Installation of New Services
4 Campbell Drive
Uxbridge, Ontario
L9P 1S4

Geotechnical Investigation Report

Oak Valley Health
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ENGLOBE

Geotechnical Investigation Report

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1 Introduction

Englobe Corp. (Englobe) was retained by Oak Valley Health to conduct a geotechnical investigation for the proposed underground services at 4 Campbell Drive, in the Township of Uxbridge. The general location of the site is presented on Figure 1.

This report encompasses the results of the geotechnical investigation conducted for the proposed development site to determine the prevailing subsurface soil and groundwater conditions, and provide pertinent geotechnical engineering design advice and recommendations for the installation of underground services (i.e. watermain, sanitary and storm sewer), retaining wall, earthquake and earth pressure design parameters, storm water management pond design, infiltration rate and pavement design. In addition, comments are also included on pertinent construction aspects including excavation, backfill and ground water control.

Terraprobe (current Englobe) has previously completed several geotechnical investigation reports at the site (File No.1-19-0022-01, dated March 22, 2019, and File No.1-19-0022-02, dated November 29, 2019). Recently, Englobe also completed geotechnical investigation for the proposed building addition (refer to File No.02310769.000, dated February 4,2024).

2 Site and Project Description

The site is located on the northwest corner of Campbell Drive and Toronto Street South, in the Township of Uxbridge. The municipal address of the site is 4 Campbell Drive, Uxbridge, Ontario. The project site is currently occupied by a two (2) storey brick building (Uxbridge Cottage Hospital), a two (2) storey Health Centre building with associated parking lots, driveways/access routes, and landscaped areas.

It is proposed to demolish the existing east building and construct the new parking lots, retaining wall and install new underground services as well as storm water management pond.

3 Investigation Procedure

The field investigation was conducted on June 17 to 20, 2024 and consisted of drilling and sampling a total of seventeen (17) boreholes in the vicinity of the proposed development and extended to depths varying from about 5.2 to 8.2 m below existing grade. The boreholes details are provided as follows:

- Advance eleven (11) boreholes (BH24-1 to 24-11) within/in the vicinity of the proposed underground services extending to depths varying from about 6.7 to 8.2 m below grade,
- Advance four (4) boreholes (BH24-12 to 24-15) within/in the vicinity of the proposed SWM pond extending to about 6.7 m depth below grade, and
- Advance two (2) boreholes (BH24-16 and 24-17) along the alignment of the proposed retaining wall extending to about 5 .2 m depth below grade.

The boreholes were staked in the field by Englobe in consultation with the client. Various utility locates agencies, including a private locator, were contacted to locate the locatable underground public and private utility lines and clear the borehole locations prior to drilling. The approximate borehole locations are shown on enclosed Borehole Location Plan (Figures 2A, 2B and 2C).

The borehole ground surface elevations were surveyed by Englobe using a Trimble R10 GNSS System. The Trimble R10 system uses the Global Navigation Satellite System and the Can-Net reference system to determine target location and elevation. The Trimble R10 system is reported to have an accuracy of up to 10 mm horizontally and up to 30 mm vertically.

The borings were advanced by a specialist drilling contractor using a continuous flight power auger machine (truck-mounted) with solid stem augers and were sampled at 0.75 m interval (upper 3.0 m depth) and 1.5 m interval (below 3.0 m depth below grade) with a conventional 50 mm diameter split

barrel samplers when the Standard Penetration Test (SPT) was carried out (ASTM D1586). The results of these Penetration Tests are reported as “N” values on the enclosed Borehole Logs at corresponding depths.

All field work (drilling, sampling, and testing) was observed and recorded by a member of Englobe’s field engineering staff, who logged the borings and examined the soil samples as they were obtained. All samples obtained during the field investigation were sealed into clean plastic jars and transported to our testing laboratory for detailed inspection and testing. All borehole soil samples were examined (visual and tactile) in detail by a geotechnical engineer and classified according to visual and index properties. Laboratory tests consisted of water content determination on all samples, and a Sieve and Hydrometer analysis test on five (5) selected native soil samples (Borehole 24-1, Sample 3; Borehole 24-6, Sample 4; Borehole 24-8, Sample 3; Borehole 24-12, Sample 4; Borehole 24-15, Sample 3 and Borehole 24-16, Sample 3). The laboratory testing results of individual soil samples are plotted on the enclosed Borehole Logs at respective sampling depths, and the results of the Sieve and Hydrometer analysis are appended and summarized in Section 4.2 of this report.

Groundwater levels were measured in the boreholes upon completion of drilling. Monitoring wells comprising of 50-mm diameter PVC tubing was installed in selected boreholes (Boreholes 24-1 to 24-13 and 24-15) to facilitate groundwater level monitoring. The results of groundwater monitoring are presented in Section 4.3 of this report. Water levels in the monitoring wells were measured on July 3, 2024, and is noted on the enclosed Borehole Logs. The results of ground water monitoring are presented in Section 4.3 of this report.

4 Subsurface Conditions

The specific soil conditions encountered at each borehole location are described in greater detail on the Borehole Logs, with a summary of the general subsurface soil conditions outlined below. This summary is intended to correlate this data to assist in the interpretation of the subsurface conditions encountered at the site.

It should be noted that the subsurface conditions are confirmed at the borehole locations only and may vary between and beyond the borehole locations. The boundaries between the various strata as shown in the logs are based on non-continuous sampling. These boundaries represent an inferred transition between the various strata, rather than a precise plane of geologic change.

4.1 Stratigraphy

The following stratigraphy is based on the borehole findings, as well as the geotechnical laboratory testing conducted on selected representative soil samples. The summary provided below is for general guidance only. Detailed depths and elevations are given in the following subsections and appended borehole logs.

4.1.1 Surficial Layers

A surficial topsoil layer (about 100 to 300 mm thick) was encountered in Boreholes 24-3, 24-5, 24-7 and 24-9 to 24-16. The topsoil was noted to be dark brown to black in colour and predominantly consisted of a silt matrix with organic presence.

A layer of asphaltic concrete (about 90 to 150 mm thick) was encountered in Boreholes 24-1, 24-2, 24-4, 24-6, 24-8 and 24-17) at the ground surface which was underlain by an aggregate layer (about 40 to 310 mm

thick). The aggregate material (comprising sand and gravel) was noted to be typically in a compact and damp condition.

The above noted pavement structure component and topsoil thicknesses were measured from the borings and are approximate and may vary between and beyond the boreholes. The topsoil thickness noted on the Borehole Logs refers to the distinct topsoil layer present at the borehole location, however, organic inclusions extended deeper than the topsoil thickness layer noted on the Borehole Logs. The topsoil thickness to be removed/stripped for the site development may differ from the topsoil thickness noted on the Borehole Logs. The reported thickness data may vary between and beyond the borehole locations. This information is not sufficient for estimating topsoil/pavement component quantities and/or associated costs. Consideration should be given to conduct shallow test pit investigation/coring to obtain accurate thickness information of the topsoil/pavement structure.

4.1.2 Earth Fill

A zone of earth fill was encountered in all boreholes (except Boreholes 24-10 and 24-11) beneath the topsoil layer/pavement structure and extended to depths varying from about 0.8 m (boreholes 24-1, 24-3, 24-4, 24-6, 24-9, 24-13, 24-15, 24-16 and 24-17) to about 2.6 m (Borehole 24-5) below existing grade. The earth fill materials predominantly consisted of sandy silt/sand with trace to some silt/silty sand with trace amounts of clay and gravel as well as organics.

The Standard Penetration Test results (N Values) obtained from the earth fill materials varied from 3 to 26 blows per 300 mm of penetration, indicating a very loose compact relative density. Measured moisture contents of the earth fill materials generally ranged from 4 to 22 percent by weight, indicating a moist to locally wet condition (at Borehole 24-5).

4.1.3 Native Soil

Undisturbed native soil was encountered in all boreholes beneath the zone of earth fill material and extended to the full depth of investigation (up to maximum about 8.2 m depth below existing grade).

Silt with trace to some clay and trace to some sand was encountered in all boreholes (except Boreholes 24-11, 24-12, 24-14 and 24-15) at depts varying from about 0.8 depth (Boreholes 24-1, 24-3, 24-4, 24-16 and 24-17) to 4.6 m (Borehole 24-10) and extended to depths varying from about 4.6 m (Boreholes 24-13) to 8.2 m (Borehole 24-6) below existing grade.

Sandy silt with trace amount of clay was encountered in Boreholes 24-6 and 24-15 at about 0.8 m depth and extended to depths varying from about1.5 m (Borehole 24-6) to 3.0 m (Borehole 24-15) below existing grade.

The Standard Penetration Test results (N Values) obtained from the native silt/sandy silt soils varied from 9 to 65 blows per 300 mm of penetration, indicating a loose to very dense (typically compact) relative density.

Measured moisture contents of the native silt/sandy silt soils ranged from 10 to 25 percent by weight, indicating a moist to wet condition.

Clayey silt with trace amounts sand was encountered in Borehole 24-8 at about 1.5 m depth and extended to about 2.3 m depth below existing grade.

The Standard Penetration Test results (N Values) obtained from the native clayey silt soil was 10 blows per 300 mm of penetration, indicating a stiff consistency. Measured moisture contents of the native clayey silt soil were 20 percent by weight, indicating a moist condition.

Sand with trace to some silt/silty sand with trace to some gravel and trace amounts of clay was encountered in Boreholes 24-9 to 24-15 at depts varying from about 0.2 m (Borehole 24-11) to 4.6 m (Borehole 24-13) and extended to depths varying from about 1.8 m (Boreholes 24-9) to 6.7 m (full depth of investigation, Boreholes 24-10 to 24-15) below existing grade.

Sand and gravel with trace amounts silt was encountered in Borehole 24-13 at about 0.8 m depth and extended to about 2.3 m depth below existing grade.

The Standard Penetration Test results (N Values) obtained from the native sand/silty sand/sand and gravel soils varied from 5 to 39 blows per 300 mm of penetration, indicating a loose to dense (typically compact) relative density. Measured moisture contents of the native sand/silty sand/sand and gravel soils ranged from 5 to 27 percent by weight, indicating a moist to wet condition.

4.2 Geotechnical Laboratory Test Results

The geotechnical laboratory testing consisted of natural water content determination for all samples, while a Sieve and Hydrometer analysis were conducted on selected native soil samples. The test results are plotted on the enclosed Borehole Logs at respective sampling depths. The results (graphs) of the Sieve and Hydrometer (grain size) analysis are appended, and a summary of these results are presented as follows:

Borehole No.	Sampling Depth below Grade (m)	Percentage (by mass)				Descriptions (MIT)
		Gravel	Sand	Silt	Clay	
Borehole 24-1, Sample 3	1.8	0	16	68	16	SILT, some sand, some clay
Borehole 24-6, Sample 4	2.6	0	15	70	15	SILT, some sand, some clay
Borehole 24-8, Sample 3	1.8	0	7	67	26	CLAYEY SILT, trace sand
Borehole 24-12, Sample 4	2.6	1	88	10	1	SAND, some silt, trace clay, trace gravel
Borehole 24-15, Sample 3	1.8	5	26	59	10	SANDY SILT, some clay, trace gravel
Borehole 24-16, Sample 3	1.8	0	30	66	4	SANDY SILT, trace gravel

4.3 Groundwater

Observations pertaining to the depth of caving were made in boreholes immediately after completion of drilling and are noted on the enclosed Borehole Logs. Monitoring wells were installed in selected boreholes (Boreholes 24-1 to 24-13 and 24-15) to facilitate groundwater level monitoring. Water levels in the monitoring wells were measured on July 3, 2024, and are noted on the enclosed Borehole Logs. A summary of these observations is provided as follows:

Borehole No.	Depth of Boring Below Grade (m)	Depth to Cave Upon Completion of DRILLING Strata Screened (m)	Water Level Depth During Drilling (m)	Water Level Depth /Elevation in the Monitoring Wells on July 3,2024 m)
BH24-1	6.7	Open	4.9	1.7/274.9
BH24-2	6.7	Open	5.8	2.5 / 274.8
BH24-3	6.7	5.3	5.2	2.5/274.4
BH24-4	6.7	5.4	5.4	2.4 /274.9
BH24-5	6.7	5.5	4.6	2.5/274.7
BH24-6	8.2	6.7	3.0	2.1 / 274.8
BH24-7	6.7	3.0	Dry	1.4/276.2
BH24-8	6.7	Open	4.6	2.3 / 275.7
BH24-9	6.7	Open	1.5	2.0/273.9
BH24-10	6.7	3.0	1.5	1.4/274.7
BH24-11	6.7	4.9	2.3	1.8/274.0
BH24-12	6.7	1.5	1.5	1.7/274.0
BH24-13	6.7	3.0	2.1	1.6/275.1
BH24-14	6.7	1.5	1.5	NM
BH24-15	6.7	4.0	2.7	1.7/275.9
BH24-16	5.2	Open	Dry	NM
BH24-17	5.2	Open	Dry	NM

NM =No Monitoring Installed

Water levels noted above may fluctuate seasonally depending upon the amount of precipitation and surface runoff.

5 Discussion and Recommendations

The following discussion and recommendations are based on the factual data obtained from this investigation and are intended for the use of the owner and the design engineer. Contractors bidding or providing services on this project should review the factual data and determine their own conclusions regarding construction methods and scheduling.

This report is provided on the basis of these terms of reference and on the assumption that the design features relevant to the geotechnical analyses will be in accordance with applicable codes, standards and guidelines of practice. The Ontario Building Code may require additional considerations beyond the recommendations provided in this report and must be followed. If there are any changes to the site development features or there is any additional information relevant to the interpretations made of the subsurface information with respect to the geotechnical analyses or other recommendations, then Englobe should be retained to review the implications of these changes with respect to the contents of this report.

5.1 Underground Services

The project involves the installation of underground services (installation of sanitary and storm sewer lines as well as extension of water line connections). Refer to the attached site servicing plan (prepared by LEA Consulting, Project No. 24153, dated Jan 17, 2024, Drawing No. C-02) for details (Appendix C).

Eleven (11) boreholes (Boreholes 24-1 to 24-11) were advanced in the vicinity of the proposed underground services extending to depths varying from about 6.7 to 8.2 m below existing grade. The boreholes encountered a zone of earth fill beneath the surficial topsoil layer/pavement structure extending to depths varying from about 0.8 to 2.6 m below existing grade. The earth fill materials were underlain by undisturbed native soil deposit which extended to the full depth of investigation (up to about 8.2 depth below grade).

Ground surface elevations at borehole locations vary from 275.9 to 278.0 m. Based on the site servicing plan, the proposed sewer invert elevations vary from 274.4 to 276.0 m. Therefore, earth fill/undisturbed native soil subgrade is expected at the proposed invert depths at the borehole locations.

The existing earth fill materials were not suitable to support the proposed buried services. The undisturbed native soil deposit and approved fill material will be suitable for support of buried services on conventional well graded granular base material. Where disturbance of the trench base is likely to occur due to ground water seepage or construction traffic, the disturbed soils should be subexcavated and replaced with suitably compacted granular fill. The subgrade should be inspected by a geotechnical engineer during construction.

5.2 Retaining Wall

As noted before, two (2) boreholes (Boreholes 24-16 and 24-17) were advanced along the alignment of the proposed reinforced concrete retaining wall. These boreholes encountered earth fill materials beneath the surficial topsoil layer/pavement structure and extended to about 0.8 depth below grade. The earth fill materials were underlain by undisturbed native soils deposit and extended to the full depth of investigation (up to about 5.2 m depth below existing grade).

Based on the borehole data and preliminary wall design information, the wall foundation subgrade would consist of undisturbed native soils silt with trace to some sand and trace clay of a compact relative density. A nominal net geotechnical reaction of 150 kPa (Serviceability Limit States, SLS) and a factored geotechnical resistance of 225 kPa (Ultimate Limit States, ULS) may be used for the design of the retaining wall foundation supported on the underlying competent undisturbed native soils.

It is recommended that the footing base be evaluated by a qualified geotechnical engineer to ensure that the founding soils exposed at the excavation base are consistent with the design bearing pressure intended by the geotechnical engineer. The subgrade should be cleaned of all deleterious materials such as topsoil, fill, softened, disturbed or caved materials, as well as any standing water. If construction proceeds during freezing weather conditions, adequate temporary frost protection for foundation subgrade must be provided.

The following general recommendations are provided for the wall design/construction:

- The retaining wall should be provided with a positive drainage system comprising free draining backfill zone and subdrain with a positive outlet to prevent the formation of hydrostatic pressure.

- The wall should be designed and constructed as per recommendations noted above and provided with free drainage backfill and positive drainage behind the wall.

- The foundation subgrade should be inspected by a qualified geotechnical engineer to ensure that the founding soils exposed at the excavation base are consistent with the design bearing pressure intended by the geotechnical engineer. Periodic site inspections will be required to confirm that the wall construction is completed in general conformance to the project recommendations.

- Any new footings adjacent to existing foundations must be located at the same level as the existing footings or below an imaginary line extending up from the edge of the existing footings at an inclination of 45 degrees.

- Heavy compaction equipment should not be used behind the wall within a lateral distance equal to the height of fill above the wall footing, in order to minimize deflection or possible damage to the wall. An appropriate light compaction equipment such as jumping jack, plate tamper, smaller walk-behind roller, etc., should be used for compaction close to the wall.

- A safety fence/barrier should be installed along the top of the retaining wall as per Ontario Building Code specifications (as applicable).

- The wall construction should be conducted under the supervision of the review engineer to ensure it is constructed in general conformance with the design details/specifications.

- A global slope stability analysis of the retaining wall system must be carried out.

  It should be noted that the mobilization of the active earth pressure behind the wall will require an outward deflection of up to 0.5 percent of the wall height. The effect of this deflection should be allowed for the design of the wall and any adjacent or connected structures. The earth pressure design parameters are provided in Section 5.5 of this report.

5.3 Storm Water Management (SWM) Pond

Based on the site servicing plan, the proposed Storm Water Management (SWM) Pond would be located in the west portion of the site. Four (4) boreholes (Boreholes 24 -12 to 24-15) were advanced in the vicinity of the proposed SWM pond footprint. The boreholes encountered a surficial topsoil layer underlain by a zone of fill material extending to depths varying from of about 0.8 to 1.5 m below existing grade. The fill material

was underlain by undisturbed native soil deposit and extended to the full depth of investigation (about 6.7 m depth below grade).

The ground surface elevations at the borehole locations varied from about 275.7 to 277.8. The design bottom/invert elevation of pond would be set at about 274.80 m. The borehole data suggests that the pond base and side slopes are expected to predominantly consist of earth fill and undisturbed native soil. The result of the sieve and hydrometer analysis conducted on two (2) selected soil samples obtained from the boreholes (Borehole 24-12, Sample 4 and Borehole 24-15, Sample 3) indicated that the soil contains 10 to 59 percent silt, 1 to 10 percent clay, 26 to 88 percent sand and 1 to 5 percent gravel particles by weight. Based on these soil gradations, the coefficient of permeability (k) of these native soil deposit is estimated to be on the order of 10^{-3} to 10^{-6} cm/sec.

Water levels varied from about 1.5 to 2.7 m and depth to cave varied from about 1.5 to 4.0 m below grade upon completion of drilling. The measured ground water level depth in the Monitoring Wells (installed in Boreholes 24-12, 24-13 and 24-15) varied from about 1.6 to 1.7 m (Elev.274.0 to 275.9 m) below grade on July 3,2024. The above data indicate that the pond invert level will be set higher, to about 1.1 m higher than the highest ground water level measures at the pond location.

Borehole data indicate that the pond footprint (base and sides) would comprise silty sand/sand and gravel/sand with trace to some silt/sandy silt deposit, therefore ground water seepage is expected into the pond. The amount of seepage/discharge would depend upon the depth of excavation and prevailing ground water level in addition to the variability of the soil composition in the area.

Typically, a separation of 1.5 m is desired between the pond invert and the ground water level to minimize impact of the SWP pond water on the ground water. Where such separation cannot be achieved due to site grading considerations and the pond design requirements are such that the groundwater influx/out-flux is not desired then provisions are generally made to incorporate a pond liner to help achieve this separation.

Based on the subsurface soils conditions encountered in the boreholes, the recommended preliminary stable slope inclination for the side slope is 4 horiz. to 1 vert. above water level and 5 horiz. to 1 vert. below water level. A detailed pond slope stability analysis should be carried out once the design details of the SWM ponds are finalized. It must be noted that regulatory agencies may also have specific requirements with respect to pond design (including side slopes) in addition to the slope considerations noted above.

5.3.1 Earth Berm, Liner and Pond Slope Surface Treatment

The final pond design grades will require an earth-berm and/or a liner. The earth fill material used for the berm and liner construction should be of low permeability and free of organic/topsoil. It should consist of at least 15 percent clay and 40 percent silt size particles. Any cobbles or boulders greater than 100 mm in size should be excluded from the earth berm fill, as should any earth fill/disturbed soils containing excessive amounts of sand or silt. The approved earth fill materials should be placed in lifts not exceeding 150 mm and be compacted to a minimum of 95 percent of the SPMDD. The materials will be placed and compacted at a water content of between 2 percent dry and 3 percent wet of the optimum moisture content. In order to achieve required compaction of the berm fill at the final slope surface, consideration should be given to ‘overbuild’ the berm (minimum 1.5 m beyond the design slope surface) and cut neatly to the final design

slope configuration. The subgrade area beneath berm fill and pond base (for liner) should be stripped to remove all organics, topsoil and vegetation. The exposed subgrade should be proof-rolled and inspected by a qualified geotechnical engineer to confirm the founding soil conditions. Any loose, soft or otherwise deleterious materials must be removed to their full extent and replaced with approved compacted earth fill (as specified above) under the direction of a qualified geotechnical engineer. Similarly, areas of sand/silt soils must be identified, subexcavated and replaced with compacted approved low permeability earth fill soils. The subgrade should be compacted to at least 95 percent SPMDD prior to the berm fill placement.

The final slope surface and all bare or exposed areas (where applicable) should be provided with suitable ground cover or erosion protection. The slope surface should be provided with a thin layer of topsoil (minimum 150 mm thick) and should be hydro-seeded with a grass mixture and mulch. If seeded, during the first 2 to 3 years, the surface cover of topsoil and seeding may require periodic maintenance until the vegetation becomes well established. It is recommended that erosion netting be staked on the outside slope (where applicable) for erosion protection (and inside the slope which is above the water level).

It is understood that the inside slopes of the SWM pond will likely be vegetated with aquatic vegetation species. Periodic fluctuations in the water level will make inside slopes susceptible to minor sheet and rill erosion over extended periods of exposure if these slopes remain bare and without vegetation. Occasional maintenance and repair of the inside bare slopes (and removal of accumulated sediment in the base) will be required. A lining of the inside slopes would reduce the amount of maintenance. The lining may consist of rip-rap or local field stones.

It is recommended that any piping or trenching in the area of the pond should be provided with seepage cut off collars (clay plugs, concrete plugs, or other barriers) to protect against water seepage through the pipe bedding and backfill.

The liner may consist of a natural soil material (such as clay or clayey silt) or a synthetic membrane liner (such as a High Density Polyethylene, Geo-synthetic Clay Liner, or PVC). The following considerations may be useful for the selection liner:

- Low permeability clayey silt materials may be available locally for the construction of the liner,
- A clay liner is readily constructed using locally available construction equipment and manpower,
- A synthetic liner requires more elaborate design and construction considerations with respect to fabrication and protection of the completed liner.

However, a synthetic liner would perform satisfactorily and could be considered if a suitable and sufficient clay source were not available.

It is recommended that the minimum liner thickness (clay liner) be 1.5 m to provide required separation between the pond invert and native soil subgrade, and that the liner be inspected on an annual basis, to deal with these considerations. We note that depending upon final pond design and measured ground water levels, the liner may be subject to uplift, therefore, provisions for temporary dewatering for pond construction and uplift resistance may be required and should be assessed.

The liner must be constructed of low permeability materials (clayey silt or clay) in order to perform adequately and to provide a liner bulk permeability on the order of 10^{-6} to10^{-7} cm/s. The liner material should consist of clean mineral soil. The grain size distribution of the liner material must conform to the following:

- no particle greater than 50 mm dimension
- not greater than 15 percent of the material larger than 4.8 mm (No. 4 sieve)
- minimum of 40 percent of the material finer than 0.08 mm (i.e., passing No. 200 sieve)
- minimum 15 percent finer than 0.002 mm (clay size)
- ! not greater than 5% organic content, with no visible roots, stumps or topsoil.

A strict control and monitoring of the liner material must be maintained to collect samples to verify its composition based on laboratory test results and to identify any variation in the material. The liner material must be placed at water contents 2 to 4 percent wet of the optimum moisture content. This is required to ensure that the material is compacted to a homogenous mass and does not remain as distinct "clods" or “clumps". The liner should be constructed in thin lifts (not exceeding 150 mm thick) and be heavily compacted to a minimum of 95 percent SPMDD using sheepsfoot roller for kneading. Liner materials should not contain any frozen soil should the construction proceeds under winter conditions. Also, adequate protection against frost penetration must be provided if required (e.g. straw bales, tarping, heating).

It is recognized that a broad range of soil materials will be suitable for a clay liner (i.e., will meet the specifications noted above). It is recommended that contractors bidding on the project provide the results of testing, to indicate the following:

- The location (source) of the clay material.
- Verification of the uniformity of the material.
- Demonstration that sufficient material is available for the project.
- Laboratory testing to demonstrate that the material meets the minimum specifications noted above.

The liner construction must be conducted under the full-time supervision of a qualified geotechnical engineer.

Alternately, a synthetic liner (HDPE, Geosynthetic Clay Liner or PVC liner) such as ‘Bentofix® Thermal Lock or equivalent’ may also be used. Manufacturer’s specifications and recommendations must be referred for the design and construction of a synthetic liner. It is recommended that the site subsurface and grading information be reviewed by the manufacturer to assess suitability of a geosynthetic liner and recommendations for installation.

The liner design must be assessed for uplift consideration depending upon the water table pond invert and permanent pool elevation as well as type of liner system.

5.3.2 Operational Considerations

The following general considerations are recommended with respect to the long-term operation and maintenance of the pond:

- A minimum operating freeboard of 0.45 m should be maintained between the high-water level and the pond rim. Overtopping of the pond, as a result of overfilling or flooding may result in pond damage. A provision of an overflow conveyance route/spillway is recommended to prevent pond overtopping, if applicable.

- The flat surface (maintenance/access roads) at the top of the pond/berm must be a minimum of 3.0 m wide to facilitate adequate compaction and to accommodate service vehicles for maintenance.
- The pond should be carefully inspected each season for including but not limited to the following:
    (i) General condition of various components including areas of erosion, settlement, slump or deterioration.
    (ii) Inspection of liner surface for discontinuities or holes as a result of burrowing animals, vandalism, settlement or the like.
    (iii) Removal of unwanted vegetation (tree, seedlings and the like) from within the footprint of the pond area.

Any damaged or deteriorated areas must be repaired regularly.

It must be noted that regulatory agencies stipulate maximum pond slope inclinations and other requirements for stormwater management pond design. These specifications may include requirements above and beyond the geotechnical recommendations provided in this report.

5.4 Infiltration Rate

The proposed development may include low impact development provision for on-site storm water management. As such an assessment of soil infiltration rates will be required as a component of the storm water management design.

A total of three (3) in-situ infiltration tests (GP1 to GP3) were conducted onsite on June 19, 2024, at approximate locations are shown on Figures 2, 2A and 2B. The test was performed using a Guelph Permeameter (Model 2800). The test locations and depths were provided by the client.

The soil type, in-situ hydraulic conductivity and infiltration rate measured at the test locations/depths during the field tests are summarized as follows:

Test Location	General Soil Type	Test Depth/Elevation Below Existing Ground Level	Estimated Hydraulic Conductivity	Infiltration Rate
GP1	Sandy Silt, trace to some gravel, trace to some clay	1.6 m/275.0 m	2.1×10^{-6} cm/sec	14 mm/hr
GP2	Silty Sand, trace gravel, trace clay	1.6 m/275.3 m	8.1×10^{-4} cm/sec	46 mm/hr
GP3	Sandy Silt, trace to some gravel, trace to some clay	1.6 m/276.4 m	4.8×10^{-6} cm/sec	14 mm/hr

*Note: Based on the in-situ hydraulic conductivity test result, the infiltration rate is estimated as per TRCA Low Impact Development Stormwater Management Planning and Design Guide, Table C1.

The design infiltration rates for the site should be evaluated based on applicable safety correction factor(s), as per the above referenced document.

5.5 Lateral Earth Pressure Design Parameters

The retaining wall should be designed to resist a pressure that can be calculated based on the following equation:

$$P = K[\gamma (h-h_w) + \gamma' h_w + q] + \gamma_w h_w$$

Where:
- **P** = the horizontal pressure (kPa)
- **K** = the earth pressure coefficient
- **h** = the depth below the ground surface (m)
- $\mathbf{h_w}$ = the depth below the groundwater level (m)
- $\boldsymbol{\gamma}$ = the bulk unit weight of soil (kN/m^3)
- $\boldsymbol{\gamma_w}$ = the bulk unit weight of water (9.8 kN/m^3)
- $\boldsymbol{\gamma'}$ = the submerged unit weight of the exterior soil, (γ_{sat} - γ_w)
- **q** = the complete surcharge loading (kPa)

Where the wall backfill can be drained effectively to eliminate hydrostatic pressures on the wall, this equation can be simplified to:

$$P = K[\gamma h + q]$$

This equation assumes that free-draining granular backfill is used and positive drainage is provided to ensure that there is no hydrostatic pressure acting in conjunction with the earth pressure.

Resistance to sliding of retaining structures is developed by friction between the base of the footing and the soil. This friction (R) depends on the normal load on the soil contact (N) and the frictional resistance of the soil (tan ϕ) expressed as R = N tan ϕ. The factored geotechnical resistance at ULS is 0.8 R.

Passive earth pressure resistance is generally not considered as a resisting force against sliding for conventional retaining structure design because a structure must deflect significantly to develop the full passive resistance.

The average values for use in the design of walls subjected to unbalanced earth pressures at this site are tabulated as follow:

Parameter	Definition	Units
ϕ	angle of internal friction	degrees
γ	bulk unit weight of soil	kN/ m^3
K_a	active earth pressure coefficient (Rankine)	dimensionless
K_o	at-rest earth pressure coefficient (Rankine)	dimensionless
K_p	passive earth pressure coefficient (Rankine)	dimensionless

Stratum/Parameter	γ	Φ	Ka	Ko	Kp
Earth Fill	19.0	28	0.36	0.53	2.77
Compact Granular Fill	21.0	32	0.31	0.47	3.25
Sand/Silty Sand	20.0	32	0.31	0.47	3.25
Silt/Sany Silt	20.0	32	0.31	0.47	3.25

The above values of the earth pressure coefficients are for the horizontal backfill grade behind the wall. The earth pressure coefficients for inclined grade will vary based on the inclination of the retained ground surface.

5.6 Pipe Bedding

The undisturbed native materials and engineered fill material compacted to 98 percent SPMDD will be suitable for support of buried services on conventional well graded granular base material. It is recommended that the utility subgrade should be inspected by a geotechnical engineer or its representative during construction. If disturbance of the trench base has occurred, such as due to ground water seepage, or construction traffic, the disturbed soils should be subexcavated and replaced with suitably compacted granular fill.

Granular bedding material should consist of a well graded, free draining soil such as OPSS Granular “A” or 19 mm Crusher Run Limestone or its equivalent as per the pertinent City/Region specifications. The bedding materials should be placed in 150 mm thick lifts and compacted to a minimum of 95 percent SPMDD or vibrated/tempted to a dense state in case of a clear stone bedding.

A clear stone type bedding may be considered if approved by the City/Region, however, on a silt/sand subgrade it must be utilized only in conjunction with a suitable geotextile filter (Terrafix 270R or equivalent). Without proper filtering, there may be entry of fines from the subgrade soils into the bedding. This loss of ground could result in loss of support to the pipes and possible future settlements. A geotextile is required where subgrade consists of cohesionless soils.

5.7 Pavement

It is understood that the paved areas at this site would consist of fire routes/access routes, and parking lot and driveways. Design recommendations for pavement structures are provided in this section.

5.7.1 Pavement Design

The following flexible pavement thickness design is provided in the table below.

Pavement Layers	Minimum Component Thickness		Compaction Requirements
	Parking Lot	Fire/Access Route	
Hot Mix Asphalt Surface Course OPSS 1150 HL 3	40 mm	40 mm	OPSS.MUNI 310
Hot Mix Asphalt Binder Course OPSS 1150 HL 8	50 mm	80 mm	
Base Course OPSS.MUNI 1010 Granular A	150 mm	150 mm	100 percent of SPMDD (ASTM D698)
Subbase Course OPSS.MUNI 1010 Granular B Type I	300 mm	400 mm	

Alternatively, consideration may also be given to the use of Portland cement concrete pavement where there is intense truck use and turning of transport vehicles in conjunction with the waste handling, loading docks or delivery facilities. The following table provides the minimum recommended rigid pavement structures:

Pavement Layers	Minimum Component Thickness		Compaction Requirements
	Light Duty Pavement	Heavy Duty Pavement	
Portland Cement Concrete, CAN/CSA A23.1- Class C-2	190 mm	215 mm	CAN/CSA A23.1
Subbase Course, OPSS MUNI 1010 Granular A	150 mm	150 mm	100 percent of SPMDD (ASTM D698)

It should be noted that in addition to the adherence to the above pavement design recommendations, a close control on the pavement construction process will also be required in order to obtain the desired pavement life. It is recommended that regular inspection and testing be conducted during the pavement construction to confirm material quality, thickness, and to ensure adequate compaction.

5.7.2 Drainage

Control of water is an important factor in achieving a good pavement life. The subgrade must be free of depressions and sloped (preferably at a minimum grade of 3 percent) to provide effective drainage toward subgrade drains. Grading adjacent to the pavement areas should be designed to ensure that water is not allowed to pond adjacent to the outside edges of the pavement. Continuous pavement subdrains should be provided along both sides of the driveway and internal roadways and drained into respective catch basins to facilitate drainage of the subgrade and granular materials. The subdrain should be installed in accordance with OPSD 216.021. The subdrain invert should be maintained at least 0.3 m below subgrade level. Two lengths of subdrain (each minimum of about 3 m long) should be installed at each catch basin over the parking lot area.

5.7.3 General Pavement Recommendations

HL 3 and HL 8 hot mix asphalt mixes should be designed, produced and placed in conformance with OPSS.MUNI 1150 and OPSS.MUNI 310 requirements and relevant Town's standard.

Granular A and Granular B Type I should meet the requirements of OPSS.MUNI 1010 and relevant Town's standards. Granular materials should be compacted to 100 percent SPMDD at ±2 percent of the optimum moisture content.

PG 58-28, conforming to OPSS MUNI 1101 is recommended in the HMA surface and binder courses.

Tack coat SS-1 should be applied between hot mix asphalt binder course and surface course.

5.7.4 Subgrade Preparation

All topsoil, organics and soft/loose soil should be stripped from the subgrade areas. The subgrade soil is expected to consist of engineered fill, native soils and these fine-grained soils will be weakened by construction traffic when wet; especially if site work is carried out during the periods of wet weather. An adequate granular working surface would be likely required in order to minimize subgrade disturbance and protect its integrity in wet periods.

Immediately prior to placing the granular subbase, the exposed subgrade should be compacted and then proof rolled with a heavy rubber-tired vehicle (such as a loaded gravel truck). The subgrade should be inspected for signs of rutting or displacement. Areas displaying signs of rutting or displacement should be recompacted and retested or, the material should be excavated and replaced with well-compacted clean fill. The fill material may consist of either granular material or local inorganic soils provided that its moisture content is within ±2 percent of optimum moisture content. Fill should be placed and compacted in accordance with OPSS.MUNI 501 and the subgrade should be compacted to 98 percent of SPMDD. The final subgrade surface should be sloped at least 3 percent to provide positive drainage.

5.8 Excavations and Ground Water Control

The boreholes data indicate that the earth fill materials and undisturbed native soils would be encountered in the excavations. Excavations must be carried out in accordance with the Occupational Health and Safety Act and Regulations for Construction Projects. These regulations designate four (4) broad classifications of soils to stipulate appropriate measures for excavation safety.

TYPE 1 SOIL

a. is hard, very dense and only able to be penetrated with difficulty by a small sharp object;
b. has a low natural moisture content and a high degree of internal strength;
c. has no signs of water seepage; and
d. can be excavated only by mechanical equipment.

TYPE 2 SOIL

a. is very stiff, dense and can be penetrated with moderate difficulty by a small sharp object;
b. has a low to medium natural moisture content and a medium degree of internal strength; and
c. has a damp appearance after it is excavated.

TYPE 3 SOIL

a. is stiff to firm and compact to loose in consistency or is previously-excavated soil;
b. exhibits signs of surface cracking;
c. exhibits signs of water seepage;
d. if it is dry, may run easily into a well-defined conical pile; and
e. has a low degree of internal strength

TYPE 4 SOIL

a. is soft to very soft and very loose in consistency, very sensitive and upon disturbance is significantly reduced in natural strength;
b. runs easily or flows, unless it is completely supported before excavating procedures;
c. has almost no internal strength;
d. is wet or muddy; and
e. exerts substantial fluid pressure on its supporting system.

The earth fill materials encountered in the boreholes are classified as Type 3 Soil, while the undisturbed native soil deposit would be classified as Type 3 Soil above and Type 4 Soil below prevailing groundwater level under these regulations.

Where workmen must enter excavations advanced deeper than 1.2 m, the trench walls should be suitably sloped and/or braced in accordance with the Occupational Health and Safety Act and Regulations for Construction Projects. The regulation stipulates the steepest slopes of excavation by soil type as follows:

Soil Type	Base of Slope	Steepest Slope Inclination
1	within 1.2 metres of bottom of trench	1 horizontal to 1 vertical
2	within 1.2 metres of bottom of trench	1 horizontal to 1 vertical
3	from bottom of trench	1 horizontal to 1 vertical
4	from bottom of trench	3 horizontal to 1 vertical

Minimum support system requirements for steeper excavations are stipulated in the Occupational Health and Safety Act and Regulations for Construction Projects, and include provisions for timbering, shoring and moveable trench boxes.

As noted before, the earth fill and native soils may contain larger particles that are not specifically identified in the boreholes. The size and distribution of such obstructions cannot be predicted with borings, because the borehole sampler size is insufficient to secure representative samples for particles of this size. Provision should be made in excavation contract to allocate risks associated with the time spent and equipment utilized to remove or penetrate such obstructions when encountered.

Ground water was encountered in all boreholes (except Boreholes 24-7, 24-16 and 24-17) and varied from about 1.5 to 5.8 m below grade upon completion of drilling. Depth to cave was noted in all boreholes (except Boreholes 24-1, 24-2, 24-8, 24-9, 24-16 and 24-17) and varied from about 1.5 to 6.7 m below grade upon completion of drilling. Water level measured in the monitoring wells on July 3, 2024, varied from about 1.4 to 2.5 m depth below grade. Relatively permeable cohesionless silt/sand soils encountered across the site were noted to be generally in a moist to wet condition. Therefore, free flowing ground water seepage is expected in the excavation penetrating these soils. The ground water levels may fluctuate seasonally depending upon the precipitation and surface runoff; and wet soils may be encountered to about 0.6 m higher than the water levels noted here due to capillary rise in fine cohesionless silt/sand soils.

Based on the borehole information, it is understood that the ground water seepage is anticipated in the excavation. This seepage will likely emanate from the perched ground water generally present within the earth fill and from the ground water seepage from the wet cohesionless silt/sand soils as encountered in the boreholes. The ground water seepage emanating from above the static ground water table should diminish slowly and can be controlled by continuous pumping from filtered at the base of the excavation. The amount of perched water seepage is expected to increase with the depth of excavation.

For excavations extending below the static ground water level/table and/or into the wet silt/sand deposit, and/or below the prevailing ground water level, it will be necessary to lower the ground water level and maintain it below the excavation base prior to and during the subsurface construction, in order to avoid loosening and sloughing of the base and sides. Consideration should be given to install a skim coat of lean concrete (mud-slab) in conjunction with positive groundwater control to preserve the subgrade integrity to provide support to foundations and utilities, and a working platform, as needed. In general, prior dewatering and ground water control provisions are required for excavations penetrating about 0.6 or more into the ground water table in cohesionless soils. Pumping from the sumps, in general may be effective for shallow excavations, up to about 1.0 m below the ground water level. A professional dewatering contractor should be consulted to review subsurface soil and ground water conditions to assess and recommend ground water control prevision if excavations and service inverts are to extend below the ground water table/level.

Ministry of the Environment, Conservation and Parks (MECP) has made changes to the requirement for Permit to Take Water approvals for construction related activities. Under the revised requirements, specific construction-related water-taking activities are eligible for Environmental Activity and Sector Registry (EASR). The trigger volume for EASR registration is water taking of more than 50,000 L/day. This includes the ground water that is collected in the open excavation as well as any precipitation or surface run off that enters the excavation.

5.9 Backfill

The earth fill materials containing excessive amounts of organic inclusion should not be reused as backfill in settlement sensitive areas, such as beneath the floor slabs, trench backfill and pavement areas. However, these materials may be stockpiled and reused for landscaping purposes.

The existing earth fill materials are considered suitable (with selection and sorting as required) for backfill provided the moisture content of these soils is within ±2 percent of the OMC. Any soil material with ±2 percent or higher in-situ moisture content than its OMC, could be put aside to dry or be tilled to reduce the moisture content so that it can be effectively compacted. Alternatively, materials of higher moisture content could be wasted and be replaced with imported material which can be readily compacted.

The existing earth fill soil will likely require selection and sorting to be reused as backfill. The selection and sorting must be conducted under the supervision of a geotechnical engineer. The site soils will be best compacted with a heavy sheep foot type roller.

The backfill should consist of clean earth and be placed in lifts of 150 mm thickness or less, and heavily compacted to a minimum of 95 percent SPMDD at a water content close to optimum (within 2 percent). The upper 600 mm of the pavement subgrade (at driveways outside of the basement roof deck) must be compacted to a minimum of 98 percent SPMDD.

It should be noted that the soils encountered on the site are generally not free draining and will be difficult to handle and compact should they become wetter as a result of inclement weather or seepage.

5.10 Quality Control

Excavations on this site must be shored to preserve the integrity of the surrounding properties and structures. The Ontario Building Code stipulates that engineering review of the subsurface conditions is required on a continuous basis during the installation of earth retaining structures. Englobe should be retained to provide this review, which is an integral part of the geotechnical design function as it relates to the shoring design considerations.

All foundations must be monitored by the geotechnical engineer on a continuous basis as they are constructed. The on-site review of the condition of the foundation soil as the foundations are constructed is an integral part of the geotechnical design function and is required by Section 4.2.2.2 of the Ontario Building Code 2012. If Englobe is not retained to carry out foundation evaluations during construction, then Englobe accepts no responsibility for the performance or non-performance of the foundations, even if they are ostensibly constructed in accordance with the conceptual design advice provided in this report.

Concrete for this structure will be specified in accordance with the requirements of CAN3 - CSA A23.1. Englobe maintains a CSA certified concrete laboratory and can provide concrete sampling and testing services for the project as necessary.

The requirements for fill placement on this project should be stipulated relative to SPMDD, as determined by ASTM D698. In-situ determinations of density during fill placement by Procedure Method B of ASTM D2922 are recommended to demonstrate that the contractor is achieving the specified soil density. Englobe is a CNSC licensed operator of appropriate nuclear density gauges for this work and can provide sampling and testing services for the project as necessary.

Englobe can provide thorough in house resources, quality control services for Building Envelope, Roofing, as well as Structural Steel in accordance with CSA W178, as necessary, for the Structural and Architectural quality control requirements of the project. Englobe is certified by the Canadian Welding Bureau under W178.1-1996.

6 Limitations and Risk

6.1 Procedures

This investigation has been carried out using investigation techniques and engineering analysis methods consistent with those ordinarily exercised by Englobe and other engineering practitioners, working under similar conditions and subject to the time, financial and physical constraints applicable to this project. The discussions and recommendations that have been presented are based on the factual data obtained by Englobe.

It must be recognized that there are special risks whenever engineering or related disciplines are applied to identify subsurface conditions. Even a comprehensive sampling and testing programme implemented in accordance with the most stringent level of care may fail to detect certain conditions. Englobe has assumed for the purposes of providing design parameters and advice, that the conditions that exist between sampling points are similar to those found at the sample locations. The conditions that Englobe has interpreted to exist between sampling points can differ from those that exist.

It may not be possible to drill a sufficient number of boreholes or sample and report them in a way that would provide all the subsurface information that could affect construction costs, techniques, equipment and scheduling. Contractors bidding on or undertaking work on the project should be directed to draw their own conclusions as to how the subsurface conditions may affect them, based on their own investigations and their own interpretations of the factual investigation results, cognizant of the risks implicit in the subsurface investigation activities so that they may draw their own conclusions as to how the subsurface conditions may affect them.

6.2 Changes in Site and Scope

It must also be recognized that the passage of time, natural occurrences, and direct or indirect human intervention at or near the site have the potential to alter subsurface conditions. Groundwater levels are particularly susceptible to seasonal fluctuations.

The discussion and recommendations are based on the factual data obtained from this investigation conducted at the site by Englobe and are intended for use by the owner and its retained designers in the design phase of the project. If there are changes to the project scope and development features, the interpretations made of the subsurface information, the geotechnical design parameters and comments relating to constructability issues and quality control may not be relevant or complete for the revised project. Englobe should be retained to review the implications of such changes with respect to the contents of this report.

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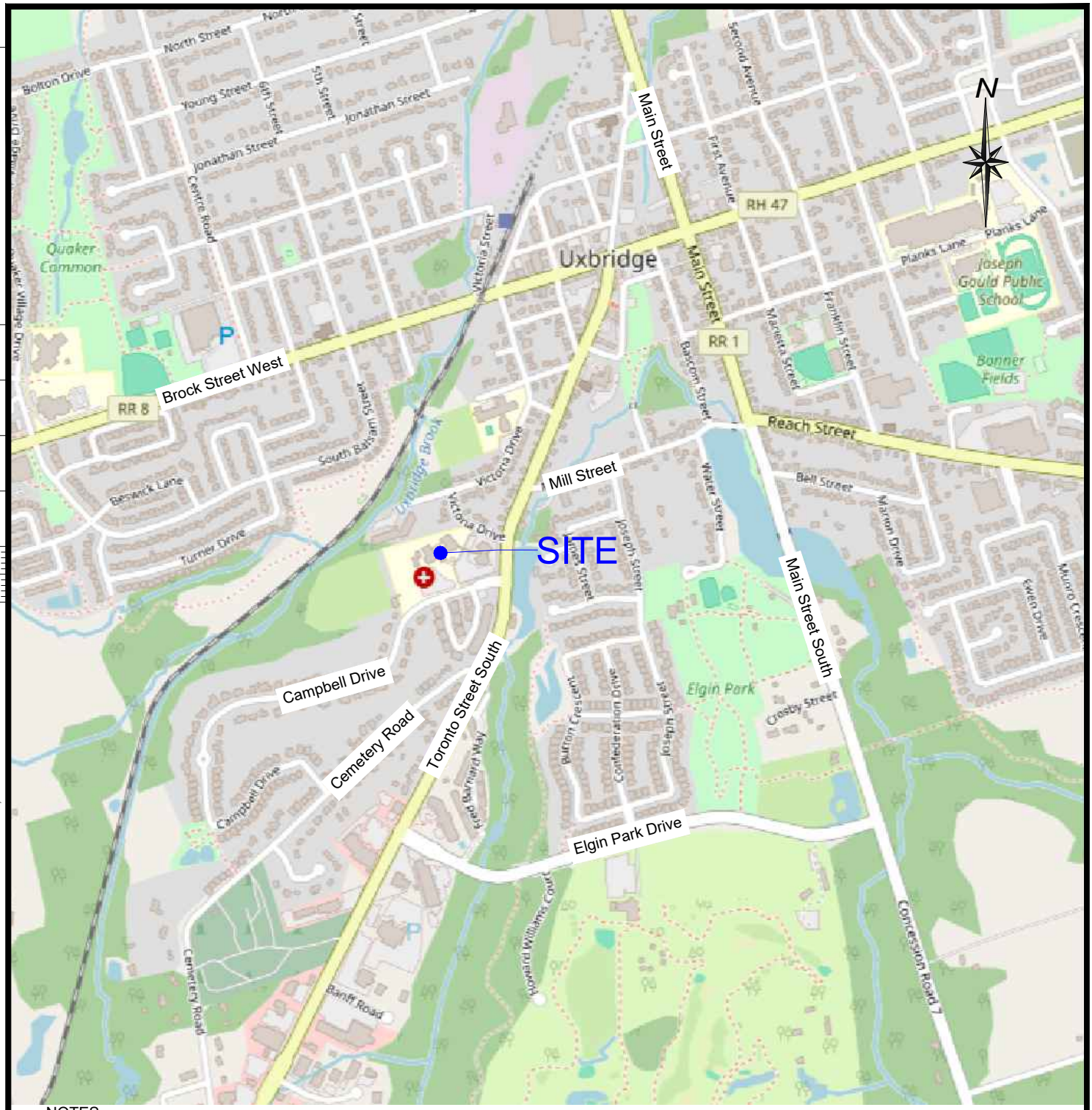
It is recognized that the regulatory agencies in their capacities as the planning and building authorities under Provincial statutes, will make use of and rely upon this report, cognizant of the limitations thereof, both expressed and implied.

We trust the foregoing information is sufficient for your present requirements. If you have any questions, or if we can be of further assistance, please do not hesitate to contact us.

Figures

ENGLOBE



NOTES:

1-REFERENCES: © OpenStreetMap contributors (2023).

2-Not to Scale

Project

Geotechnical investigation
Proposed Services
4 Campbell Dr, Uxbridge

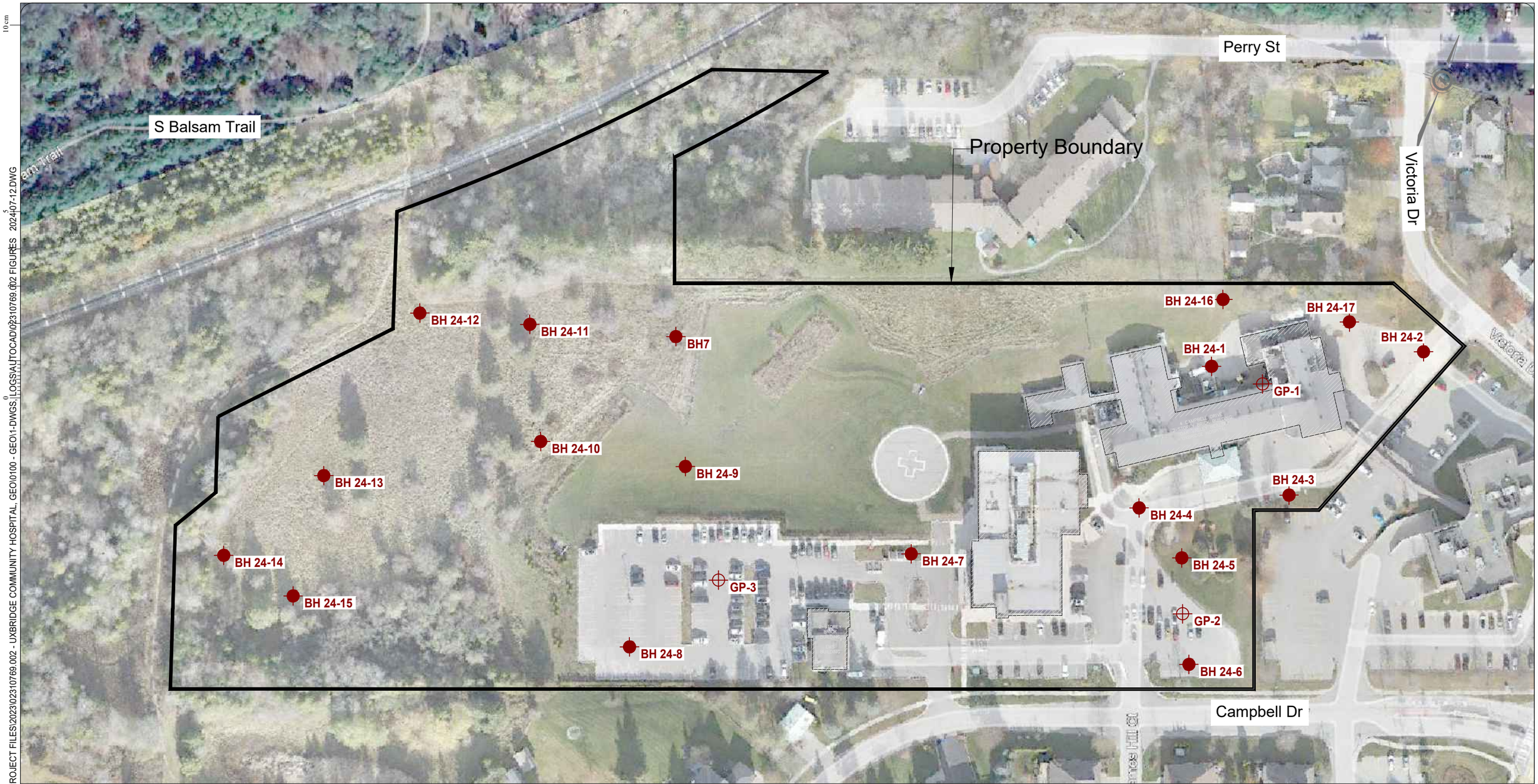
Title

Site Location Plan

ENGLOBE

Prepared	S. Abdus	Discipline	GEOTECHNICAL	Project manager	S. Abdus	
Drawn	C. Kamal	Scale	N.T.S.	Sequence no.	-	
Checked	S. Abdus	Date	2022/11/22			

Resp.	Project	Phase	Disc.	Type	Drawing no.	Rev.
01	02310769.000	000	-	D	1	00



LEGEND:

- Approximate Borehole Location
- Approximate Guelph Permeameter Location

0 10 20 30 40 50 m

SCALE 1:1250

REFERENCE

Image ©2024 Google Earth

Project

Geotechnical investigation
Proposed Services
4 Campbell Dr, Uxbridge

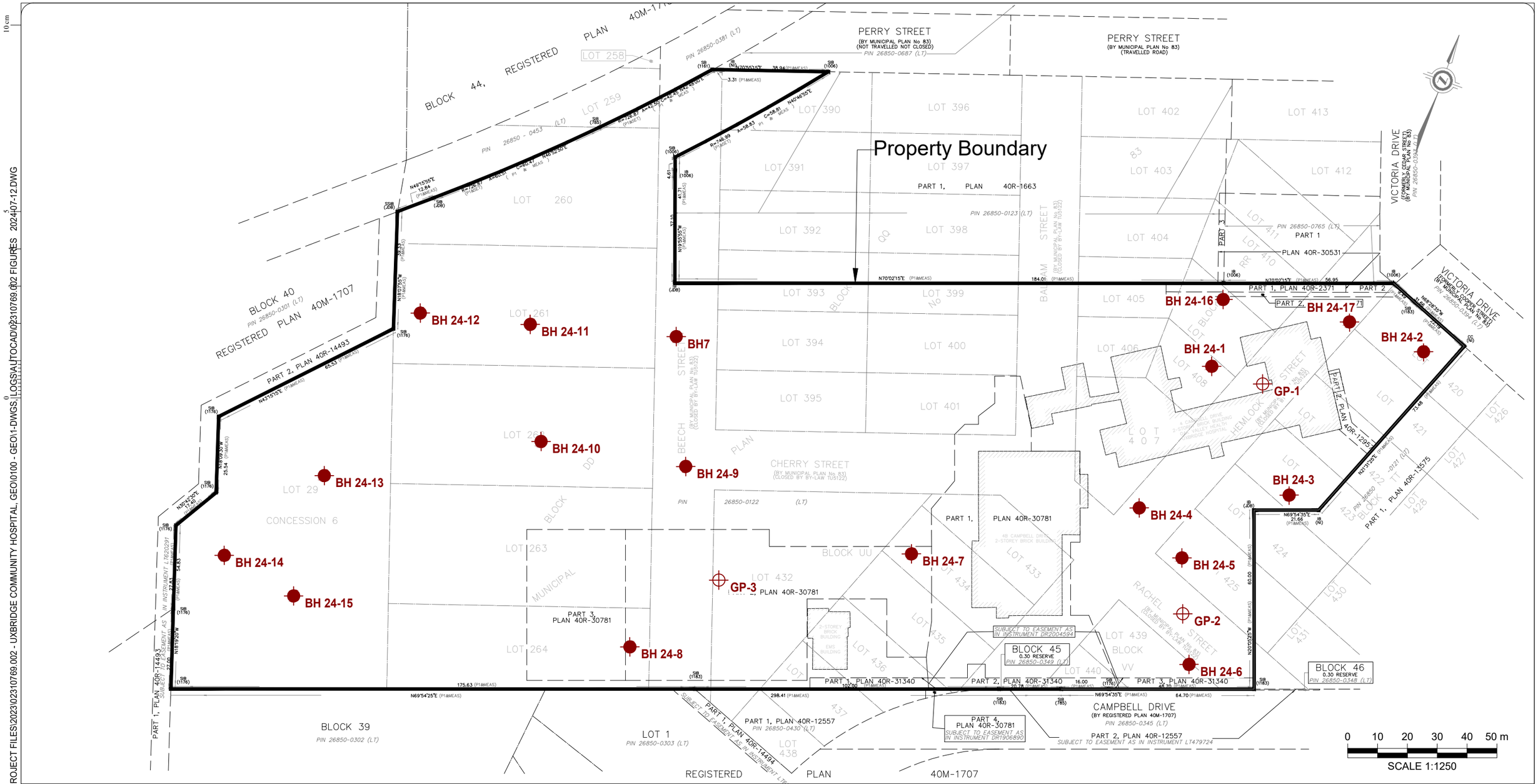
Title

Borehole Location Plan
Google Earth

eNGLOBE

Prepared	C. Kamal	Discipline	GEOTECHNICAL	Project manager	S. Abdus	
Drawn	C. Kamal	Scale	AS SHOWN	Sequence no.	--	
Checked	S. Abdus	Date	JULY 2024			

Resp.	Project	Phase	Disc.	Type	Drawing no.	Rev.
01	02310769.002	0200	-	D	2A	00



LEGEND:

- Approximate Borehole Location
- Approximate Guelph Permeameter Location

REFERENCE:

Municipal Plan No. 83,
Township of Uxbridge
Regional Municipality of Durham
Reference No.: 23-23-669-02,
Survey Completed
Date: January 12, 2024
By: J.D.Barnes Limited

Project

Geotechnical investigation
Proposed Services
4 Campbell Dr, Uxbridge

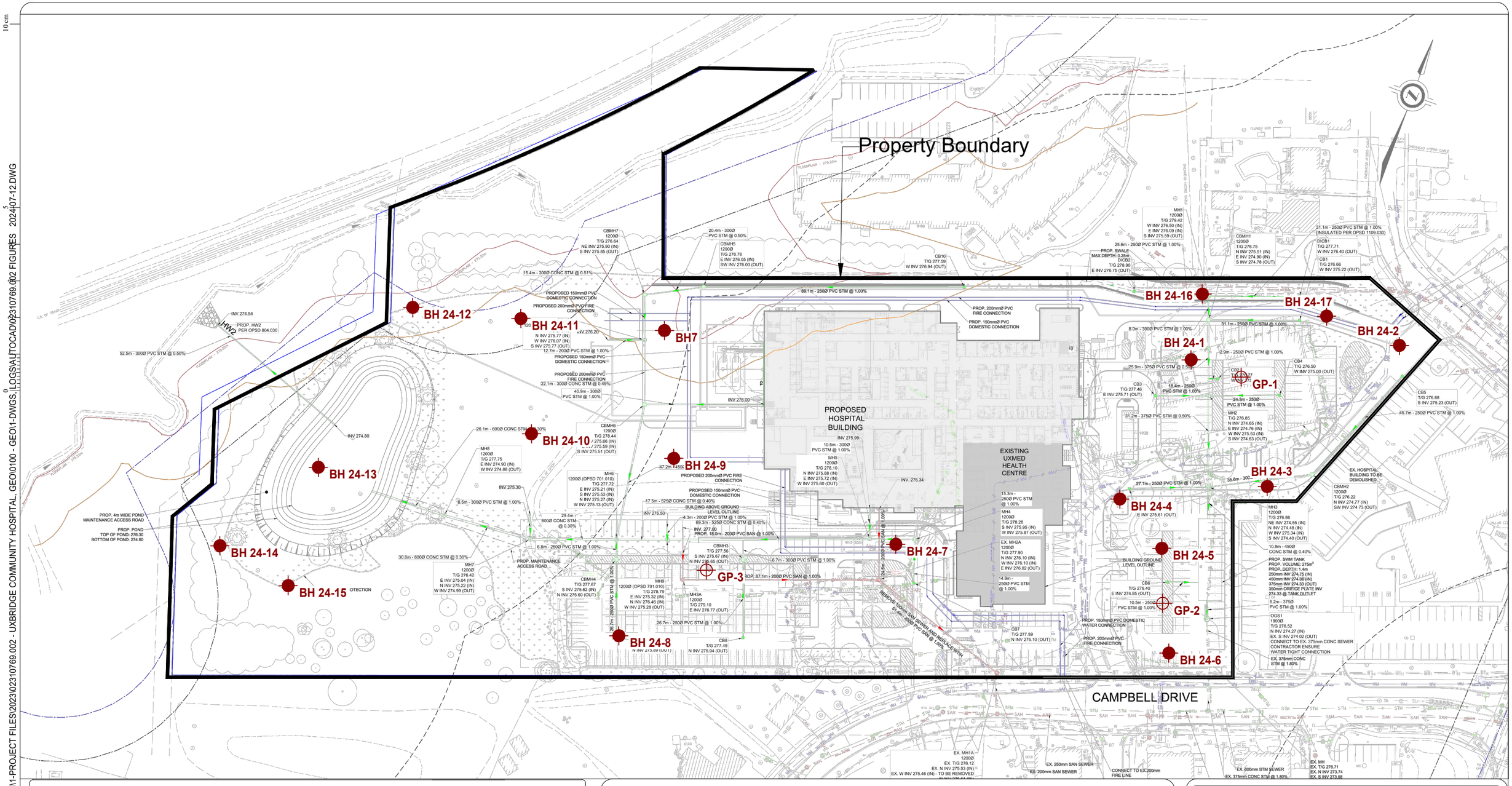
Title

Borehole Location Plan
Existing Condition

eNGLOBE

Prepared	C. Kamal	Discipline	GEOTECHNICAL	Project manager	S. Abdus	
Drawn	C. Kamal	Scale	AS SHOWN	Sequence no.	--	
Checked	S. Abdus	Date	JULY 2024			

Resp.	Project	Phase	Disc.	Type	Drawing no.	Rev.
01	02310769.002	0200	-	D	2B	00



LEGEND:

- Approximate Borehole Location
- Approximate Guelph Permeameter Location

0 10 20 30 40 50 m

SCALE 1:1250

REFERENCE:

Title: Site Servicing Plan (Final Works)
Proj. No.: 24163, Date: Jan.17, 2024
Dwg. No.: C-02, By: LEA

Project

Geotechnical investigation
Proposed Additions
4 Campbell Dr, Uxbridge

Title

Borehole Location Plan
Site Servicing Plan

eNGLOBE

Prepared	C. Kamal
Drawn	C. Kamal
Checked	S. Abdus

Discipline	GEOTECHNICAL
Scale	AS SHOWN
Date	JULY 2024

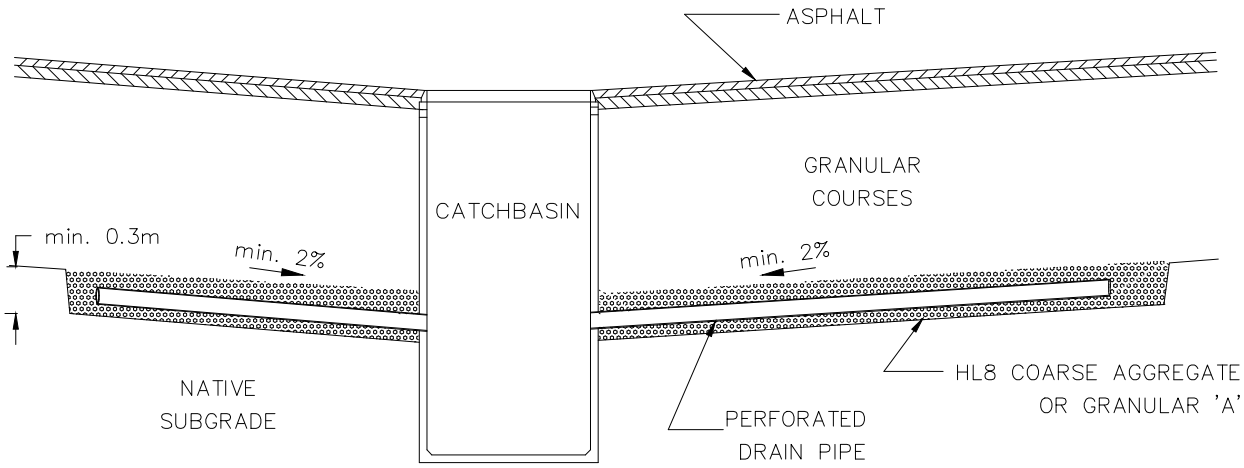
Project manager: S. Abdus
Sequence no.: --

Resp.	Project	Phase	Disc.	Type	Drawing no.	Rev.
01	02310769.002	0200	-	D	2C	00

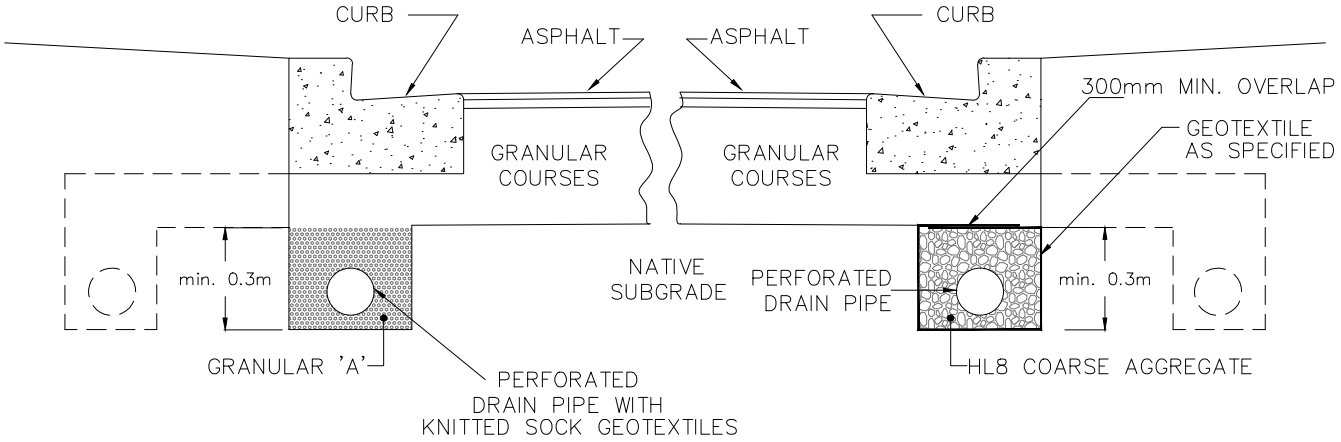
10 cm

Y:\SHARED\CA\TERRAPROBE\BRAMPTON\1-PROJECT FILES\2023\02310769.002 - UXBRIDGE COMMUNITY HOSPITAL, GEO\0100 - GEO\1-DWGS_LOGS\AUTOCAD\02310769.002 FIGURES 2024-07-12.DWG

Longitudinal Subdrain Connection to Catchbasin



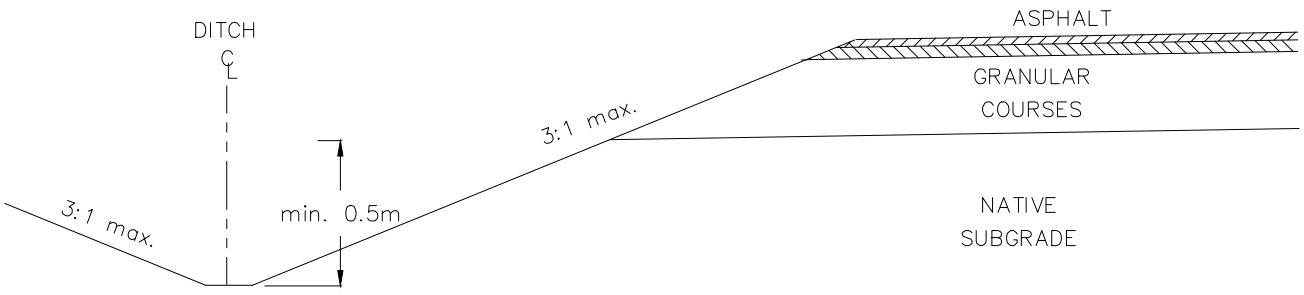
Urban Cross Sections



Unwrapped Trench

Wrapped Trench

Rural Cross Section



eNGLOBe	Title: PAVEMENT DRAINAGE ALTERNATIVES Figure 4

Appendix A
Borehole Logs

ENGLOBE

ABBREVIATIONS AND TERMINOLOGY

SAMPLING METHODS

AS	auger sample
CORE	cored sample
DP	direct push
FV	field vane
GS	grab sample
SS	split spoon
ST	shelby tube
WS	wash sample

PENETRATION RESISTANCE

Standard Penetration Test (SPT) resistance ('N' values) is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a standard 50 mm (2 in.) diameter split spoon sampler for a distance of 0.3 m (12 in.).

Dynamic Cone Test (DCT) resistance is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a conical steel point of 50 mm (2 in.) diameter and with 60° sides on 'A' size drill rods for a distance of 0.3 m (12 in.)."

COHESIONLESS SOILS

Compactness	'N' value
very loose	< 4
loose	4 – 10
compact	10 – 30
dense	30 – 50
very dense	> 50

COHESIVE SOILS

Consistency	'N' value	Undrained Shear Strength (kPa)
very soft	< 2	< 12
soft	2 – 4	12 – 25
firm	4 – 8	25 – 50
stiff	8 – 15	50 – 100
very stiff	15 – 30	100 – 200
hard	> 30	> 200

COMPOSITION

Term (e.g)	% by weight
trace silt	< 10
some silt	10 – 20
silt*y*	20 – 35
sand *and* silt	> 35

TESTS AND SYMBOLS

MH	mechanical sieve and hydrometer analysis
w, w_c	water content
w_L, LL	liquid limit
w_P, PL	plastic limit
I_P, PI	plasticity index
k	coefficient of permeability
γ	soil unit weight, bulk
G_s	specific gravity
φ'	internal friction angle
c'	effective cohesion
c_u	undrained shear strength

▽	Unstabilized water level
▼	1st water level measurement
▼	2nd water level measurement
▼	Most recent water level measurement
3.0 +	Undrained shear strength from field vane (with sensitivity)
C_c	compression index
c_v	coefficient of consolidation
m_v	coefficient of compressibility
e	void ratio

FIELD MOISTURE DESCRIPTIONS

Damp	refers to a soil sample that does not exhibit any observable pore water from field/hand inspection.
Moist	refers to a soil sample that exhibits evidence of existing pore water (e.g. sample feels cool, cohesive soil is at plastic limit) but does not have visible pore water
Wet	refers to a soil sample that has visible pore water

LOG OF BOREHOLE 24-1

Project No.	: 02310769.002	Client	: Oak Valley Health	Originated by	: BR
Date started	: June 18, 2024	Project	: Uxbridge Community Hospital	Compiled by	: AS
Sheet No.	: 1 of 1	Location	: Uxbridge, ON	Checked by	: AS

Position : E: 649866, N: 4885021 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, MC, LL)	Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
0	276.6	**GROUND SURFACE**					276			PID: 0 FID: 0		SS1 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC
	276.2	100mm **ASPHALTIC CONCRETE**										
	0.4	250mm **AGGREGATE**		1	SS	18						
	275.8	**FILL**, sandy silt, trace to some gravel, trace clay, trace organics, compact, dark brown, moist										
	0.8	**SILT**, trace to some clay, trace to some sand, compact to very dense, brown, moist		2	SS	35				PID: 0 FID: 1		
1							275					
				3	SS	16				PID: 0 FID: 1		0 16 68 16
2		...brownish grey below		4	SS	61	274			PID: 0 FID: 3		
3				5	SS	44				PID: 15 FID: 1		SS5 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC
4							273					
		...dilatent and wet below		6	SS	48	272			PID: 15 FID: 1		wet sampler
5							271					
6				7	SS	32				PID: 0 FID: 1		
	269.9						270					
	6.7	**END OF BOREHOLE**										

Penetration Test Values (Blows / 0.3m): ×Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit | Natural Water Content | Liquid Limit; PL MC LL; 10 20 30

Unstabilized Water Level

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Unstabilized water level measured at 4.9 m below ground surface; borehole was open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jul 3, 2024	1.7	274.9

file: 02310769.000 bh logs.gpj

LOG OF BOREHOLE 24-2

Project No.	: 02310769.002	Client	: Oak Valley Health	Originated by	: BR
Date started	: June 17, 2024	Project	: Uxbridge Community Hospital	Compiled by	: AS
Sheet No.	: 1 of 1	Location	: Uxbridge, ON	Checked by	: AS

Position : E: 649931, N: 4885050 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Elev Depth (m)	Description	Number	Type	SPT 'N' Value
277.3	**GROUND SURFACE**			
	90mm **ASPHALTIC CONCRETE**			
276.9	250mm **AGGREGATE**	1	SS	13
0.4	**FILL**, sand, trace to some silt, trace gravel, trace organics, loose to compact, dark brown, moist	2	SS	5
275.8				
1.5	**SILT**, trace to some clay, trace to some sand, dilatant, loose to compact, brown, wet	3	SS	9
		4	SS	18
		5	SS	16
		6	SS	26
	...dense	7	SS	50
270.6				
6.7	**END OF BOREHOLE**			

Penetration Test Values (Blows / 0.3m): Dynamic Cone (10, 20, 30, 40)

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane (40, 80, 120, 160)

Moisture / Plasticity: Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL) (10, 20, 30)

Headspace Vapour (ppm): PID: 0 FID: 0

Instrument Details

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

SS2 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC

wet sampler

SS4 Analysis: M&I, PAH, PCB, VOC

SS5 Analysis: BTEX, VOC, PHC

Unstabilized water level measured at 5.8 m below ground surface; borehole was open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jul 3, 2024	2.5	274.8

file: 02310769.000 bh logs.gpj

LOG OF BOREHOLE 24-3

Project No.	: 02310769.002	Client	: Oak Valley Health	Originated by	: BR
Date started	: June 17, 2024	Project	: Uxbridge Community Hospital	Compiled by	: AS
Sheet No.	: 1 of 1	Location	: Uxbridge, ON	Checked by	: AS

Position : E: 649905, N: 4884989 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour (ppm)	Instrument Details	Unstabilized Water Level	Lab Data and Comments
0	276.9	**GROUND SURFACE**											
		100mm **TOPSOIL**											
		FILL, silty sand, trace gravel, trace organics, compact, dark brown, moist		1	SS	12				PID: 0 FID: 0			SS1 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC, DUP#1
	276.1												
	0.8	**SILT**, trace to some clay, trace to some sand, dilatant, compact, brown, wet		2	SS	12	276			PID: 0 FID: 0			
1				3	SS	15	275			PID: 0 FID: 0			
2				4	SS	26	274			PID: 0 FID: 0			wet sampler; SS4 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC
3				5	SS	22	273			PID: 0 FID: 0			
4		...brownish grey below		6	SS	26	272			PID: 0 FID: 0			
5				7	SS	16	271			PID: 0 FID: 0			
6	270.2												
	6.7	**END OF BOREHOLE**											

Penetration Test Values (Blows / 0.3m): Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL); 10 20 30

Unstabilized Water Level

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Unstabilized water level measured at 5.2 m below ground surface; borehole caved to 5.3 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jul 3, 2024	2.5	274.4

file: 02310769.000 bh logs.gpj

LOG OF BOREHOLE 24-4

Project No.	: 02310769.002	Client	: Oak Valley Health	Originated by	: BR
Date started	: June 17, 2024	Project	: Uxbridge Community Hospital	Compiled by	: AS
Sheet No.	: 1 of 1	Location	: Uxbridge, ON	Checked by	: AS

Position : E: 649860, N: 4884968 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value	Elevation Scale (m)
0	277.3	**GROUND SURFACE**					
		120mm **ASPHALTIC CONCRETE**					
	276.9	240mm **AGGREGATE**		1	SS	13	277
	0.4	**FILL**, silty sand, trace clay, trace gravel, trace organics, compact, dark brown, moist					
	276.5						
	0.8	**SILT**, trace to some clay, trace to some sand, dilatant, compact, brown, wet		2	SS	17	276
1				3	SS	19	
2				4	SS	29	275
3		...brownish grey below		5	SS	23	274
4				6	SS	18	273
5							272
6				7	SS	25	271
	270.6						
	6.7						

Penetration Test Values (Blows / 0.3m): Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit; PL MC LL; 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

PID: 0 FID: 0

SS1 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC

SS5 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC

wet sampler

END OF BOREHOLE

Wet cave at 5.4 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jul 3, 2024	2.4	274.9

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LOG OF BOREHOLE 24-5

Project No.	: 02310769.002	Client	: Oak Valley Health	Originated by	: BR
Date started	: June 18, 2024	Project	: Uxbridge Community Hospital	Compiled by	: AS
Sheet No.	: 1 of 1	Location	: Uxbridge, ON	Checked by	: AS

Position : E: 649879, N: 4884957 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, MC, LL)	Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
0	277.2	**GROUND SURFACE**					277					
		100mm **TOPSOIL**										
		FILL, silty sand, trace clay, trace to some gravel, trace organics, loose to compact, dark brown, moist		1	SS	5				PID: 150 FID: 1		SS1 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC, DUP#2
1				2	SS	15	276			PID: 25 FID: 1		
				3	SS	16				PID: 30 FID: 1		
2		...wet					275					wet sampler
	274.6			4	SS	13				PID: 0 FID: 1		
	2.6	**SILT**, trace to some clay, trace to some sand, dilatant, compact, brown, wet										
3				5	SS	20	274			PID: 10 FID: 0		SS5 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC
4							273					
		...brownish grey below		6	SS	22				PID: 10 FID: 1		
5							272					
6				7	SS	17	271			PID: 0 FID: 1		
	270.5											
	6.7	**END OF BOREHOLE**										

Penetration Test Values (Blows / 0.3m): ×Dynamic Cone (10, 20, 30, 40)

Undrained Shear Strength (kPa): ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane (40, 80, 120, 160)

Moisture / Plasticity: Plastic Limit (PL) — Natural Water Content (MC) — Liquid Limit (LL); (10, 20, 30)

Unstabilized Water Level

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Unstabilized water level measured at 4.6 m below ground surface; borehole caved to 5.5 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jul 3, 2024	2.5	274.7

file: 02310769.000 bh logs.gpj

LOG OF BOREHOLE 24-6

Project No.	: 02310769.002	Client	: Oak Valley Health	Originated by	: BR
Date started	: June 18, 2024	Project	: Uxbridge Community Hospital	Compiled by	: AS
Sheet No.	: 1 of 1	Location	: Uxbridge, ON	Checked by	: AS

Position : E: 649893, N: 4884924 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)
	276.9	**GROUND SURFACE**					
0	276.7	150mm **ASPHALTIC CONCRETE**					
	0.2						
	276.7	40mm **AGGREGATE**		1	SS	6	
	0.2						
	276.4	250mm **TOPSOIL**					
	0.5						
	276.1	**FILL**, sandy silt, trace clay, trace gravel, trace organics, loose, dark brown, moist					
	0.8						
1		**SANDY SILT**, trace clay, compact, brown, moist		2	SS	16	276
	275.4						
	1.5						
		SILT, trace to some clay, trace to some sand, dilatant, compact, brown, wet		3	SS	17	275
2							
				4	SS	20	
							274
3		...brownish grey below		5	SS	14	
4							273
				6	SS	21	
5							272
6		...very loose		7	SS	1	271
7							270
		...compact		8	SS	15	269
8	268.7						
	8.2	**END OF BOREHOLE**					

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10, 20, 30, 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40, 80, 120, 160

Moisture / Plasticity — Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL): 10, 20, 30

Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
PID: 30 FID: 0		
PID: 90 FID: 0		SS2 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC
PID: 45 FID: 0		
PID: 40 FID: 0		0 15 70 15
PID: 40 FID: 0		
PID: 25 FID: 0		
PID: 0 FID: 0		
PID: 0 FID: 0		

Unstabilized Water Level

GRAIN SIZE DISTRIBUTION (%) (MIT) — GR SA SI CL

Unstabilized water level measured at 3.0 m below ground surface; borehole caved to 6.7 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jul 3, 2024	2.1	274.8

file: 02310769.000 bh logs.gpj

LOG OF BOREHOLE 24-7

Project No.	: 02310769.002	Client	: Oak Valley Health	Originated by	: BR
Date started	: June 18, 2024	Project	: Uxbridge Community Hospital	Compiled by	: AS
Sheet No.	: 1 of 1	Location	: Uxbridge, ON	Checked by	: AS

Position : E: 649715, N: 4884866 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
0	277.6	**GROUND SURFACE**					277	Dynamic Cone 10 20 30 40; Unconfined / Field Vane / Pocket Penetrometer / Lab Vane 40 80 120 160	Plastic Limit / Natural Water Content / Liquid Limit PL MC LL 10 20 30			Unstabilized Water Level; GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
		100mm **TOPSOIL**										
		FILL, silty sand, trace clay, trace gravel, trace organics, compact, dark brown, moist		1	SS	13				PID: 30 FID: 0		
1		...topsoil inclusion, black		2	SS	20	276			PID: 5 FID: 0		
2	275.3			3	SS	10				PID: 35 FID: 0		SS3 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC
	2.3	**SILT**, trace to some clay, trace to some sand, dilatant, compact, brown, wet		4	SS	12	275			PID: 0 FID: 0		
3				5	SS	16				PID: 0 FID: 0		
4							274					
		...brownish grey below		6	SS	17	273			PID: 35 FID: 0		wet sampler; SS6 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC
5							272					
6				7	SS	15	271			PID: 35 FID: 0		
	270.9 6.7	**END OF BOREHOLE**										

Borehole was dry and caved to 3.0 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jul 3, 2024	1.4	276.2

file: 02310769.000 bh logs.gpj

LOG OF BOREHOLE 24-8

Project No.	: 02310769.002	Client	: Oak Valley Health	Originated by	: BR
Date started	: June 19, 2024	Project	: Uxbridge Community Hospital	Compiled by	: AS
Sheet No.	: 1 of 1	Location	: Uxbridge, ON	Checked by	: AS

Position : E: 649793, N: 4884927 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Elev Depth (m)	Description	Number	Type	SPT 'N' Value
278.0	**GROUND SURFACE**			
	105mm **ASPHALTIC CONCRETE**			
	310mm **AGGREGATE**	1	SS	24
277.5 / 0.5	**FILL**, silty sand, trace clay, trace gravel, trace organics, loose to compact, dark brown, moist	2	SS	5
276.5 / 1.5	**CLAYEY SILT**, trace sand, stiff, brown, moist	3	SS	10
275.7 / 2.3	**SILT**, trace to some clay, trace to some sand, dilatant, compact, brown, wet	4	SS	15
	...brownish grey below	5	SS	12
	...loose	6	SS	9
	...dense	7	SS	47
271.3 / 6.7	**END OF BOREHOLE**			

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10, 20, 30, 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40, 80, 120, 160

Moisture / Plasticity — Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL): 10, 20, 30

Headspace Vapour (ppm): PID: 0 FID: 0; PID: 75 FID: 0; PID: 30 FID: 0; PID: 35 FID: 0; PID: 30 FID: 0; PID: 20 FID: 0; PID: 5 FID: 0

Instrument Details: wet sampler

Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

SS2 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC — 0 7 67 26

SS5 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC

Unstabilized Water Level

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jul 3, 2024	2.3	275.7

Unstabilized water level measured at 4.6 m below ground surface; borehole was open upon completion of drilling.

50 mm dia. monitoring well installed.

file: 02310769.000 bh logs.gpj

LOG OF BOREHOLE 24-9

Project No.	: 02310769.002	Client	: Oak Valley Health	Originated by	: BR
Date started	: June 19, 2024	Project	: Uxbridge Community Hospital	Compiled by	: AS
Sheet No.	: 1 of 1	Location	: Uxbridge, ON	Checked by	: AS

Position : E: 649712, N: 4884929 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0	275.9	**GROUND SURFACE**				
	275.7	230mm **TOPSOIL**				
	0.2	**FILL**, silty sand, trace clay, trace gravel, trace organics, loose, dark brown, moist		1	SS	6
	275.1					
1	0.8	**SILTY SAND**, trace clay, compact, brown, wet		2	SS	14
	274.1			3	SS	14
2	1.8	**SILT**, trace to some clay, trace to some sand, trace gravel, dilatant, compact, brownish grey, wet		4	SS	24
3				5	SS	20
4						
5				6	SS	16
6				7	SS	19
	269.2					
	6.7					

Elevation Scale (m): 275, 274, 273, 272, 271, 270

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit — PL MC LL — 10 20 30

Headspace Vapour (ppm): PID: 0 FID: 0

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)

GR SA SI CL

SS2 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC

END OF BOREHOLE

Unstabilized water level measured at 1.5 m below ground surface; borehole was open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jul 3, 2024	2.0	273.9

file: 02310769.000 bh logs.gpj

LOG OF BOREHOLE 24-10

Project No.	: 02310769.002	Client	: Oak Valley Health	Originated by	: BR
Date started	: June 19, 2024	Project	: Uxbridge Community Hospital	Compiled by	: AS
Sheet No.	: 1 of 1	Location	: Uxbridge, ON	Checked by	: AS

Position : E: 649664, N: 4884920 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0	276.1	**GROUND SURFACE**				
	275.8	300mm **TOPSOIL**				
	0.3	**SILTY SAND**, trace to some gravel, trace clay, compact to dense, brown, wet		1	SS	6
1				2	SS	34
2				3	SS	47
				4	SS	24
3		...brownish grey		5	SS	18
4	271.5					
	4.6	**SILT**, trace sand, trace gravel, trace clay, compact, brownish grey, wet		6	SS	20
5						
6	270.0					
	6.1	**SAND**, trace to some silt, trace clay, trace gravel, loose, brownish grey, wet		7	SS	5
	269.4					
	6.7					

Elevation Scale (m): 276, 275, 274, 273, 272, 271, 270

Penetration Test Values (Blows / 0.3m): Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit; PL MC LL; 10 20 30

Headspace Vapour (ppm): PID: 0 FID: 0; PID: 15 FID: 0; PID: 20 FID: 0; PID: 0 FID: 0; PID: 0 FID: 0; PID: 0 FID: 0; PID: 0 FID: 0

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

SS3 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC, DUP#4

END OF BOREHOLE

Unstabilized water level measured at 1.5 m below ground surface; borehole caved to 3.0 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jul 3, 2024	1.4	274.7

file: 02310769.000 bh logs.gpj

LOG OF BOREHOLE 24-11

Project No.	: 02310769.002	Client	: Oak Valley Health	Originated by	: BR
Date started	: June 20, 2024	Project	: Uxbridge Community Hospital	Compiled by	: AS
Sheet No.	: 1 of 1	Location	: Uxbridge, ON	Checked by	: AS

Position : E: 649647, N: 4884956 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0	275.8	**GROUND SURFACE**				
	275.6	180mm **TOPSOIL**				
	0.2	**SILTY SAND**, trace gravel, trace clay, loose to compact, brown, moist		1	SS	3
1		...wet below		2	SS	12
		...some gravel		3	SS	25
2		...silt lense inclusions		4	SS	18
3	272.8					
	3.0	**SAND**, trace to some silt, trace clay, trace gravel, loose to compact, brownish grey, wet		5	SS	7
4						
				6	SS	8
5						
6				7	SS	11
	269.1					
	6.7	**END OF BOREHOLE**				

Elevation Scale (m): 275, 274, 273, 272, 271, 270

Penetration Test Values (Blows / 0.3m): Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit; PL MC LL; 10 20 30

Headspace Vapour (ppm): PID: 55 FID: 0; PID: 90 FID: 0; PID: 0 FID: 0; PID: 0 FID: 0; PID: 0 FID: 0; PID: 0 FID: 0; PID: 0 FID: 0

Instrument Details: Unstabilized Water Level

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

SS2 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC

Unstabilized water level measured at 2.3 m below ground surface; borehole caved to 4.9 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jul 3, 2024	1.8	274.0

file: 02310769.000 bh logs.gpj

LOG OF BOREHOLE 24-12

Project No.	: 02310769.002	Client	: Oak Valley Health	Originated by	: BR
Date started	: June 20, 2024	Project	: Uxbridge Community Hospital	Compiled by	: AS
Sheet No.	: 1 of 1	Location	: Uxbridge, ON	Checked by	: AS

Position : E: 649611, N: 4884946 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value	Elevation Scale (m)
0	275.7	**GROUND SURFACE**					275
		100mm **TOPSOIL**					
		FILL, silty sand, trace clay, trace to some gravel, trace organics, trace stone pieces inclusion, loose to compact, dark brown, moist		1	SS	8	
1				2	SS	26	
	274.2						274
	1.5	**SAND**, trace to some silt, trace clay, trace gravel, compact, brown, wet		3	SS	17	
2				4	SS	15	273
3				5	SS	16	
							272
4							
				6	SS	20	271
5							
							270
6		...brownish grey		7	SS	13	
	269.0						269
	6.7	**END OF BOREHOLE**					

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10, 20, 30, 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40, 80, 120, 160

Moisture / Plasticity — Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL): 10, 20, 30

Headspace Vapour (ppm)

PID: 5	FID: 1
PID: 0	FID: 0
PID: 0	FID: 0
PID: 0	FID: 1
PID: 0	FID: 1
PID: 0	FID: 1
PID: 0	FID: 0

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)

GR SA SI CL

SS1 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC

1 88 10 1

SS4 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC

Wet cave at 1.5 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jul 3, 2024	1.7	274.0

file: 02310769.000 bh logs.gpj

LOG OF BOREHOLE 24-13

Project No.	: 02310769.002	Client	: Oak Valley Health	Originated by	: BR
Date started	: June 20, 2024	Project	: Uxbridge Community Hospital	Compiled by	: AS
Sheet No.	: 1 of 1	Location	: Uxbridge, ON	Checked by	: AS

Position : E: 649599, N: 4884884 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0	276.7	**GROUND SURFACE**				
	276.5	180mm **TOPSOIL**				
	0.2	**FILL**, silty sand, trace gravel, trace organics, very loose, dark brown, moist		1	SS	3
	275.9					
1	0.8	**SAND AND GRAVEL**, trace silt, dense, brown, moist		2	SS	35
				3	SS	39
2	274.4					
	2.3	**SILT**, trace to some clay, trace to some sand, dilatant, compact, brown, wet		4	SS	18
3				5	SS	21
4	272.1					
	4.6	**SAND**, trace to some silt, trace clay, trace gravel, compact, brownish grey, wet		6	SS	13
5						
6				7	SS	11
	270.0					
	6.7	**END OF BOREHOLE**				

Elevation Scale (m): 276, 275, 274, 273, 272, 271, 270

Penetration Test Values (Blows / 0.3m): Dynamic Cone (10, 20, 30, 40)

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane (40, 80, 120, 160)

Moisture / Plasticity: Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL) (10, 20, 30)

Headspace Vapour (ppm): PID: 0 FID: 0; PID: 5 FID: 1; PID: 25 FID: 0; PID: 0 FID: 1; PID: 0 FID: 2; PID: 0 FID: 1; PID: 0 FID: 0

Instrument Details: ...at 1.5m, wet sampler

Lab Data and Comments: SS3 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC

Unstabilized Water Level

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Unstabilized water level measured at 2.1 m below ground surface; borehole caved to 3.0 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jul 3, 2024	1.6	275.1

file: 02310769.000 bh logs.gpj

LOG OF BOREHOLE 24-14

Project No.	: 02310769.002	Client	: Oak Valley Health	Originated by	: BR
Date started	: June 20, 2024	Project	: Uxbridge Community Hospital	Compiled by	: AS
Sheet No.	: 1 of 1	Location	: Uxbridge, ON	Checked by	: AS

Position : E: 649577, N: 4884848 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
0	277.8	**GROUND SURFACE**					277	Dynamic Cone: 10 20 30 40; Unconfined / Pocket Penetrometer: 40 80 120 160; Field Vane / Lab Vane	Plastic Limit / Natural Water Content / Liquid Limit; PL MC LL; 10 20 30			Unstabilized Water Level; GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
		110mm **TOPSOIL**										
		FILL, silty sand, trace gravel, trace rootlets, trace organics, loose, dark brown, moist		1	SS	7				PID: 0 FID: 0		SS1 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC
1				2	SS	5				PID: 0 FID: 0		
	276.3											▽
	1.5	**SAND**, trace to some silt, trace clay, trace gravel, compact, brown, wet		3	SS	20	276			PID: 0 FID: 1		
2				4	SS	22				PID: 0 FID: 1		SS4 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC
3				5	SS	13	275			PID: 0 FID: 1		
4							274					
5				6	SS	15	273			PID: 0 FID: 0		
6		...dense		7	SS	34	272			PID: 0 FID: 0		
	271.1											
	6.7	**END OF BOREHOLE**										

Wet cave measured at 1.5 m below ground surface upon completion of drilling.

file: 02310769.000 bh logs.gpj

LOG OF BOREHOLE 24-15

Project No.	: 02310769.002	Client	: Oak Valley Health	Originated by	: BR
Date started	: June 20, 2024	Project	: Uxbridge Community Hospital	Compiled by	: AS
Sheet No.	: 1 of 1	Location	: Uxbridge, ON	Checked by	: AS

Position : E: 649604, N: 4884843 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0	277.6	**GROUND SURFACE**				
	277.4	190mm **TOPSOIL**				
	0.2	**FILL**, silty sand, trace gravel, trace organics, trace rootlets, very loose, dark brown, moist		1	SS	3
	276.8					
	0.8	**SILT**, some sand to sandy, trace to some clay, trace gravel, dilatent, compact, brown, wet		2	SS	12
1				3	SS	11
2				4	SS	22
3	274.6					
	3.0	**SAND**, trace to some silt, trace clay, trace gravel, compact to dense, brownish grey, wet		5	SS	16
4						
				6	SS	21
5						
6				7	SS	32
	270.9					
	6.7	**END OF BOREHOLE**				

Elevation Scale (m): 277, 276, 275, 274, 273, 272, 271

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) Natural Water Content (MC) Liquid Limit (LL) — 10 20 30

Headspace Vapour (ppm): PID: 0 FID: 0 | PID: 0 FID: 1 | PID: 5 FID: 1 | PID: 0 FID: 1 | PID: 0 FID: 0 | PID: 0 FID: 0 | PID: 0 FID: 0

Instrument Details: Unstabilized Water Level

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

5 26 59 10

SS3 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC

wet sampler

Unstabilized water level measured at 2.7 m below ground surface; borehole caved to 4.0 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jul 3, 2024	1.7	275.9

file: 02310769.000 bh logs.gpj

LOG OF BOREHOLE 24-16

Project No.	: 02310769.002	Client	: Oak Valley Health	Originated by	: BR
Date started	: June 20, 2024	Project	: Uxbridge Community Hospital	Compiled by	: AS
Sheet No.	: 1 of 1	Location	: Uxbridge, ON	Checked by	: AS

Position : E: 649844, N: 4885038 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, Natural Water Content, LL)	Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
0	280.1	**GROUND SURFACE**					280					
		100mm **TOPSOIL**										
		FILL, silty sand, trace gravel, trace organics, loose, dark brown, moist		1	SS	5				PID: 5 FID: 0		SS1 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC, DUP#3
	279.3											
	0.8	**SILT**, some sand to sandy, trace to some clay, trace gravel, loose to compact, brown, moist		2	SS	9	279			PID: 0 FID: 0		
1												
				3	SS	19				PID: 0 FID: 0		0 30 66 4 SS3 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC
2							278					
		...wet, dilatent below		4	SS	18				PID: 0 FID: 0		SS4 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC
3												
				5	SS	21	277			PID: 0 FID: 0		
4							276					
				6	SS	12				PID: 0 FID: 0		
5	274.9						275					
	5.2	**END OF BOREHOLE**										

Penetration Test Values (Blows / 0.3m): Dynamic Cone (10, 20, 30, 40)

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane (40, 80, 120, 160)

Moisture / Plasticity: Plastic Limit (PL) 10, Natural Water Content (MC) 20, Liquid Limit (LL) 30

Lab Data and Comments: Unstabilized Water Level; GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Borehole was dry and open upon completion of drilling.

file: 02310769.000 bh logs.gpj

LOG OF BOREHOLE 24-17

Project No.	: 02310769.002	Client	: Oak Valley Health	Originated by	: BR
Date started	: June 17, 2024	Project	: Uxbridge Community Hospital	Compiled by	: AS
Sheet No.	: 1 of 1	Location	: Uxbridge, ON	Checked by	: AS

Position : E: 649904, N: 4885051 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, MC, LL)	Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
0	**277.0**	**GROUND SURFACE**					277					
	276.8	150mm **ASPHALTIC CONCRETE**										
	0.2 276.6	240mm **AGGREGATE**		1	SS	29				PID: 0 FID: 0		SS1 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC
	0.4 276.2	**FILL**, sandy silt, trace to some gravel, trace clay, trace organics, compact, dark brown, moist										
1	0.8	**SILT**, trace to some clay, trace to some sand, dilatant, compact to very dense, brown, wet		2	SS	12	276			PID: 15 FID: 0		SS2 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC
		...brownish grey below		3	SS	21				PID: 0 FID: 0		
2							275					
				4	SS	25				PID: 0 FID: 0		SS4 Analysis: M&I, BTEX, PAH, PCB, VOC, PHC
3							274					
				5	SS	35				PID: 0 FID: 0		
4							273					
				6	SS	65				PID: 0 FID: 0		
5	271.8 5.2						272					

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

Penetration Test Values (Blows / 0.3m): Dynamic Cone; Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit

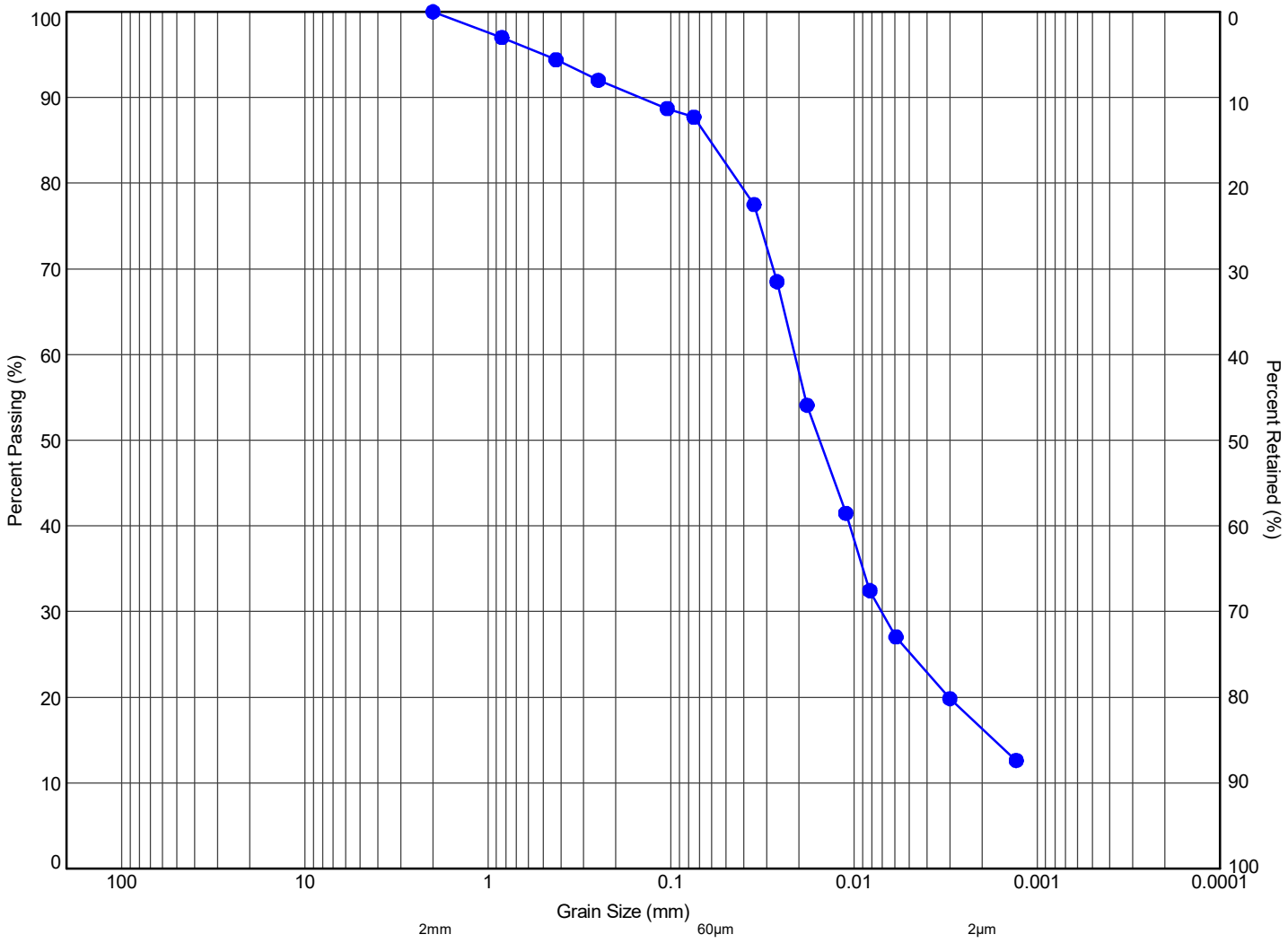
Unstabilized Water Level

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

file: 02310769.000 bh logs.gpj

Appendix B
Geotechnical Laboratory Test Results

ENGLOBE



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**24-1**	SS3	1.8	274.8	0	16	68	16	

eNGLOBe

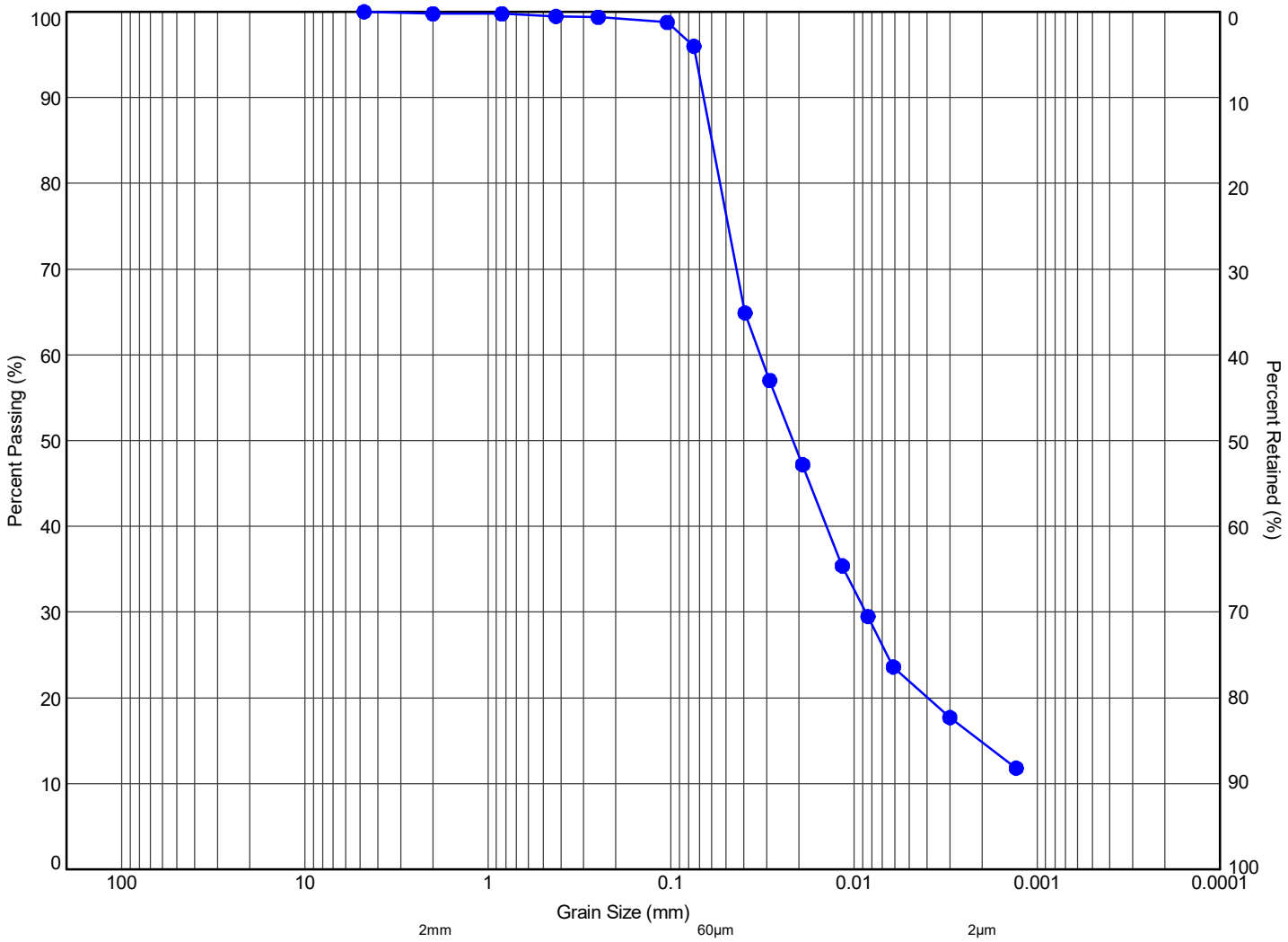
Title:

GRAIN SIZE DISTRIBUTION

SILT, SOME SAND, SOME CLAY

File No.:

02310769.002



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**24-6**	SS4	2.6	274.3	0	15	70	15	

ENGLOBE

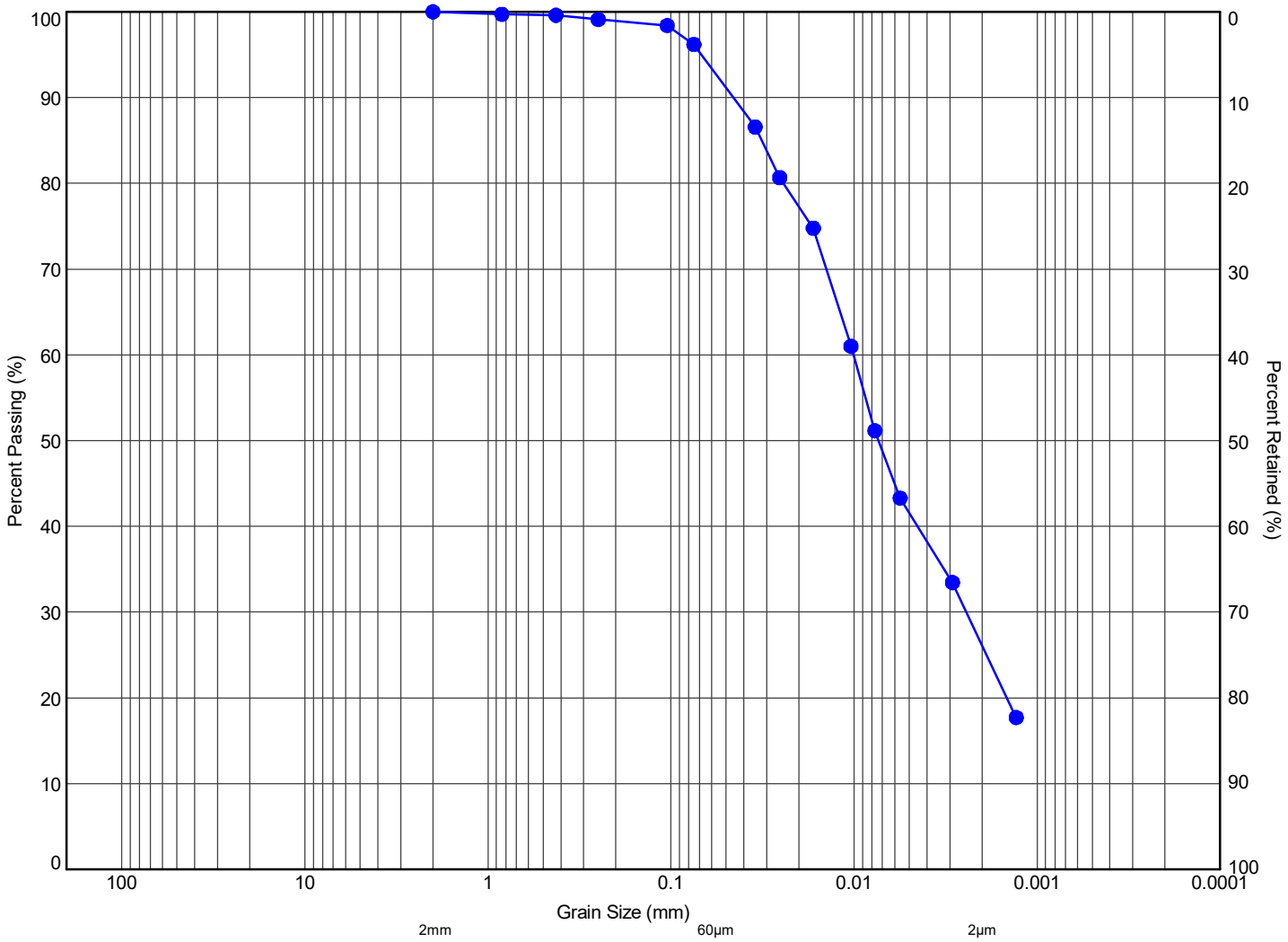
Title:

GRAIN SIZE DISTRIBUTION

SILT, SOME SAND, SOME CLAY

File No.:

02310769.002



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**24-8**	SS3	1.8	276.2	0	7	67	26	

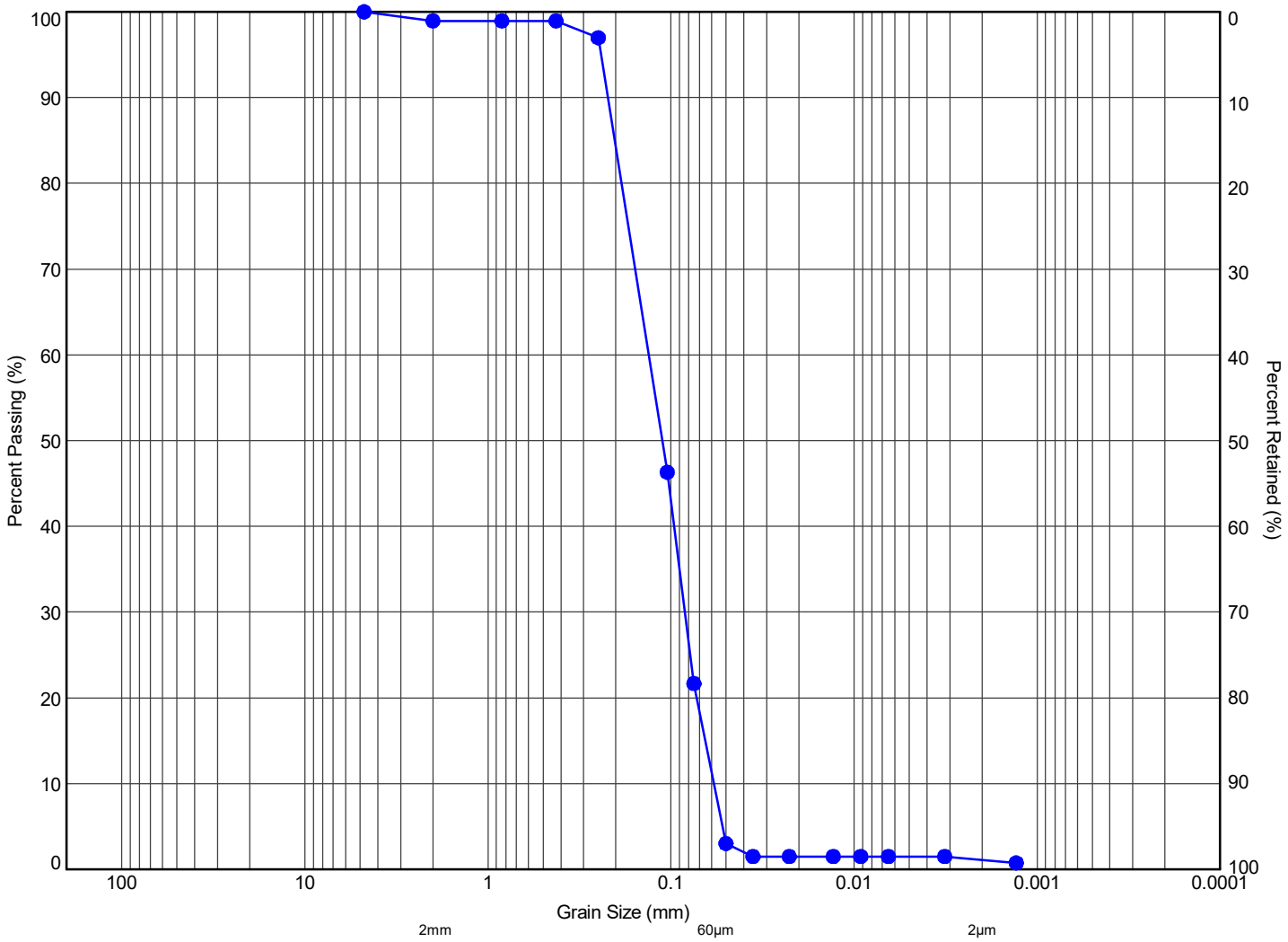
eNGLOBe

Title:

GRAIN SIZE DISTRIBUTION
CLAYEY SILT, TRACE SAND

File No.:

02310769.002



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**24-12**	SS4	2.6	273.1	1	88	10	1	

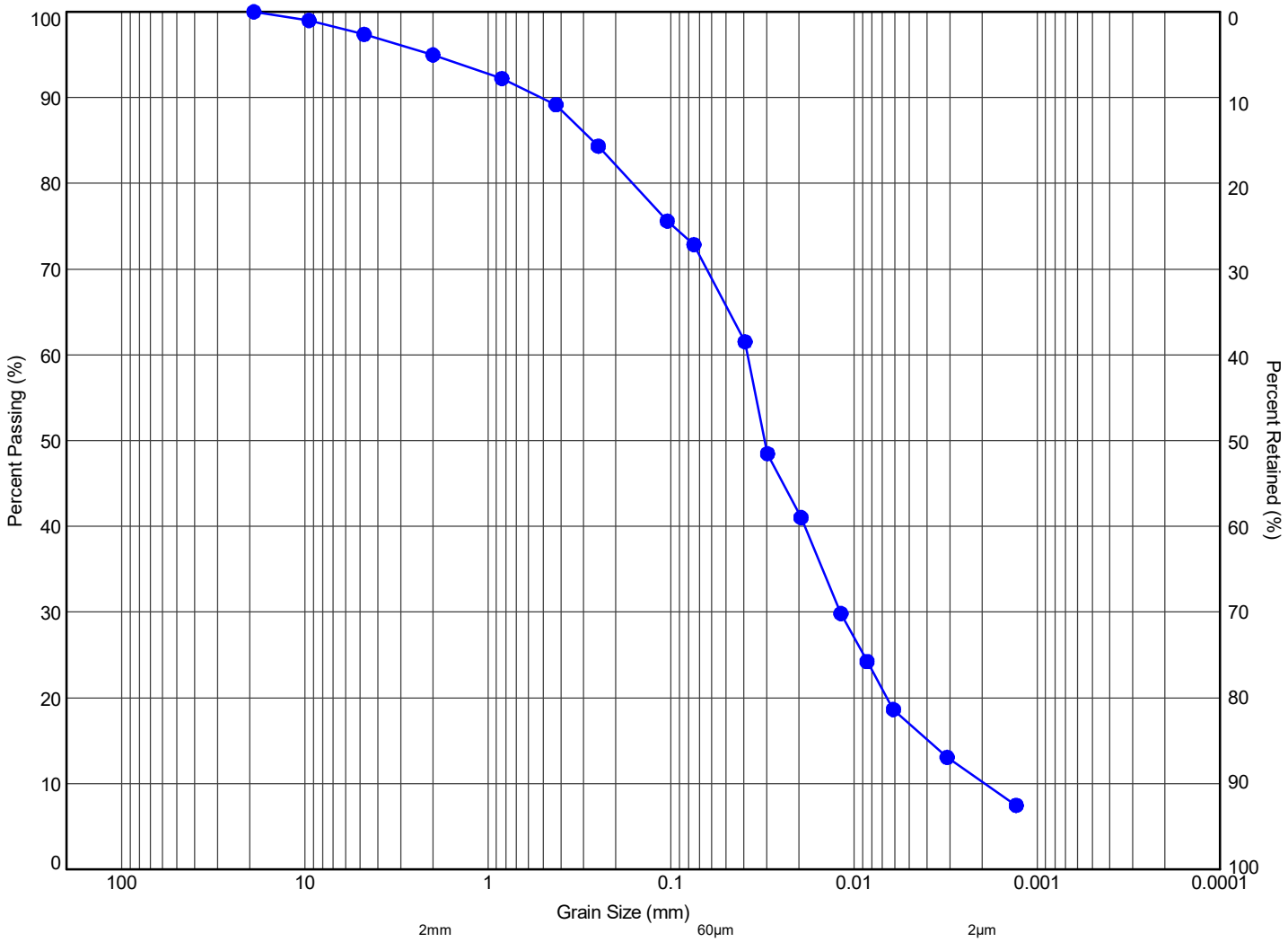
ENGLOBE

Title:

GRAIN SIZE DISTRIBUTION

SAND, SOME SILT, TRACE CLAY, TRACE GRAVEL

File No.: **02310769.002**



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**24-15**	SS3	1.8	275.8	5	26	59	10	

ENGLOBE

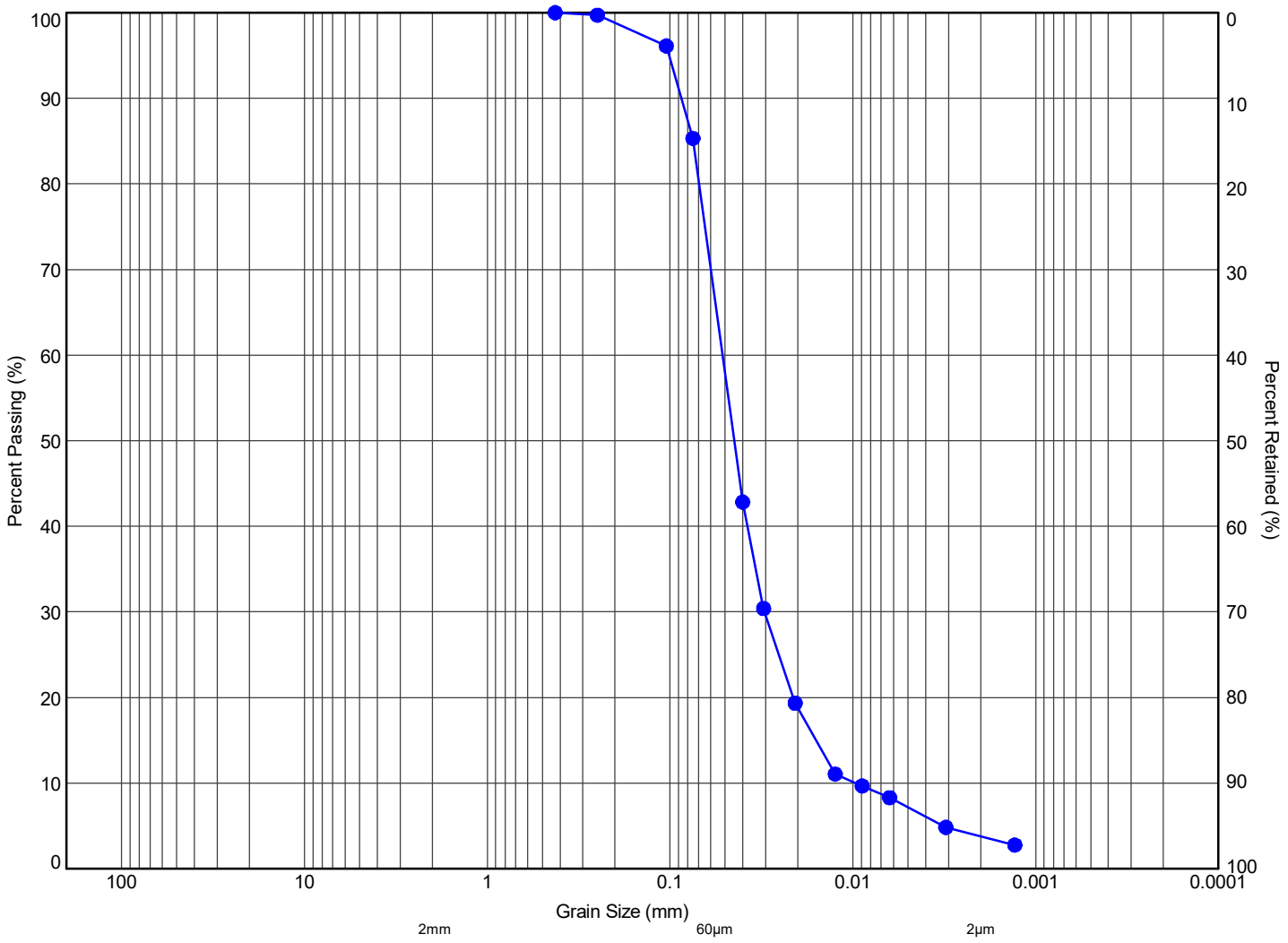
Title:

GRAIN SIZE DISTRIBUTION

SANDY SILT, SOME CLAY, TRACE GRAVEL

File No.:

02310769.002



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**24-16**	SS3	1.8	278.3	0	30	66	4	

ENGLOBE

Title:

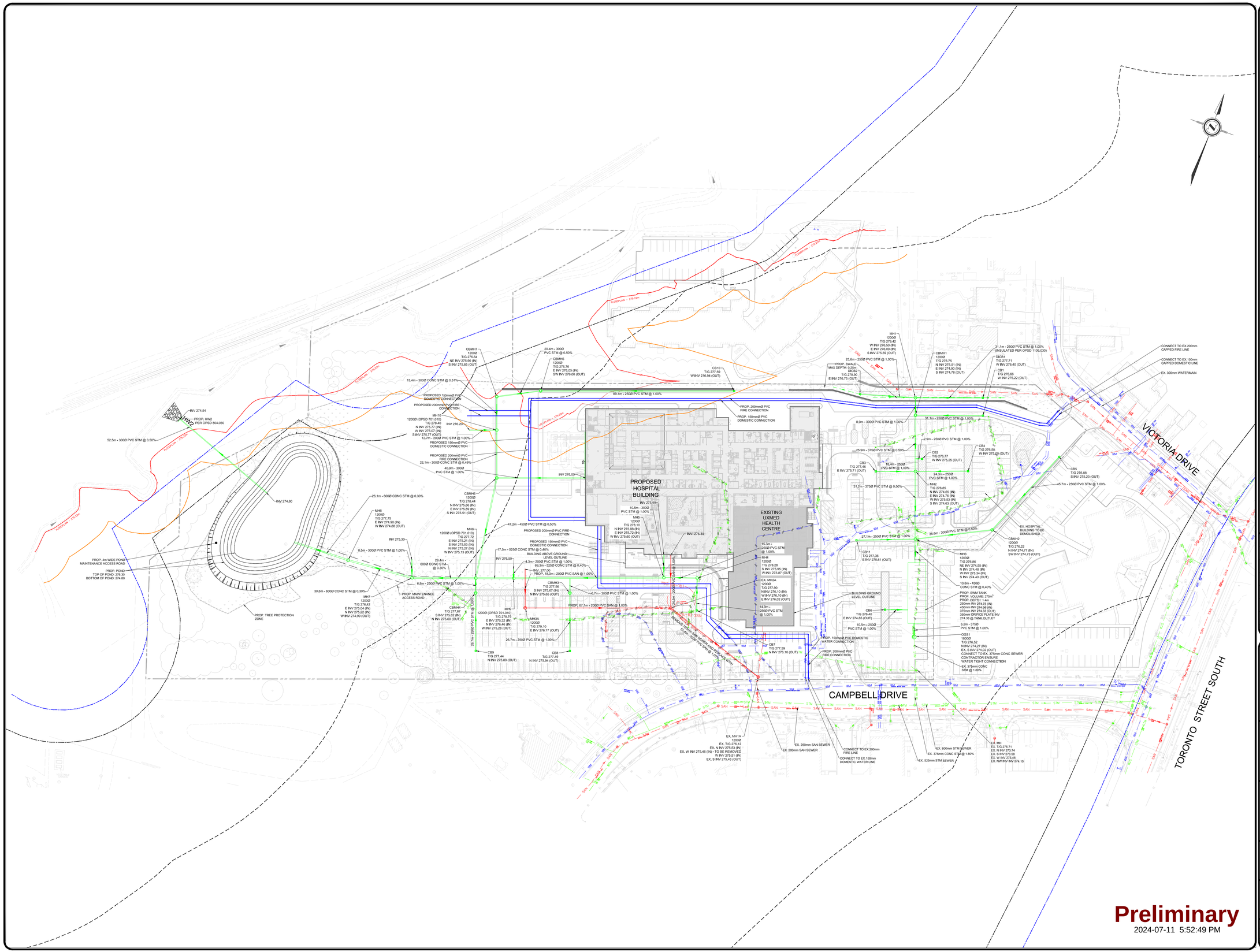
GRAIN SIZE DISTRIBUTION
SANDY SILT, TRACE CLAY

File No.:

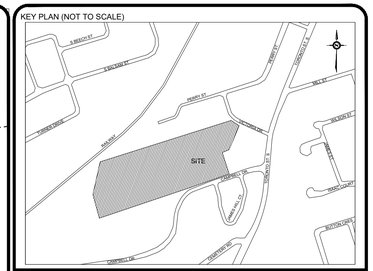
02310769.002

Appendix C
Site Servicing Plan

ENGLOBE



KEY PLAN (NOT TO SCALE)



LEGEND:

- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING HYDRO
- EXISTING GAS MAIN
- EXISTING STREET LIGHT
- EXISTING ROGERS
- EXISTING BELL
- EXISTING STORM MANHOLE
- EXISTING SANITARY AND/OR COMBINED SEWER MANHOLE
- EXISTING CATCHBASIN
- EXISTING LIGHT STANDARD
- EXISTING WATER VALVE
- EXISTING FIRE HYDRANT
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED CATCHBASIN
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATER MAIN
- EXISTING UTILITY REMOVAL
- HEADWALL AND RIPRAP
- PROPERTY LINE
- REGIONAL FLOOD LINE
- REGIONAL FLOOD LINE OFFSET
- MEANDERBELT LIMIT
- MEANDERBELT LIMIT OFFSET
- LSRCA REGULATION LIMIT
- PROPOSED BUILDIN
- EXISTING BUILDING TO REMAIN
- BUILDING GROUND LEVEL OUTLINE
- BUILDING ABOVE GROUND LEVEL OUTLINE
- PROPOSED TREE PROTECTION ZONE

BEARING

BEARINGS ARE UTM GRID, DERIVED BY REAL TIME NETWORK (RTN) OBSERVATIONS, UTM ZONE 17, NAD83 (CSRS) (2010.0) FOR BEARING COMPARISONS, A ROTATION OF 1°06'00" COUNTER-CLOCKWISE WASAPPLIED TO BEARINGS ON PLAN P1, P2, AND P4.
DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BYTHE COMBINED SCALE FACTOR OF 0.9997577.
ALL BUILDING TIES ARE TAKEN TO CONCRETE FOUNDATION.

ELEVATION

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE ONTARIO MINISTRY OF NATURAL RESOURCES AND FORESTRY BENCHMARK No. 00819728024 HAVING A PUBLISHED ELEVATION OF 261.000 METRES.

SURVEYING INFORMATION

SURVEYING INFORMATION IS REFERENCED FROM J. D. BARNES LIMITED - REFERENCE NO: 22-21-9-877-00, DATED JANUARY 03, 2023.

No.	Revision	Date	By	App.
2	ISSUED FOR STAGE 2.1 BLOCK SCHEMATICS	MAY 02, 2024	H.B.	G.S
1	ISSUED FOR SD COSTING	APR. 01, 2024	H.B.	G.S.

FOR DISCUSSION PURPOSES ONLY

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Owner/Client:

diamond schmitt

Uxbridge Hospital
Oak Valley Health

Location:

OAK VALLEY HEALTH UXBRIDGE HOSPITAL
UXBRIDGE, ON

Title:

SITE SERVICING PLAN (FINAL WORKS)

Designed By:	J.P.	Drawn By:	J.P.
Checked By:	F.F.		
Scale:	1:750 (FULL SIZE)	Date:	JAN. 17, 2024
Drawing No.:	C-02		
Project No.:	24163		

Preliminary
2024-07-11 5:52:49 PM

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