



August 26, 2020

Reference No. 11217258-01

Ms. Vanessa Simpson
Towerhill Development Inc.Ltd.
c/o Innovative Planning Solutions
647 Welham Road, Unit 9A
Barrie, ON L4N 0B7

**Re: Geotechnical Investigation Report – Addendum #2
Proposed Residential Development – Towerhill Development
Fallis Line, Millbrook, Ontario**

Dear Ms. Simpson:

1. Introduction

This letter is provided in response to comments provided by the County of Peterborough and the Township of Cavan Monaghan via email, subject “Revised Plan of Subdivision, Official Plan Amendment & Zoning By-law Amendment, 862 Fallis Line & 1080 County Road 10, Part Lots 11 & 12, concession 6 (Cavan), Township of Cavan Monaghan, County File No. 15T-18002 (Plan of Subdivision), Township File No. OPA-01-18 (Official Plan Amendment), Township File No. ZBA-07-18 (Zoning By-law Amendment). Comments provided by the County of Peterborough and the Township of Cavan Monaghan requested confirmation that recommendations provided in the previously submitted reports are still applicable.

GHD Limited (GHD, formerly Geo-Logic Inc.) completed a review of the revised “Draft Plan of Subdivision”, prepared by Innovative Planning Solutions, dated February 27, 2019. The revised draft plan relocates the proposed Storm Water Management (SWM) pond to block 377. Geotechnical recommendation for the SWM pond at this new location is provided in this letter. The remaining recommendations provided in our previously prepared reports entitled “Geotechnical Investigation Report, Proposed Residential Development, Fallis Line, Cavan-Monaghan, Ontario, Geo-Logic Inc. Project No. G024822A1, dated April 2014” and “Addendum #1- Geotechnical Investigation Report, Proposed Residential Development, Fallis Line, Cavan-Millbrook, Ontario, Geo-Logic Project No. G024822A1, dated February 24, 2015” are still applicable.

The attached Test Hole Location Plan (Figure 1), illustrate our previously advanced test hole locations in the revise draft plan. As shown in Figure 1, the proposed SWM pond will be located in the area of Test Hole TP-36. The native soils encountered in test hole TP-36 consisted of glacial till, described as clayey silty sand, with gravel and occasional cobbles. The hydraulic conductive of the native soils in the proposed SWM pond areas is expected to be on the order of 10^{-4} to 10^{-6} cm/sec based on hydraulic conductivity testing conducted at the site and gradation results of representative samples of the glacial till materials.

GHD Limited

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Based on the soils observed, and the anticipated base elevations, it appears that construction of the SWM pond in this area is feasible. In general, excavation of the soils for the SWM pond are expected to be straightforward, provided that appropriate measures are taken during construction to minimize any overland or near-surficial flow of water into the area. Although groundwater seepage was not observed in the excavation of test pit TP-36, glacial till typically contains discontinuous layer/seam of more permeable soils (sand and/or gravel) where groundwater seepage is generally encountered, as such groundwater seepage and/or surficial water inflow into the open SWM pond excavation is expected. However, this is generally expected to be controlled by pumping from within the excavation, along with further measures if required, including up-gradient cutoff trenching with appropriate drainage out-letting.

It is recommended that the SWM pond subgrade surfaces be proof rolled, and a representative of GHD approve the subgrade prior to construction of the berms. Construction of the berms may utilize excess site till soils having a hydraulic conductivity of 10^{-5} cm/sec or lower. Such operations should place soil in lifts no thicker than 150mm prior to compaction, and compacted to at least 95% SPMDD. These soils should be verified by GHD prior to use for SWM liner material.

The native, disturbed till soils in a re-compacted form can be made suitable to form the SWM pond's "liner" provided the material hydraulic conductivity is deemed to be suitable prior to installation. Native undisturbed till could have a sufficiently low permeability and may be substitute for a liner where confirmed by geotechnical engineer. An inspection of the excavated and exposed SWM pond surfaces should be performed at the time of construction, to assess whether any discrete or localized areas of increased hydraulic conductivity are present within the exposed soils, in which case such areas may be lined with a more suitable (ie, less hydraulically conductive) material.

For the purpose of the proposed SWM pond, the soils observed should be stable from slip circle failure if sloped at 3 horizontal to 1 vertical (3H:1V) or flatter in the long term both above and below the water table. Between the stable water level and the expected high water level, it is recommended that the slopes be lessened to 5H:1V (or flatter) to guard against erosion by wavelet action. The till material will require vegetative root mass (or otherwise suitable erosion protection) to minimize erosional forces on exposed slopes.

Slopes and berms of the SWM pond should be constructed so as to reduce or eliminate the effects of surficial erosion. Features to do so may include slope vegetation, installation of erosion or gabion mats, rip rap, and/or other acceptable stabilizing features.

It is recommended that a regular maintenance program for the SWM pond include monitoring of it for any potential slope erosion, degradation, or otherwise undesirable structural conditions. Should any such conditions become evident, immediate mitigative actions must be performed.



We trust that this report meets with your immediate requirements. Should you have any questions, please contact our office.

Sincerely,

GHD



Leandro Ramos, P.Eng.

Nyle McIlveen, P.Eng.

/LR/nm

Enclosures



Enclosures

