GEOTECHNICAL INVESTIGATION AND SLOPE STABILITY ASSESSMENT 890 MEADOW WOOD ROAD MISSISSAUGA, ONTARIO

for

UNITED LANDS

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Peto MacCallum Ltd.
CONSULTING ENGINEERS

January 26, 2021

PML Ref.: 20HF020
Report: 1
(Revised)

Mr. Dan Welton
United Lands
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Oakville, Ontario
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Dear Mr. Welton

Geotechnical Investigation and
Slope Stability Assessment
890 Meadow Wood Road
Mississauga, Ontario

Peto MacCallum Ltd. (PML) is pleased to report the results of the geotechnical investigation and limited chemical testing program recently completed for this project. Authorization to proceed with this assignment was provided by Mr. Dan Welton in a signed proposal dated June 1, 2020.

It is understood that a five lot residential subdivision development is planned at 890 Meadow Wood Road, Mississauga, Ontario. The development Site area is 0.51 hectares with lot sizes between 559 m^2 to 1,172 m^2. The site is to be accessed by a new road extending off of Sunningdale Bend. The northern limit of the Site is coincident with the top of slope of a shallow ravine with a slope height of about 5 m and an inclination of about 1.0 vertical to 3.4 horizontal. A small shallow water course, which is a tributary to Sheridan Creek, is located about 5 m from the toe of the slope.

The purpose of the geotechnical investigation was to assess the subsurface soil and ground water conditions at the site and based on the findings, provide geotechnical comments and recommendations for the design and construction of the proposed development.

In conjunction with the geotechnical investigation, a slope stability assessment was conducted to evaluate the stability of the slope and assess the position of the long term stable top of slope.

A limited chemical testing program was included with the geotechnical work to check the geoenvironmental quality of the site soil in order to provide comments regarding on-site or off-site re-use and/or disposal options of excess soil.

The subsurface stratigraphy in the boreholes typically comprised sand, over silt, underlain by probable shale bedrock.

Based on the findings of this investigation and assessment, it is considered feasible to commence foundation construction using shallow foundations (strip/spread) on native undisturbed sand or adequately prepared engineered fill.

In general, the slope is considered stable with the long-term stable top of slope coincident with the existing physical top of slope. The proposed changes to the top of slope including regrading with up to 1.6 m upfill and low armour stone retaining wall are also considered stable with respect to a minimum factor of safety of 1.6. Regulatory development setbacks as required by Credit Valley Conservation Authority (CVC) will apply.

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The results of the limited chemical testing program indicate the chemical quality of the tested soil samples met the Site Condition Standards (SCSs) for Table 9 (T9) Residential/Parkland/ Institutional (RPI).

Detailed comments and recommendations concerning the design and construction of the proposed lot development and pavement structures as well as the results of the slope stability analysis and limited chemical testing program are provided in the attached report.

We trust this report has been completed within our terms of reference and is sufficient for your current needs.

Should you have further questions, please do not hesitate to contact our office.

Sincerely

Peto MacCallum Ltd.

Scott Jeffrey, P.Eng., QP_{ESA}, $LEED_{GA}$
Senior Associate
Regional Manager, Geotechnical and Geoenvironmental Services

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TABLE OF CONTENTS

1. INTRODUCTION

Peto MacCallum Ltd. (PML) is pleased to report the results of the geotechnical investigation and limited chemical testing program recently completed for this project. Authorization to proceed with this assignment was provided by Mr. Dan Welton in a signed proposal dated June 1, 2020.

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The purpose of the geotechnical investigation was to assess the subsurface soil and ground water conditions at the site and based on the findings, provide geotechnical comments and recommendations for the design and construction of the proposed development.

In conjunction with the geotechnical investigation, a slope stability assessment was conducted to evaluate the stability of the slope and assess the position of the long-term stable top of slope.

A limited chemical testing program was included with the geotechnical work to check the geoenvironmental quality of the on-site soil in order to provide comments regarding on-site or off-site re-use and/or off-site disposal options for excess soil which may be generated during the demolition/construction phase of the project. It should be noted that ground water sampling and testing was not part of the Terms of Reference for this assignment and no work was carried out in this regard.

The comments and recommendations provided in this report are based on the site conditions at the time of the investigation and are applicable only to the proposed development as described in the report. Any changes in development, including finished grades and layout will require review by PML to assess the validity of the report and may require modified recommendations, additional investigation and/or analysis.

2. INVESTIGATION PROCEDURES

2.1 Subsurface Investigation

Drilling field work was carried out on July 2, 2020 and consisted of five (5) boreholes (Boreholes 1 to 5) including a monitoring well in BH1, drilled from 6.5 to 7.7 m termination depths. The borehole locations are shown on Drawing 1, appended.

The borehole locations were selected and established in the field by PML. Ground surface elevations at the borehole locations were also determined by PML.

The boreholes were advanced using continuous flight solid stem augers, powered by a track-mounted Geoprobe 7822DT drill rig, supplied and operated by a specialist drilling contractor, working under the full-time supervision of a member of PML's engineering staff.

Representative samples of the overburden were recovered at frequent depth intervals using a conventional split-spoon sampler during drilling. Standard penetration tests along with pocket penetrometer tests were conducted simultaneously with the sampling operation to assess the strength characteristics of the substrata.

The ground water conditions at the borehole locations were assessed during drilling by visual examination of the soil, the sampler and the drill rods as the samples were retrieved and when appropriate by measurement of the water level in the open borehole.

Upon completion of drilling, the boreholes were decommissioned in accordance with O. Reg. 903/90, as amended.

The recovered soil samples were returned to our laboratory for detailed visual examination and classification, and routine moisture content determinations.

Selected soil samples were submitted to SGS Canada Inc. for laboratory testing to assess the geoenvironmental properties of the soil. Details concerning the geoenvironmental chemical testing program including procedures and results of chemical testing are provided in Appendix B.

2.2 Slope Reconnaissance

A slope reconnaissance was also conducted on July 2, 2020, and consisted of a visual examination of the subject property and the slope conditions along the norther limit of the property.

The slope reconnaissance was generally conducted in accordance with the Ontario Ministry of Natural Resources Technical Guide for River & Stream Systems: Erosion Hazard Limit (MNR Guideline). The slopes were evaluated in accordance with the MNR slope stability rating chart as provided in Figure 1. Details of the slope reconnaissance and slope stability review are provided in Section 4.1.

3. PHYSIOGRAPHIC AND GEOLOGIC SETTING

The site is situated in the physiographic region known as the Iroquois Plain. The Iroquois Plain was formed in the late Pleistocene times by a body of water known as Lake Iroquois, which emptied eastward at Rome, New York (Chapman and Putnam, 1984). Lake Iroquois was characterized by higher water levels than the present-day Lake Ontario, caused by an ice sheet blocking the present-day St. Lawrence River valley. When the St. Lawrence valley became free of ice, the water level dropped to a level much lower than the present Lake Ontario levels (Karrow, 1959). The Iroquois Plain is characterized by sands deposited by Lake Iroquois.

Based on Quaternary Geology Map series M2500 the site is underlain by deposits of lacustrine and outwash sand. Bedrock underlying the overburden soils is shale of the Georgian Bay Formation.

4. SUMMARIZED SUBSURFACE CONDITIONS

Reference is made to the appended Log of Borehole sheets for details of the subsurface conditions including soil classifications, inferred stratigraphy, standard penetration test N values, ground water observations, and the results of laboratory moisture content determinations.

Due to the soil sampling procedures and limited sample size, the depth demarcations on the borehole logs must be viewed as transitional zones between layers and cannot be construed as exact geologic boundaries between layers. PML would be pleased to assist in defining geologic boundaries during construction if required.

The subsurface stratigraphy in the boreholes typically comprised sand, over silt, underlain by shale bedrock.

4.1 Sand

2.8 to 5.1 m of fine to coarse sand was contacted at the surface of all boreholes. The sand was loose to very loose in the upper 1.5 m with some organics and rootlets near the surface becoming compact to dense and medium grained with trace gravel below 1.5 m. The sand was judged to be damp to wet with moisture content determinations ranging from 2.8 to 20.5%

4.2 Silt

Silt was contacted below the sand in all boreholes and was encountered in the boreholes at varying depths between 2.1 to 5.3 m (elevations 90.3 to 93.5). The silt contained trace to some clay. The silt was generally compact to dense and was judged to be damp to wet with a moisture content ranging between 15.4 to 21.0%.

4.3 Bedrock

Borehole 1 terminated upon reaching spoon refusal on probable bedrock at depth of 7.7 m (elevation 87.9). Rock coring to prove bedrock was not included in the scope of work for this investigation; however, the elevations where refusal was met are consistent with the reported bedrock elevations at nearby locations. The bedrock in the vicinity of the site is known to consist of shale of the Queenston Formation.

4.4 Ground Water Conditions

Upon completion of auguring, cave was observed at all boreholes from 5.0 to 3.6 m with free water observed in Boreholes 1 to 3 and Borehole 5 at depth ranging from 3.3 to 4.3 m. Borehole 4 was observed to be dry. The most recent water level taken at Borehole/Monitoring Well 1 was taken on July 8, 2020 with a recorded water level at 4.5 m (elevation 91.1). Ground water levels may fluctuate subject to seasonal variations and precipitation patterns.

5. ENGINEERING DISCUSSION AND RECOMMENDATIONS

It is understood that a development of five lots and a new access road is planned at 680 Meadow Wood Road, Mississauga, Ontario. The development footprint will be approximately 5,000 m^2. The purpose of the geotechnical investigation and slope stability assessment was to assess the subsurface soil and ground water conditions at the site and based on the findings, provide geotechnical comments and recommendations for the design and construction of the proposed development.

The subsurface stratigraphy in the boreholes typically comprised sand, over silt, underlain by probable shale bedrock.

5.1 Slope Assessment

The stability of the slope was assessed by the observational method generally following the MNR Technical Guidelines and confirmed by engineering analysis. The observational method involves assessment of the performance of existing slopes by visual examination of site features. The engineering analysis involves assessment of pertinent engineering properties of the soil from borehole data, our experience with similar studies conducted in the area and conventional analytical techniques.

Pertinent details of the slope configuration and related factors to be considered during the stability assessment are documented on Figure 1 and summarized below.

5.1.1 General Slope Observations

This slope was observed to be about 5 m in height from the with an inclination of about 3.4H:1V. A small shallow water course, which is a tributary to Sheridan Creek, is located about 5 m from the toe of the slope.

The top of physical slope begins about 1 m north of Borehole 1.

Refer to Appendix C - Photographs 1 to 4 for additional information.

The details of the slope reconnaissance are recorded on the attached MNR slope rating chart. Based on the reconnaissance it was noted that:

- Existing site grade on the table land generally ranges from elevation 94.3 to 96.0;
- The slope to the northwest of the track is about 5 m high from the existing top of slope to the toe of slope at elevation 90.1 (Photographs 2 and 3);
- The existing slope inclination is about 3.4 horizontal to 1 vertical (3.4H:1V) on average (Drawing 3) at its closest to the proposed site;
- Vegetation on the slope was moderate to dense and consists mostly of mature trees. Trees were observed to be generally vertical with straight trunks;
- No evidence of deep-seated instability or slope creep was observed;

- No evidence of seepage emanating on the face of the slope was detected;
- No evidence of significant drainage over the slope was observed and no erosion gullies are present;
- No debris accumulation or dumping was observed;
- A small, shallow, narrow channel creek is located about 5 m north of the toe of the slope with no evidence of active erosion observed (Photograph 4).

5.1.2 Evaluation of Slope Stability

The MNR Slope Stability Rating Chart categorizes the potential for instability as “low”, “slight” or “moderate”. Based on the site reconnaissance, the slope stability rating value for current conditions was assessed to be 22 which is classed as having a “low” potential for instability.

Cognizant of the observed satisfactory performance of the existing slope (no evidence of deep seated instability), the vegetation cover (moderate to dense and consists mostly of mature trees), and the measured inclination of the slope, it is considered that the slope is stable in its current configuration with an overall slope angle that is flatter than the assumed stable slope angle of 3 horizontal to 1 vertical as referenced in CVC policies and MNR guidelines. As such, the long term top of stable slope is considered to be coincident with the existing physical top of slope. The position of the top of stable slope/physical top of slope is shown on Drawings 1 and 2 with the section view on Drawing 3.

Preliminary site designs have called for grade changes of up to about 1.6 m or less at the top of the slope along with the construction of an amour stone retaining wall to be installed at the approximate location of the current stable top of slope along will the addition of fill. Engineering analysis was completed to evaluate the changes on the slope. This was completed using a limit equilibrium model (Geo Studio 2007 v. by Geo-Slope International Ltd.) and by applying the Morgenstern-Price and Spencer Analysis methods. Soil properties were determined from borehole information, in situ testing, laboratory testing and from our experience with similar sites. A cross section of the slope with soil properties is shown in Figure 3, appended.

The following conditions were considered in the modeling:

- The long-term drained condition was used for the shear strength of the sand and silts.
- An assumed high groundwater condition at 1.5 m above the measured level was used in the analysis.

Based on the analysis, the proposed armour stone retaining wall design is considered stable with respect to a factor of safety (FOS) of about 1.6 against rotational failure on the slope. According to Section 4.3.3.1 of the MNR Technical Guide, the current computed FOS from the engineering analysis is greater than the recommended minimum FOS range of 1.3 to 1.5 for slopes with habitable structures.

Cognizant of the observed satisfactory performance of the slope and the results of the computer aided engineering analysis, it is considered that the slope is and will remain stable with the proposed site grading and retaining wall construction with respect to a minimum FOS > 1.5.

All regulatory permits and approvals such as from Credit Valley Conservation will apply for any work within regulated lands.

5.1.3 Toe Erosion Allowance

The existing small water course is located about 5 m from the toe of the slope. The small channel is narrow and shallow with a width of less than about 500 mm and a water depth of less than about 200 mm. There was no observed evidence of active erosion along the small channel. Based on these observed conditions, no significant channel erosion is anticipated; however, as per the MNR Technical Guide, Section 3.1 Table 3, and considering the soil conditions at the site comprising compact sand and dense silt, a toe erosion allowance of 2 m is considered to be applicable for this site, as shown on Figure 2. Given that the water course is located approximately 5 m from the toe of the slope, no additional toe erosion setback is required in order to establish the long-term stable top of slope

5.1.4 Erosion Access Allowance

As per the MNR Guideline, the erosion hazard limit is to include an erosion access allowance in order to provide for emergency access to erosion prone areas and provide for construction access for regular maintenance and access to the site in the event of an erosion occurence or failure of a structure; and to provide protection against unforeseen or predicted external conditions which could have an adverse effect on the natural conditions or processes acting on or within an erosion prone area. The MNR guideline suggests that a 6 m erosion access allowance is typical; however, the guideline also acknowledges that a 6 m erosion access allowance may be excessive or insufficient depending on site specific conditions. Cognizant of the fact that the slope at the site is low, relatively flat and well vegetated, without any evidence of instability or erosion, there is a low to negligible risk of a future erosion event requiring emergency or maintenance access. Additionally, if future access is required, the low, flat slope face is directly accessible and easily traversable for maintenance equipment and personnel. As such a 6 m erosion access allowance would be considered excessive for this site. CVC and the City of Mississauga should be consulted regarding the minimum erosion access allowance that can be supported under the applicable policies.

5.1.5 General Recommendations for Slopes

The following general recommendations should also be adopted:

1. In general, construction materials should not be stockpiled within 5 m of the crest of the slopes, without prior review and approval of the geotechnical engineer.

2. Discharge from the rainwater leaders of the proposed building should be directed to the street or transported to the base of the slope in pipes to minimize the flow of water over the slope.

3. Fill, grass clippings and similar materials should not be placed at the top or on the face of the existing slope as these may block seepage paths and result in the build-up of hydrostatic pressure, thereby reducing the stability of the slope.

4. Care must be taken to minimize damage to the existing vegetation in and adjacent to the slope (trees, tree roots, grass cover).

5.2 Site Preparation

Preparation of the site should consist of removal of loose sand in all areas of proposed building addition and other settlement sensitive structures followed by proofrolling the exposed subgrade under geotechnical supervision to expose soft/loose or unstable material. Any soft/loose or unstable material should be subexcavated, removed and replaced with approved soil having a moisture content adjusted to within 3% of the optimum moisture content. Approved material should be inorganic material which is free of debris and otherwise deleterious materials.

The subgrade should be approved by geotechnical personnel prior to placement of bulk fill.

Bulk fill placed to raise the grades should be placed as an engineered fill in uniform 200 to 300 mm thick lifts within 3% of the optimum moisture content. Engineered fill in the building envelopes should be compacted to at least 98% standard Proctor maximum dry density (SPMDD). Compaction to 95% SPMDD should be suitable in other areas. In this regard, trench backfill would also be considered as engineered fill. In landscaped areas where post construction settlement may not be a concern, compaction to 90% SPMDD may be suitable. Further recommendations regarding placement of engineered fill are presented in Appendix A. It should be noted that the subexcavated area should extend laterally beyond the building limits by a distance that is greater than the required depth of fill beneath the footing as noted in Appendix A.

In areas that underlie pavements and walkways, the bulk fill placed to raise site grades to the proposed design levels should be compacted to at least 95% SPMDD. In landscaped areas, compaction to at least 90% SPMDD will be adequate.

Based on the borehole information, portions of the fill and sand may be suitable for re-use as engineered fill subject to geotechnical review and approval during construction. However, depending on seasonal conditions at the time of construction, some moisture content adjustments may be necessary.

The native soils are considered to be frost susceptible, and should not be used where frost related movements or heave could present a concern.

Organic soil, topsoil, deleterious or excessively wet material should not be used as backfill.

Full time site observation should be carried out by PML to examine and approve backfill material, to review placement operations, and to verify the specified compaction is achieved.

5.3 Buildings

5.3.1 Foundations

Based on a review of borehole elevations, the ground surface elevation on the site ranges from about elevation 94.3 to 96.0 m. The proposed finished site grades and founding levels for the buildings were not known at the time of this report; however, it is assumed that some grade alterations may be required. It is further assumed that the footings for the buildings will be founded at or below the minimum frost depth of 1.2 m below finished grade.

Where grades are raised, such that proposed footing elevations are within 1.4 m of the current ground surface within the loose sand, including footings constructed within adequately prepared engineered fill constructed over the loose sand, then footings should be proportioned for a factored net bearing resistance at Ultimate Limit State (ULS) of 115 kPa and bearing pressure at Serviceability Limit State (SLS) of 75 kPa. Where footings are to be supported on engineered fill, the engineered fill pad should be constructed under full time geotechnical supervision in accordance with the general guidelines for engineered fill provided in Appendix B.

Footings constructed deeper than 1.4 m below the existing surface grades and on the compact to dense sand, should be proportioned for a factored net bearing resistance at Ultimate Limit State (ULS) of 300 kPa and bearing pressure at Serviceability Limit State (SLS) of 200 kPa.

The total settlement of foundations designed in accordance with the foregoing recommendations is not expected to exceed 25 mm. Differential settlement is expected to be less than 75% of this value.

In general, where founding levels of adjacent footings vary, the founding elevation between footings should be stepped in maximum 600 mm steps at a maximum inclination of 10 horizontal to 7 vertical (10H:7V).

Prior to placement of structural concrete, all foundation excavations should be examined by geotechnical personnel from PML to verify that the founding stratum is in accordance with the assumptions and recommendations of this report.

All footings subject to frost action should be provided with a minimum of 1.2 m of soil cover or equivalent thermal insulation. A 25 mm thick layer of polystyrene insulation is thermally equivalent to 600 mm of soil cover.

The native subgrade is prone to disturbance from exposure to weather and construction traffic. Accordingly, a 50 mm skim slab of lean concrete should be provided over the base of the approved subgrade if structural concrete cannot be provided within 24 hours of approval of the foundation base.

All work should be carried out in accordance with the Occupational Health and Safety Act (Ontario Regulation 213/91) and with local regulations.

5.3.2 Earthquake Considerations

Design provisions for earthquake loading should also be applied. Based on the characteristics of the subsoils encountered in the boreholes at this site, the subject property would be classified as Site Class D per The Ontario Building Code Act, (2012) Section 4.1.8.4.

5.3.3 Floor Slab Construction

Construction of the floor slabs as a conventional slab-on-grade floors is considered feasible.

Preparation of the floor slab subgrade should include stripping of the loose, wet and otherwise deleterious material followed by proofrolling of the exposed subgrade with a heavy roller to ensure uniform adequate support. Excessively loose/soft or compressible materials revealed during the proofrolling operations should be subexcavated and replaced with well compacted approved material.

Fill placed under the floor slab to achieve finished subgrade levels or as foundation excavation backfill should comprise approved inorganic material having a moisture content within 3% of the optimum value, placed in maximum 200 mm thick lifts, and compacted to at least 95% of standard Proctor maximum dry density (SPMDD).

A minimum 150 mm thick layer of well compacted free draining Granular A type material meeting OPSS 1010 specifications should be provided directly beneath the slab-on-grade. A polyethylene vapour barrier should be placed under the slab if a moisture sensitive finish is to be placed on the floor.

Exterior grades should be maintained at least 150 mm below the ground floor level and sloped to promote drainage away from the building. If finished floor levels cannot be maintained at least 150 mm above surrounding grades then perimeter foundation drains are recommended.

5.3.4 Subsurface Walls

Provided free-draining granular backfill is employed and hydrostatic pressure is not allowed to develop, the lateral earth pressure, p, acting on the subsurface walls should be computed using the following equation, assuming a triangular pressure distribution:

$$p = K(\gamma h + q)$$

where K = lateral earth pressure coefficient
= 0.5 for wall restrained at both top and bottom
γ = unit weight of free-draining granular material
= 21.0 kN/m^3
h = depth below final grade (m)
q = surcharge load (kPa), if present

The excavation adjacent to the basement walls should be backfilled with free-draining granular material satisfying the OPS Granular B gradation specification and a weeping tile system installed to minimize the build-up of hydrostatic pressure behind the wall. Alternatively, an approved drainage board product may be provided. The in situ soil may have variable silt content and would not be classified as “free draining”, but may be re-used as exterior foundation backfill if a drainage board product is installed as per Ontario Building Code requirements.

The perforated drainage pipe should be surrounded by a properly designed graded granular filter or wrapped with approved geotextile to prevent migration of fines into the system. The perforated drainage pipe should be placed on a positive grade and lead to a frost-free sump or outlet.

The backfill adjacent to the subsurface walls should be compacted to at least 95% of SPMDD. The backfill should be compacted using light equipment to minimize potential damage to the wall. It is imperative that the excavation is of sufficient width to enable operation of suitable compaction equipment; use of a hoe-pack is not suitable for this application.

The exterior grade should be sloped to promote surface drainage away from the building.

General recommendations for drainage and backfill are provided on Figure 2.

5.4 Underground Services

5.4.1 Trench Excavations

Open cut excavations are anticipated to extend through the native sand and silt. In general, excavations are expected to be relatively straightforward using conventional excavation equipment. The possibility of cobbles and boulders in the native overburden should not be overlooked.

Provided adequate ground water control is achieved, the in situ soil is classified as Type 3 soil according to the Occupational Health and Safety Act (OHSA) criteria. Therefore, excavation sidewalls should be cut at a maximum inclination of 1H:1V from the bottom of the excavation.

It may be necessary to further flatten the excavation sideslopes if excessively loose, soft conditions or concentrated seepage zones are encountered.

Excavation side slopes should be continuously examined for evidence of instability, particularly following periods of heavy rain, thawing or when the excavation has been left open for extended periods of time. When required, appropriate remedial action must be taken to ensure the continued stability of the excavation slope and the safety of workers in the excavation.

If space is not available for inclined slopes, it will be necessary to use a braced excavation to support the walls of the excavation and maintain the integrity of existing facilities. The magnitude and distribution of the lateral earth pressures acting on a braced excavation wall is dependent upon the support system used, the number of supports, the allowable movements and the construction sequence.

The recommended design earth pressure distribution for multiple and singly braced walls, for the conditions which exist at the site, are presented in Figures 4 and 5. Recommendations concerning design and construction of the braced excavation support systems are also presented in the Figures.

The ground surface adjacent to a braced excavation is expected to experience some inward movement and vertical settlement. The magnitude of movements adjacent to a braced cut can be limited by proper selection of the lateral earth pressure coefficient provided good quality workmanship and construction practice is employed.

Foundations of heavily loaded/settlement sensitive structures and/or utilities located within close proximity to the excavation may require underpinning to preserve the integrity of these structures. Further comments and general recommendations in this regard are presented in Figure 6.

All work should be carried out in accordance with the current Occupational Health and Safety Act (Ontario Regulation 213/91) and with local regulations.

5.4.2 Ground Water Control

Upon completion of auguring, cave was observed at all boreholes from 5.0 to 3.6 m while free water was observed in Boreholes 1 to 3 and 5 from 3.3 to 4.3 m with Borehole 4 observed as dry. The most recent water level taken at Monitoring Well 1 was taken on July 8, 2020 being at 4.5 m (elevation 91.1). Ground water levels may fluctuate subject to seasonal variations and precipitation patterns.

It is anticipated that seepage or surface water that enters the excavations will be adequately handled by conventional sump pumping techniques.

5.4.3 Bedding Material

It is anticipated the subgrade for the underground services will comprise native sand. In general, the compact to dense sand is considered suitable for conduit support. However, in localized areas, loose/soft zones of the subgrade may require subexcavation or compaction prior to the placement of the granular pipe bedding material.

The normal 150 mm bedding thickness of granular material as per Ontario Provincial Standard (OPS) and/or local requirements should be satisfactory. Local subexcavation and thickening of the bedding layer may be necessary where unstable conditions are encountered. The need for subgrade improvement or thickening of bedding is best determined by geotechnical review during construction.

The bedding material should be carried up as backfill for at least 300 mm above the pipe obvert, and should be placed in 150 mm lifts compacted to 95% SPMDD.

5.5 Trench Backfill

The industry standard normally calls for service trenches to be backfilled with inorganic, debris free material placed in uniform 200 to 300 mm thick lifts within 3% of the optimum moisture content and compacted to at least 95% SPMDD.

Organic soil, topsoil, deleterious or excessively wet material should not be used as backfill.

It is anticipated that the excavated material will generally consist of native sand and silt.

Re-use of portions of the excavated fill and native sand and layered silts and clays from above the water table is considered feasible from a geotechnical perspective, depending on the moisture content of the excavated material at time of construction relative to its optimum moisture content. Depending on seasonal conditions, some moisture content adjustments to the backfill materials may be required. The on-site soils may have variable silt content and could be frost susceptible and are considered unsuitable for use where free draining backfill is required. It is anticipated that excavations for underground services will generally be above measured short term water level; however, water levels may fluctuate and portions of the overburden from below the observed water levels will be wetter than its optimum moisture content and will be unsuitable for backfill unless allowed to air dry prior to reuse.

Should construction extend into the winter season, particular attention must be given to ensure that frozen material is not used as backfill.

The trenching and backfilling operations should be carried out in a manner which minimizes the length of trench left open yet accommodates efficient pipe laying and compaction activities.

Full time site observation should be carried out by PML to examine and approve backfill material, to carefully inspect placement operations, and to verify the compaction by in situ density testing using nuclear gauges.

5.6 Pavement Construction

The anticipated subgrade for pavement construction is anticipated to consist of sand with possible variable silt content and/or engineered fill. Based on typical traffic patterns for local residential streets, the estimated strength and frost susceptibility of the anticipated subgrade and assuming adequate drainage, the following pavement structure is recommended for a minor local residential street as per City of Mississauga Standard Drawing 2220.010:

Pavement Component	Thickness (mm)
Surface Course (HL3)	40
Binder Course (HL8)	85
Granular A Base Course	200
Granular B Subbase Course	175

The pavement granular courses should conform to the OPS specifications for select granular materials. They should be placed in maximum 200 mm thick lifts and compacted to at least 100% of standard Proctor maximum dry density (SPMDD). The asphalt should be placed and compacted to a minimum of 92% of the material's maximum relative density (MRD). Reference is made to OPS Specification OPSS.MUNI 310, revised November 2017.

Preparation of the subgrade for pavement construction should involve stripping deleterious materials followed by proofrolling of the subgrade with a heavy roller. Excessively loose, soft, wet or deleterious material revealed by the proofrolling operations should be subexcavated and replaced. The subgrade surface should be compacted to at least 98% SPMDD and the water content of the material should be within 2% of optimum moisture content.

The pavement design considers that construction will be carried out during the drier time of the year and that the subgrade is stable, as determined by proofrolling operations. If the subgrade should become excessively wet or rutted during construction activities, additional subbase material may be required. The need for additional subbase is best determined during construction.

For the pavement to function properly, provision must be made for water to drain out of, and not collect in, the granular courses. In this regard, the pavement subgrade should be sloped to promote drainage towards catch basins or manholes. The excavation around catch basins and manholes should be backfilled with free-draining granular material to minimize differential movements between the pavement and structures due to frost action. The manholes/catch basins should be provided with perforated stub drains to permit drainage of the backfill.

Site review should be carried out by PML personnel to examine and approve subgrade, backfill/granular materials, to observe placement operations and verify the compaction (granular and asphalt) by in situ testing using nuclear gauges.

5.7 Stormwater Infiltration

The soil conditions encountered in the boreholes are considered to be favourable for stormwater infiltration. Based on the soil grain size distribution for samples BH2 SS3 and BH3 SS6 (refer to Figures 7 and 8), an unfactored infiltration rate of 60 mm/hour may be assumed. A minimum factor of safety of 2.5 should be used. It is recommended that in situ infiltration testing such as by Guelph Permeameter testing be carried out at the proposed location and depth of stormwater infiltration galleries to confirm design assumptions.

6. GEOENVIRONMENTAL CONSIDERATIONS

PML understands that excess soil may be generated during construction; the volume of which is unknown at this time. A limited chemical testing program was carried out to check the geoenvironmental quality of the soil at selected sampling locations in order to provide comments regarding on site or off-site re-use and/or disposal options of excess soil.

A Phase One Environmental Site Assessment (ESA) was not within the scope of work for this assignment. Accordingly, soil and ground water impairment that has not been identified by the limited chemical testing program may exist elsewhere at the site. The limited chemical testing program does not constitute an Environmental Site Assessment as defined under the Environmental Protection Act and O. Reg. 153/04, as amended.

6.1 Chemical Testing Protocol

Representative samples collected during the geotechnical investigation were returned to our laboratory for detailed visual examination. Soil samples were submitted for chemical analysis to SGS Canada Inc. (SGS), a Canadian Association for Laboratory Accreditation Inc. (CALA) accredited laboratory in Lakefield, Ontario. The chemical analyses conducted by SGS were in accordance with the O. Reg. 153/04, as amended Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act dated March 9, 2004, amended as of July 1, 2011.

As part of the geoenvironmental procedural protocol, all recovered soil samples were examined for visual and olfactory evidence of potential contamination.

Samples were reviewed and selected for chemical testing in accordance with the proposal whereby four soil samples were selected and analyzed for general testing for metals and inorganic parameters, petroleum hydrocarbon (PHC) fractions F1 to F4, including benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH's).

The rationale for sample selection was also based on materials exhibiting visual and/or olfactory evidence of contamination, material most likely to be contaminated (i.e. fill materials), site coverage and materials most likely to be excavated during construction.

A list of all samples submitted for analysis is included as Table B1, appended.

6.2 Site Condition Standards

The Ontario Ministry of the Environment, Conservation and Parks (MECP) has developed a set of Soil, Ground water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (April 15, 2011) and O. Reg. 153/04, as amended. The standards consist of nine tables (Table 1 through Table 9) that provide criteria for maximum concentrations of various contaminants. In general, the applicable O. Reg. 153/04, as amended Site Condition Standards (SCSs) depend on the site location, land use, soil texture, bedrock depth, soil pH and source of potable water at the investigation site. In order to determine the Site Sensitivity, Sections 41 and 43.1 of O. Reg. 153/04, as amended were evaluated by PML as per the following table:

Site Condition Standard and Site Sensitivity Analysis

Criteria	Result
Current Property Use O. Reg. 153/04, as amended Part I Section 1	Residential
Potable vs. Non-Potable Ground Water O. Reg. 153/04, as amended Part IX Section 35	Non-Potable
Proximity to Areas of Natural Significance O. Reg. 153/04, as amended Part IX Section 41 (1) (a)	> 30 m
Soil pH O. Reg. 15/04, as amended Section 41 (1) b	Surface Soil: 5 to 9 Subsurface Soil: 5 to 11
Soil Texture O. Reg. 153/04, as amended Part IX Section 42	Coarse
Proximity to a Water Body O. Reg. 153/04, as amended Part IX Section 43.1	< 30 m (due to proximity to creek)
Shallow Soil O. Reg. 153/04, as amended Part IX Section 43.1	No
Site Condition Standards	Table 9 (T9) Site Condition Standards (SCSs) for Residential/Parkland/Institutional (RPI)

For the option of re-using the excess soils with minimal environmental restrictions, the O. Reg. 153/04, as amended, Full Depth Background Table 1 (T1) SCSs for Residential/Parkland/ Institutional/Industrial/Commercial/Community (RPI/ICC) property uses were utilized.

For the option of re-using the excess soils at a property (or properties) with a potable ground water condition, the O. Reg. 406/19, Full Depth Excess Soil Quality Standards (ESQSs) Table 2.1 (T2.1) were utilized for both RPI and ICC land uses.

For the option of re-using the excess soils at a property (or properties) with a non-potable ground water condition, the O. Reg. 406/19, Full Depth ESQSs Table 3 (T3.1) were utilized for both RPI and ICC land uses.

It is noted that a comparison to ESQS tables was not conducted as part of this assignment. If the potential receiving site for excess soil falls within one of these other categories, additional evaluation by PML will be required to confirm conformance.

6.3 Analytical Findings

Laboratory Certificates of Analysis compared to T1 RPI/ICC and T3 ICC SCSs are included in Appendix B. The measured values and corresponding SCSs are shown on the certificates of analysis. In the event of an exceedance of the SCSs, the level is shown highlighted in orange, where applicable.

6.3.1 On-Site

Based on the results of chemical testing, the measured concentration of the tested parameters complied with the applicable T9 RPI/ICC SCSs.

6.3.2 Off-Site Re-Use

A comparison of the results was carried out against the more common ESQSs of T1, T2.1 and T3.1. The following table outlines a summary of the suitability for re-use of excess soil material based on the limited chemical testing:

Table 1 (RPI/ICC)	Table 2.1 (RPI)	Table 2.1 (ICC)	Table 3.1 (RPI)	Table 3.1 (ICC)	Licensed Landfill
No[1]	Yes	Yes	Yes	Yes	TCLP[2] Testing may be required

Notes:
1. Due to exceedances of SAR in sample SS8 BH 1
2. TCLP - Toxicity Characteristic Leaching Procedure.

6.4 Discussion and Recommendations

Elevated SAR concentration above the T1 SCS/ESQS was noted in one sample at the location of Borehole 1. SAR is often related to the historical use of de-icing salt for control of snow and/or ice. It is noted that de-icing salt related parameters are physical, non-health related parameters typically affecting vegetation and that elevated levels of these parameters are relevant to soils that must support plant growth. Elevated levels are usually an indication of salts within the soil (typically de-icing salts used in parking lots and roadways).

Under O. Reg. 406/19, 1. Excess soil quality standards for chemicals (e.g., sodium adsorption ratio and electrical conductivity) in soil resulting solely from the use of a substance for the safety of vehicular or pedestrian traffic applied under conditions of snow or ice or both, are deemed to be met if the following criteria are met:

i. The excess soil is finally placed at one of the following locations:

   a) where it is reasonable to expect that the soil will be affected by the same chemicals as a result of continued application of a substance for the safety of vehicular or pedestrian traffic under conditions of snow or ice;

   b) at an industrial or commercial property use and to which non-potable standards would be applicable; or

   c) at least 1.5 metres below the surface of the soil.

ii. The excess soil is not finally placed at any of the following locations:

   a) within 30 metres of a waterbody;

   b) within 100 metres of a potable water well or area with an intended property use that may require a potable water well; or,

   c) a location that will be used for growing crops or pasturing livestock unless the excess soil is placed 1.5 metres or greater below the soil surface.

iii. The project leader or operator of the project area has informed the reuse site owner or operator that the excess soil is from a location that may be expected to contain the chemical and, if sampling and analysis has been conducted in accordance with the regulation, the project leader or operator of the project area has provided relevant sampling results to the reuse site owner or operator, including the soil characterization report if prepared, and identified and communicated any potential risks to surface water and ground water to the reuse site owner or operator.

If the excess soil is to be removed from the site for off-site re-use, the following conditions must be met:

- The work must be completed in accordance with local by-laws governing soil movement and/or placement at other sites;
- All analytical results and environmental assessment reports must be fully disclosed to the receiving site owners/authorities and they have agreed to receive the material;
- The applicable ESQSs for the receiving site have been determined, as confirmed by the environmental consultant and the ESQSs are consistent with the chemical quality of the soil originating at the Source Site;
- Transportation and placement of the excess soil is monitored by the environmental consultant to check the material is appropriately placed at the pre-approved site;
- The Receiving Site must be arranged and/or approved well in advance of excavation in order to avoid delays during construction. As well, it is noted the chemical testing requirements for various Receiving Sites is site-specific and additional testing may be required, beyond that provided in this report.
- The excavation work, for any amount of excess soil, should be conducted in accordance with a written Soil Management Plan (SMP) prepared by a qualified professional (QP) to ensure that all excess excavated material is tested and managed appropriately, and that imported fill material is of suitable quality and meets the SCSs applicable to the site. Re-use of excess excavated soil on site is also subject to acceptance for re-use by the geotechnical consultant at the time of construction based on geotechnical considerations.

All chemical testing must satisfy the specific requirements of the selected Receiving Site(s), which may be more or less than the limited testing included with this Report. As such, additional sampling and chemical testing (including testing for additional parameters) may be required at the time of construction in order to verify that the chemical quality of the excess soil leaving the Site meets the minimum requirements of the Receiving Site(s).

It should be noted that since completion of the sampling and analysis program in 2020, the MECP has introduced new On-Site and Excess Soil Management Regulation, O. Reg. 406/19. The regulation includes specific requirements for testing, project planning documentation tracking and registration of excess soil. Considering the time that has passed since the sampling and testing, and considering the new O. Reg. 406/19 requirements, additional environmental review of excess soil management requirements is recommended, including additional soil sampling and analytical testing. When required, PML should be contacted to provide further review and recommendations relating to the management of excess soils.

It should be noted that the soil conditions between and beyond the sampled locations may differ from those encountered during this assignment. PML should be contacted if impacted soil conditions become apparent during future development to further assess and appropriately handle the materials, if any, and evaluate whether modifications to the conclusions documented in this report are necessary.

7. CLOSURE

We trust the information presented in this report is sufficient for your present purposes. If you have any questions, please do not hesitate to contact our office.

Sincerely

Peto MacCallum Ltd.

Sam MacDonald, B.Sc., EIT
Project Supervisor
Geotechnical Services

Scott Jeffrey, P.Eng., QP_{ESA}, $LEED_{GA}$
Senior Associate
Regional Manager, Geotechnical and Geoenvironmental Services

AR/SM/SJ:ld

TABLE 8.1 - SLOPE STABILITY RATING CHART

Site Location:	890 Meadow Wood Road, Mississauga	File No.:	20HF020
Client:	United Lands	Inspection Date:	July 2, 2018
Inspected By:	Alonzo Rowe, BASc, EIT	Weather	Sunny, 32ºC

				Rating Value
1.	**SLOPE INCLINATION**			
		degrees	**horiz. : vert.**	
	a)	18 or less	3 : 1 or flatter	(0)
	b)	18 - 26	2 : 1 to more than 3 : 1	6
	c)	more than 26	steeper than 2 : 1	16
2.	**SOIL STRATIGRAPHY**			
	a)	Shale, Limestone, Granite (Bedrock)		0
	b)	Sand, Gravel		6
	c)	Glacial Till		9
	d)	Clay, Silt		(12)
	e)	Fill		16
	f)	Leda Clay		24
3.	**SEEPAGE FROM SLOPE FACE**			
	a)	None or Near bottom only		(0)
	b)	Near mid-slope only		6
	c)	Near crest only or, From several levels		12
4.	**SLOPE HEIGHT**			
	a)	2 m or less		0
	b)	2.1 to 5 m		(2)
	c)	5.1 to 10 m		4
	d)	more than 10 m		8
5.	**VEGETATION COVER ON SLOPE FACE**			
	a)	Well vegetated; heavy shrubs or forested with mature trees		(0)
	b)	Light vegetation; Mostly grass, weeds, occasional trees, shrubs		4
	c)	No vegetation, bare		8
6.	**TABLE LAND DRAINAGE**			
	a)	Table land flat, no apparent drainage over slope		0
	b)	Minor drainage over slope, no active erosion		(2)
	c)	Drainage over slope, active erosion, gullies		4
7.	**PROXIMITY OF WATERCOURSE TO SLOPE TOE**			
	a)	15 meters or more from slope toe		0
	b)	Less than 15 meters from slope toe		(6)
8.	**PREVIOUS LANDSLIDE ACTIVITY**			
	a)	No		(0)
	b)	Yes		6

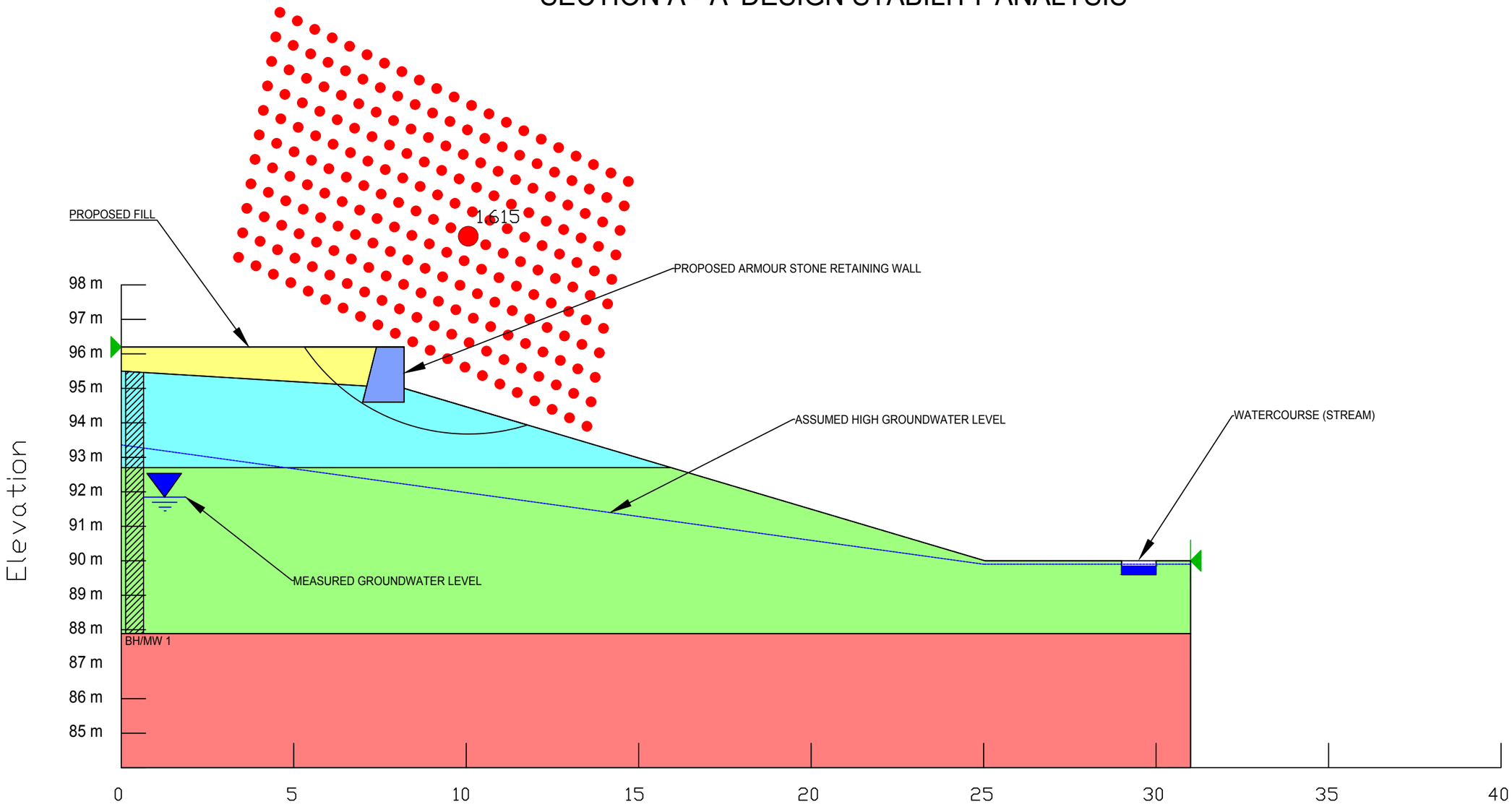
SLOPE INSTABILITY RATING — **RATING VALUES TOTAL** — **INVESTIGATION REQUIREMENTS** — **TOTAL** 22

RATING VALUES

(1.)	Low potential	< 24	Site inspection only, confirmation, report letter.
2.	Slight potential	25-35	Site inspection and surveying, preliminary study, detailed report.
3.	Moderate potential	> 35	Boreholes, piezometers, lab tests, surveying, detailed report.

NOTES: a) Choose only one from each category; compare total rating value with above requirements.
b) If there is a water body (stream, creek, river, pond, bay, lake) at the slope toe; the potential for toe erosion and undercutting should be evaluated in detail and, protection provided if required.

SECTION A - A' DESIGN STABILITY ANALYSIS



ASSUMED SOIL PROPERTIES:

SOIL		c' (kPa)	Ø' (°)	γ (kN/m³)
FILL		0	28	17
SANDS		0	30	18
SILTS		0	30	19
ARMOUR STONE		3,000	25	24
SHALE BEDROCK		700	30	24

0m 2.5 5 7.5 10

SCALE
(1:150)

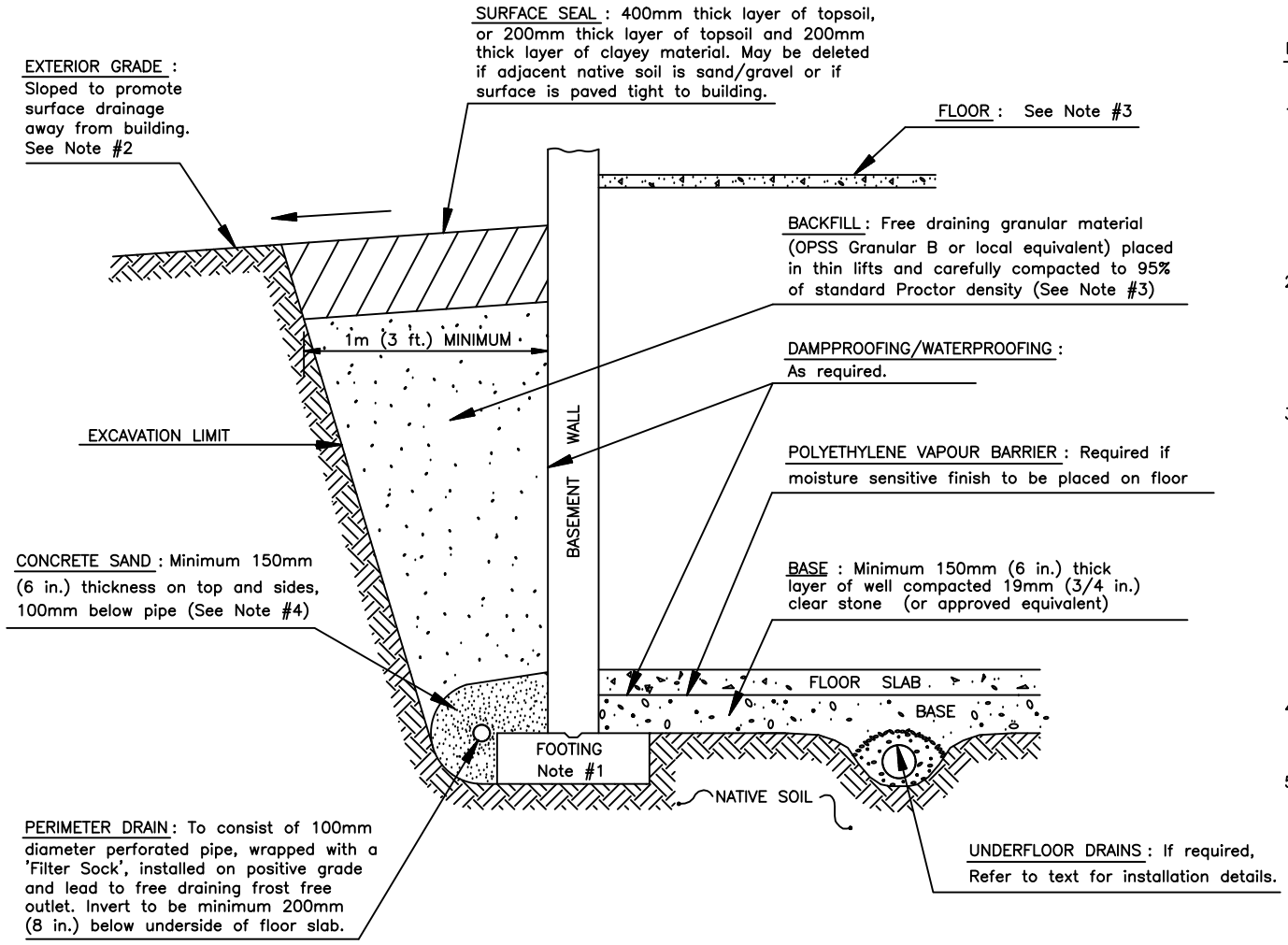
UNITED LANDS

GEOTECHNICAL INVESTIGATION &
SLOPE STABILITY ASSESSMENT
890 MEADOW WOOD ROAD, MISSISSAUGA, ONTARIO

SECTION A - A' DESIGN STABILITY ANALYSIS

Peto MacCallum Ltd.
CONSULTING ENGINEERS

		DATE	SCALE	PML REF.	FIGURE NO.
DRAWN	AR	APR 2021	AS SHOWN	20HF020	2
CHECKED	SJ				
APPROVED	SJ				



NOTES

1. Footing may be constructed by placement of structural concrete neat against natural soil. Drain to be installed in a similar manner immediately above footing maintaining 200mm (8 in.) distance between top of drain and underside of floor slab.
2. Exterior grade to be minimum 300mm (12 in.) below interior floor slab, or other means established to prevent entry of surface water into building through building openings.
3. Basement wall to be supported by floor system or interior bracing prior to commencement of backfill placement. Heavy construction equipment should not be permited within a distance from the foundation wall equivalent to half the wall height. Overcompaction of backfill to be avoided as excessive lateral earth pressure may result. Approved drainage board product may be used in lieu of free draining granular.
4. Concrete sand may be replaced with clear stone, if wrapped in approved geotextile.
5. Refer to text for details regarding founding levels, competent bearing material and construction details specific to particular site.

STANDARD DRAWING

GENERAL RECOMMENDATIONS REGARDING DRAINAGE AND BACKFILL REQUIREMENTS FOR BASEMENT WALLS AND FLOOR SLABS

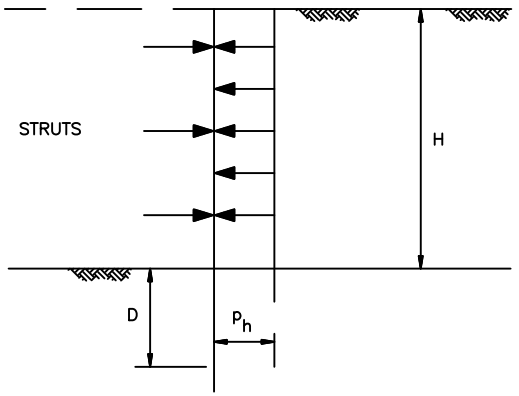
Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN:	AR	DATE	SCALE	JOB NO.	FIGURE NO.
CHECKED:	SJ	APR 2021	N.T.S.	20HF020	3
APPROVED:	SJ				

NOTES

1. The actual magnitude and distribution of the horizontal earth pressures which will act on the bracing system are dependent upon the permissible lateral/vertical movements adjacent to the excavation, the soil type, groundwater conditions, drainage provisions, temporary/permanent surcharge loads, the type of bracing system adopted, weather conditions, quality of workmanship and length of time the excavation will be supported. Hence, the recommended pressure diagram and design parameters should be reviewed when construction details, schedule and type of support system are established.
2. Stability of base of excavation must be confirmed when bracing system design, excavation geometry and surcharge loads are established. If groundwater table is well above base of excavation and/or artesian conditions exist, local lowering of the groundwater level will be necessary to prevent bottom heave/piping of the base of the excavation.
3. Earth pressure diagram is applicable to maximum depth of cut of 12m (40 ft.).
4. Structural components of bracing system should be confirmed adequate for each level of excavation.
5. If sheeting will not permit drainage, bracing system must be designed to resist water pressure.
6. Surcharge loads such as street/construction traffic, supported utilities, adjacent foundations, temporary stockpiles and other loads carried by bracing system are not included in earth pressure diagram.
7. Temporary surcharge loading should not be closer to the face of the excavation than half the depth of excavation unless accounted for in bracing design.
8. If settlement sensitive structures are located near the excavation, special measures should be undertaken to control settlements. A condition survey should be conducted prior to construction and apppropriate monitoring (surface and insitu) carried out during construction.
9. Earth pressure diagram is applicable for relatively short construction periods. If excavation is to be open for long periods, monitoring of deformation is essential, earth pressure diagram must be reviewed, and remedial works may be required.
10. Earth pressure diagram does not account for extended periods of exposure of the excavation to freezing temperatures.
11. Bracing system should be regularly examined for signs of distress.
12. All work should be carried out in accordance with the Occupational Health and Safety Act and local regulations. Good quality workmanship and construction practices are to be employed.
13. This sheet should be read in conjunction with text of report for this project. Additional comments and recommendations concerning these general guidelines will be provided if required.

EARTH PRESSURE DIAGRAM



p_h = design lateral earth pressure
= $0.65K\gamma H$

K = lateral earth pressure coefficient

γ = unit weight of soil

H = depth of excavation

D = depth of embedment of soldier piles (if used).

RECOMMENDED DESIGN PARAMETERS

γ = 18.0 kN/m^3

K = 0.30 (movement of retained soil acceptable)
0.50 (movement of adjacent structures/facilities unacceptable)

LATERAL EARTH PRESSURE DISTRIBUTION

MULTI–BRACED CUTS IN COHESIONLESS SOILS

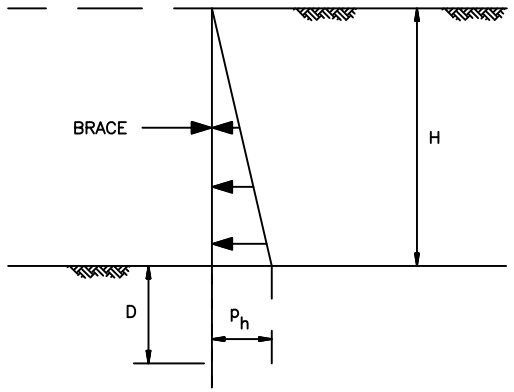
Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN: AR	DATE	SCALE	JOB NO.	FIGURE NO.
CHECKED: SJ	APR 2021	N.T.S.	20HF020	4
APPROVED: SJ				

NOTES

1. The actual magnitude and distribution of the horizontal earth pressures which will act on the bracing system are dependent upon the permissible lateral/vertical movements adjacent to the excavation, the soil type, groundwater conditions, drainage provisions, temporary/permanent surcharge loads, the type of bracing system adopted, weather conditions, quality of workmanship and length of time the excavation will be supported. Hence, the recommended pressure diagram and design parameters should be reviewed when construction details, schedule and type of support system are established.
2. Stability of base of excavation must be confirmed when bracing system design, excavation geometry and surcharge loads are established. If groundwater table is well above base of excavation and/or artesian conditions exist, local lowering of the groundwater level will be necessary to prevent bottom heave/piping of the base of the excavation.
3. Earth pressure diagram is applicable to maximum depth of cut of 12m (40 ft.).
4. Structural components of bracing system should be confirmed adequate for each level of excavation.
5. If sheeting will not permit drainage, bracing system must be designed to resist water pressure.
6. Surcharge loads such as street/construction traffic, supported utilities, adjacent foundations, temporary stockpiles and other loads carried by bracing system are not included in earth pressure diagram.
7. Temporary surcharge loading should not be closer to the face of the excavation than half the depth of excavation unless accounted for in bracing design.
8. If settlement sensitive structures are located near the excavation, special measures should be undertaken to control settlements. A condition survey should be conducted prior to construction and apppropriate monitoring (surface and insitu) carried out during construction.
9. Earth pressure diagram is applicable for relatively short construction periods. If excavation is to be open for long periods, monitoring of deformation is essential, the earth pressure diagram must be reviewed, and remedial works may be required.
10. Earth pressure diagram does not account for extended periods of exposure of the excavation to freezing temperatures.
11. Bracing system should be regularly examined for signs of distress.
12. All work should be carried out in accordance with the Occupational Health and Safety Act and local regulations. Good quality workmanship and construction practices are to be employed.
13. This sheet should be read in conjunction with text of report for this project. Additional comments and recommendations concerning these general guidelines will be provided if required.

EARTH PRESSURE DIAGRAM



p_h = design lateral earth pressure
= $K\gamma H$

K = lateral earth pressure coefficient

γ = unit weight of soil

H = depth of excavation

D = depth of embedment of soldier piles (if used).

RECOMMENDED DESIGN PARAMETERS

γ = 18.0 kN/m^3

K = 0.30 (movement of retained soil acceptable)
0.50 (movement of adjacent structures/facilities unacceptable)

LATERAL EARTH PRESSURE DISTRIBUTION

SINGLY–BRACED CUTS IN COHESIONLESS SOILS

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN: AR	DATE	SCALE	JOB NO.	FIGURE NO.
CHECKED: SJ	APR 2020	N.T.S.	20HF020	5
APPROVED: SJ				

NOTES

1. The need to underpin existing footings/utilities is dependent upon soil type, proximity of the existing facility to the face of the excavation, loads imposed on the foundation and permissible movements.

   ZONE A:
   Foundations of relatively heavy and/or settlement sensitive structures/ utilities located in Zone A generally require underpinning.

   ZONE B:
   Foundations of structures located within Zone B generally do not require underpinning. Consideration should be given to underpinning of settlement sensitive utilities or heavy foundation units located in this zone.

   ZONE C:

   Utilities and foundations located within Zone C do not normally require underpinning.

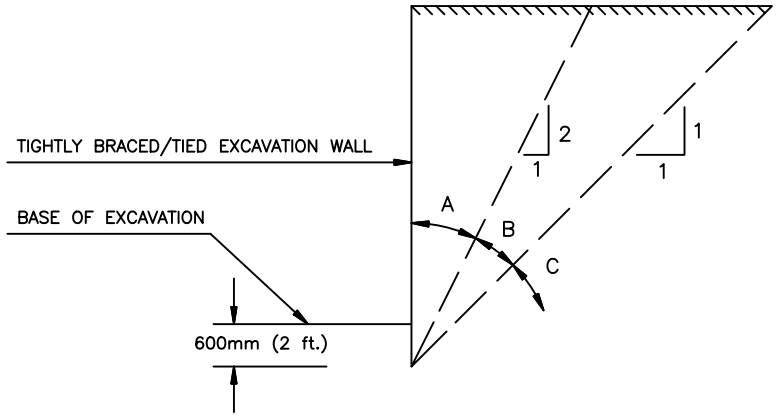
   Underpinning of foundations located in Zones A and B should extend at least into Zone C.

2. As an alternative to underpinning, it may be possible to control movement of existing utilities and foundations by supporting the face of the excavation with bracing/tiebacks or a rigid (caisson) wall. Horizontal and vertical earth pressures imposed on the excavation wall by non–underpinned foundations must be considered in the design of the support system.

3. A condition survey should be conducted prior to construction and appropriate monitoring (surface and insitu) carried out during construction to monitor any movement which may occur.

4. All work should be carried out in accordance with the Occupational Health and Safety Act and local regulations. Good quality workmanship and construction practices are to be employed.

5. This sheet is to be read in conjunction with text of report for this project. Additional comments and recommendations concerning these general guidelines will be provided if required.



STANDARD DRAWING

GENERAL RECOMMENDATIONS REGARDING UNDERPINNING OF FOUNDATIONS/UTILITIES LOCATED CLOSE TO EXCAVATION

Peto MacCallum Ltd.
CONSULTING ENGINEERS

		DATE	SCALE	JOB NO.	FIGURE NO.
DRAWN:	AR	APR 2021	N.T.S.	20HF020	6
CHECKED:	SJ				
APPROVED:	SJ				

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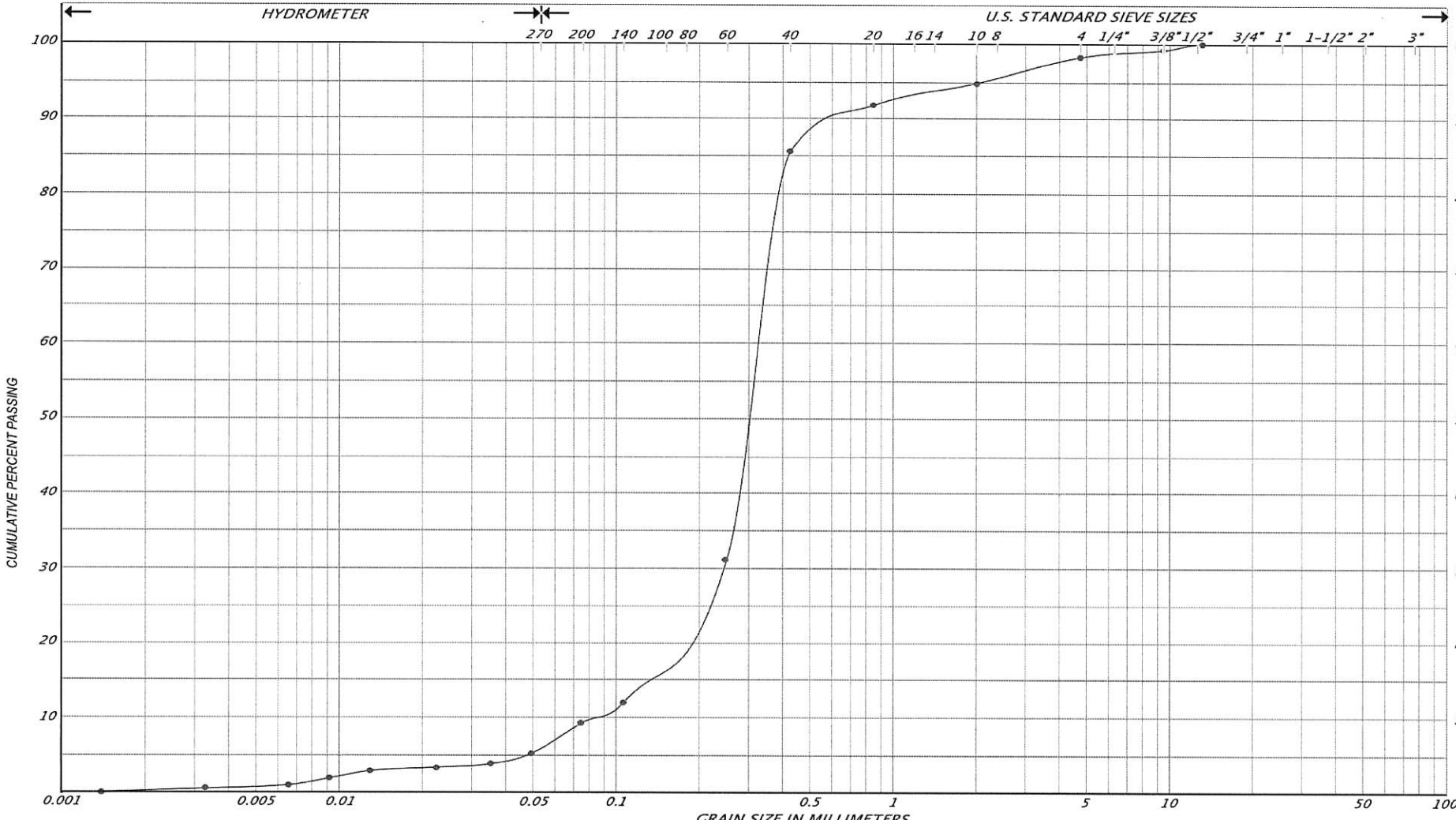
PROJECT NO. 20HF020
FIGURE NO.

PARTICLE SIZE DISTRIBUTION CHART



SILT & CLAY				FINE		MEDIUM		COARSE	GRAVEL			COB BLES	UNIFIED
				SAND									
CLAY	FINE	MEDIUM	COARSE	FINE		MEDIUM		COARSE	GRAVEL			COBBLES	M.I.T
	SILT			SAND									
CLAY	SILT			V.FINE	FINE	MED.		COARSE	GRAVEL				US BUREAU
				SAND									

REMARKS: Bore Hole 2, Sample No.3, Depth , Lab No.2050618-B,

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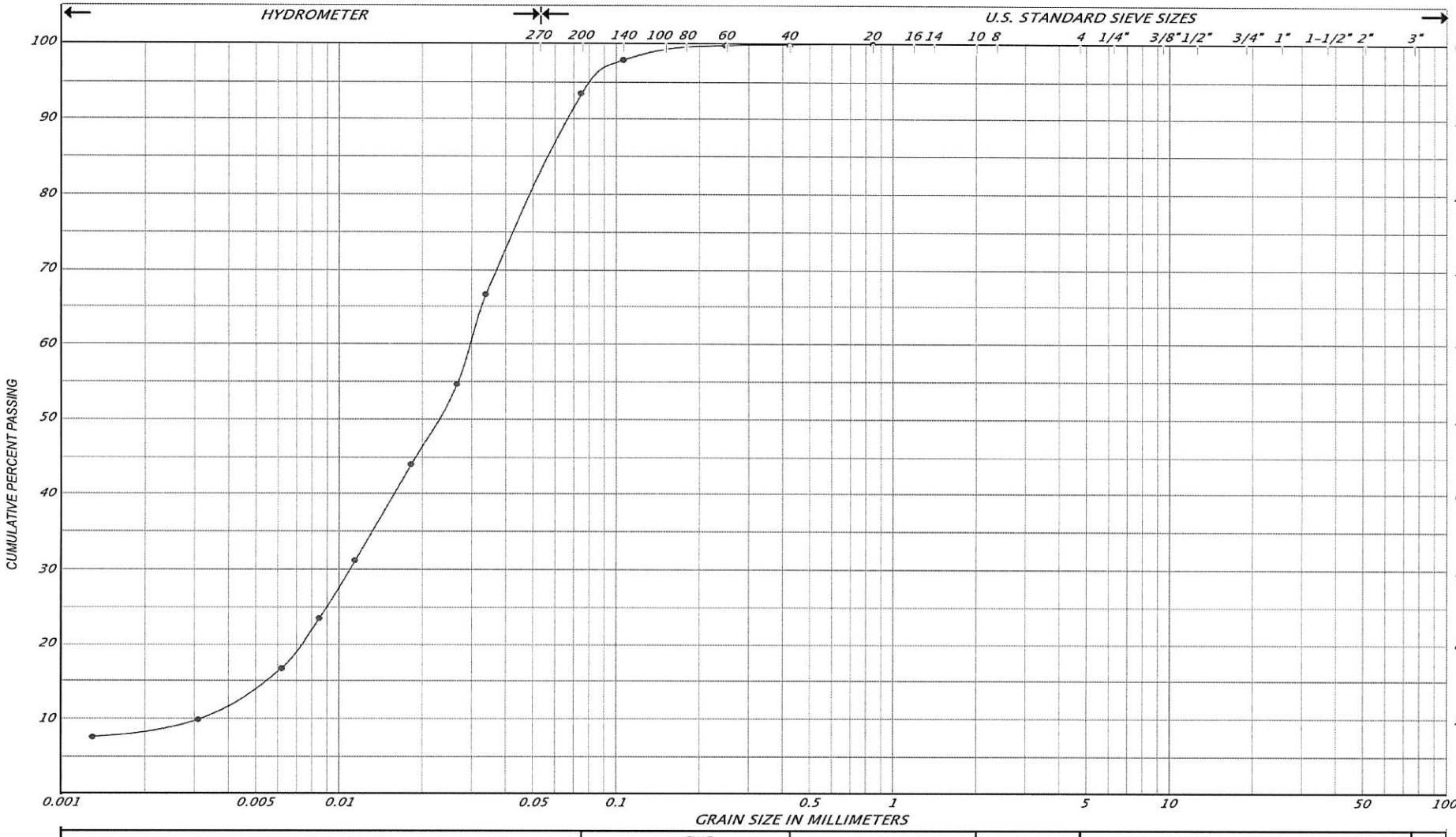
CONSULTING ENGINEERS

PROJECT NO. 20HF020
FIGURE NO.

PARTICLE SIZE DISTRIBUTION CHART



SILT & CLAY				FINE	MEDIUM	COARSE	GRAVEL			COB BLES	UNIFIED
				SAND							
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL			COBBLES	M.I.T
	SILT			SAND							
CLAY	SILT			V.FINE	FINE	MED.	COARSE	GRAVEL			US BUREAU
				SAND							

REMARKS: Bore Hole 3, Sample No.6, Depth , Lab No.2050618-A,

LIST OF ABBREVIATIONS

PENETRATION RESISTANCE

Standard Penetration Resistance N: - The number of blows required to advance a standard split spoon sampler 0.3 m into the subsoil. Driven by means of a 63.5 kg hammer falling freely a distance of 0.76 m.

Dynamic Penetration Resistance: - The number of blows required to advance a 51 mm, 60 degree cone, fitted to the end of drill rods, 0.3 m into the subsoil. The driving energy being 475 J per blow.

DESCRIPTION OF SOIL

The consistency of cohesive soils and the relative density or denseness of cohesionless soils are described in the following terms:

CONSISTENCY	N (blows/0.3 m)	c (kPa)	DENSENESS	N (blows/0.3 m)
Very Soft	0 - 2	0 - 12	Very Loose	0 - 4
Soft	2 - 4	12 - 25	Loose	4 - 10
Firm	4 - 8	25 - 50	Compact	10 - 30
Stiff	8 - 15	50 - 100	Dense	30 - 50
Very Stiff	15 - 30	100 - 200	Very Dense	> 50
Hard	> 30	> 200		

WTPL	Wetter Than Plastic Limit
APL	About Plastic Limit
DTPL	Drier Than Plastic Limit

TYPE OF SAMPLE

SS	Split Spoon	TW	Thinwall Open
WS	Washed Sample	TP	Thinwall Piston
SB	Scraper Bucket Sample	OS	Oesterberg Sample
AS	Auger Sample	FS	Foil Sample
CS	Chunk Sample	RC	Rock Core
ST	Slotted Tube Sample		

PH	Sample Advanced Hydraulically
PM	Sample Advanced Manually

SOIL TESTS

Qu	Unconfined Compression	LV	Laboratory Vane
Q	Undrained Triaxial	FV	Field Vane
Qcu	Consolidated Undrained Triaxial	C	Consolidation
Qd	Drained Triaxial		

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF WELL NO. 1

PROJECT Geotechnical Investigation & Slope Stability Asessment
PML REF. 20HF020
LOCATION 890 Meadow Wood Road, Mississauga, Ontario
BORING DATE July 2, 2020
ENGINEER Scott Jeffrey
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN A. Rowe

DEPTH (metres)	ELEV	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES
		SURFACE ELEVATION 95.56				
0.0	95.56	SAND: Loose light brown sand fill, damp		1	SS	7
0.68	94.88	becoming very loose		2	SS	2
1.4	94.2	becoming compact, moist		3	SS	10
2.1	93.5	occasional roiunded fine gravel		4	SS	23
2.9	92.7	SILT: Dense brown silt, some clay, trace to some sand, moist		5	SS	37
4.0	91.6	becoming wet		6	SS	37
				7	SS	36
7.5						
7.7	87.9	shale fragments		8[1]	SS	53/150 mm
		BOREHOLE TERMINATED AT 7.7 m UPON PRACTICAL REFUSAL TO ADVANCE ON PROBABLE BEDROCK				

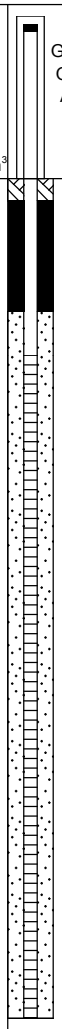
ELEVATION SCALE: 95, 94, 93, 92, 91, 90, 89, 88

SHEAR STRENGTH (kPa)
+ FIELD VANE △ TORVANE ○ Qu
▲ POCKET PENETROMETER ○ Q
50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

UNIT WEIGHT kN/m³

GROUND WATER OBSERVATIONS AND REMARKS
GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL



Upon completion of augering, free water at 3.3 m, cave at 3.6 m

Water Level Readings:

Date	Depth	Elev.
2020-07-08	3.7	91.9

NOTES 1. Sample submitted for chemical anaylsis

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 2

PROJECT Geotechnical Investigation & Slope Stability Asessment — **PML REF.** 20HF020
LOCATION 890 Meadow Wood Road, Mississauga, Ontario — **BORING DATE** July 2, 2020 — **ENGINEER** Scott Jeffrey
BORING METHOD Continuous Flight Solid Stem Augers — **TECHNICIAN** A. Rowe

DEPTH (metres)	ELEV	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
		SURFACE ELEVATION 95.18					
0.0		SAND: Loose light brown fine sand, damp; occasional organics and rootlets		1	SS	7	
1.0				2	SS	6	
1.4	93.8	becoming dense, medium gravel		3	SS	47	
2.0							
2.1	93.1	becoming brown to light grey		4[1]	SS	42	
2.9	92.3	becoming moist to wet		5	SS	40	
3.0							
4.0	91.2	SILT: Compact brown silt, wet		6	SS	28	
5.0							
5.5	89.7	becoming grey		7	SS	14	
6.0							
6.5	88.7	BOREHOLE TERMINATED AT 6.5 m					Upon completion of augering, free water at 3.5 m, cave at 3.6 m
7.0							
8.0							
9.0							
10.0							

ELEVATION SCALE: 95, 94, 93, 92, 91, 90, 89

SHEAR STRENGTH (kPa)
+ FIELD VANE △ TORVANE ○ Qu
▲ POCKET PENETROMETER ○ Q
50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

UNIT WEIGHT kN/m³

NOTES 1. Sample submitted for chemical anaylsis

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 3

PROJECT Geotechnical Investigation & Slope Stability Asessment — **PML REF.** 20HF020
LOCATION 890 Meadow Wood Road, Mississauga, Ontario — **BORING DATE** July 2, 2020 — **ENGINEER** Scott Jeffrey
BORING METHOD Continuous Flight Solid Stem Augers — **TECHNICIAN** A. Rowe

DEPTH (metres)	ELEV	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	ELEVATION SCALE
		SURFACE ELEVATION 94.63					
0.0		SAND: Loose light brown to grey fine sand, damp		1[1]	SS	7	
				2	SS	7	
1.4	93.2	becoming coarse, dense to very dense		3	SS	36	
2.0				4	SS	53	
2.9	91.7	beoming wet		5	SS	48	
4.0	90.6	SILT: Compact to dense brownish grey silt, some clay, wet		6	SS	25	
				7	SS	34	
6.5	88.1	BOREHOLE TERMINATED AT 6.5 m					

SHEAR STRENGTH (kPa)
+ FIELD VANE △ TORVANE ○ Qu
▲ POCKET PENETROMETER ○ Q
50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

UNIT WEIGHT kN/m³

GROUND WATER OBSERVATIONS AND REMARKS
GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

Upon completion of augering, free water at 3.4 m, cave at 3.6 m

NOTES 1. Sample submitted for chemical anaylsis

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 4

PROJECT Geotechnical Investigation & Slope Stability Asessment
PML REF. 20HF020
LOCATION 890 Meadow Wood Road, Mississauga, Ontario
BORING DATE July 2, 2020
ENGINEER Scott Jeffrey
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN A. Rowe

DEPTH (metres)	ELEV	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES
	95.57	SURFACE ELEVATION 95.57				
0.0	95.57	SAND: Loose to very loose light brown fine sand, damp; occasional organics		1	SS	8
1.0				2	SS	2
1.4	94.2	becoming grey, coarse		3	SS	33
2.0						
2.1	93.5	SILT: Dense brown sandy silt, trace clay, moist		4A	SS	37
2.5	93.1	SAND: Dense to compact brownish grey coarse sand, trace silt and gravel		4B		
3.0				5	SS	15
4.0	91.6	becoming brown, some silt, saturated		6	SS	20
5.0						
5.5	90.1	SILT: Compact grey silt, some clay, moist		7	SS	13
6.5	89.1	BOREHOLE TERMINATED AT 6.5 m				
7.0						
8.0						
9.0						
10.0						

ELEVATION SCALE: 95, 94, 93, 92, 91, 90

SHEAR STRENGTH (kPa)
+ FIELD VANE △ TORVANE ○ Qu
▲ POCKET PENETROMETER ○ Q
50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

UNIT WEIGHT kN/m³

GROUND WATER OBSERVATIONS AND REMARKS
GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

Upon completion of augering, no free water, cave at 4.5 m

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 5

PROJECT Geotechnical Investigation & Slope Stability Asessment
PML REF. 20HF020
LOCATION 890 Meadow Wood Road, Mississauga, Ontario
BORING DATE July 2, 2020
ENGINEER Scott Jeffrey
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN A. Rowe

DEPTH (metres)	ELEV	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	ELEVATION SCALE
		SURFACE ELEVATION 96.00					
0.0		SAND: Compact light brown fine sand, damp		1	SS	19	
1.0	95			2[1]	SS	2	
1.4	94.6	becoming light grey, coarse		3	SS	13	
2.0	94						
2.1	93.9	becoming dense, trace gravel; occasional iron staining		4	SS	33	
2.9	93.1	becoming compact, trace silt		5	SS	23	
3.0	93						
4.0	92.0	SILT: Dense light brown silt, trace to some sand, trace clay, moist to wet		6	SS	33	
5.0	91						
6.0	90			7	SS	38	
6.5	89.5	BOREHOLE TERMINATED AT 6.5 m					
7.0							
8.0							
9.0							
10.0							

SHEAR STRENGTH (kPa)
+FIELD VANE △TORVANE ○ Qu
▲POCKET PENETROMETER ○ Q
50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

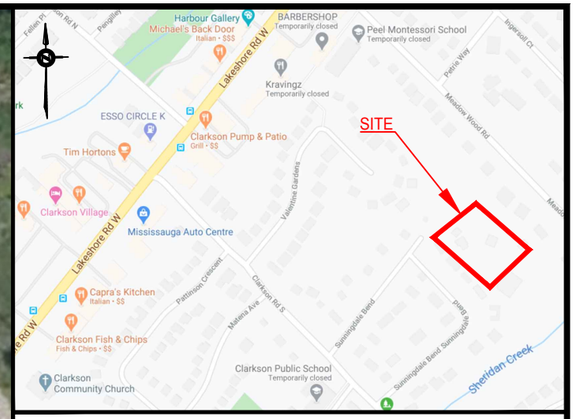
PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

UNIT WEIGHT kN/m³

GROUND WATER OBSERVATIONS AND REMARKS
GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

Upon completion of augering, free water at 4.3 m, cave at 5.0 m

NOTES 1. Sample submitted for chemical anaylsis



KEY PLAN
MISSISAUGA, ONTARIO

LEGEND:

BH 5
EL. 96.60 — PETO MACCALLUM LTD. (PML) BOREHOLE (BH) LOCATION
ELEVATION (METRIC, GEODETIC)

A A' — SLOPE CROSS SECTION
REFER TO DRAWING 3

REFERENCE:

PLAN PRODUCED FROM TOPO DRAWING LABELED "DCP MAY 11 20", DATED MAY 11, 2020 AND FROM GIS INFORMATION FROM THE CITY OF MISSISSAUGA ONLINE INTERACTIVE MAPPING SERVICE.

NOTE:

1. THE INFERRED STRATIGRAPHY REFERRED TO IN THE REPORT IS BASED ON THE DATA FROM THESE BOREHOLES SUPPLEMENTED BY GEOLOGICAL EVIDENCE. THE ACTUAL STRATIGRAPHY BETWEEN THE BOREHOLES MAY VARY.
2. GEODETIC GROUND SURFACE ELEVATIONS AND UTM CO-ORDINATES AT THE BOREHOLE LOCATIONS WERE DETERMINED BY PML USING A GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS). THE SURVEY EQUIPMENT COMPRISED A SOKKIA CANADA GCX-3 NETWORK REAL TIME KINEMATIC (RTK) ROVER SYSTEM.

0m 10 20 30 40 50

SCALE
(1:750)

UNITED LANDS

GEOTECHNICAL INVESTIGATION &
SLOPE STABILITY ASSESSMENT
890 MEADOW WOOD ROAD, MISSISSAUGA, ONTARIO

BOREHOLE LOCATION PLAN

Peto MacCallum Ltd.
CONSULTING ENGINEERS

		DATE	SCALE	PML REF.	DRAWING NO.
DRAWN	AR	APR 2021	AS SHOWN	20HF020	1
CHECKED	SJ				
APPROVED	SJ				

EXISTING TOP OF SLOPE/LONG TERM STABLE TOP OF SLOPE

A

A'

NATURAL AREA LIMIT BY CVCA, JUNE 11, 2010

TOP OF BANK STAKED OUT BY CVCA ON OCTOBER 15, 2007

LIMIT 5m NHS BUFFER (JUNE 2010)

NATURAL AREA LIMIT OCTOBER 20, 2020

BH/MW 1
EL. 95.56

BH 2
EL. 95.18

BH 4
EL. 95.57

BH 5
EL. 96.00

Lot 5
1,250m²
B.E. = 265m² (43%)
55.85m Frontage

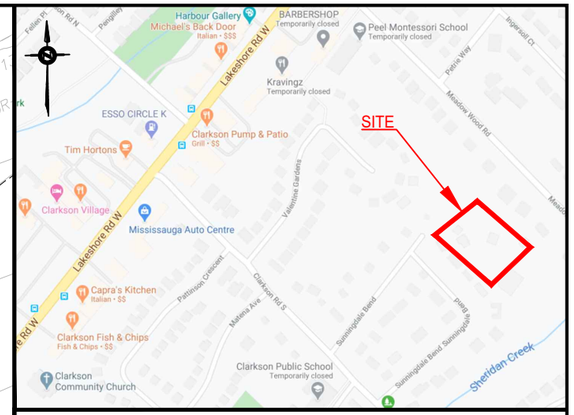
Lot 1
559m²
B.E. = 226m² (40%)
24.43m Frontage

Municipal ROW

Meadowwood Road

91.0
92.0
93.0
94.0

N86°07'40"W 9.90
N88°03'00"W 15.53
N66°32'40"E 11.40
N62°04'20"E 27.22
N62°32'50"W 31.02
N37°34'20"E 8.67
N37°27'10"E 7.21
N45°12'40"W 69.42
7.00
6.36
R=13
R=9.5



KEY PLAN
MISSISSAUGA, ONTARIO

LEGEND:

- BH 5 / EL. 96.60 — PETO MACCALLUM LTD. (PML) BOREHOLE (BH) LOCATION; ELEVATION (METRIC, GEODETIC)
- A A' — SLOPE CROSS SECTION; REFER TO DRAWING 3
- 94.0 — TOPOGRAPHIC CONTOUR LINE

REFERENCE:
PLAN PRODUCED FROM TOPO DRAWING LABELED "DCP MAY 11 20", DATED MAY 11, 2020, FROM TOPO DRAWING LABELED "PART OF LOTS 8, 9 AND 10 REGISTERED PLAN D-13" BY TARASICK McMILLAN KUBICKY LIMITED DATED OCTOBER 20, 2020, AND FROM GIS INFORMATION FROM THE CITY OF MISSISSAUGA ONLINE INTERACTIVE MAPPING SERVICE.

NOTE:
1. THE INFERRED STRATIGRAPHY REFERRED TO IN THE REPORT IS BASED ON THE DATA FROM THESE BOREHOLES SUPPLEMENTED BY GEOLOGICAL EVIDENCE. THE ACTUAL STRATIGRAPHY BETWEEN THE BOREHOLES MAY VARY.
2. GEODETIC GROUND SURFACE ELEVATIONS AND UTM CO-ORDINATES AT THE BOREHOLE LOCATIONS WERE DETERMINED BY PML USING A GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS). THE SURVEY EQUIPMENT COMPRISED A SOKKIA CANADA GCX-3 NETWORK REAL TIME KINEMATIC (RTK) ROVER SYSTEM.
3. ELEVATIONS ARE REFERRED TO CANADIAN GEODETIC VERTICAL DATUM - 1928 AND WERE DERIVED FROM CITY OF MISSISAUGA BENCHMARK No. 713, HAVING A PUBLISHED ELEVATION OF 96.649 m

0m 2.5 5 7.5 10 15
SCALE
(1:300)

REVISIONS:

No.	DATE	
1	01/26/2023	UPDATED TOPOGRAPHIC INFORMATION

UNITED LANDS

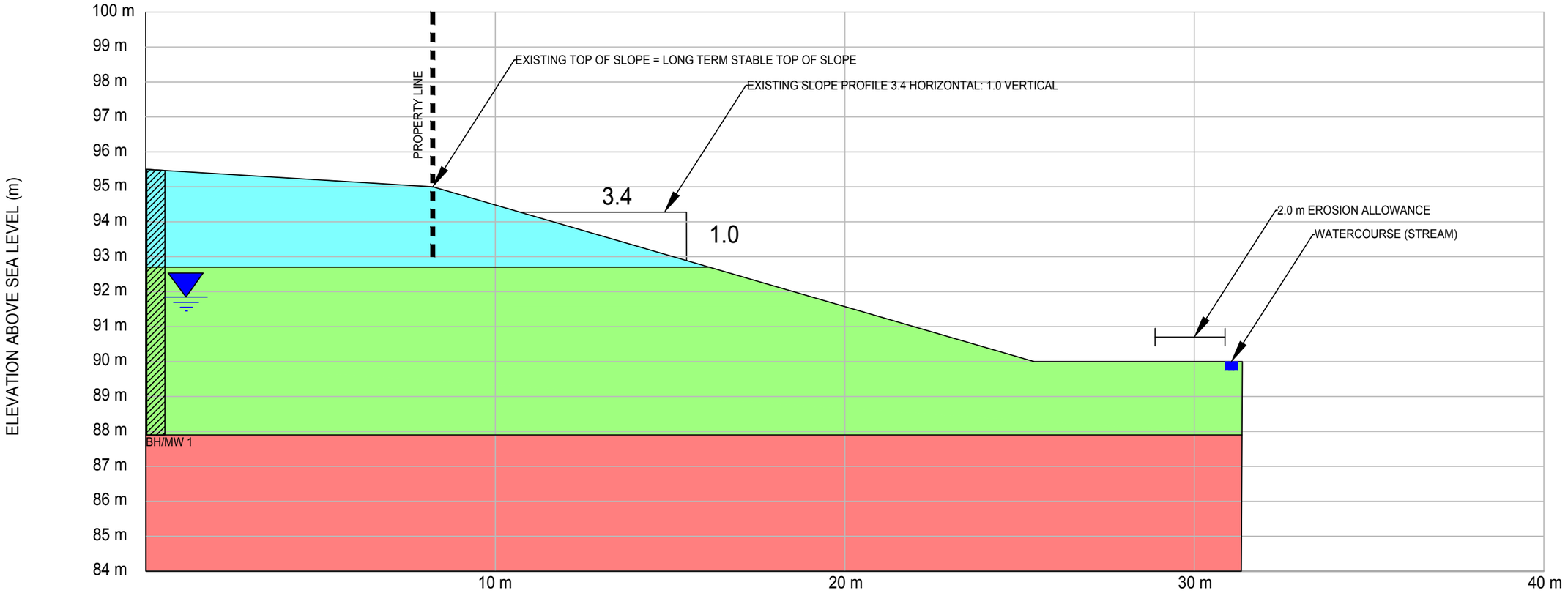
GEOTECHNICAL INVESTIGATION &
SLOPE STABILITY ASSESSMENT
890 MEADOW WOOD ROAD, MISSISSAUGA, ONTARIO

BOREHOLE LOCATION PLAN - SLOPE AREA

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

		DATE	SCALE	PML REF.	DRAWING NO.
DRAWN	AR	JAN 2023	AS SHOWN	20HF020	2
CHECKED	SJ				
APPROVED	SJ				

SECTION A - A'



SANDS	
SILTS	
BEDROCK	

0m 2.5 5 7.5 10

SCALE
(1:150)

UNITED LANDS

GEOTECHNICAL INVESTIGATION &
SLOPE STABILITY ASSESSMENT
890 MEADOW WOOD ROAD, MISSISSAUGA, ONTARIO

SECTION A - A'

Peto MacCallum Ltd.
CONSULTING ENGINEERS

		DATE	SCALE	PML REF.	DRAWING NO.
DRAWN	AR	APR 2021	AS SHOWN	20HF020	3
CHECKED	SJ				
APPROVED	SJ				

Appendix A

Engineered Fill

ENGINEERED FILL

The information presented in this appendix is intended for general guidance only. Site specific conditions and prevailing weather may require modification of compaction standards, backfill type or procedures. Each site must be discussed, and procedures agreed with Peto MacCallum Ltd. prior to the start of the earthworks and must be subject to ongoing review during construction. This appendix is not intended to apply to embankments. Steeply sloping ravine residential lots require special consideration.

For fill to be classified as engineered fill suitable for supporting structural loads, a number of conditions must be satisfied, including but not necessarily limited to the following:

1. Purpose

The site specific purpose of the engineered fill must be recognized. In advance of construction, all parties should discuss the project and its requirements and agree on an appropriate set of standards and procedures.

2. Minimum Extent

The engineered fill envelope must extend beyond the footprint of the structure to be supported. The minimum extent of the envelope should be defined from a geotechnical perspective by:

- at founding level, extend a minimum 1.0 m beyond the outer edge of the foundations, greater if adequate layout has not yet been completed as noted below; and
- extend downward and outward at a slope no greater than 45° to meet the subgrade

All fill within the envelope established above must meet the requirements of engineered fill in order to support the structure safely. Other considerations such as survey control, or construction methods may require an envelope that is larger, as noted in the following sections.

Once the minimum envelope has been established, structures must not be moved or extended without consultation with Peto MacCallum Ltd. Similarly, Peto MacCallum Ltd. should be consulted prior to any excavation within the minimum envelope.

3. Survey Control

Accurate survey control is essential to the success of an engineered fill project. The boundaries of the engineered fill must be laid out by a surveyor in consultation with engineering staff from Peto MacCallum Ltd. Careful consideration of the maximum building envelope is required.

During construction it is necessary to have a qualified surveyor provide total station control on the three dimensional extent of filling.

4. Subsurface Preparation

Prior to placement of fill, the subgrade must be prepared to the satisfaction of Peto MacCallum Ltd. All deleterious material must be removed and in some cases, excavation of native mineral soils may be required.

Particular attention must be paid to wet subgrades and possible additional measures required to achieve sufficient compaction. Where fill is placed against a slope, benching may be necessary and natural drainage paths must not be blocked.

5. Suitable Fill Materials

All material to be used as fill must be approved by Peto MacCallum Ltd. Such approval will be influenced by many factors and must be site and project specific. External fill sources must be sampled, tested and approved prior to material being hauled to site.

6. Test Section

In advance of the start of construction of the engineered fill pad, the Contractor should conduct a test section. The compaction criterion will be assessed in consultation with Peto MacCallum Ltd. for the various fill material types using different lift thicknesses and number of passes for the compaction equipment proposed by the Contractor.

Additional test sections may be required throughout the course of the project to reflect changes in fill sources, natural moisture content of the material and weather conditions.

The Contractor should be particularly aware of changes in the moisture content of fill material. Site review by Peto MacCallum Ltd. is required to ensure the desired lift thickness is maintained and that each lift is systematically compacted, tested and approved before a subsequent lift is commenced.

7. Inspection and Testing

Uniform, thorough compaction is crucial to the performance of the engineered fill and the supported structure. Hence, all subgrade preparation, filling and compacting must be carried out under the full time inspection by Peto MacCallum Ltd.

All founding surfaces for all buildings and residential dwellings or any part thereof (including but not limited to footings and floor slabs) on structural fill or native soils must be inspected and approved by PML engineering personnel prior to placement of the base/subbase granular material and/or concrete. The purpose of the inspection is to ensure the subgrade soils are capable of supporting the building/house foundation and floor slab loads and to confirm the building/house envelope does not extend beyond the limits of any structural fill pads.

8. Protection of Fill

Fill is generally more susceptible to the effects of weather than natural soil. Fill placed and approved to the level at which structural support is required must be protected from excessive wetting, drying, erosion or freezing. Where adequate protection has not been provided, it may be necessary to provide deeper footings or to strip and recompact some of the fill.

9. Construction Delay Time Considerations

The integrity of the fill pad can deteriorate due to the harsh effects of our Canadian weather. Hence, particular care must be taken if the fill pad is constructed over a long time period.

It is necessary therefore, that all fill sources are tested to ensure the material compactability prior to the soil arriving at site. When there has been a lengthy delay between construction periods of the fill pad, it is necessary to conduct subgrade proof rolling, test pits or boreholes to verify the adequacy of the exposed subgrade to accept new fill material.

When the fill pad will be constructed over a lengthy period of time, a field survey should be completed at the end of each construction season to verify the areal extent and the level at which the compacted fill has been brought up to, tested and approved.

In the following spring, subexcavation may be necessary if the fill pad has been softened attributable to ponded surface water or freeze/thaw cycles.

A new survey is required at the beginning of the next construction season to verify that random dumping and/or spreading of fill has not been carried out at the site.

10. Approved Fill Pad Surveillance

It should be appreciated that once the fill pad has been brought to final grade and documented by field survey, there must be ongoing surveillance to ensure that the integrity of the fill pad is not threatened.

Grading operations adjacent to fill pads can often take place several months or years after completion of the fill pad.

It is imperative that all site management and supervision staff, the staff of Contractors and earthwork operators be fully aware of the boundaries of all approved engineered fill pads.

Excavation into an approved engineered fill pad should never be contemplated without the full knowledge, approval and documentation by the geotechnical consultant.

If the fill pad is knowingly built several years in advance of ultimate construction, the areal limits of the fill pad should be substantially overbuilt laterally to allow for changes in possible structure location and elevation and other earthwork operations and competing interests on the site. The overbuilt distance required is project and/or site specified.

Iron bars should be placed at the corner/intermediate points of the fill pad as a permanent record of the approved limits of the work for record keeping purposes.

11. Unusual Working Conditions

Construction of fill pads may at times take place at night and/or during periods of freezing weather conditions because of the requirements of the project schedule. It should be appreciated therefore, that both situations present more difficult working conditions. The Owner, Contractor, Design Consultant and Geotechnical Engineer must be willing to work together to revise site construction procedures, enhance field testing and surveillance, and incorporate design modifications as necessary to suit site conditions.

When working at night there must be sufficient artificial light to properly illuminate the fill pad and borrow areas.

Placement of material to form an engineered fill pad during winter and freezing temperatures has its own special conditions that must be addressed. It is imperative that each day prior to placement of new fill, the exposed subgrade must be inspected and any overnight snow or frozen material removed. Particular attention should be given to the borrow source inspection to ensure only nonfrozen fill is brought to the site.

The Contractor must continually assess the work program and have the necessary spreading and compacting equipment to ensure that densification of the fill material takes place in a minimum amount of time. Changes may be required to the spreading methods, lift thickness, and compaction techniques to ensure the desired compaction is achieved uniformly throughout each fill lift.

The Contractor should adequately protect the subgrade at the end of each shift to minimize frost penetration overnight. Since water cannot be added to the fill material to facilitate compaction, it is imperative that densification of the fill be achieved by additional compaction effort and an appropriate reduced lift thickness. Once the fill pad has been completed, it must be properly protected from freezing temperatures and ponding of water during the spring thaw period.

If the pad is unusually thick or if the fill thickness varies dramatically across the width or length of the fill pad, Peto MacCallum Ltd. should be consulted for additional recommendations. In this case, alternative special provisions may be recommended, such as providing a surcharge preload for a limited time or increase the degree of compaction of the fill.

Appendix B

Limited Chemical Testing Program

Table B1 – Soil Samples Submitted for Geoenvironmental Chemical Testing

SGS Canada Inc., Certificates of Analysis

TABLE B1

Summary of Samples Submitted for Geoenvironmental Chemical Testing

Location	Sample ID	Approx. Depth (m)	Description
Borehole 1	BH1 SS8	7.5 – 7.7	Silt
Borehole 2	BH2 SS2	0.7 – 1.2	Sand
Borehole 3	BH3 SS1	0.0 – 0.6	Sand
Borehole 5	BH5 SS2	0.7 – 1.2	Sand

Note**:** All samples submitted for O. Reg. 153/04, as amended metals and inorganics package chemical testing.

FINAL REPORT

CA14262-JUL20 R1

20HF020

Prepared for

Peto MacCallum Ltd

FINAL REPORT

CA14262-JUL20 R1

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	Peto MacCallum Ltd	Project Specialist	Jill Campbell, B.Sc.,GISAS
		Laboratory	SGS Canada Inc.
Address	45 Burford Road Hamilton, ON L8E 3C6. Canada	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Alonzo Rowe	Telephone	2165
Telephone	(905) 561-2231	Facsimile	705-652-6365
Facsimile	(905) 561-6366	Email	jill.campbell@sgs.com
Email	arowe@petomaccallum.com;smacdonald@petomaccallum.con	SGS Reference	CA14262-JUL20
Project	20HF020	Received	07/08/2020
Order Number		Approved	07/13/2020
Samples	Soil (4)	Report Number	CA14262-JUL20 R1
		Date Reported	07/13/2020

COMMENTS

CCME Method Compliance: Analyses were conducted using analytical procedures that comply with the Reference Method for the CWS for Petroleum Hydrocarbons in Soil and have been validated for use at the SGS laboratory, Lakefield, ON site.

Quality Compliance: Instrument performance / calibration quality criteria were met and extraction and analysis limits for holding times were met.

nC6 and nC10 response factors within 30% of response factor for toluene: YES

nC10, nC16 and nC34 response factors within 10% of the average response for the three compounds: YES

C50 response factors within 70% of nC10 + nC16 + nC34 average: YES

Linearity is within 15%: YES

F4G - gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
The results for F4 and F4G are both reported and the greater of the two values is to be used in application to the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

Benzo(b)fluoranthene results for comparison to the standard are reported as benzo(b+j)fluoranthene. Benzo(b)fluoranthene and benzo(j)fluoranthene co-elute and cannot be reported individually by the analytical method used.

Temperature of Sample upon Receipt: 6 degrees C
Cooling Agent Present:Yes
Custody Seal Present:Yes

Chain of Custody Number:NA

SIGNATORIES

Jill Campbell, B.Sc.,GISAS

TABLE OF CONTENTS

Client: Peto MacCallum Ltd

Project: 20HF020

Project Manager: Alonzo Rowe

Samplers: Alonzo Rowe

PACKAGE: **REG153 - Hydrides** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 3 - Industrial/Commercial - UNDEFINED

L2 = REG153 / SOIL / COARSE - TABLE 3 - Residential/Parkland - UNDEFINED

				Sample Number	10	11	12	13
				Sample Name	SS8 BH1	SS1 BH3	SS2 BH5	SS2 BH2
				Sample Matrix	Soil	Soil	Soil	Soil
				Sample Date	02/07/2020	02/07/2020	02/07/2020	02/07/2020
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**
Hydrides								
Antimony	µg/g	0.8	40	7.5	< 0.8	< 0.8	< 0.8	< 0.8
Arsenic	µg/g	0.5	18	18	2.1	13	2.0	1.6
Selenium	µg/g	0.7	5.5	2.4	< 0.7	< 0.7	< 0.7	< 0.7

PACKAGE: **REG153 - Metals and Inorganics** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 3 - Industrial/Commercial - UNDEFINED

L2 = REG153 / SOIL / COARSE - TABLE 3 - Residential/Parkland - UNDEFINED

				Sample Number	10	11	12	13
				Sample Name	SS8 BH1	SS1 BH3	SS2 BH5	SS2 BH2
				Sample Matrix	Soil	Soil	Soil	Soil
				Sample Date	02/07/2020	02/07/2020	02/07/2020	02/07/2020
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics								
Moisture Content	%	-			17.3	7.4	6.1	4.0
Barium	µg/g	0.1	670	390	21	31	11	9.2
Beryllium	µg/g	0.02	8	4	0.23	0.20	0.19	0.12
Boron	µg/g	1	120	120	5	1	1	2
Cadmium	µg/g	0.02	1.9	1.2	0.03	0.13	0.04	0.09
Chromium	µg/g	0.5	160	160	7.9	8.9	7.8	3.5
Cobalt	µg/g	0.01	80	22	4.1	2.1	3.1	2.0
Copper	µg/g	0.1	230	140	14	10	8.1	10
Lead	µg/g	0.1	120	120	3.4	35	4.6	3.1
Molybdenum	µg/g	0.1	40	6.9	0.1	0.2	0.1	< 0.1
Nickel	µg/g	0.5	270	100	8.4	4.7	5.9	4.3
Silver	µg/g	0.05	40	20	< 0.05	0.06	< 0.05	< 0.05
Thallium	µg/g	0.02	3.3	1	0.05	0.04	0.03	0.02

Client: Peto MacCallum Ltd

Project: 20HF020

Project Manager: Alonzo Rowe

Samplers: Alonzo Rowe

PACKAGE: **REG153 - Metals and Inorganics** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 3 - Industrial/Commercial - UNDEFINED

L2 = REG153 / SOIL / COARSE - TABLE 3 - Residential/Parkland - UNDEFINED

				Sample Number	10	11	12	13
				Sample Name	SS8 BH1	SS1 BH3	SS2 BH5	SS2 BH2
				Sample Matrix	Soil	Soil	Soil	Soil
				Sample Date	02/07/2020	02/07/2020	02/07/2020	02/07/2020
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics (continued)								
Uranium	µg/g	0.002	33	23	0.41	0.29	0.43	0.21
Vanadium	µg/g	3	86	86	14	15	20	7
Zinc	µg/g	0.7	340	340	21	30	14	12
Water Soluble Boron	µg/g	0.5	2	1.5	< 0.5	< 0.5	< 0.5	< 0.5

PACKAGE: **REG153 - Other (ORP)** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 3 - Industrial/Commercial - UNDEFINED

L2 = REG153 / SOIL / COARSE - TABLE 3 - Residential/Parkland - UNDEFINED

				Sample Number	10	11	12	13
				Sample Name	SS8 BH1	SS1 BH3	SS2 BH5	SS2 BH2
				Sample Matrix	Soil	Soil	Soil	Soil
				Sample Date	02/07/2020	02/07/2020	02/07/2020	02/07/2020
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**
Other (ORP)								
Mercury	µg/g	0.05	3.9	0.27	< 0.05	< 0.05	< 0.05	< 0.05
Sodium Adsorption Ratio	No unit	0.2	12	5	2.6	< 0.2	< 0.2	< 0.2
SAR Calcium	mg/L	0.09			15.0	14.6	19.5	12.8
SAR Magnesium	mg/L	0.02			3.7	2.3	1.0	0.84
SAR Sodium	mg/L	0.15			43.5	1.6	1.2	1.1
Conductivity	mS/cm	0.002	1.4	0.7	0.30	0.11	0.12	0.08
pH	pH Units	0.05			8.04	7.25	7.57	8.11
Chromium VI	µg/g	0.2	8	8	< 0.2	< 0.2	< 0.2	< 0.2
Free Cyanide	µg/g	0.05	0.051	0.051	< 0.05	< 0.05	< 0.05	< 0.05

EXCEEDANCE SUMMARY

No exceedances are present above the regulatory limit(s) indicated

QC SUMMARY

Conductivity

Method: EPA 6010/SM 2510 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0146-JUL20	mS/cm	0.002	<0.002	0	10	99	90	110	NA		

Cyanide by SFA

Method: SM 4500 I Internal ref.: ME-CA-IENVISFA-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Free Cyanide	SKA5031-JUL20	µg/g	0.05	<0.05	ND	20	96	80	120	NV	75	125

Hexavalent Chromium by SFA

Method: EPA218.6/EPA3060A I Internal ref.: ME-CA-IENVISKA-LAK-AN-012

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chromium VI	SKA5026-JUL20	ug/g	0.2	<0.2	ND	20	91	80	120	90	75	125

QC SUMMARY

Mercury by CVAAS

Method: EPA 7471A/EPA 245 | Internal ref.: ME-CA-IENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury	EMS0036-JUL20	µg/g	0.05	<0.05	2	20	107	80	120	87	70	130

Metals in aqueous samples - ICP-OES

Method: MOE 4696e01/EPA 6010 | Internal ref.: ME-CA-IENVISPE-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
SAR Calcium	ESG0029-JUL20	mg/L	0.09	<0.09	1	20	100	80	120	101	70	130
SAR Magnesium	ESG0029-JUL20	mg/L	0.02	<0.02	1	20	98	80	120	105	70	130
SAR Sodium	ESG0029-JUL20	mg/L	0.15	<0.15	2	20	97	80	120	108	70	130

QC SUMMARY

Metals in Soil - Aqua-regia/ICP-MS

Method: EPA 3050/EPA 200.8 | Internal ref.: ME-CA-[ENVISPE-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver	EMS0036-JUL20	ug/g	0.05	<0.05	1	20	106	70	130	106	70	130
Arsenic	EMS0036-JUL20	µg/g	0.5	<0.5	4	20	99	70	130	106	70	130
Barium	EMS0036-JUL20	ug/g	0.1	<0.1	1	20	107	70	130	90	70	130
Beryllium	EMS0036-JUL20	µg/g	0.02	<0.02	2	20	102	70	130	86	70	130
Boron	EMS0036-JUL20	µg/g	1	<1	4	20	102	70	130	79	70	130
Cadmium	EMS0036-JUL20	µg/g	0.02	<0.02	0	20	102	70	130	102	70	130
Cobalt	EMS0036-JUL20	µg/g	0.01	<0.01	1	20	99	70	130	105	70	130
Chromium	EMS0036-JUL20	µg/g	0.5	<0.5	3	20	99	70	130	104	70	130
Copper	EMS0036-JUL20	µg/g	0.1	<0.1	1	20	102	70	130	102	70	130
Molybdenum	EMS0036-JUL20	µg/g	0.1	<0.1	2	20	97	70	130	105	70	130
Nickel	EMS0036-JUL20	ug/g	0.5	<0.5	1	20	98	70	130	104	70	130
Lead	EMS0036-JUL20	ug/g	0.1	<0.1	18	20	102	70	130	95	70	130
Antimony	EMS0036-JUL20	µg/g	0.8	<0.8	ND	20	98	70	130	92	70	130
Selenium	EMS0036-JUL20	µg/g	0.7	<0.7	ND	20	104	70	130	99	70	130
Thallium	EMS0036-JUL20	µg/g	0.02	<0.02	5	20	103	70	130	100	70	130
Uranium	EMS0036-JUL20	µg/g	0.002	<0.002	1	20	99	70	130	91	70	130
Vanadium	EMS0036-JUL20	µg/g	3	<3	3	20	99	70	130	102	70	130
Zinc	EMS0036-JUL20	µg/g	0.7	<0.7	5	20	101	70	130	97	70	130

QC SUMMARY

pH

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	ARD0037-JUL20	pH Units	0.05		0	20	100	80	120			

Water Soluble Boron

Method: O.Reg. 153/04 I Internal ref.: ME-CA-IENVI SPE-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Water Soluble Boron	ESG0025-JUL20	µg/g	0.5	<0.5	ND	20	97	80	120	115	70	130

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Samples analysed as received. Solid samples expressed on a dry weight basis. “Temperature Upon Receipt” is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act” published by the Ministry and dated March 9, 2004 as amended.

-- End of Analytical Report --

BH4
SS2

SGS

Request for Laboratory Services and CHAIN OF CUSTODY

No:

Page 1 of 1

SGS Environment, Health and Safety
- Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7658 Fax: 705-652-6365
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 Web: www.ca.sgs.com

Laboratory Information Section - Lab use only

Received By: Oleg Mozhir
Received Date: 7 \ 8 \ 20 (mm\dd\yy)
Received Time: 11 : 50 am / pm (circle)

Received By (signature):
Custody Seal Present: (Y) / N (circle)
Custody Seal Intact: (Y) N

Cooling Agent Present: (Y) N Type: ice
Temperature Upon Receipt (°C): 6 6 6

LAB LIMS #: CA14262-Jul20

REPORT INFORMATION

Company: Peto MacCallum Ltd
Contact: Alonzo Rowe
Address: 45 Burford Road
Hamilton ON L8E 3C6
Phone: (905) 561-2231
Fax:
Email: arowe@petomaccallum.com

INVOICE INFORMATION

☑ (same as Report Information)
Company:
Contact:
Address:
Phone:
Email:

PROJECT INFORMATION

Quotation #: P.O. #:
Project #: Site Location/ID:

TURNAROUND TIME (TAT) REQUIRED

☐ Regular TAT (5-7days) TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 3pm or on weekends : TAT begins the next business day

RUSH TAT (Additional Charges May Apply) ☐ 1 Day ☐ 2 Days ☐ 3-4 Days

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date: Rush Confirmation ID:

REGULATIONS

Regulation 153 (2011):
☑ Table 1 ICC ☐ Res/Park Soil Texture:
☐ Table 2 ☐ Ind/Com ☐ Coarse
☑ Table 3 RPI/ICC ☐ Agri/Other ☐ Medium
☐ Table ____ ☐ Fine

Other Regulations:
☐ Reg 347/558 (3 Day min TAT)
☐ PWQO ☐ MMER
☐ CCME ☐ Other:
☐ MISA

Sewer By-Law:
☐ Sanitary
☐ Storm
Municipality:

DRINKING WATER SAMPLES (POTABLE WATER FOR HUMAN CONSUMPTION) MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	ANALYSIS REQUESTED: metals and inorganics	COMMENTS: Field Filtered (F) Preserved (P)
1	SS8 BH1	July 2	AM	1	Soil	X	
2	SS1 BH5	"	"	"	"	X	
3	SS2 BH5	"	"	"	"	X	
4	SS2 BH2	"	"	"	"	X	
5							
6							
7							
8							
9							
10							

Observations/Comments/Special Instructions

Sampled By (NAME):	Alonzo Rowe	**Signature:**	Date: 07/07/20 (mm/dd/yy)	Pink Copy - Client
Relinquished by (NAME):	Alonzo Rowe	**Signature:**	Date: 07/07/20 (mm/dd/yy)	Yellow & White Copy - SGS

Appendix C

Site Photographs 1 to 4

Photograph 1 – View looking northeast to the slope on the access road.

Photograph 2 – View to the northeast looking down the slope.

Photograph 3 – View looking southwest up the slope from the slope toe.

Photograph 4 – View near the toe of the slope showing the watercourse.