GEMTEC
Consulting Engineers and Scientists

# MEMORANDUM

July 19, 2021 File: 64153.85

To: Mark Bissett, P.Eng., Senior Project Manager

From: Greg Davidson, P.Eng. and Brent Wiebe, P.Eng. - VP Operations - Ontario

**Re: Tree Planting Recommendations**
**Klondike Ridge-Block 10**
**1055 Klondike Road**
**Ottawa, Ontario**

## INTRODUCTION

As requested, a review of tree planting conditions was undertaken by the undersigned for the proposed multi-unit apartment building (Block 10) located at 1055 Klondike Road in the City of Ottawa, Ontario. GEMTEC Consulting Engineers and Scientists Limited (GEMTEC) have previously prepared a geotechnical report for this site titled: "Geotechnical Investigation, Proposed Residential Subdivision, 1055 Klondike Road, Ottawa, Ontario" dated April 4, 2018, as well as a technical memorandum titled: "Potential for Soil Volume Change, Proposed Residential Subdivision, 1055 Klondike Road, Ottawa, Ontario" dated May 11, 2018.

## BACKGROUND

A preliminary grading plan titled: "Grading Plan, Klondike Ridge-Block 10, Drawing No. 117034-10-GR" was provided to us by Novatech for review. The City of Ottawa document titled "Tree Planting in Sensitive Marine Soils-2017 Guidelines, Draft Version 2.0", dated January 7, 2019 was referenced for our review as well as the above mentioned reports and memorandums prepared by GEMTEC.

The City of Ottawa Tree Planting in Sensitive Marine Soils – 2017 guidelines indicate that for street trees in the road right-of-way where sensitive marine clay soils have been identified, the tree to foundation setbacks may be reduced to 4.5 metres for small (mature tree height up to 7.5 metres) and medium size trees (mature tree height 7.5-14 metres) provided they meet the six following conditions:

1. Soil Plasticity;
2. Foundation Depth;
3. Soil Volumes;

4. Tree Species;
5. Reinforced Foundation; and,
6. Grading to Tress

The six criteria noted above are expanded on in the following sections.

**Soil Plasticity**

*The soil plasticity index of the soil between the underside of footing (USF) and a depth of 3.5 metres does not exceed 40% (i.e. low/medium plasticity clay soils).*

Based on the results of our previous investigations, the plasticity index of the soil between the underside of footing (USF) and 3.5 metres depth does not exceed 40% and therefore this requirement is met.

A summary of our laboratory Atterberg limit testing, potential for volume change, and the proposed underside of footing elevations can be found in Tables 1, 2 and 3 below.

**Table 1 – Summary of Atterberg Limits**

| Borehole | Sample Number | Sample Depth (metres) | Elevation (Geodetic) | Plastic Limit[1] (%) | Liquid Limit[1] (%) | Plasticity Index[1] (%) | Modified Plasticity Index[2] (%) |
|---|---|---|---|---|---|---|---|
| 18-4 | 4 | 2.3 to 2.9 | 75.61 | 21.5 | 48.9 | 27.5 | 27.4 |

1. Calculated in accordance with ASTM D4318
2. The modified plasticity index ($PI_m$) was calculated using the following formula, where PI is the plasticity index determined in accordance with ASTM D4318: $PI_m$ = PI x (% passing the 425-µm sieve / 100%).

**Table 2 – Potential for Soil Volume Change**

| Borehole | Sample Number | Sample Depth (metres) | Potential for Soil Volume Change |
|---|---|---|---|
| 18-4 | 4 | 2.3 to 2.9 | Low/Medium |

**Table 3 – Proposed Underside of Footing Elevations**

| Block Number | Underside of Footing Elevation (Geodetic) |
|---|---|
| 10 | 75.25 |

### Foundation Depth

*The underside of footing (USF) must be 2.1 metres or greater below the lowest finished grade.*

Based on a review of the grading plan provided, the finished grades of the proposed apartment building meet this requirement.

### Soil Volumes

*A small size tree must be provided with a minimum of 25m$^3$ of available soil volume as determined by a Landscape Architect. A medium size tree must be provided with a minimum of 30m$^3$ of available soil volume, as determined by a Landscape Architect.*

It is recommended that a Landscape Architect be consulted in order to confirm the above soil volume requirements.

### Tree Species

*Street tree species must be small to medium size (with a preference for native, non-invasive species), as confirmed by a Landscape Architect in the landscape plan.*

It is recommended that a Landscape Architect be consulted in order to confirm the above tree species requirements.

### Reinforced Foundation

*The foundation walls are to be reinforced at least nominally to provide ductility as described in the Geotechnical Report (GEMTEC, 2018), with a minimum of two upper and two lower 15M bars in the foundation wall or similar design, provided it is signed off by a structural engineer.*

It is recommended that the structural engineer confirm this requirement is met once final drawings are produced.

**Grading to Trees**

*Grading surrounding the tree must promote draining to the tree root zone (in such a manner as not to be detrimental to the tree), as noted on the subdivision Grading Plan and detailed on the Landscape Plan.*

It is recommended that the above comment be reflected on the Grading and Landscape plans.

## SUMMARY

Based on a review of the above information, from a geotechnical perspective, Guidelines 1 and 2 of the City of Ottawa Tree Planting in Sensitive Marine Clay Soils are met. It is recommended that the remainder of the guidelines be confirmed by the relevant parties.

We trust this memorandum provides sufficient information for your present purposes. If you have any questions concerning this information, please do not hesitate to contact our office.

Greg Davidson, P.Eng.
Geotechnical Engineer

Brent Wiebe, P.Eng.
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Senior Geotechnical Engineer

GD/BW

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