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March 2, 2020

Mr. Joey Theberge
Theberge Homes
904 Lady Ellen Place
Ottawa, ON K2G 6J8

**Project Name: Additional TestPit Investigation. Proposed Residential Development
1158 Old Second Line Road, Ottawa, Ontario**

Project Number: OTT-00245054-A0

EXP Services Inc. (EXP) is pleased to present the results of the additional testpit investigation completed at the proposed residential development to be constructed at 1154 Second Line, Ottawa, ON (Figure 1) site. This work was authorized by you via our signed Work Authorization on January 6, 2020.

The purpose of the additional investigation was to collect additional data on the elevation of the bedrock throughout the site to be used by the contractors bidding on the civil and structural work for this project. This letter report should be read in conjunction with the preliminary geotechnical investigation completed by EXP on this site under report number OTT-00245054-A0 dated April 12, 2018.

Procedure

The fieldwork for the additional investigation was undertaken on January 15, 2020 and comprised the excavation of thirty four (34) test pits throughout the site using a 320 mechanical shovel to bucket refusal at depths ranging between 0.05 m and 2.08 m below the existing ground surface. The fieldwork was supervised on a full-time basis by an engineer from EXP.

Prior to excavation, the test pit locations were cleared of any private and public underground services. Grab samples of the overburden soils encountered were taken at select test pit locations. All the test pits were backfilled on completion of the fieldwork. The locations of the additional testpits and previous data are presented on Figure 2. The ground surface and bedrock elevations at each test pits were surveyed by EXP using a GPS total station.

Subsurface Soil and Groundwater Conditions

A detailed description of the geotechnical conditions encountered in the additional test pits are presented in Table 1 (attached). The table and related information depict subsurface conditions only at the specific locations and times indicated. Subsurface conditions and water levels at other locations may differ from conditions at the location where sampling was conducted. The passage of time also may result in changes in the conditions interpreted to exist at the location where sampling was conducted.

It should be noted that the soil boundaries are intended to reflect approximate transition zones for the purpose of geotechnical design and should not be interpreted as exact planes of geological change. A review of the Table 1 below reveals the following subsurface soil and bedrock conditions.

- Organic topsoil layer ranging in thickness between 50 mm and 580 mm was encountered at the surface in all the test pits except in Test Pit Nos. 20-23 to 20-25.
- Fill was encountered at the surface in Test Pit Nos. 20-23 to 20-25 and below the topsoil in Test Pit Nos. 20-27. The fill extends to a depth of 0.3 m to 0.6 m below the ground surface in those test pits. The fill comprised of crusher-run limestone mixed with some sand and gravel and contains occasional rootlets.
- Silty sand was encountered below the fill or topsoil in Test Pit Nos. 20-01 to 20-04, 20-06, 20-08, 20-12, 20-14, 20-15, 20-20 to 20-25, 20-27 and 20-31. The shallow deposit of silty sand extended to a depth of 0.25 m to 2.07 where it contacted either the caprock bedrock or the sound bedrock. The silty sand is brown to grey in color, contains trace of gravel, some rootlets and frequent cobbles and boulders.
- Caprock blocks were encountered in eight test pits, i.e. Test Pit Nos. 20-02, 20-03, 20-04, 20-16, 20-23, 20-24, 20-26 and 20-32. Its thickness ranged between 150 mm and 570 mm. The large blocks were loose and was easily displaced/removed by the excavator. Thin sand seams was contacted between the caprock blocks and the sound bedrock.
- Refusal to excavator bucket was met in all the test pits at a depth ranging between 0.05 m and 2.10 m (Elev. 104.11 m to 99.70 m). Review of available geological maps indicates that bedrock underlying the site likely consists of interbedded sandstone and sandy dolomite of the March formation. In the event that large discrepancy in rock elevation is found between two adjacent points, it is recommended that the highest rock elevation should be taken in the computation of the rock volume.
- Upon completion of excavation, all test pits were dry.

General Closure

The comments given in this letter report are provided as additional information only to the report previously prepared by EXP. Therefore, this letter should be read in conjunction with that initial geotechnical investigation prepared for this site by EXP under Report number OTT-00245054-A0 dated April 12, 2018.

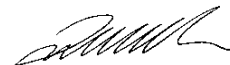
We trust that the information contained in this letter type report will be satisfactory for your purposes. Should you have any questions, please contact this office.

Sincerely,

EXP Services Inc.



Maxime Leroux, P.Eng.
Project Engineer, Geotechnical Services
Earth and Environment



Ismail M. Taki, M.Eng., P.Eng.
Manager, Geotechnical Services
Earth and Environment

Attachments: *Figure 1: Site Location – Key Plan*

Figure 2: Site Plan showing additional test pits and rock elevations

| Table I: Summary of Findings in Test Pits | | | | | | | | |
|---|--------------------------|----------------|------------|-------------|------------------------|-----------|----------------------|-----------|
| Test Pit No. | Ground Surface Elev. (m) | Topsoil | Fill | Sand | Top of Caprock Bedrock | | Top of Sound Bedrock | |
| | | Thickness (mm) | Depth (m) | Depth (m) | Depth (m) | Elev. (m) | Depth (m) | Elev. (m) |
| 20-01 | 102.56 | 150 | | 0.15 – 1.46 | | | 1.46 | 101.10 |
| 20-02 | 103.13 | 150 | | 0.15 – 1.86 | 1.86 | 101.27 | 2.06 | 101.07 |
| 20-03 | 102.81 | 125 | | 0.13 - 1.90 | 1.90 | 100.91 | 2.10 | 100.71 |
| 20-04 | 102.42 | 200 | | 0.20 – 0.72 | 0.72 | 101.70 | 0.87 | 101.55 |
| 20-05 | 102.38 | 220 | | | | | 0.22 | 102.16 |
| 20-06 | 102.12 | 250 | | 0.25 – 0.63 | | | 0.63 | 101.49 |
| 20-07 | 102.10 | 250 | | | | | 0.25 | 101.85 |
| 20-08 | 101.48 | 200 | | 0.20 – 0.39 | | | 0.39 | 101.09 |
| 20-09 | 100.86 | 300 | | | | | 0.30 | 100.56 |
| 20-10 | 101.05 | 90 | | | | | 0.09 | 100.96 |
| 20-11 | 100.42 | 50 | | | | | 0.05 | 100.37 |
| 20-12 | 100.59 | 250 | | 0.25 – 0.35 | | | 0.35 | 100.24 |
| 20-13 | 100.76 | 210 | | | | | 0.21 | 100.55 |
| 20-14 | 100.90 | 100 | | 0.10 – 0.25 | | | 0.25 | 100.65 |
| 20-15 | 100.68 | 120 | | 0.12 – 0.32 | | | 0.32 | 100.36 |
| 20-16 | 100.96 | 200 | | | 0.20 | 100.76 | 0.77 | 100.19 |
| 20-17 | 101.24 | 270 | | | | | 0.27 | 100.97 |
| 20-18 | 101.50 | 580 | | | | | 0.58 | 100.92 |
| 20-19 | 102.14 | 200 | | | | | 0.20 | 101.94 |
| 20-20 | 101.96 | 250 | | 0.25 – 0.37 | | | 0.37 | 101.59 |
| 20-21 | 102.95 | 150 | | 0.15 – 0.80 | | | 0.80 | 102.15 |
| 20-22 | 103.39 | 200 | | 0.20 – 2.07 | | | 2.06 | 101.33 |
| 20-23 | 104.45 | | 0 – 0.40 | 0.4 – 1.52 | 1.47 | 102.98 | 1.67 | 102.78 |
| 20-24 | 104.26 | | 0 – 0.30 | 0.30 – 0.73 | 0.70 | 103.56 | 1.00 | 103.26 |
| 20-25 | 104.71 | | 0 – 0.30 | 0.30 – 0.60 | | | 0.60 | 104.11 |
| 20-26 | 101.38 | 200 | | | 0.20 | 101.18 | 0.64 | 100.74 |
| 20-27 | 104.66 | 150 | 0.15 – 0.6 | 0.60 – 0.79 | | | 0.80 | 103.86 |
| 20-28 | 102.89 | 80 | | | | | 0.08 | 102.81 |
| 20-29 | 101.27 | 420 | | | | | 0.42 | 100.85 |

| Table I: Summary of Findings in Test Pits | | | | | | | | |
|---|------------------------------|----------------|-----------|-------------|----------------|-----------|----------------------|-----------|
| TestPit Nos | Ground Surface Elevation (m) | Topsoil | Fill | Sand | Top of Caprock | | Top of Sound Bedrock | |
| | | Thickness (mm) | Depth (m) | Depth (m) | Depth (m) | Elev. (m) | Depth (m) | Elev. (m) |
| 20-30 | 101.37 | 360 | | | | | 1.36 | 100.01 |
| 20-31 | 100.63 | 275 | | 0.28 – 0.66 | | | 0.66 | 99.97 |
| 20-32 | 102.26 | 200 | | | 0.20 | 102.06 | 0.62 | 101.64 |
| 20-33 | 102.97 | 200 | | | | | 0.20 | 102.77 |
| 20-34 | 102.56 | 330 | | | | | 0.33 | 102.23 |

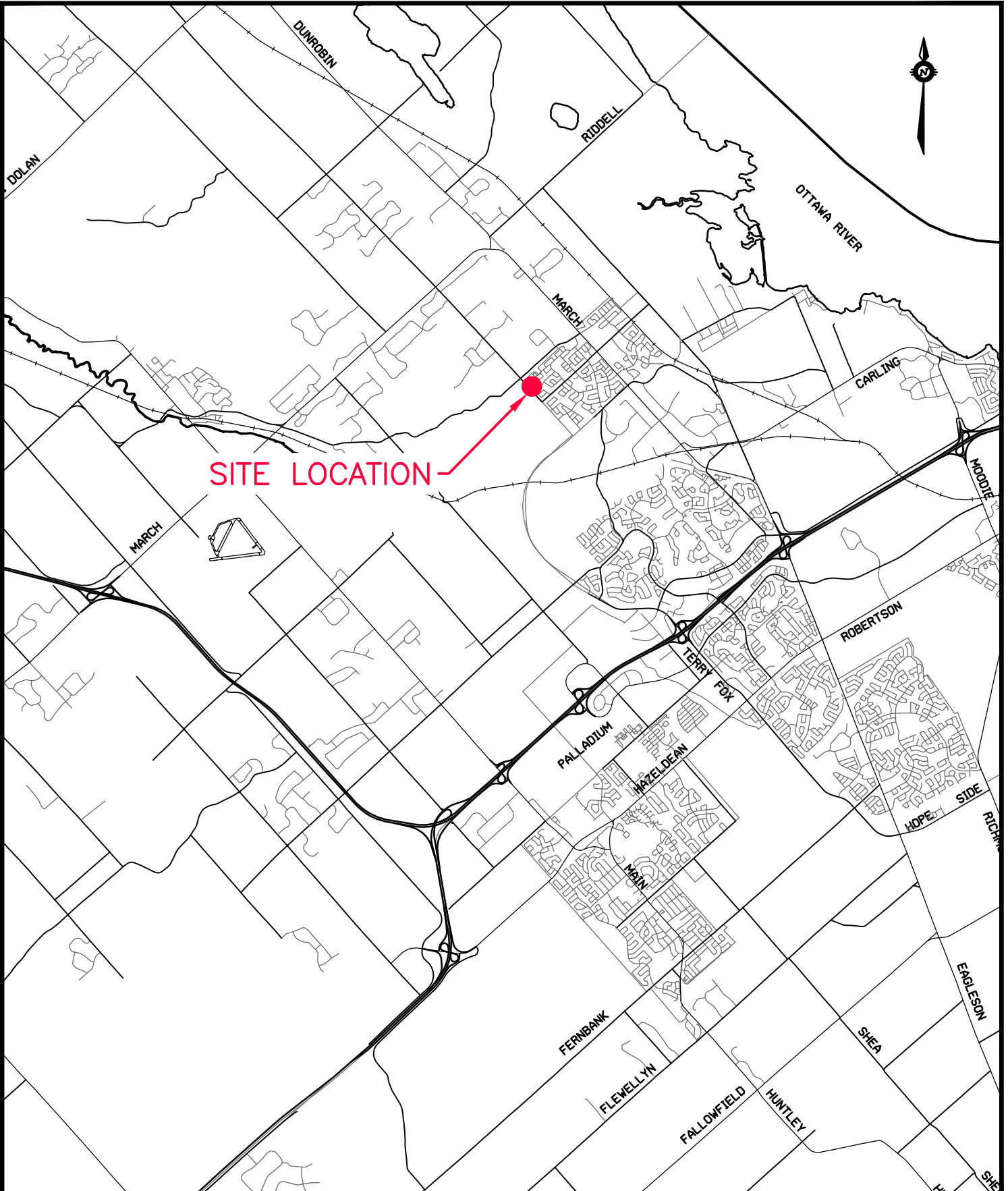
EXP Services Inc.

Client: Theberge Homes
Additional Test Pit Investigation, Proposed Residential Development
1158 Old Second Line Road, Ottawa, ON.
EXP Project Number: OTT-00245054-A0
March 2, 2020

FIGURES



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 Last Saved: Jan 30, 2020 9:25 AM Last Plotted: Jan 30, 2020 9:29 AM Plotted by: HewsonJ



SITE LOCATION

exp Services Inc.
 100-2650 Queensview Drive
 Ottawa, ON K2B 8H6
 www.exp.com



| | |
|---------|----------|
| DESIGN | EXP |
| DRAWN | JH |
| DATE | JAN 2020 |
| FILE NO | 245054 |

**1158 OLD SECOND LINE RD.
 THERBERGE HOMES**

SITE LOCATION PLAN

SCALE
 NTS
 SKETCH NO

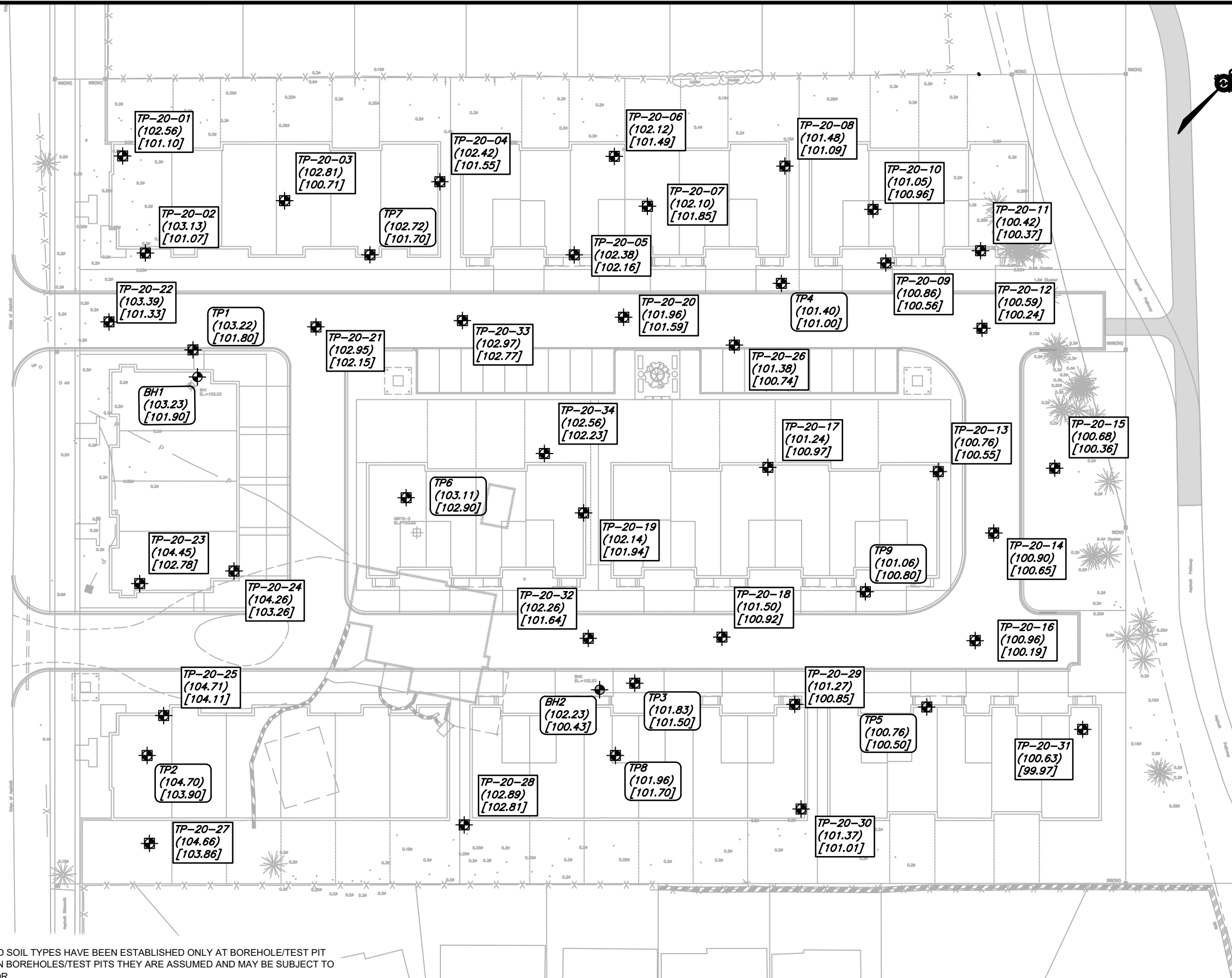
FIG-1

File name: P:\Projects\Geotechnical\240000\245054_Geo and PHI Update 1158 Second Line Theberge\0 - DWG\245054-BH.dwg
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OLD SECOND LINE ROAD

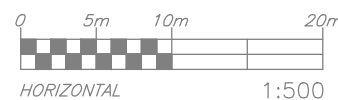
LEGEND

- TP-20-01 (102.56) [101.10] TEST PIT NO. (COMPLETED JAN. 2020)
 (GROUND ELEVATION)
 [SOUND BEDROCK ELEVATION]
- TP1 (103.22) [101.80] TEST PIT NO. (COMPLETED 2019)
 (GROUND ELEVATION)
 [BEDROCK ELEVATION]
- BH1 (103.22) [101.90] BOREHOLE NO. (COMPLETED 2019)
 (GROUND ELEVATION)
 [BEDROCK ELEVATION]



NOTES :

1. THE BOUNDARIES AND SOIL TYPES HAVE BEEN ESTABLISHED ONLY AT BOREHOLE/TEST PIT LOCATIONS. BETWEEN BOREHOLES/TEST PITS THEY ARE ASSUMED AND MAY BE SUBJECT TO CONSIDERABLE ERROR.
2. SOIL SAMPLES AND ROCK CORES WILL BE RETAINED IN STORAGE FOR THREE MONTHS AND THEN DESTROYED UNLESS THE CLIENT ADVISES THAT AN EXTENDED TIME PERIOD IS REQUIRED.
3. BOREHOLE/TEST PIT ELEVATIONS SHOULD NOT BE USED TO DESIGN BUILDING(S) OR FLOOR SLABS OR PARKING LOT(S) GRADES.
4. THIS DRAWING FORMS PART OF THE REPORT PROJECT NUMBER AS REFERENCED AND SHOULD BE USED ONLY IN CONJUNCTION WITH THIS REPORT.
5. BASE PLAN OBTAINED FROM ARCHITECTURAL SITE PLAN.



| | | | | |
|---|--|---|---|--------------------------------------|
| exp Services Inc. 100-2650 Queensview Drive Ottawa, ON K2B 8H6 www.exp.com | | DESIGN EXP DRAWN JH DATE JAN 2020 FILE NO 245054 | 1158 OLD SECOND LINE RD. THERBERGE HOMES TEST PIT/BOREHOLE LOCATION PLAN | SCALE 1:500 SKETCH NO FIG-2 |
|---|--|---|---|--------------------------------------|