July 27, 2023

Cal-Parc Development Inc.
12 Trotter Court
Barrie, Ontario
L4N 5S4

Attn: Mr. Dave Seaman

RE: Preliminary Geotechnical Test Pit Investigation
Proposed Townhouse Development
290 Cundles Road East, Barrie, Ontario
Project No. 2300804 Revision 1

GEI Consultants Ltd. (GEI) was retained by Cal-Parc Developments Inc. to complete a subsurface investigation and provide a preliminary geotechnical report for the proposed townhouse development at 290 Cundles Road East in Barrie, Ontario. The site is shown in Figure 1 in Enclosure 1.

1. INTRODUCTION

Development of the lands located at 290 Cundles Road East in the northeast quadrant of the intersection of Cundles Road East and Livingstone Street East is proposed. The current concept has several blocks with a total of 22 units that will be three-storeys. Full-depth basements are not proposed however, it is understood that the lower level may have partial burial of some walls in some areas due to the grading. Paved access and parking will be provided and the site will be serviced through connection with municipal servicing.

A preliminary subsurface investigation consisting of a program of test pits was carried out at the site as part of due diligence. Based on the test pit information, a geotechnical report was requested with preliminary geotechnical engineering recommendations for available bearing capacities for foundations, floor slabs, basements/drainage and constructability considerations such as excavations and temporary groundwater control.

Geoenvironmental assessment or chemical testing was not part of the current scope.

2. PROCEDURES AND METHODOLOGY

On February 22, 2023, a representative of our technical staff visited the site to observe the subsurface conditions within four (4) test pits excavated by the Owner. Test Pits 1 to 4 were excavated to 2.1 to 2.2 m depth.

The approximate test pit locations are provided in Figure 1 in Enclosure 1.

The stratigraphic descriptions were based on visual assessment. Inferred consistency or relative density of the soil strata was determined based on tactile probing of the material. The exposed conditions in the test pit were also assessed visually. Test pits were backfilled upon completion.

The GEI field staff examined the soils encountered in the test pits, including the presence of fill materials, groundwater observations during and upon completion of the excavation.

3. SITE AND TEST PIT OBSERVATIONS

A detailed breakdown of the results of each test pit is provided in the table below.

	Test Pit 1	Test Pit 2	Test Pit 3	Test Pit 4
Relative Location on the Property	Northeast corner of site.	Southeast corner of site.	North central part of site.	Northwest corner of site
GPS Coordinates	N: 4918774.6 E: 604767.7	N: 4918756.5 E: 604770.7	N: 4918767.3 E: 604752.4	N: 4918753.4 E: 604738.7
Ground Surface Elevation (m)	259.05	258.80	259.45	259.95
Stratigraphy Encountered (Depth)	0.0m to 0.45m – Parking Lot Fill – Sand and gravel, some silt, compact, brown, moist over sandy silt, compact, dark brown, moist 0.45m to 2.1m – NATIVE SOIL – Silt Till, some sand, trace clay and gravel, cobbles and boulders, compact, brown, moist	0.0m to 0.1m – Topsoil. 0.1m to 0.3m – FILL – Sandy silt, trace gravel, loose, brown, moist 0.3m to 2.1m – NATIVE SOIL – Silt Till, some sand, trace clay and gravel, cobbles and boulders, compact, brown, moist	0.0m to 0.3m – Topsoil. 0.3m to 0.7m – FILL – Sand, trace to some silt, trace organics, loose, brown, very moist 0.7m to 2.1m – NATIVE SOIL – Silt Till, some sand, trace clay and gravel, cobbles and boulders, compact, brown, moist	0.0m to 0.15m – Topsoil. 0.15m to 0.5m – FILL – Silty sand, trace organics, loose, brown, moist 0.5m to 2.2m – NATIVE SOIL – Silt Till, some sand, trace clay and gravel, cobbles and boulders, compact, brown, moist
Groundwater and Caving Conditions	No groundwater observed in test pit upon completion. No seepage was noted in the test pit.	No groundwater observed in test pit upon completion. No seepage was noted in the test pit.	No groundwater observed in test pit upon completion. Minor seepage was noted in fill above till. No accumulation in base of test pit.	No groundwater observed in test pit upon completion. No seepage was noted in the test pit.

4. GEOTECHNICAL ENGINEERING RECOMMENDATIONS

4.1. Foundations

The test pits encountered 0.3 to 0.7 m of topsoil and fill which are considered unsuitable to support footings. Footings for the houses can be supported on the native silt till deposit where the footing can be designed for a geotechnical reaction at Serviceability Limit State (SLS) of 100 kPa and a factored geotechnical resistance at Ultimate Limit State (ULS) of 150 kPa.

The minimum strip footing widths to be used shall be dictated as per the Ontario Building Code.

Any founding elements exposed to ambient air temperature throughout the year must be provided with a minimum of 1.2 m of earth cover for frost protection. Where earth cover less than 1.2 m, additional equivalent insulation is required. A 25 mm thick polystyrene insulation board is equivalent to 300 mm of soil cover.

Prior to pouring concrete for the footings, the footing subgrade must be cleaned of deleterious materials or caved materials, loose/weathered bedrock and any standing water. During the excavation and construction of the footings GEI should be retained to inspect the founding base to ensure the subgrade has been properly prepared and that the integrity of the founding soil has been maintained.

4.2. Floor Slabs

A lightly loaded unreinforced concrete slab can be constructed for each unit on the native till deposit at this site provided the full depth of the topsoil/fill is removed.

The native subgrade soil for the slab on grade must be assessed by the geotechnical engineer, prior to the placement of an aggregate base. It is necessary that the floor slabs be provided with a capillary moisture barrier and drainage layer.

4.3. Basements/Drainage

Basement walls must be designed to resist unbalanced lateral earth pressures imparted from the weight of adjacent soils.

Where partial basements are constructed, all basement foundation walls must be provided with damp-proofing provisions in conformance to the Ontario Building Code. A perimeter drainage system must be installed that will remove any water that infiltrates into the building backfill, to ensure that any water does not infiltrate into the basement.

For the slab-on-grade structures planned, perimeter and under-slab drainage at the foundation level is not required, provided that the underside of concrete slab is at least 200 mm above the prevailing grade of the site.

4.4. Excavation and Groundwater Control

Excavation to about 2 m depth is anticipated and will encounter the surficial topsoil/fill and the underlying native silt till. Harder digging and the presence of cobbles and boulders should be expected in the till soil.

Excavations must be carried out in accordance with the Occupational Health and Safety Act, Ontario Regulation 213/91 (as amended), Construction Projects, Part III - Excavations, Section 222 through 242. Where workers must enter an excavation, the soil must be suitably sloped and/or braced in accordance with the OHSA. For this site, excavation sidewalls are to be constructed no steeper than 1 horizontal to 1 vertical from the base of the excavation.

Excavation sidewalls will need to be continuously reviewed for evidence of instability and groundwater seepage, particularly following periods of heavy rain or thawing. When required, remedial action must be taken to ensure the continued stability of excavation slopes and the safety of the workers.

Groundwater seepage was not encountered in any of the test pits, except minor seepage from the fill that had a very limited volume (water did not accumulate at the base of the test pit). Based on this, no major groundwater problems are anticipated for excavation down to 2.0 m depth below existing grade. Any seepage should be controllable by conventional pumping.

A Permit-to-Take-Water (PTTW) is not required. Registry on the Environmental Activity and Sector Registry (EASR) system is also not required.

5. CONCLUSION

We trust this information is sufficient for your present purposes. Should you have any questions concerning the above, or can be of any further assistance, please do not hesitate to contact the undersigned.

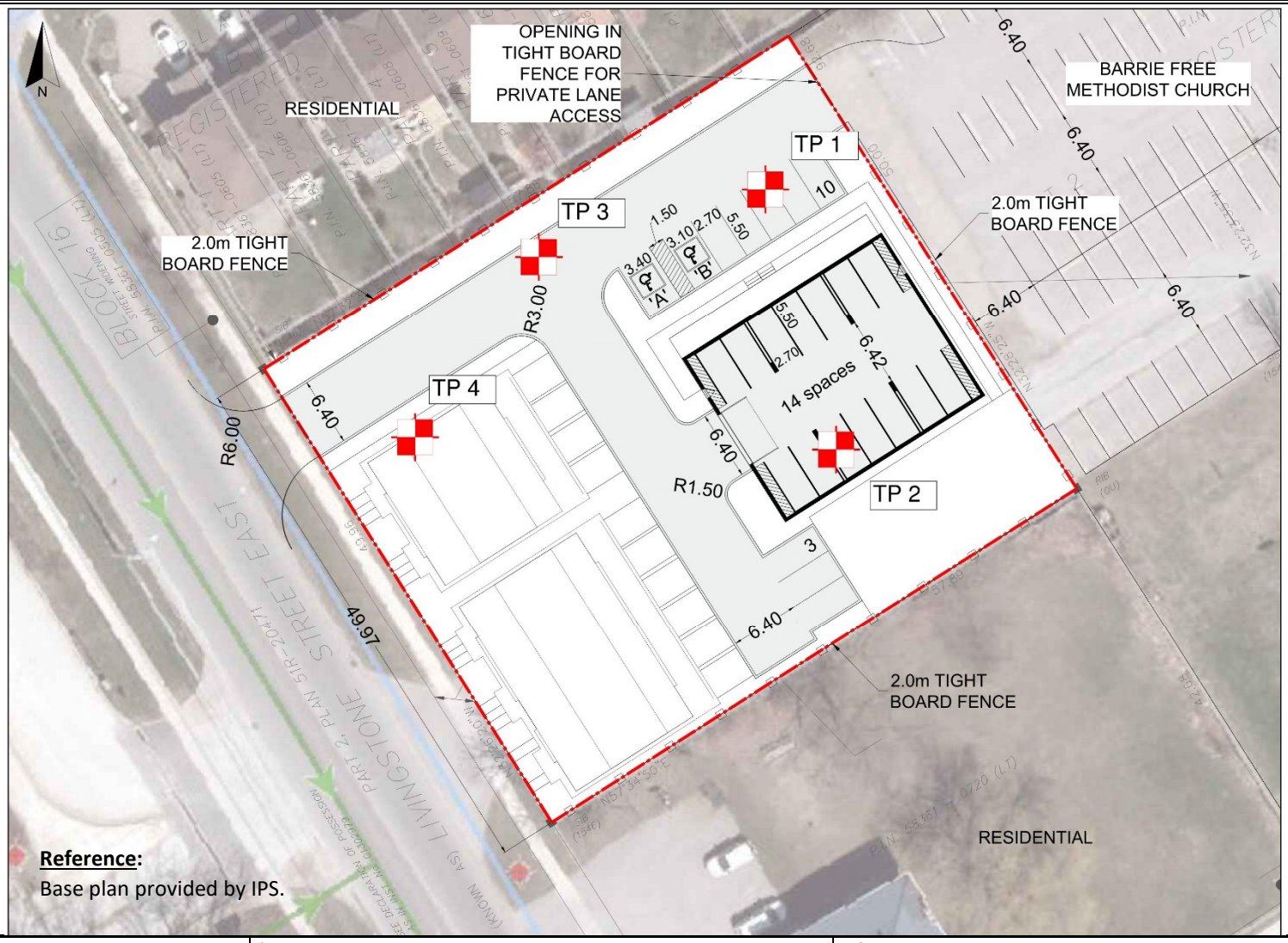
Yours truly,
GEI Consultants

Geoffrey R. White, P.Eng.
Geotechnical Practice Lead

Enclosures (1)
Test Pit Location Plan

ENCLOSURE 1

Test Pit Location Plan



Reference:
Base plan provided by IPS.

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Client: Cal-Parc Developments Inc.	Scale: N.T.S.
	Date: July 2023
Project: Proposed Townhouse Development	Drawn By: G. W.
	Project No: 2300804
Title: TEST PIT LOCATION PLAN	FIGURE 1