka, Ontario. The following reports have been produced:

- exp Services Inc., May 11, 2016, Springer Pond Developments Inc. – Geotechnical Assessment
- exp Services Inc., March 2018, Springer Pond Developments Inc. – Hydrogeological Assessment

This report provides a review of the geotechnical report (exp 2016). The review of the hydrogeological report is provided in a separate report.

The work was authorized by Mr. Brian Lima, P.Eng. of the Municipality of Middlesex Centre (Client) and was completed in accordance with the scope of work outlined in Stantec Consulting Ltd. (Stantec) Proposal No. 674236 dated June 5, 2018.

It should be noted that environmental aspects were not considered in this review. Limitations associated with this report and its contents are provided in the statement included in Appendix A.

## **SITE LOCATION**

The Site is located northeast of the intersection of Springer Street and Glendon Drive, in Komoka, Ontario. The exp (2016) report describes the proposed residential development. The proposed parceling, for the overall site, consists of Blocks 1 to 5. Furthermore, the exp (2016) report states the following:

“This report is intended to provide specific comments regarding Block 1, which is expected to involve the creation of 8 lots fronting onto Springer Street.”

Accordingly, the review presented in this report, specifically applies to the Block 1 area, referred to as the project site, which fronts onto Springer Street (as indicated in Figure 1 of the exp 2016 report).

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## REVIEW OF AVAILABLE INFORMATION

The available documents, that contain geotechnical information, are listed below:

- Preliminary Geotechnical Information, April 28, 1998, prepared by Golder Associates Ltd.
- Geotechnical Comments, June 19, 2002, prepared by Golder Associates Ltd.
- Uncontrolled Filling Operations, October 4, 2002, prepared by Golder Associates Ltd.
- Geotechnical Investigation, August 29, 2003, prepared by Golder Associates Ltd.
- Geotechnical Comments, January 9, 2004, prepared by Golder Associates Ltd.
- exp Services Inc., March 2018, Springer Pond Developments Inc. – Hydrogeological Assessment

The geotechnical investigations, that had been conducted for the proposed residential development, included test pits and boreholes. Table 1 provides a summary of test pits and boreholes that were in the project area (Block 1 area).

**Table 1: Summary of test pits and boreholes in the Block 1 area**

Report	Summary
Golder 1988	7 test pits excavated up to 4.8 mBGS.
Golder 2003	2 boreholes drilled to 9.6 mBGS.
exp 2018	2 boreholes (in the Block 1 area) drilled to 4.3 mBGS (drilled in 2016)

The stratigraphy encountered in the boreholes and test pits are summarized below.

### **Topsoil**

The topsoil thickness ranged between 15mm and 380mm.

### **Fill**

Below the topsoil and extending to between 0.8 m and 5.9 mBGS was a layer of very loose to compact sandy silt to silty fine sand fill. The fill occasionally contained trace to some topsoil inclusions, and occasional concrete pieces.

### **Sand and Gravel**

Below the fill in borehole BH2 (Golder 2003) a 0.8 m thick layer of sand and gravel with cobbles was encountered.

### **Sandy Silt/Silt**

A layer of silt was encountered below the fill and extending to 7.3 mBGS in borehole BH1 (Golder 2003). Sandy silt was encountered below 4.2 mBGS in test pits TP4 and TP6 (Golder 1998).

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### **Silty Sand/Sand/ Sand and Gravel**

Beneath the silt in borehole BH1 and sand and gravel in borehole BH2 (Golder 2003) layers of silty sand, sand and/or sand and gravel were encountered. The layers varied in silt and gravel content.

### **Clayey Silt**

At the base of borehole BH1 (Golder 2003), a layer of clayey silt was encountered.

## **GROUNDWATER**

The exp (2016) report indicated a groundwater level of 4.3 mBGS. However, the more recent exp hydrogeological report (2018) indicates a higher groundwater level of 1.4 to 1.7 mBGS. This water level is significantly higher than the previously reported level.

Table 2 shows the latest groundwater table data, which is based on the exp hydrogeological report (2018)

Table 2. Groundwater data

**Table 2: Groundwater data**

<b>Borehole/MW</b>	<b>Ground Surface (mAMSL*)</b>	<b>High Groundwater Table (mAMSL*)</b>	<b>Depth (mBGS)</b>	<b>Depth (ftBGS)</b>
BH101/MW	240.6	238.9	1.7	5.6
BH101/MW	240.0	238.6	1.4	4.6

\* mAMSL denotes metres above mean sea level

## **REVIEW OF EXP 2016 REPORT'S FINDINGS AND RECOMMENDATIONS**

Table 3 summarizes the findings and recommendations, provided in the exp 2016 report, and the corresponding comments by Stantec.

July 4, 2018

Mr. Brian Lima, P.Eng.

Page 4 of 7

Reference: Peer Review of Geotechnical Report Regarding Proposed Residential Development at Springer Street, Komoka, Ontario

**Table 3: Summary of exp 2016 report findings and recommendations**

Section	Findings / Recommendations Summary	Comment - Stantec
Groundwater	4.3 m below ground surface, at an Elevation of 236.0 m.	See latest data in Table 2
Site Preparation	Recommendations for: Decommissioning of wells Filling activities Subgrade improvements	No comments.
Excavation and Construction Dewatering	General (temporary excavations) Excavation support Construction dewatering	No comments.
Building Foundations	Deep foundations are recommended. Deep foundations alternatives: Driven piles (timber piles may be considered) Helical piers	Other alternatives like Geopiers may be considered as well.
Basements	Recommendations: Where possible basement floor slab should be above the seasonal high groundwater level. Where deep foundation is used, the basement is expected to be comprised of a structural slab tied to the foundation units.	Latest groundwater data suggests that the basement floor slab, most likely, will be below the high groundwater level. Basement slab elevations should be raised as per recommendation. Structural slab is applicable for deep foundations.
Site Servicing	Recommendations for: Subgrade soils beneath the water and sewer pipes Trench backfill Construction backfill	No comments.
Earthquake Design Considerations	Recommendations for determination of the earthquake loading using OBC 2006	No comments.
Pavement Design	Recommendations for pavement design.	No comments.
Curbs and Sidewalks	Recommendations for concrete and subgrade for sidewalks.	No comments.

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## **UTRCA COMMENTS**

The Upper Thames River Conservation Authority (UTRCA) has issued several documents regarding the proposed residential development. The following documents contain relevant information pertaining the geotechnical aspects of the proposed development:

- March 14, 2013, Applications of Consent B-9/13 and B10/13 (letter), March 14, 2013, prepared by Tracy Annett
- March 25, 2013, Proposed Filling and Lot Creation, 45 Springer Street, Komoka (letter), prepared by Karen Winfield
- January 19, 2017, Applications for Draft Plan of Subdivision & Zoning By-law Amendment (letter), prepared by Spencer McDonald

The following is a summary of UTRCA's recommendations:

Upon review of the property UTRCA has determined that the slopes adjacent to the waterbody would be considered 'human-made' hazards. It has referenced Section 3.2.1 of The Provincial Policy Statement (2014) which states that:

Development on, abutting or adjacent to lands affected by mine hazards; oil, gas and salt hazards; or former mineral mining operations, mineral aggregate operations or petroleum resource operations may be permitted only if rehabilitation or other measures to address and mitigate known or suspected hazards are under way or have been completed.

UTRCA recommends that a geotechnical report is required to ensure that the polices of the Provincial Policy Statement (PPS) are achieved. UTRCA therefore suggests that geotechnical information be provided to support the location of a potential building envelope adjacent to the pond.

UTRCA recommends that since this is a 'Human-made Hazard' that prior to issuing a building permit for lots adjacent to the pond the Municipality require the submission of a favorable geotechnical opinion that provides recommendations on:

- surface/subsurface lot drainage (directing runoff toward street if possible);
- maintenance of vegetative cover on the slope;
- stability of the soils on the site;
- how to deal with an elevated water table for design and construction of foundation, if applicable; and
- a requirement for the completion of Sediment and Erosion Control Plans for this site.

The exp (2016) report was reviewed with the point of view of whether the UTRCA's comments have been addressed. Table 4 summarizes UTRCA's comments and the corresponding comments by Stantec.

Reference: Peer Review of Geotechnical Report Regarding Proposed Residential Development at Springer Street, Komoka, Ontario

**Table 4: UTRCA comments**

UTRCA Comment	Comment - Stantec
Adherence to guidelines of Section 3.2.1 of the PPS (2014).	<ul style="list-style-type: none"> <li>• The exp 2016 report does not address this recommendation.</li> <li>• To address this concern, it is recommended to conduct a slope stability analysis of the slopes towards the pond.                             <ul style="list-style-type: none"> <li>– Further information, regarding conducting the recommended slope stability analysis, is provided in the Discussion and Recommendations Section of this report.</li> </ul> </li> </ul>
Surface/subsurface lot drainage.	The exp 2016 report does not address this item.
Maintenance of vegetative cover on the slope.	The exp 2016 report does not address this item.
Stability of the soils on the site.	See the first item above.
How to deal with an elevated water table for design and construction of foundation.	Recommendations are provided in Section 4.4 of the exp 2016 report.
Requirement for the completion of Sediment and Erosion Control Plans for this site.	This item, generally, is not considered to be part of a geotechnical investigation/assessment task.

**DISCUSSION AND RECOMMENDATIONS**

Tables 3 and 4 provide Stantec’s comments. Additionally, the following tasks are recommended.

**Slope Stability Analysis**

It is recommended to conduct a slope stability analysis of the slopes towards the pond. This analysis is required according to guidelines of Section 3.2.1 of the PPS (2014).

This slope stability analysis should include the following items:

- A recent survey/bathymetry of the slopes.
- Consideration of the additional fill that will be placed as part of the residential development.

**Liquefaction Assessment**

The presence of a thick, very loose to compact sandy silt to silty fine sand fill layer, at the project site is significant. Accordingly, it is recommended to conduct a liquefaction assessment of the fill material.

**Appropriate Deep Foundation Option**

The ground vibrations, due to pile driving, could cause differential settlements. This is particularly the case when loose fill is present. The reason, for possible differential settlement, is that, settlement in areas close to the vibration source, can be significantly larger than in areas that are at a further distance.

This issue should be considered when deciding on the appropriate deep foundation option for the project site.

July 4, 2018  
Mr. Brian Lima, P.Eng.  
Page 7 of 7

Reference: Peer Review of Geotechnical Report Regarding Proposed Residential Development at Springer Street, Komoka, Ontario

## CLOSURE

Use of this report is subject to the Statement of General Conditions, attached. If you have any questions, please do not hesitate to contact the undersigned.

Respectfully,

Stantec Consulting Ltd.



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Attachment: Statement of General Conditions

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