Geotechnical Investigation for Modification of Ponds at 3525 Baseline Road, Sutton, Ontario

Prepared For:

GEC Architecture

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ET24-1438B

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EXECUTIVE SUMMARY

Engtec Consulting Inc. ('Engtec') was retained by GEC Architecture ('GEC') to carry out a geotechnical investigation at the site of the existing Storm Water Management Ponds within the York Region North Roads ('YRNR') Operation Centre, located at 3525 Baseline Road, Sutton, Ontario. It is Engtec's understanding that modification of the existing ponds are necessary to meet the storm water management requirements of the YRNR Centre. Based on the modified pond geometry provided to Engtec, cutting or filling would be required.

The geotechnical investigation consisted of advancing a total of seven (7) boreholes to determine the prevailing subsurface soil and groundwater conditions. The boreholes were extended to depths ranging from 2m to 5m below the existing grade. The investigation results revealed that the subsoil condition comprised a surficial cover (topsoil/earth fill) followed by till soils (clayey silt till and sandy silt till) to the end of termination.

Based on the borehole findings, the following geotechnical issues related to the construction of pond modification are discussed and accordingly, recommendations are provided in this submission.

- Excavation and removal of bottom sediments;
- Excavation for the siltation pond;
- Infill/raise grade for the new 'barrier' berm from the existing pond bottom to design grade;
- Lining requirement for pond bottom and side slopes; and
- Erosion protection of the slope toe areas.

1 INTRODUCTION

Engtec Consulting Inc. ('Engtec') was retained by GEC Architecture ('GEC') to conduct a geotechnical investigation at the location of the existing Storm Water Management Pond (SWMP) Facility within the York Region North Roads (YRNR) Operation Centre, located at 3525 Baseline Road, Sutton, Ontario. The SWMP facility site showing the existing ponds as well as the drainage swale is illustrated in Figure 1 below.

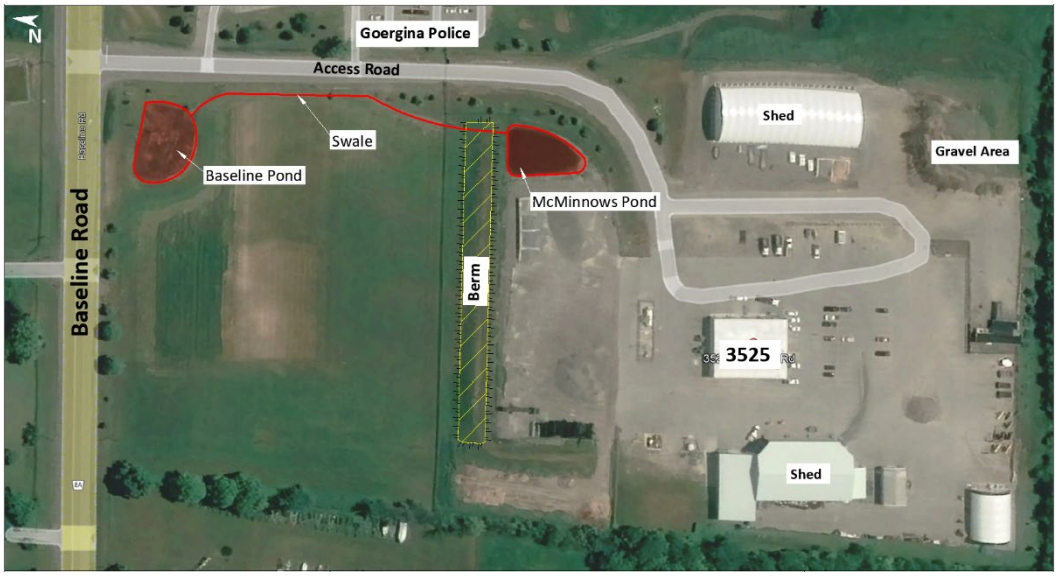


Figure 1: The YRNROC Site Plan illustrating the Locations of Existing SWMP Facility.

Site Orientation Note: *For the purposes of the site description and the preparation of this report, project north is assumed as "North." Accordingly, the alignment of Baseline Road is in the "east-west direction."*

The purpose of this geotechnical investigation is to obtain information on the prevailing sub-surface soil and groundwater information at the site by means of drilling boreholes, in-situ tests and laboratory tests and based on the findings, to provide geotechnical recommendations for the proposed modification of the existing ponds.

The work carried out for the investigation was completed in accordance with Engtec Proposal No. ETP24-1083, dated July 30, 2024. Authorization to proceed with this investigation was given by Angela Ng, Intern Architect at GEC Architecture.

The scope of services also included an On-site and Excess Soil Management study in accordance with O. Reg 406/19, which was carried out concurrently by Engtec's Environmental Team. The findings and recommendations of the environmental study are reported under separate covers.

2 SITE AND PROJECT DESCRIPTION

The Storm Water Management Pond Facility is situated on the private access roadway from Baseline Road, Sutton, Ontario. It encompasses two wet pools, namely, McMinnows Pond and Baseline Pond, and a 125m long drainage swale, as illustrated in Figure 1 (see, Section 1).

Engtec carried out visual inspection of the ponds during the field work on October 23, 24 and 28, 2024. The McMinnows Pond is approximately 35m by 20m in plan. The height of the pond is estimated to be 2.7m±. Berms

(1.2m± high) exist on the east, south and west periphery. During the visits, a pool of water (1.2m± deep), was seen in the pond. The inlet and exit structures comprised of 600mm diameter and 450mm diameter corrugated PVC culverts as per the submitted drawings. At the time of field work, no flow of water was noted through either culvert.

The existing Baseline Pond (35m± by 35m± in plan) is a shallow wet pond located at the north end of SWM Centre. The pond, 0.5m± to 1m± high, was dry at the time of visits. The ground surface was covered with berry stocks, shrubs, wild plants, etc., except the NE corner which sustained aquatic born bulrushes or cattails at the existing grade. The inlet and exit structures comprised PVC culverts. No water flow was noted in either culvert.

At the time of visits, the existing swale was seen dry, and it is lined with a rip-rap layer. No flow of water was noted.

2.1 Review of Available Drawings

Engtec was provided with a set of drawings (100% CDR2), prepared by 'GEC Architecture', pertaining to the modification of two existing ponds and the drainage swale (see, list of drawings in Section 5).

The drawings show that the existing pond would be deepened to elevation 250.1m and a new 'isolator' berm (top elevation 251.6m) would be constructed. Per pond modification plan, a 'wet cell' (30m by 20m in plan) would be constructed at the north pond margin areas. Presently, an elongated berm exists in the east-west direction. The base of the proposed 'wet cell' would be at elevation 250.35m. Permanent pool level in the McMinnows pond is posted as 252.35m. The side slopes of 4H:1V (4 horizontal to 1 vertical) and 500mm clay liner on the slope surface are proposed.

The existing Baseline Pond would be expanded to 175m by 165m in plan. The profile drawing shows that pond bottom would be established at elevation 249.38m± to 249.32m±. The High-Water Level (HWL) in the pond is posted as 250.35m. A slope inclination of 4H:1V (4 horizontal to 1 vertical) is proposed.

3 INVESTIGATION PROCEDURE

In 2023, Engtec carried out a geotechnical investigation for Office Building addition at the southern part of YRROC (Engtec Report No. ET23-1438A dated December 4, 2023). A total of ten (10) boreholes, designated as BH1 through BH10, were advanced.

The field work for this investigation was performed on October 23 and 28, 2024 and comprised drilling and sampling a total of seven (7) boreholes. The site plan indicating the approximate locations of the boreholes is attached as Drawing No. 1 in Appendix A. For identification purposes, these boreholes will be designated as BH100 series to separate them from those advanced earlier. The details of boreholes are provided in Table 1 below. The borehole locations were established in the field by Engtec personnel using a hand-held GPS device (GARMIN eTrex20). The recorded NAD83 coordinates are shown in the Table.

Table 1: Borehole Information Summary.

Borehole ID	Pond	Existing Ground Elevation (m [1] ±)	Depth (mBGS [2])	Latitude	Longitude
BH101	McMinnows Pond	252.6m	5.3m	44.289344	-79.419109
BH102	McMinnows Pond / Swale	252.5m	5.0m	44.289767	-79.419089
BH103	Baseline Pond/Swale	251.0m	5.3m	44.290198	-79.419224
BH104	Baseline Pond	249.9m	5.3m	44.290298	-79.419455
BH105		249.9m	5.3m	44.290301	-79.419865
BH106	Hydro Corridor	249.9m	1.8m	44.290271	-79.420999
BH107		250.0m	1.8m	44.288526	-79.4202777

Note: [1] *Approximate Ground Elevation taken from the spot elevations posted in the submitted drawings.*
[2] *mBGS – meters below the existing ground surface.*

The boreholes were advanced using 115mm diameter continuous flight auger using a track-mount MT-5 drill rig supplied by a drilling specialist subcontracted to Engtec. Soil samples were retrieved with a 51mm (2in) O.D. split-barrel (split spoon) sampler driven with a hammer weighing 624N and dropping 760mm (30in) in accordance with ASTM D1586 Standard Penetration Test method and protocols. The number of blows for 300mm spoon penetration was recorded as N-values.

The fieldwork for this investigation was monitored by a member of our engineering staff who, also logged the boreholes and cared for the recovered samples.

Observations for shallow groundwater conditions were made in the open boreholes on completion. All boreholes were backfilled in accordance with O. Reg. 903. Several boreholes were monitored for periods ranging from two hours to 48 hours to observe and record the steady groundwater level.

All soil samples, obtained during borehole drilling and sampling, were brought to our laboratory for further examination and determination of natural water content on all soil samples and grain size analysis on selected soil samples.

The ground surface elevations at borehole locations were estimated from the spot elevations available on in the submitted drawings and were understood to have been referenced to geodetic datum. The ground surface elevation (shown on the borehole logs) should not be used or relied on for any purpose.

The photographs taken during the site visit is attached in Appendix B of this submission.

4 SUBSURFACE AND GROUNDWATER CONDITIONS

The subsurface and groundwater conditions encountered in the boreholes as well as field and laboratory testing results are presented on the Record of Boreholes in Appendix C. The Appendix also includes the 'Notes on Sample Descriptions and Explanation of the Terms' used to assist in the interpretation of the Record of Borehole sheets.

The following is a summarized account of the subsurface conditions encountered in the boreholes. The soil conditions might vary between the borehole locations.

4.1 Topsoil

Topsoil was encountered in both boreholes. The measured thickness was 150mm (BH1) and 200mm (BH2). It should be noted that topsoil thickness was measured at the borehole locations only and may vary between and beyond the borehole locations.

4.2 Earth Fill/Disturbed Soil

Earth fill/disturbed soil was encountered beneath the topsoil at all borehole locations. The earth fill which ranged in composition from sandy silt to clayey silt with trace amount of rootlets and organic matter. The fill extends from 0.5m to 1m below the existing grade.

The SPT N-values within the fill layer ranged from 1 blows and 10 blows per 0.3m penetration. The measured moisture content ranged from 10% to 15%.

4.3 Native Ground

Clayey silt till was encountered below the fills in boreholes BH101, BH104 and BH105. The clayey silt till layer extended to 1.8m and 3.5m below the existing grade. The measured SPT N-values of the clayey silt till, ranging from 10 blows to 35 blows per 300 mm penetration, indicated a stiff to hard consistency. The measured moisture contents ranged from 9% to 12%.

The Sandy silt till was encountered below the Clayey silt till in Boreholes BH101, BH102, BH104 and BH105. The sandy silt till layer extended to the termination in all boreholes. The measured SPT N-values of the sandy silt till, ranging from 15 blows to 63 blows per 300 mm penetration, indicated a compact to very dense compactness condition. The measured moisture contents ranged from 11% to 20%.

Six (6) representative samples of till soils recovered from the SPT spoon were selected for complete grain size analysis. The results are shown in Table 2 below.

Table 2: Results of Grain Size Analysis.

Borehole ID	Sample ID	Depth (m)	Grain Size Distribution (%)			
			Gravel	Sand	Silt	Clay
BH101	SS3	1.3 - 1.8m	4	18	48	30
BH101	SS5	3.1 - 3.5m	2	20	53	25
BH102	SS2	0.6 - 1.1m	4	27	54	15
BH103	SS2	0.6 - 1.1m	10	32	40	18
BH104	SS2	0.6 - 1.1m	6	27	37	30
BH104	SS4	2.3 - 2.8m	4	36	44	17

The laboratory test results are attached to Appendix D of this submission.

4.4 Ground Water Conditions

Observation for groundwater depth was made in the open boreholes upon completion of drilling work.

Three boreholes, designated as BH101, BH104, and BH105, were monitored for periods ranging from two hours to 48 hours to observe and record the steady groundwater level. The results of groundwater depth measurements are shown in Table 3 below.

Table 3: Measured Groundwater Depths.

Borehole ID	EX. Gr. El. (m)	On Completion GWL	Cave Depth	GWL Depth
BH101	252.5m	3.2m	3.5m	1.5m
BH102	252.5m	3.5m	3.9m	Back filled
BH103	251.0m	N/A	3.0m	1.5m
BH104	249.0m	N/A	3.0m	0.9m
BH105	249.9m	2.7m	3.0m	1.5m

5 DISCUSSION AND RECOMMENDATIONS

In preparation of this report, the following drawings/Reports were submitted to Engtec:

- Drawing No. C-07, (Rev 7, Issued for 100% CD R2), titled "*Site Plan and Drainage Area Map*", dated July 15, 2024, prepared by GEC Architecture;
- Drawing No. C-08, (Rev 7, Issued for 100% CD R2), titled "*Baseline Pond Modifications*", dated July 15, 2024, prepared by GEC Architecture
- Drawing No. C-09, (Rev 7, Issued for 100% CD R2), titled "*McMinnows Pond Modifications*", dated July 15, 2024, prepared by GEC Architecture;
- Drawing No. C-10, (Rev 7, Issued for 100% CD R2), titled "*Pond Sections*", dated July 15, 2024, prepared by GEC Architecture;
- Drawing No. C-11, (Rev 7, Issued for 100% CD R2), titled "*Swale Modifications*", dated July 15, 2024, prepared by GEC Architecture;
- Drawing No. C-12, (Rev 7, Issued for 100% CD R2), titled "*Berm Modifications*", dated July 15, 2024, prepared by GEC Architecture;
- Drawing No. C-13, (Rev 7, Issued for 100% CD R2), titled "*Construction Details*", dated July 15, 2024, prepared by GEC Architecture;
- Drawing No. C-14, (Rev 7, Issued for 100% CD R2), titled "*Pond Design*", dated July 15, 2024, prepared by GEC Architecture;
- Report No. 2021-15922RRR, titled "*Geotechnical Investigation for North District Patrol Facility Storm Water Management at 3525 Baseline Road, Sutton, Ontario*", dated March 14, 2023, prepared by SOLA Engineering; and
- Report No. ET23-1438A, titled "*Geotechnical Investigation for Maintenance Building Expansion at 3525 Baseline Road, Sutton, Ontario*", dated December 4, 2023, prepared by Engtec Consulting Inc.

The geotechnical recommendations presented in this report are based on the pond design data obtained from the submitted drawings and findings of Engtec's geotechnical investigation presented in the preceding sections

of this report. The anticipated construction conditions are also discussed in general terms; however, these are not intended to direct the contractors how to carry out the work.

From the submitted drawings, the existing and modified pond geometries are shown in Drawing Nos. 2 through 4 placed in Appendix E.

5.1 Construction Considerations for McMinnows Pond

Borehole BH101 advanced adjacent to the pond area, encountered a surficial fill layer underlain by native ground (clayey silt till and sandy silt till) to the end of the borehole. The groundwater depth of 1.5m was recorded in the borehole (El. 252.6m).

Drawing No. 2 placed in Appendix E shows the existing and modified pond geometries displaying the areas of cut and fill, while Table 4 provides the details of cutting or filling together with groundwater lowering requirements.

Table 4: Soil Stratigraphy and Cutting and Filling.

Location	Excavation or Cutting	Anticipated Subsoil Condition at Base Level	Dewatering Requirements
Siltation Area	Cutting from El. 250.6m to El. 250.1m	Stiff Clayey Silt Till	Down to El. 249.5m
New 'Barrier' Berm	Filling from El. 250.6m to El. 251.6m	Stiff Clayey Silt Till	Down to El. 249.5m
Wet Cell	Cutting from El. 256.2m to El. 250.35m	Stiff Clayey Silt Till	Down to El. 249.5m

In the ensuing sub-sections, removal of bottom sediment, excavation and infill/raise grade; removal of existing berm fill and lining requirement of bottom of pond as well as side slope will be discussed.

5.1.1 Pond Bottom Preparation

'Soupy' sediments / very soft / unstable organic soils prevail over the existing pond side. Based on hand shoveling at the edge of water, thickness is estimated to be 400mm to 500mm±. The following general procedure is recommended for preparation of sediment laden subgrade for cutting / filling operations.

- Prior to undertaking the excavation/raising grade operation, the groundwater level in the pond area be verified by test pits and select the most suitable method of dewatering. Dewatering could take the form of pumping from filtered sumps or pumping from deep wells depending on the amount of seepage;
- Cutting / filling operations should be undertaken with the pond, completely emptied;.
- Vacuum suction dredging will likely be required to remove the bottom sediments. Settling and/or filtration basins may be required prior to discharging pond water elsewhere;
- After removal of soft soil, the exposed subgrade should be inspected and approved by a geotechnical engineer and proof-rolled (using suitable equipment) to establish stable and uniform subgrade conditions. Upfilling, if required, should be placed as 'engineered fill' complying with the standard protocol.

5.1.2 Siltation Area (Forebay) Construction

The existing silt layer removal is discussed above. Excavations for the new pond bed (El. 250.1m) should be carried out in accordance with the Ontario Health and Safety Regulations for Construction Projects (latest ed.) The BH log (BH101) reveals that excavation will involve native stiff to very stiff clayey silt till, although removal of cobbles and boulders should also be anticipated. Conventional excavation equipment may be used for the removal of the till soil.

Dewatering and groundwater control is discussed in the preceding section. Dewatering measures should lower the groundwater level to at least 0.5 m below the excavation of 250.1m±.

The inclination of the side slope is recommended as 4H:1V or flatter.

5.1.3 New 'Barrier' Berm Construction

Construction of the new berm between 'forebay' and 'wet cell' area would require approximately 1.0 m of upfilling (from elevation 250.6m± to elevation 251.6m±).

The sediment layer should be completely removed, and exposed subgrade should be approved by a geotechnical engineer. The berm subgrade should be stabilized prior to the placement of upfill materials.

The upfilling shall be carried out with clean imported soil (free of organic matter) and compacted under the continuous supervision of a geotechnical engineer. The earth fill material should be of low permeability consisting of a minimum of 20% clay (finer than 0.002mm size) and 35% silt particles. The on-site surplus clean fill/native tills are also suitable for the construction of the berm. The fill soil should be placed in lifts not greater than 150mm and uniformly compacted to a minimum 95% of Standard Proctor Maximum Dry Density (SPMDD). In order to achieve required compaction of the berm fill at the final slope surface, consideration should be given to 'over-build' of the berm (0.5 m beyond design slope surface) and cut neatly to the final design slope configuration.

5.1.4 'Wet Cell' Construction

The 'wet cell' will be constructed by fully removing the existing fill pile which is consisted of brown clayey silt to silty sand to sandy silt containing topsoil and debris. The subsoil at the final excavated grade will likely comprise stiff to very stiff clayey silt till and/or compact to dense sandy silt till. Regardless, the subgrade should be approved by a geotechnical engineer during construction.

5.1.5 Liner Requirement

The inclination of the pond side slope is shown as 4H:1V in the submitted drawing which is considered acceptable.

Based on data in BH101, excavation for the pond side and bottom is likely to encounter the clayey silt till deposit. Gradation analyses of soil samples collected from the site showed the average composition as follows: gravel 5%, sand 27%, silt 45% and clay 23%. The co-efficient of permeability of this soil is estimated to be less than 10^{-5} cm/sec, indicating very low permeability. In our opinion, potential infiltration/exfiltration into/from the pond is low and generally acceptable.

It is mentioned here that somewhat greater volume of infiltration could be expected from the sandy seams, if encountered, during excavation. Therefore, in order to prevent possible seepage from side slope areas and to maintain the design water level in the pond, it is recommended to install a clay liner with a 400mm thickness over the side slopes and pond bottom. The adequacy of this thickness should be further confirmed during pond construction. The clay liner should extend to about 500mm above the permanent pool level. Regardless, the clay liner should be compacted to 98% Standard Proctor Maximum Dry Density (SPMDD), within 1% (below) or 3% (above) of the clay's optimum moisture content. The clay should be inorganic and consist of a minimum 60% fines (silt and clay) by weight passing No. 200 sieve (0.074mm) of which a minimum of 20% is clay (0.002mm). The clay liner should be watered at the completion and/or start of each working day and on hot sunny days, as directed by the Geotechnical Engineer, in order to minimize shrinkage cracks. Alternatively, a geosynthetic clay liner may be considered for the proposed SWMP. In this case, Bentofix® with one woven and nonwoven component or equivalent may be considered for the liner system.

5.1.6 Rip-rap Protection

The pond side slopes above the groundwater should be protected against possible erosion by rip-rap blanket and/or vegetative cover, or similar measures. A suitable geofabric separator (Terrafix 360R or approved equivalent) should be used to separate the rip-rap materials from the underlying soils. The pond toe areas as well as culvert inlet/outlet areas should also be protected against erosion.

5.1.7 Global Slope Stability

The existing pond (including berm) height is 2.8m±. The berm has shown signs of erosion. It is recommended that the existing berm be removed and reconstructed using engineered fill, the fill placement is discussed in Section 5.1.3.

We further recommend a global slope stability assessment be carried out for the modified pond with no water (empty pond) and full water (long-term and short-term draw down condition).

5.2 Construction Considerations for Baseline Pond

Borehole BH104 advanced adjacent to the pond area, encountered a surficial fill layer underlain by native ground (clayey silt till and sandy silt till) to the end of the borehole. The groundwater depth of 0.9 m was recorded in the borehole (El. 248.1m).

Drawing No. 3 in Appendix E shows the cut and fill scenario during implementation of the pond modification.

5.2.1 Base Preparation

Remove all topsoil, organic materials, and disturbed/soft soils from the pond footprint. The excavated subgrade shall be approved and then proof-rolled witnessed by a geotechnical engineer.

Excavations should be carried out in accordance with the Ontario Health and Safety Regulations for Construction Projects (latest ed.) Conventional excavation is anticipated for the removal of topsoil/fill mantle. Conventional pumping from sump pits should be able to handle localized infiltration/seepage, if any exists, within the fill soils.

5.2.2 Side Slopes

The inclination of the side slope is recommended as 4H:1V or flatter.

In order to prevent seepage from side slope areas, and to maintain the design water level in the pond, it is recommended to install a clay liner with a minimum 300mm thickness, over the side slopes and base areas.

5.3 Swale Construction

Drawing No. 4 in Appendix E shows the cut and fill scenario during implementation of the swale modification.

Boreholes BH102 and BH103 indicate that the swale will be excavated through the existing sediment followed by soft/loose fill soils. The material at the bottom comprises sandy silt fill to clayey silt fill.

The new swale should be constructed with an inclination of 4H:1V or flatter. The swale would be provided with a rip-rap cover to mitigate the erosion and 'silt' deposition.

Prior to placing any new materials (soil, stone, geotextiles), existing 'soupy' sediments should be removed. Once the excavation is completed, filter fabric [360R or heavier (or the equivalent)] should be placed to the bottom and sides of the drainage channel.

5.4 Hydro Cable Installation

The investigation results (from Boreholes BH106 and BH107) indicate that subsoils at the founding grade will likely comprise stiff clayey silt till which considered suitable for installation of hydro cables.

Prior to installation, all soft/disturbed/loose soil /debris, if any, is completely removed from the excavated grade and subgrade should be inspected and evaluated by a geotechnical engineer.

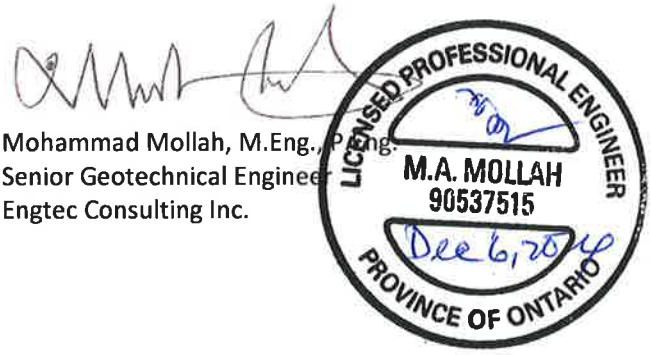
6 CLOSING REMARKS

The site investigation and recommendations contained in this report follow that accepted practice for geotechnical consultants in Ontario. Laboratory testing undertaken for this project follows ASTM, CSA and/or MTO-LS Standards that are considered standard practice in Ontario.

This report has been prepared for the Region of York and GEC Architecture. Third party use of this report without Engtec's consent is prohibited.

We trust that this report is satisfactory for your purposes. Should you have any questions, please contact this office.

Yours truly,



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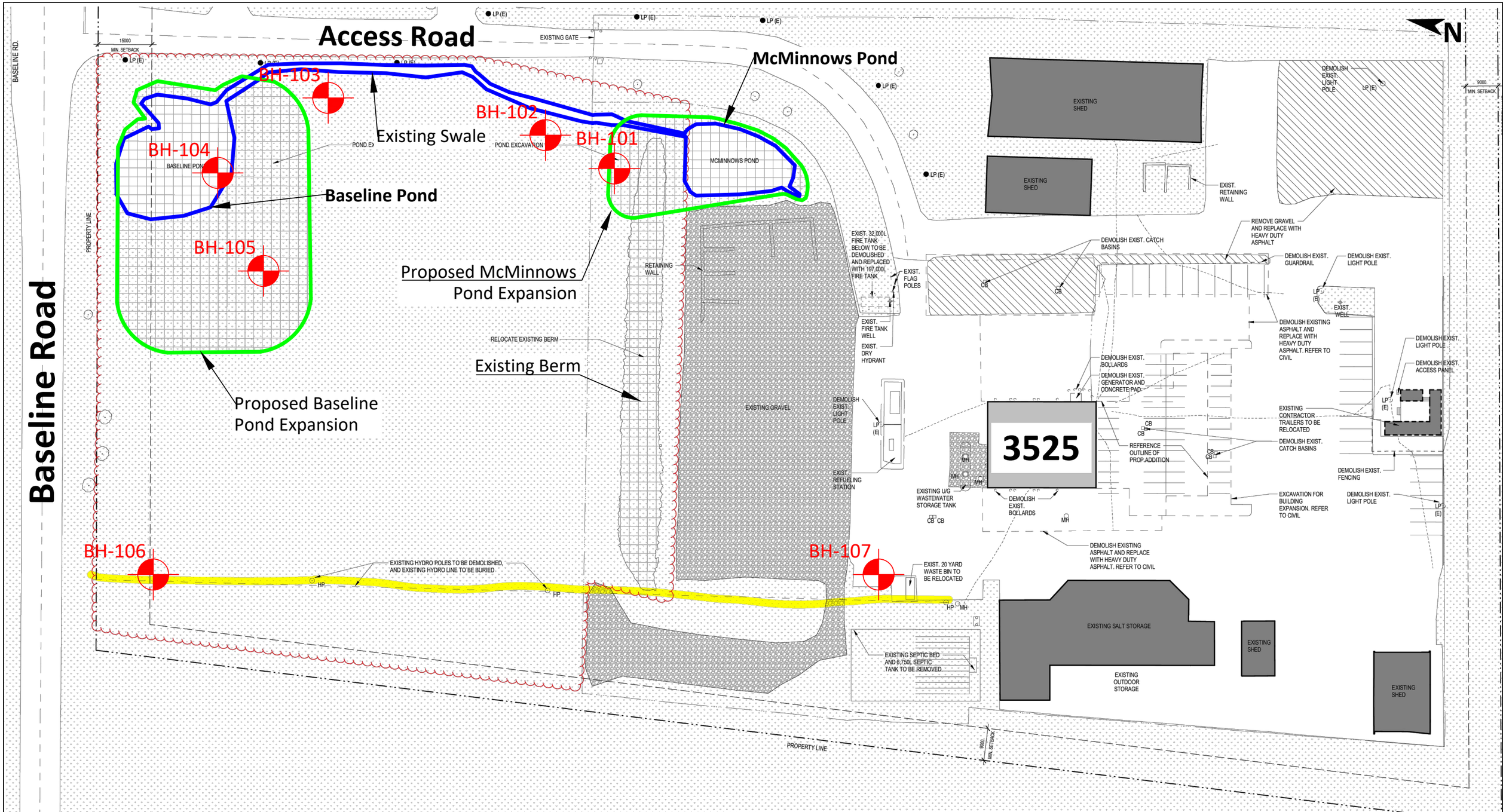
Appendix A

Key Plan and Site Plan Showing the Borehole Locations



BH-X Borehole Locations

Existing Pond and Swale

Proposed Pond Expansion

Project Name: Geotechnical Investigation for SWM Ponds

Project Location: 3525 Baseline Road, Sutton West

Drawing Title: Borehole Plan

Drawing No. 02

Project No. ET24-1438B

Contract No.

Drawn By: L.W Checked By: M.M

Date: Novermber 7, 2024 Scale: NTS

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Appendix B

Photographs

McMinnows Pond

Picture 1: View of the McMinnows Pond (Looking N towards the Baseline Road).

Picture 2: View of the McMinnows Pond (Looking S towards the YRNR Operation Centre).

Picture 3: View showing the Eastside Slope Areas.

Picture 4: Looking W shows the North and West Slope Condition.

Picture 5: View shows the Existing Culvert at Outlet End.

Picture 6: View shows the Existing Culvert at Inlet End.

Baseline Pond

Picture 7: View of the Baseline Pond (Looking E Towards the Georgina Police Centre).

Picture 8: (Looking W) View of the Existing Baseline Pond Showing Cattails Plants on Surface.

Picture 9: Subsoil Condition at Baseline Pond Bed.

Picture 10: Subsoil Condition at Baseline Pond Bed.

Picture 11: Baseline Pond Inlet Area from the Existing Swale.

Picture 12: Culvert to Discharge Water into The Municipal Line.

Swale

Picture 13: Existing Swale Condition.

Picture 14: Existing Swale Condition.

Picture 15: View of Borehole BH1 Location showing Existing Fill Berm (L) and Fence (R).

Photograph 16: Soil Sample Retrieved in the SPT Spoon.

Picture 17: View of Borehole BH104 Location (Baseline Pond Area).

Picture 18: Soil Sample Retrieved in the SPT Spoon.

Appendix C

BH Logs

Enclosure 1A: Notes on Sample Descriptions

1. Each soil stratum is described according to the *Modified Unified Soil Classification System*. The compactness condition of cohesionless soils (SPT) and the consistency of cohesive soils (undrained shear strength) are defined according to Canadian Foundation Engineering Manual, 4th Edition. Different soil classification systems may be used by others. Please note that a description of the soil stratums is based on visual and tactile examination of the samples augmented with field and laboratory test results, such as a grain size analysis and/or Atterberg Limits testing. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.

2. Fill: Where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc., none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional preliminary geotechnical site investigation.

3. Till: The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (60 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

Enclosure 1B: Explanation of Terms Used in the Record of Boreholes

Sample Type

AS	Auger sample
BS	Block sample
CS	Chunk sample
DO	Drive open
DS	Dimension type sample
FS	Foil sample
NR	No recovery
RC	Rock core
SC	Soil core
SS	Spoon sample
SH	Shelby tube Sample
ST	Slotted tube
TO	Thin-walled, open
TP	Thin-walled, piston
WS	Wash sample

Penetration Resistance

Standard Penetration Resistance (SPT), N:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in) required to drive a 50 mm (2 in) drive open sampler for a distance of 300 mm (12 in).

PM – Samples advanced by manual pressure
WR – Samples advanced by weight of sampler and rod
WH – Samples advanced by static weight of hammer

Dynamic Cone Penetration Resistance, N_d:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in) to drive uncased a 50 mm (2 in) diameter, 60° cone attached to "A" size drill rods for a distance of 300 mm (12 in).

Piezo-Cone Penetration Test (CPT):

An electronic cone penetrometer with a 60 degree conical tip and a projected end area of 10 cm² pushed through ground at a penetration rate of 2 cm/s. Measurement of tip resistance (Q_t), porewater pressure (PWP) and friction along a sleeve are recorded electronically at 25 mm penetration intervals.

Textural Classification of Soils (ASTM D2487)

Classification	Particle Size
Boulders	> 300 mm
Cobbles	75 mm - 300 mm
Gravel	4.75 mm - 75 mm
Sand	0.075 mm – 4.75 mm
Silt	0.002 mm-0.075 mm
Clay	<0.002 mm(*)

(*) Canadian Foundation Engineering Manual (4th Edition)

Coarse Grain Soil Description (50% greater than 0.075 mm)

Terminology	Proportion
Trace	0-10%
Some	10-20%
Adjective (e.g. silty or sandy)	20-35%
And (e.g. sand and gravel)	> 35%

Soil Description

a) Cohesive Soils(*)

Consistency Value	Undrained Shear Strength (kPa)	SPT "N"
Very soft	<12	0-2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very stiff	100-200	15-30
Hard	>200	>30

(*) Hierarchy of Shear Strength prediction

1. Lab triaxial test
2. Field vane shear test
3. Lab. vane shear test
4. SPT "N" value
5. Pocket penetrometer

b) Cohesionless Soils

Density Index (Relative Density)	SPT "N" Value
Very loose	<4
Loose	4-10
Compact	10-30
Dense	30-50
Very dense	>50

Soil Tests

w	Water content
w_p	Plastic limit
w_l	Liquid limit
C	Consolidation (oedometer) test
CID	Consolidated isotropically drained triaxial test
CIU	consolidated isotropically undrained triaxial test with porewater pressure measurement
D_R	Relative density (specific gravity, Gs)
DS	Direct shear test
ENV	Environmental/ chemical analysis
M	Sieve analysis for particle size
MH	Combined sieve and hydrometer (H) analysis
MPC	Modified proctor compaction test
SPC	Standard proctor compaction test
OC	Organic content test
U	Unconsolidated Undrained Triaxial Test
V	Field vane (LV-laboratory vane test)
γ	Unit weight

SOIL TYPES

As defined in Port III: Excavations - Occupational Health and Safety Act and regulations for Construction Projects

March 2017

Type 1 Soil

A. is hard, very dense, and only able to be penetrated with difficulty by a small, sharp, object;

B. has a low natural moisture content, and a high degree of internal strength;

C. has no signs of water seepage; and

D. can be excavated only by mechanical equipment

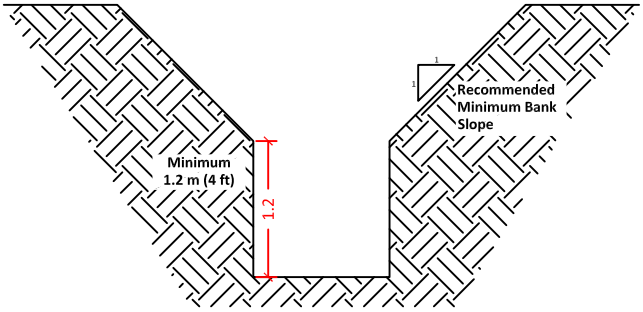
Type 2 Soil

A. is very stiff, dense, and can be penetrated with moderate difficulty by a small, sharp object;

B. has a low to medium natural moisture content and medium degree of internal strength; and

C. has a damp appearance after it is excavated

GOOD SOIL



Type 3 Soil

A. is stiff to firm, and compact to loose in consistency, or is previously excavated soil;

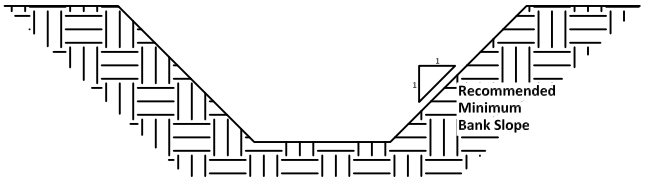
B. exhibits signs of surface crocking;

C. exhibits signs of water seepage

D. if it is dry, may run easily into a well-defined conical pile; and

E. has a low degree of internal strength

FAIRLY GOOD SOIL



Type 4 Soil

A. is soft to very soft, and very loose in consistency, very sensitive, and upon disturbance, is significantly reduced in natural strength;

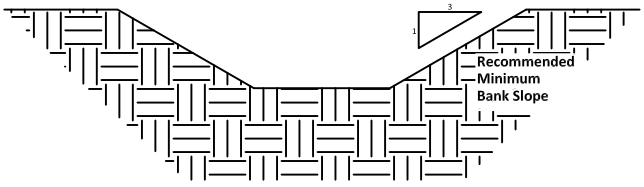
B. runs easily or flows, unless it is completely supported before excavating procedures;

C. has almost no internal strength;

D. is wet or muddy; and

E. exerts substantial fluid pressure on its supporting system

BAD SOIL



*If an excavation contains more than one type of soil, the soil shall be classified as the type with the highest soil type

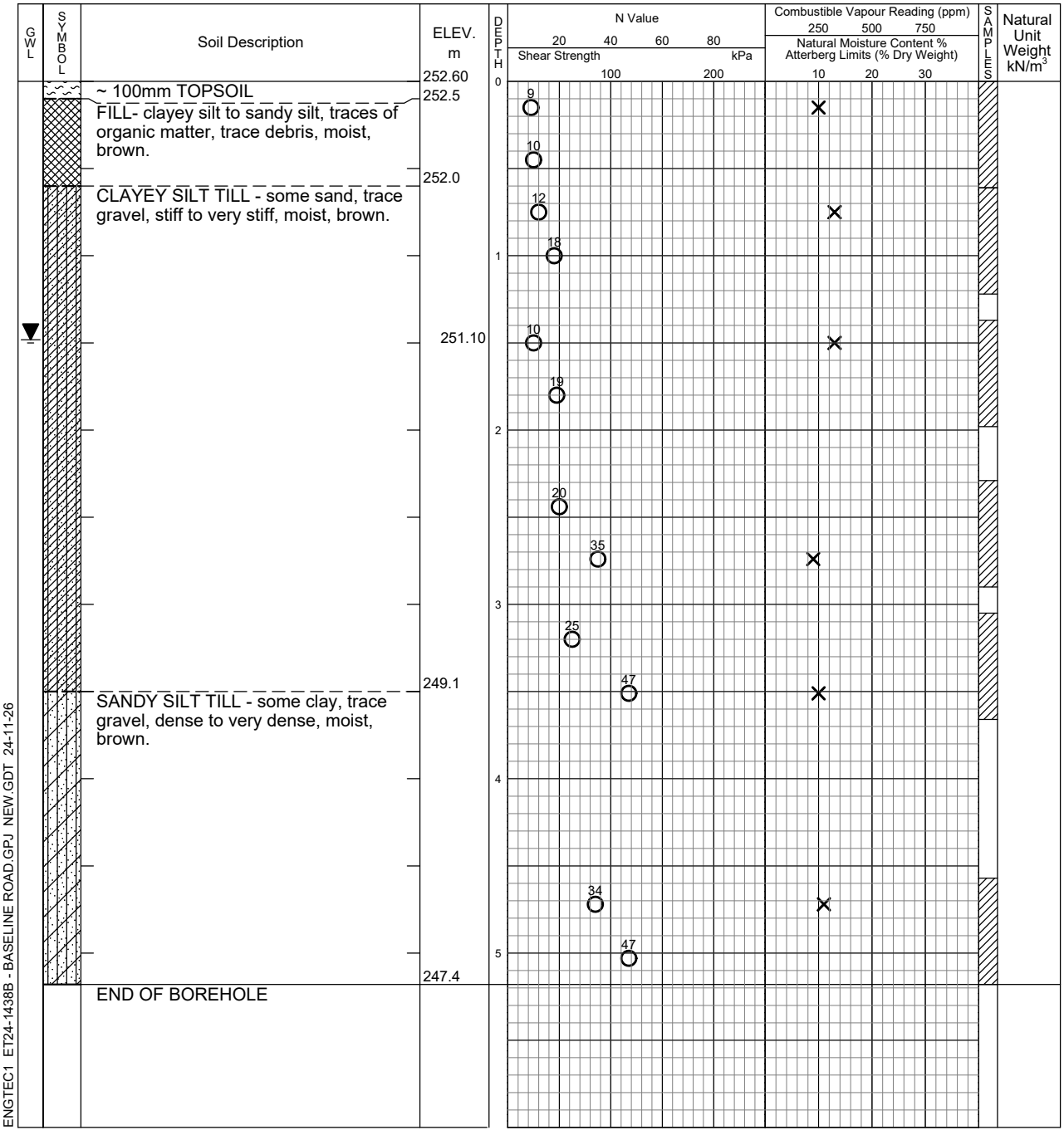
Log of Borehole BH101

Project No. ET24-1438A
Figure No. 1
Project: Geotechnical Investigation for Modification of SWM Ponds
Sheet No. 1 of 1
Location: 3525 Baseline Road, Sutton, Ontario

Date Drilled: October 23, 2024
Drill Type: Geoprobe 7822DT
Datum: Approximate Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



ENGTEC1 ET24-1438B - BASELINE ROAD.GPJ NEW.GDT 24-11-26

Engtec Consulting Inc.
1-2447 Anson Drive
Mississauga, ON, L5S 1G1
(905) 856-2988

Borehole data requires interpretation assistance from ENGTEC before use by others.

See Figures 1A and 1B for Notes on Sample Descriptions and Terminology.

Time	Water Level (m)	Depth to Cave (m)
October 23, 2024	3.2m	3.5m
48 Hours	1.5m	

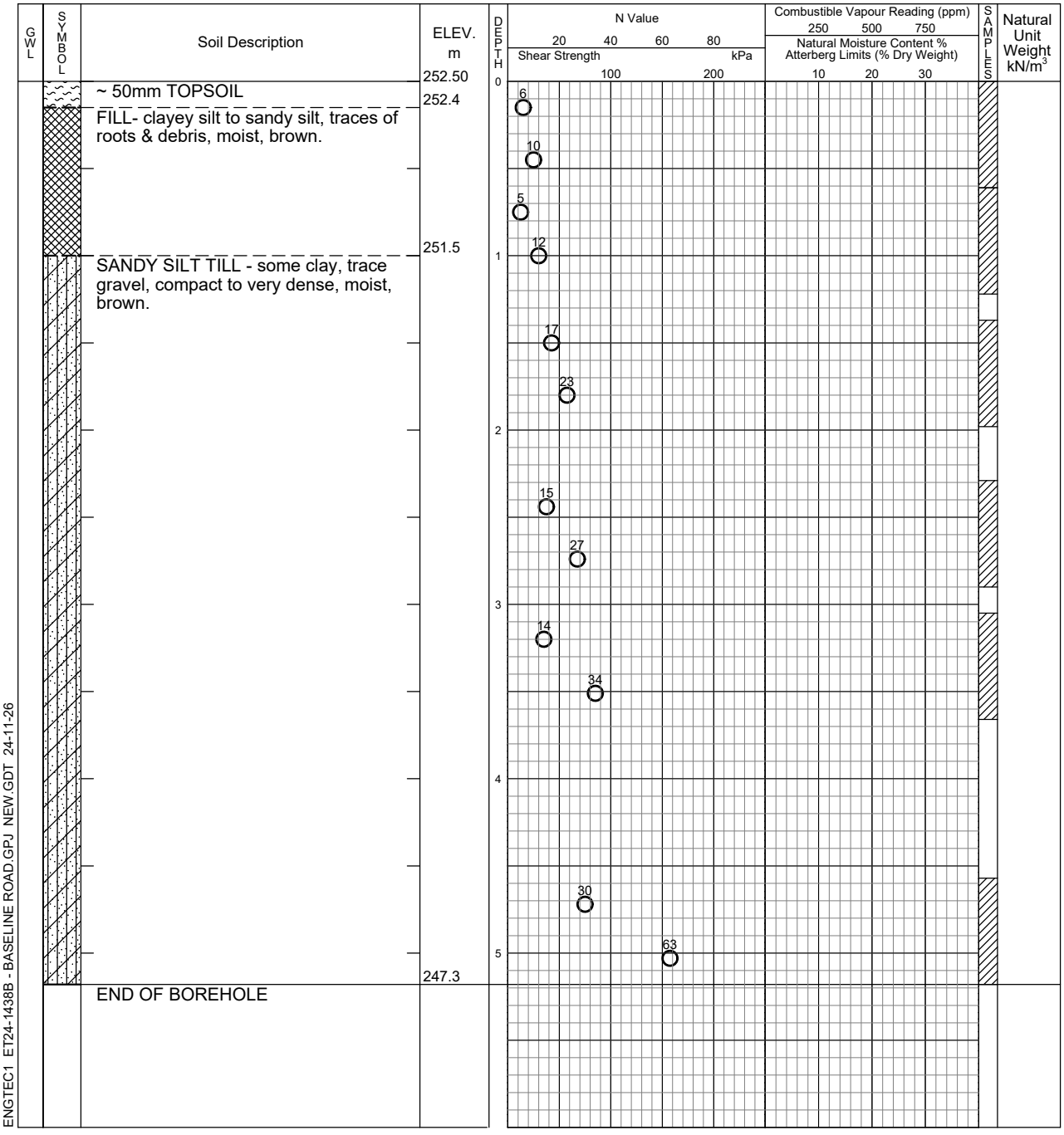
Log of Borehole BH102

Project No. ET24-1438A
Figure No. 2
Project: Geotechnical Investigation for Modification of SWM Ponds
Sheet No. 1 of 1
Location: 3525 Baseline Road, Sutton, Ontario

Date Drilled: October 28, 2024
Drill Type: Geoprobe 7822DT
Datum: Approximate Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



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Borehole data requires interpretation assistance from ENGTEC before use by others.

See Figures 1A and 1B for Notes on Sample Descriptions and Terminology.

Time	Water Level (m)	Depth to Cave (m)
October 28, 2024	3.5m	3.9m

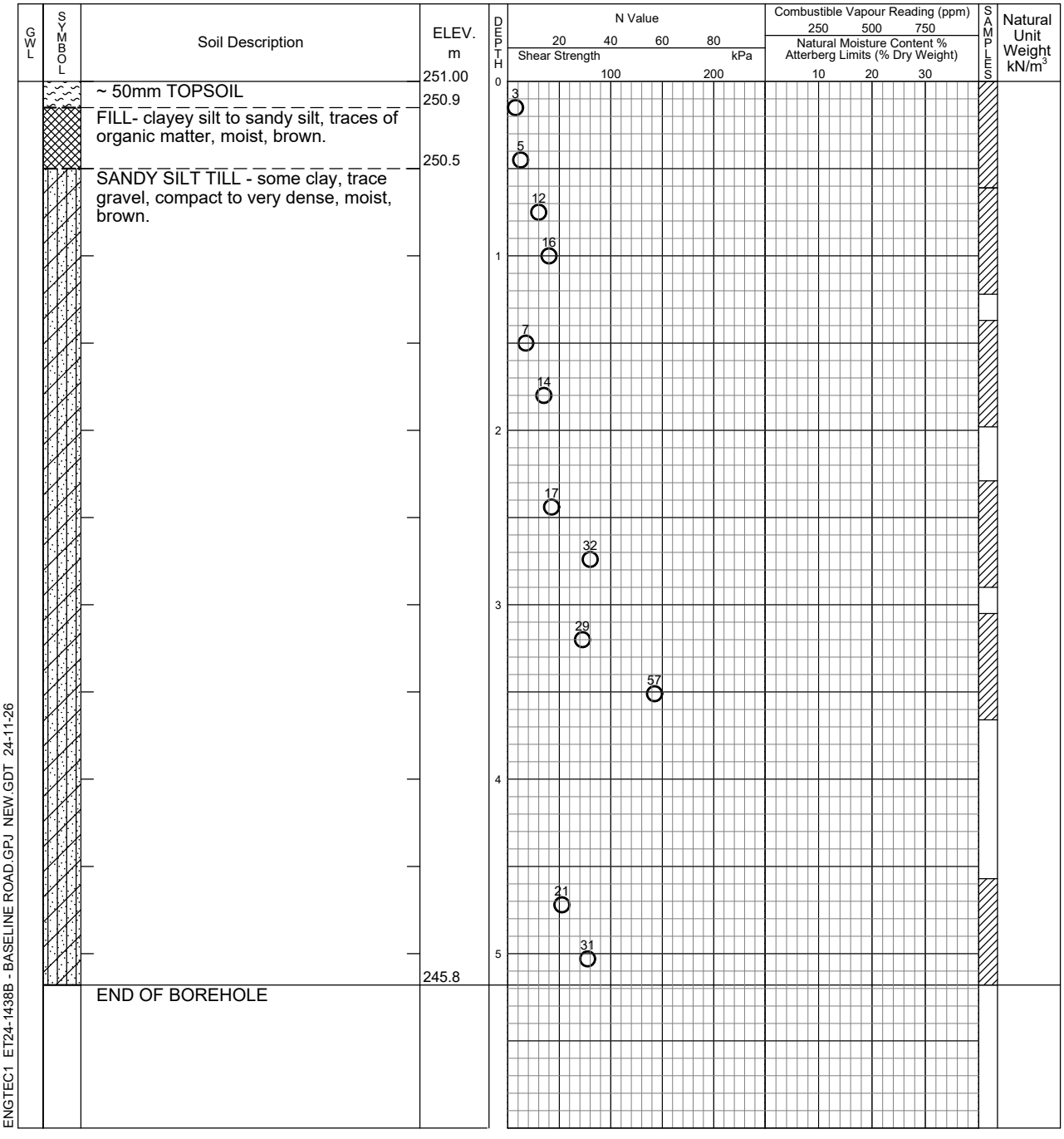
Log of Borehole BH103

Project No. ET24-1438A
Figure No. 3
Project: Geotechnical Investigation for Modification of SWM Ponds
Sheet No. 1 of 1
Location: 3525 Baseline Road, Sutton, Ontario

Date Drilled: October 28, 2024
Drill Type: Geoprobe 7822DT
Datum: Approximate Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



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See Figures 1A and 1B for Notes on Sample Descriptions and Terminology.

Time	Water Level (m)	Depth to Cave (m)
October 28, 2024	3.0m	3.5m

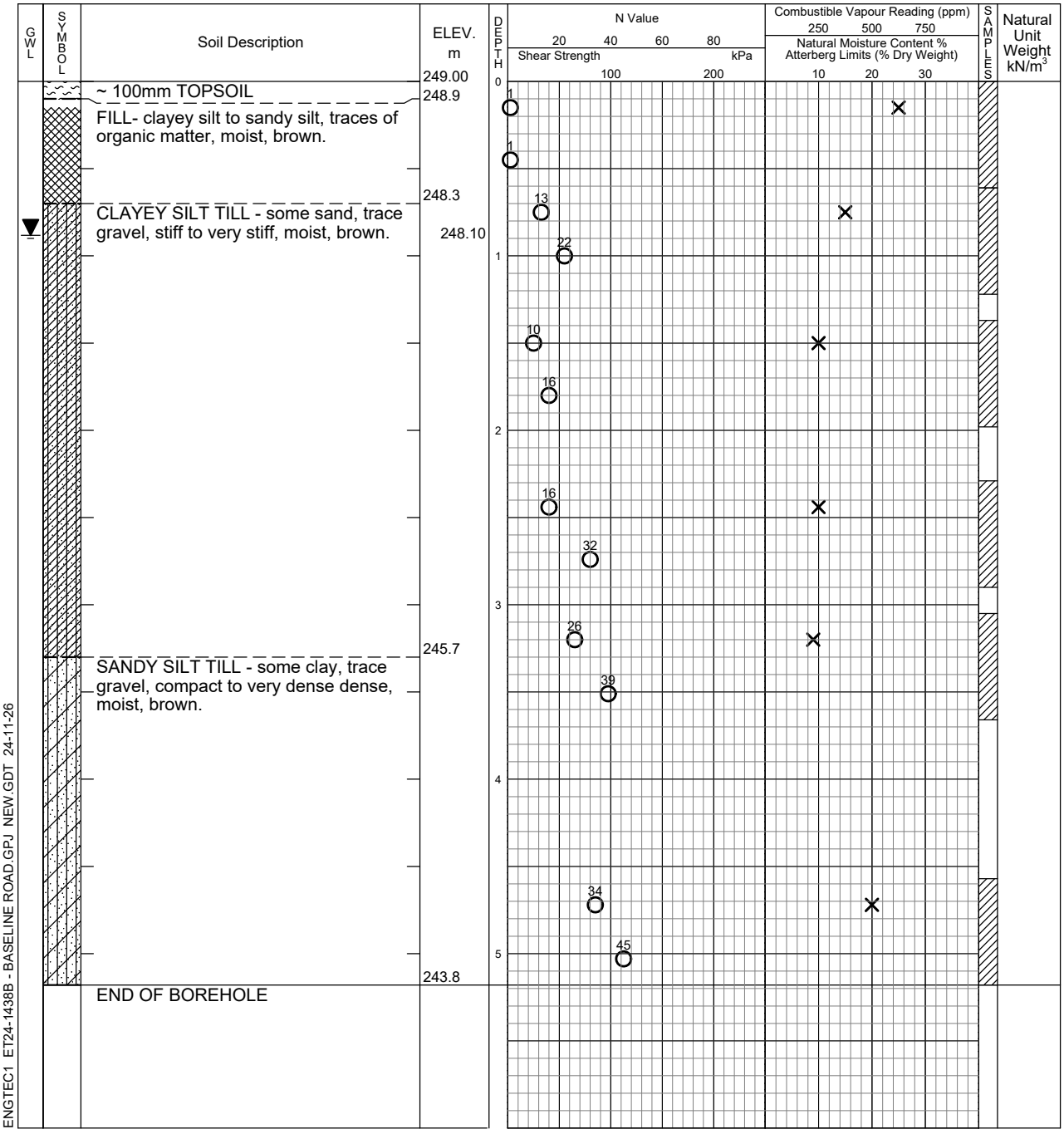
Log of Borehole BH104

Project No. ET24-1438A
Figure No. 4
Project: Geotechnical Investigation for Modification of SWM Ponds
Sheet No. 1 of 1
Location: 3525 Baseline Road, Sutton, Ontario

Date Drilled: October 23, 2024
Drill Type: Geoprobe 7822DT
Datum: Approximate Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



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(905) 856-2988

Borehole data requires interpretation assistance from ENGTEC before use by others.

See Figures 1A and 1B for Notes on Sample Descriptions and Terminology.

Time	Water Level (m)	Depth to Cave (m)
October 23, 2024	3.0m	3.8m
0.9m in 4 hrs	0.9m	

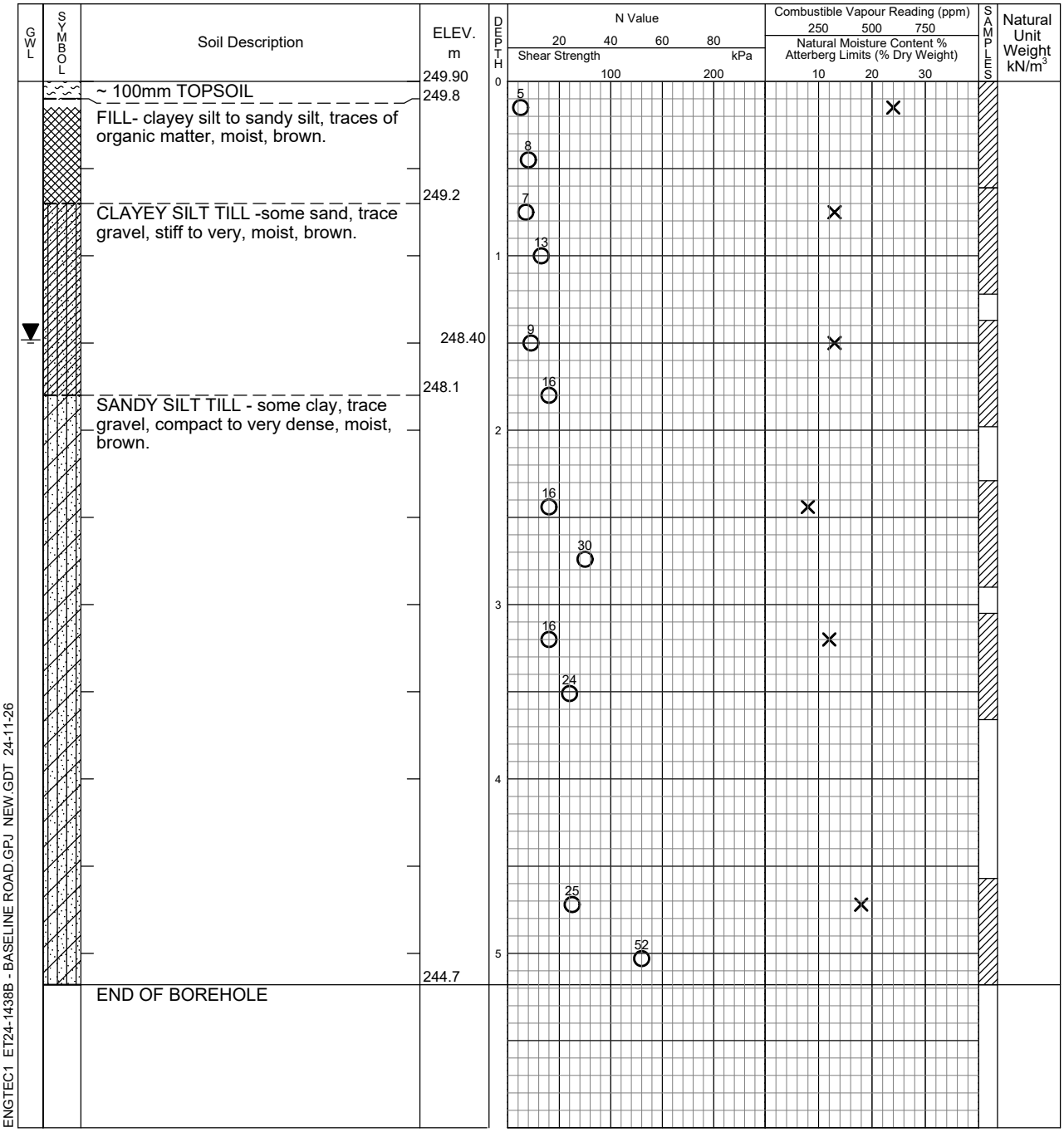
Log of Borehole BH105

Project No. ET24-1438A
Figure No. 5
Project: Geotechnical Investigation for Modification of SWM Ponds
Sheet No. 1 of 1
Location: 3525 Baseline Road, Sutton, Ontario

Date Drilled: October 28, 2024
Drill Type: Geoprobe 7822DT
Datum: Approximate Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



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(905) 856-2988

Borehole data requires interpretation assistance from ENGTEC before use by others.

See Figures 1A and 1B for Notes on Sample Descriptions and Terminology.

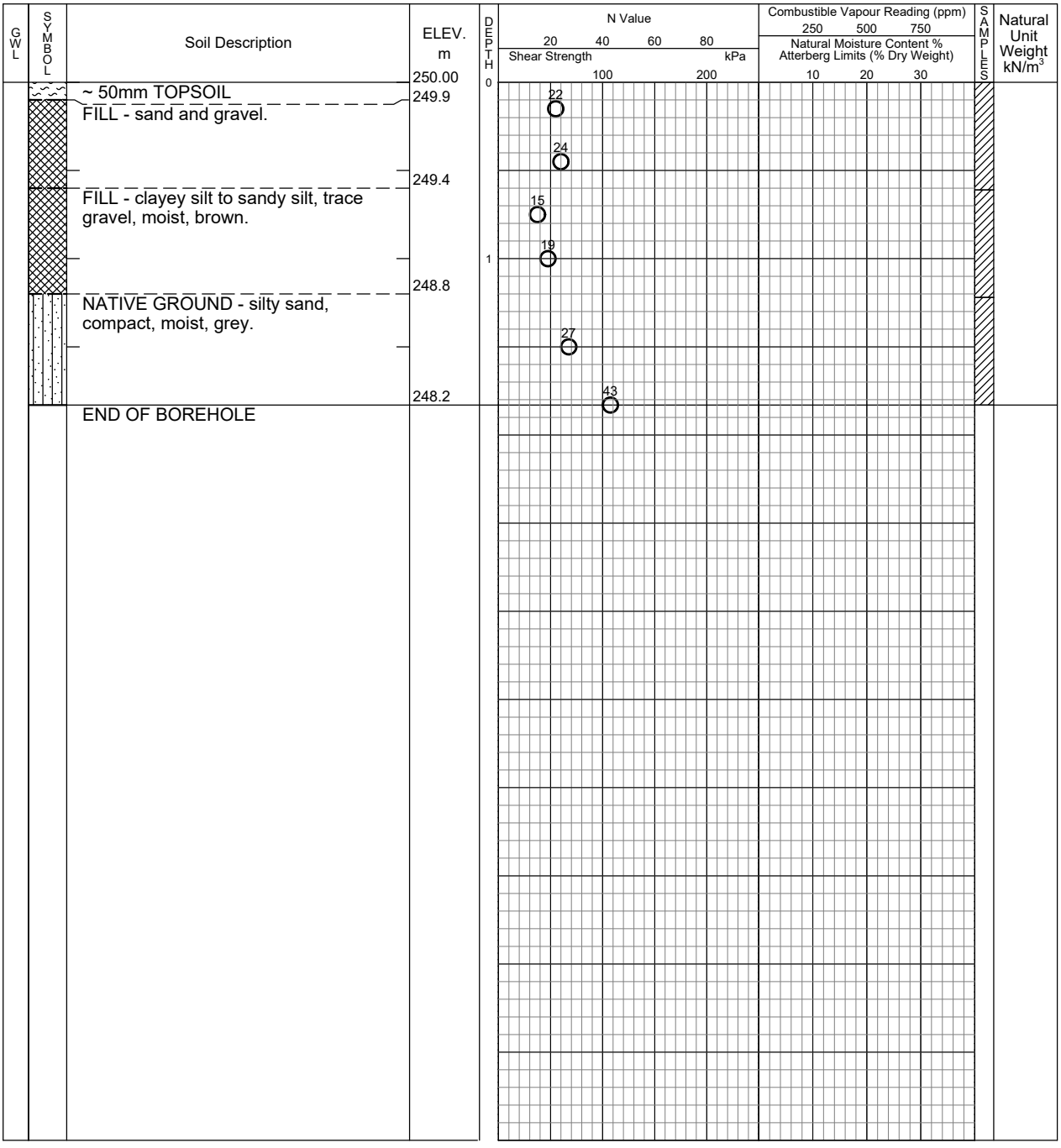
Time	Water Level (m)	Depth to Cave (m)
October 28, 2024	2.7m	3.0m
3 hrs 1.5m in 3 hrs	1.5m	

Log of Borehole BH106

Project No. ET24-1438A
Figure No. 7
Project: Geotechnical Investigation for Modification of SWM Ponds
Sheet No. 1 of 1
Location: 3525 Baseline Road, Sutton, Ontario

Date Drilled: October 23, 2024
Drill Type: Geoprobe 7822DT
Datum: Approximate Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)
Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



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(905) 856-2988

Borehole data requires interpretation assistance from ENGTEC before use by others.

See Figures 1A and 1B for Notes on Sample Descriptions and Terminology.

Time	Water Level (m)	Depth to Cave (m)
October 23, 2024	Dry	1.0m

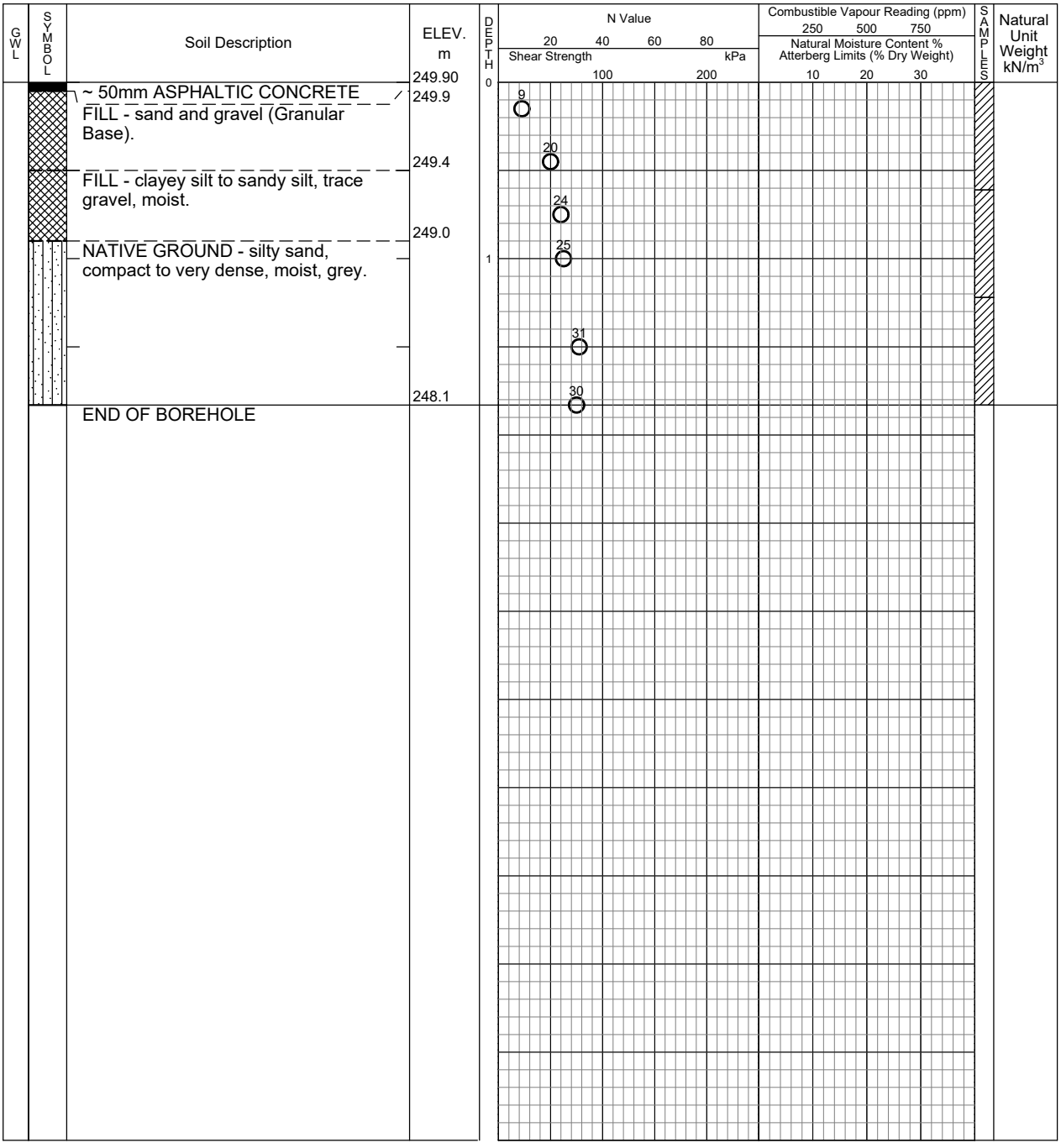
Log of Borehole BH107

Project No. ET24-1438A
Figure No. 6
Project: Geotechnical Investigation for Modification of SWM Ponds
Sheet No. 1 of 1
Location: 3525 Baseline Road, Sutton, Ontario

Date Drilled: October 28, 2024
Drill Type: Geoprobe 7822DT
Datum: Approximate Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



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(905) 856-2988

Borehole data requires interpretation assistance from ENGTEC before use by others.

See Figures 1A and 1B for Notes on Sample Descriptions and Terminology.

Time	Water Level (m)	Depth to Cave (m)
October 28, 2024	Dry	1.0m

Appendix D

Laboratory Testing Results

Engtec Consulting Inc.
1-2447 Anson Drive, Mississauga
Ontario, L5S 1G1
Telephone: (905) 856-2988
Fax: (905) 856-2989

Moisture Content

Project Name :	**Engineering Services - 3525 Baseline Rd., Georgina**	**Date sampled:**	**November 5, 2024**
Project No.:	**ET24- 1438B**	**Date tested:**	**November 7, 2024**
Lab Sample No.:	**G09835**		

BOREHOLE #	**4**	**4**	**4**	**4**	**4**	**4**
SAMPLE#	**1**	**2**	**3**	**4**	**5**	**6**
TARE #	1	2	3	4	5	6
WT. OF TARE (gms)	13.50	13.90	14.30	14.60	14.30	14.60
WT. OF TARE+WET SOIL (gms)	80.7	96.3	118.1	96.9	106.1	107.2
WT. OF TARE+DRY SOIL (gms)	74.6	86.9	106.2	89.8	96.6	98.3
WT. OF WATER (gms)	6.10	9.40	11.90	7.10	9.50	8.90
WT. OF DRY SOIL (gms.)	61.10	73.00	91.90	75.20	82.30	83.70
% MOISTURE CONTENT (%)	10.0	12.9	12.9	9.4	1.8	10.6

BOREHOLE #	**7**	**7**	**7**	**7**	**7**	**7**
SAMPLE#	**1**	**2**	**3**	**4**	**5**	**6**
TARE #	1	2	3	4	5	6
WT. OF TARE (gms)	13.90	13.60	14.40	13.50	13.80	13.90
WT. OF TARE+WET SOIL (gms)	103.7	100.2	124.9	109.4	113.9	103.7
WT. OF TARE+DRY SOIL (gms)	85.7	89.2	114.3	100.4	106.0	88.9
WT. OF WATER (gms)	18.00	11.00	10.60	9.00	7.90	14.80
WT. OF DRY SOIL (gms.)	71.80	75.60	99.90	86.90	92.20	75.00
% MOISTURE CONTENT (%)	25.1	14.6	10.6	10.4	8.6	19.7

BOREHOLE #	**8**	**8**	**8**	**8**	**8**	**8**
SAMPLE#	**1**	**2**	**3**	**4**	**5**	**6**
TARE #	1	2	3	4	5	6
WT. OF TARE (gms)	13.70	14.40	13.90	14.40	14.40	14.10
WT. OF TARE+WET SOIL (gms)	65.6	111.2	96.4	129.1	111.6	114.6
WT. OF TARE+DRY SOIL (gms)	55.7	99.8	87.1	120.8	101.4	99.5
WT. OF WATER (gms)	9.90	11.40	9.30	8.30	10.20	15.10
WT. OF DRY SOIL (gms.)	42.00	85.40	73.20	106.40	87.00	85.40
% MOISTURE CONTENT (%)	23.6	13.3	12.7	7.8	11.7	17.7

Engtec Consulting Inc.
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Fax: (905) 856-2989

Grain Size Analysis & Hydrometer
LS - 702

Lab Sample No.: G09835
Project Name: Engineering Services-3525 Baseline Road ,Georgina

Date Reported: November 12, 2024
Project No: ET24-1438B

Grain Size Proportion (%)	
Gravel - Coarse	0.0
Gravel - Fine	3.6
Sand - Coarse	4.2
	2.3
Sand - Fine	11.8
Silt (> 2mm), < 75mm):	47.8
Clay (< 2mm):	30.3
Total	100.0

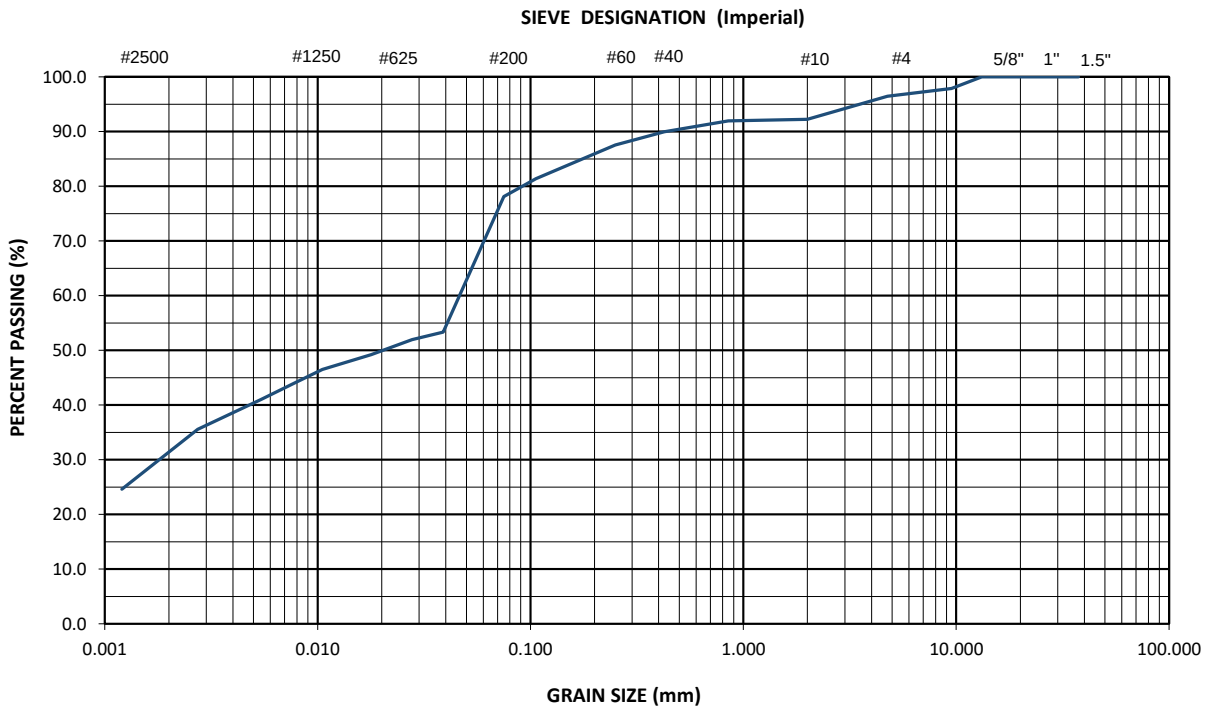
Sample Information	
Borehole No.:	BH#4, SS3
Sample Method:	Split Spoon
Depth:	4.5' - 6.5'
Sample Description:	Clayey ,Silts with Sand &Gravel - Brown
Sampled By:	Engtec
Sampling Date:	November 5, 2024
Client Sample ID:	N/A
Comments:	Clayey ,Silts with Sand &Gravel - Brown

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
37.5	100.0	**0.0389**	53.3
26.5	100.0	**0.0278**	51.9
19	100.0	**0.0178**	49.2
16	100.0	**0.0105**	46.5
13.2	100.0	**0.0075**	43.7
9.5	97.9	**0.0054**	41.0
4.75	96.4	**0.0027**	35.5
2	92.2	**0.0012**	24.6
0.85	92.0	**0.0000**	0.0
0.425	90.0		
0.25	87.6		
0.106	81.4		
0.075	78.1		

Review Status - Laboratory Manager
☑ Reviewed
☐ Not Reviewed

UNIFIED SOIL CLASSIFICATION SYSTEM

	CLAY AND SILT		SAND			GRAVEL	
			Fine	Medium	Coarse	Fine	Coarse
%	30.3	47.8	11.8	2.3	4.2	3.6	0.0



Reported By: Leonardo Pilapil, C.E.T.
Laboratory Supervisor

Approved By: Salman Bhutta ,Ph.D., P.Eng.
Project Manager

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Telephone: (905) 856-2988
Fax: (905) 856-2989

Grain Size Analysis & Hydrometer
LS - 702

Lab Sample No.: G09835
Project Name: Engineering Services-3525 Baseline Road ,Georgina

Date Reported: November 12, 2024
Project No: ET24-1438B

Grain Size Proportion (%)	
Gravel - Coarse	0.0
Gravel - Fine	2.2
Sand - Coarse	2.7
	2.9
Sand - Fine	14.3
Silt (> 2mm), < 75mm):	53.0
Clay (< 2mm):	24.9
Total	100.0

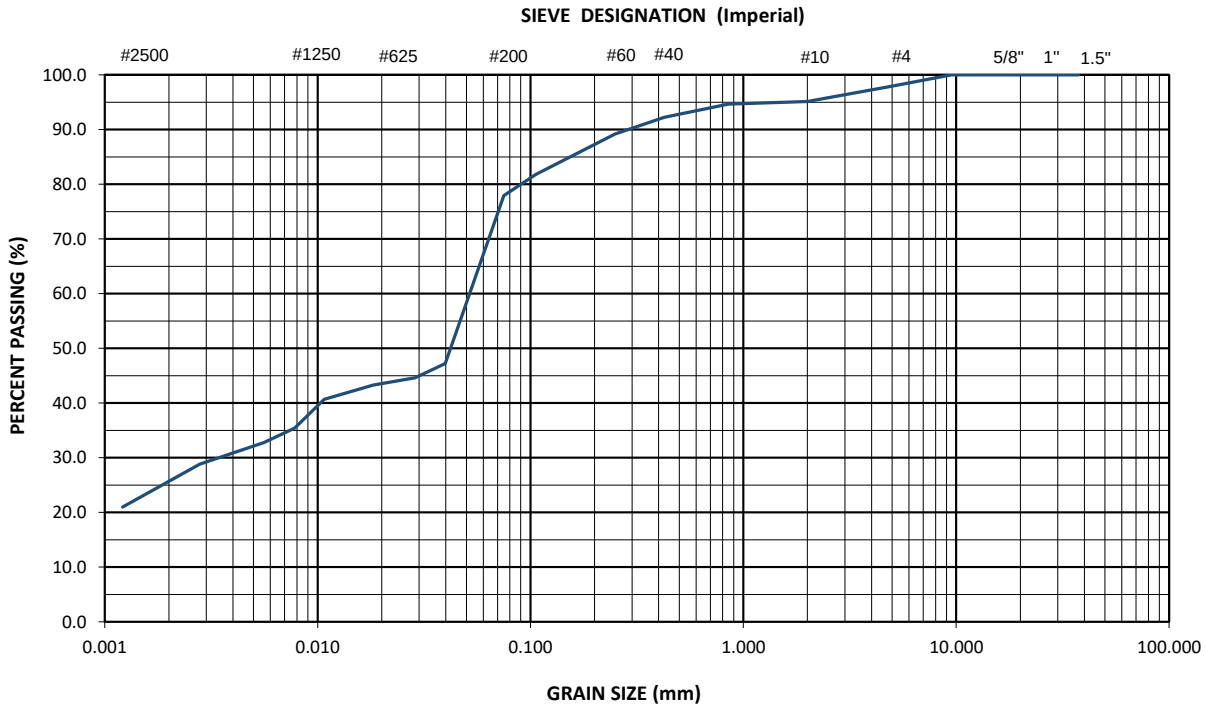
Sample Information	
Borehole No.:	BH#4, SS5
Sample Method:	Split Spoon
Depth:	10' - 12'
Sample Description:	Sandy ,Clay with Silt & &Gravel - Brown
Sampled By:	Engtec
Sampling Date:	November 5, 2024
Client Sample ID:	N/A
Comments:	Sandy ,Clay with Silt & &Gravel - Brown

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
37.5	100.0	**0.0397**	47.2
26.5	100.0	**0.0287**	44.6
19	100.0	**0.0182**	43.3
16	100.0	**0.0107**	40.7
13.2	100.0	**0.0078**	35.4
9.5	100.0	**0.0056**	32.8
4.75	97.8	**0.0028**	28.8
2	95.1	**0.0012**	21.0
0.85	94.7	**0.0000**	0.0
0.425	92.2		
0.25	89.2		
0.106	81.8		
0.075	77.9		

Review Status - Laboratory Manager
☑ Reviewed
☐ Not Reviewed

UNIFIED SOIL CLASSIFICATION SYSTEM

	CLAY AND SILT		SAND			GRAVEL	
			Fine	Medium	Coarse	Fine	Coarse
%	24.9	53.0	14.3	2.9	2.7	2.2	0.0



Reported By: Leonardo Pilapil, C.E.T.
Laboratory Supervisor

Approved By: Salman Bhutta ,Ph.D., P.Eng.
Project Manager

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Grain Size Analysis & Hydrometer
LS - 702

Lab Sample No.: G09835
Project Name: Engineering Services-3525 Baseline Road . Georgina

Date Reported: November 13, 2024
Project No: ET24-1438B

Grain Size Proportion (%)	
Gravel - Coarse	1.3
Gravel - Fine	3.0
Sand - Coarse	2.3
	2.5
Sand - Fine	22.2
Silt (> 2mm), < 75mm):	53.5
Clay (< 2mm):	15.1
Total	100.0

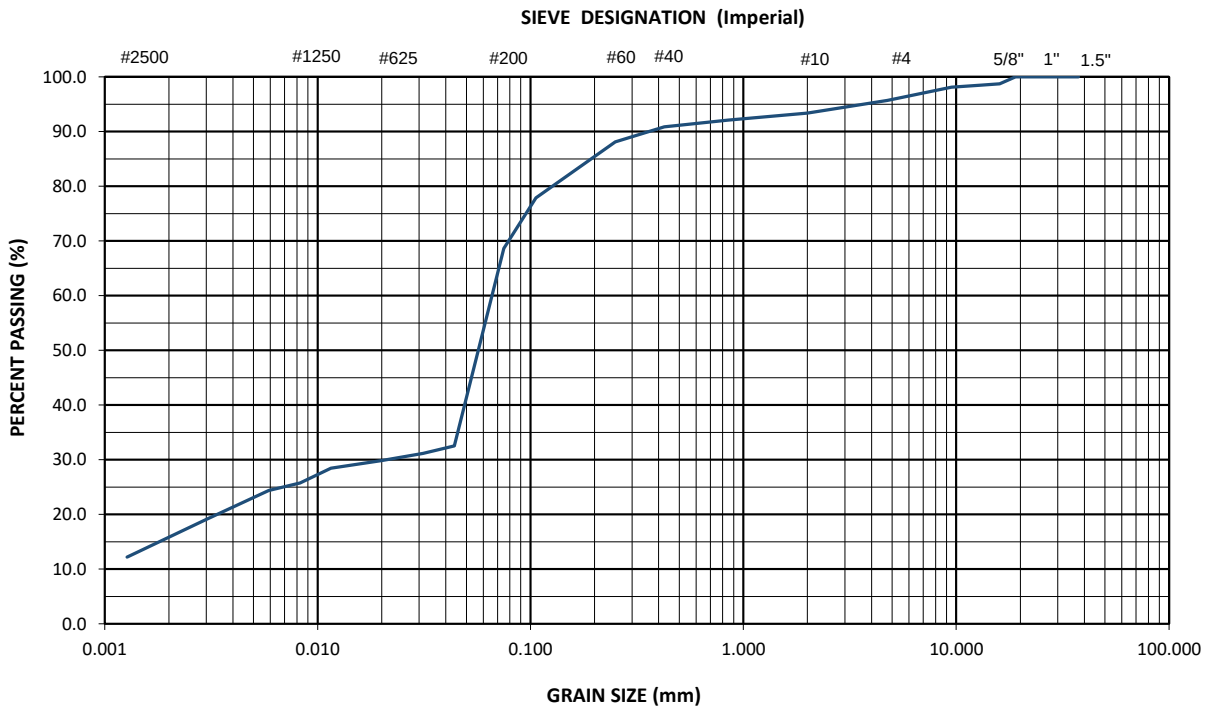
Sample Information	
Borehole No.:	BH#5, SS2
Sample Method:	Split Spoon
Depth:	2' - 4'
Sample Description:	Sandy ,Silt with Clay & Gravel - Brown
Sampled By:	Engtec
Sampling Date:	November 5, 2024
Client Sample ID:	N/A
Comments:	Sandy ,Silt with Clay & Gravel - Brown

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
37.5	100.0	**0.0438**	32.5
26.5	100.0	**0.0313**	31.2
19	100.0	**0.0199**	29.8
16	98.7	**0.0116**	28.4
13.2	98.5	**0.0083**	25.7
9.5	98.1	**0.0059**	24.4
4.75	95.7	**0.0030**	19.0
2	93.4	**0.0013**	12.2
0.85	92.1	**0.0000**	0.0
0.425	90.9		
0.25	88.1		
0.106	77.9		
0.075	68.6		

Review Status - Laboratory Manager
☑ Reviewed
☐ Not Reviewed

UNIFIED SOIL CLASSIFICATION SYSTEM

	CLAY AND SILT		SAND			GRAVEL	
			Fine	Medium	Coarse	Fine	Coarse
%	15.1	53.5	22.2	2.5	2.3	3.0	1.3



Reported By: Leonardo Pilapil, C.E.T.
Laboratory Supervisor

Approved By: Salman Bhutta ,Ph.D., P.Eng.
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Grain Size Analysis & Hydrometer
LS - 702

Lab Sample No.: G09835
Project Name: Engineering Services-3525 Baseline Road ,Georgina

Date Reported: November 13, 2024
Project No: ET24-1438B

Grain Size Proportion (%)	
Gravel - Coarse	1.7
Gravel - Fine	8.0
Sand - Coarse	4.0
	6.7
Sand - Fine	21.3
Silt (> 2mm), < 75mm):	40.0
Clay (< 2mm):	18.4
Total	100.0

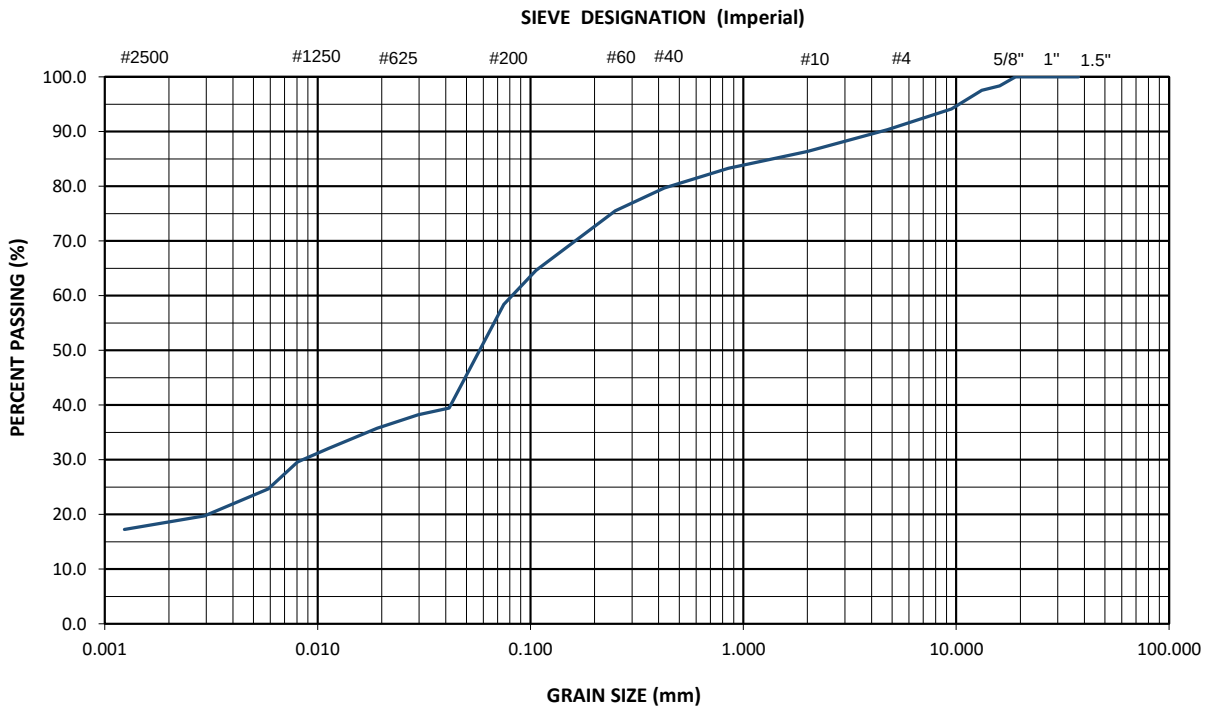
Sample Information	
Borehole No.:	BH#6, SS2
Sample Method:	Split Spoon
Depth:	2' - 4'
Sample Description:	Sandy ,Silt with Clay & Gravel - Brown
Sampled By:	Engtec
Sampling Date:	November 5, 2024
Client Sample ID:	N/A
Comments:	Sandy ,Silt with Clay & Gravel - Brown

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
37.5	100.0	**0.0415**	39.4
26.5	100.0	**0.0296**	38.2
19	100.0	**0.0190**	35.7
16	98.3	**0.0112**	32.0
13.2	97.5	**0.0080**	29.6
9.5	94.1	**0.0059**	24.6
4.75	90.3	**0.0029**	19.7
2	86.3	**0.0012**	17.3
0.85	83.3	**0.0000**	0.0
0.425	79.7		
0.25	75.5		
0.106	64.6		
0.075	58.4		

Review Status - Laboratory Manager
☑ Reviewed
☐ Not Reviewed

UNIFIED SOIL CLASSIFICATION SYSTEM

	CLAY AND SILT		SAND			GRAVEL	
			Fine	Medium	Coarse	Fine	Coarse
%	18.4	40.0	21.3	6.7	4.0	8.0	1.7



Reported By: Leonardo Pilapil, C.E.T.
Laboratory Supervisor

Approved By: Salman Bhutta ,Ph.D., P.Eng.
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Grain Size Analysis & Hydrometer
LS - 702

Lab Sample No.: G09835
Project Name: Engineering Services-3525 Baseline Road ,Georgina

Date Reported: November 12, 2024
Project No: ET24-1438B

Grain Size Proportion (%)	
Gravel - Coarse	0.0
Gravel - Fine	5.8
Sand - Coarse	5.6
	4.2
Sand - Fine	17.3
Silt (> 2mm), < 75mm):	36.8
Clay (< 2mm):	30.4
Total	100.0

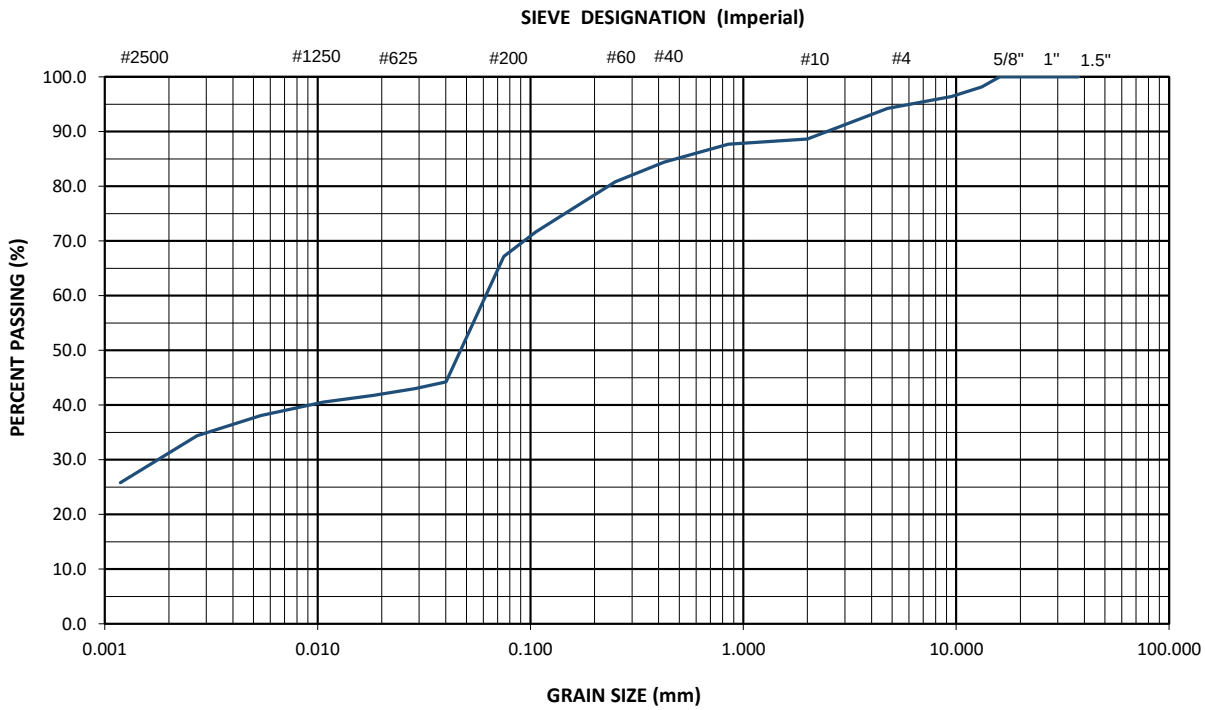
Sample Information	
Borehole No.:	BH#7, SS2
Sample Method:	Split Spoon
Depth:	2' - 4'
Sample Description:	Sandy ,Silt with Clay &Gravel - Brown
Sampled By:	Engtec
Sampling Date:	November 5, 2024
Client Sample ID:	N/A
Comments:	Sandy ,Silt with Clay &Gravel - Brown

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
37.5	100.0	**0.0401**	44.2
26.5	100.0	**0.0286**	43.0
19	100.0	**0.0183**	41.8
16	100.0	**0.0106**	40.5
13.2	98.1	**0.0076**	39.3
9.5	96.4	**0.0054**	38.1
4.75	94.2	**0.0027**	34.4
2	88.6	**0.0012**	25.8
0.85	87.7	**0.0000**	0.0
0.425	84.4		
0.25	80.8		
0.106	71.7		
0.075	67.2		

Review Status - Laboratory Manager
☑ Reviewed
☐ Not Reviewed

UNIFIED SOIL CLASSIFICATION SYSTEM

	CLAY AND SILT		SAND			GRAVEL	
			Fine	Medium	Coarse	Fine	Coarse
%	30.4	36.8	17.3	4.2	5.6	5.8	0.0



Reported By: Leonardo Pilapil, C.E.T.
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Grain Size Analysis & Hydrometer
LS - 702

Lab Sample No.: G09835
Project Name: Engineering Services-3525 Baseline Road ,Georgina

Date Reported: November 13, 2024
Project No: ET24-1438B

Grain Size Proportion (%)	
Gravel - Coarse	0.0
Gravel - Fine	3.8
Sand - Coarse	3.6
	6.7
Sand - Fine	24.9
Silt (> 2mm), < 75mm):	43.9
Clay (< 2mm):	17.1
Total	100.0

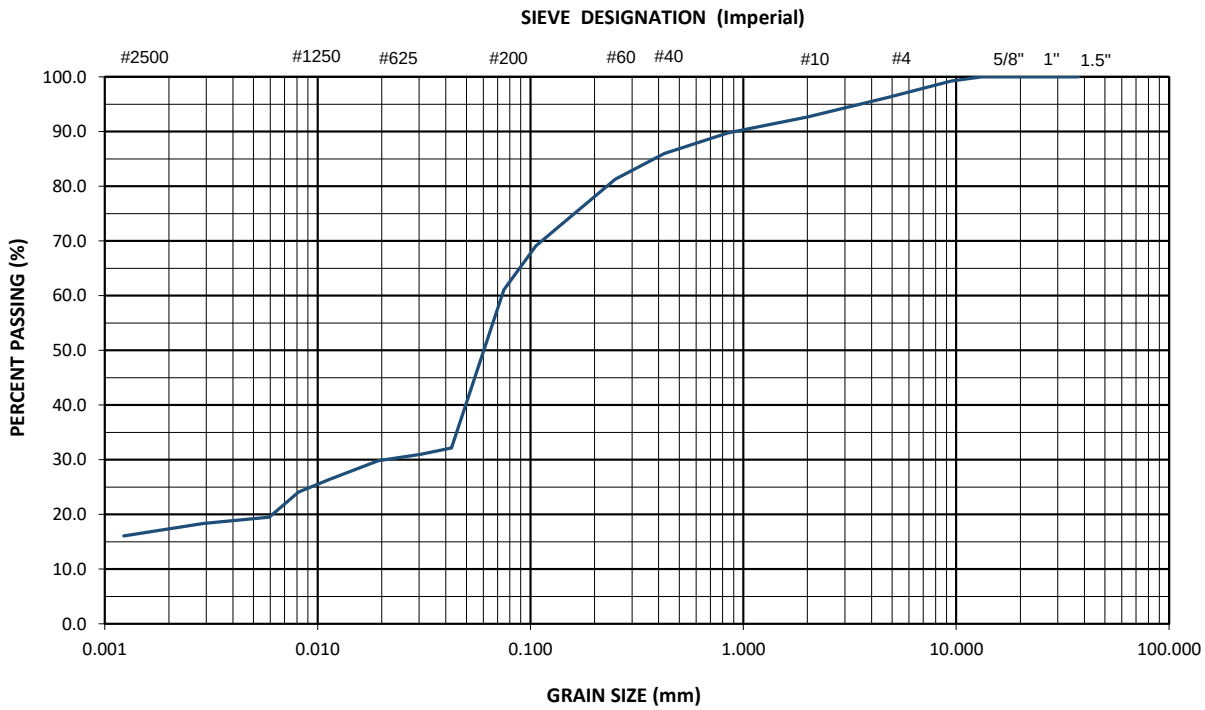
Sample Information	
Borehole No.:	BH#7, SS4
Sample Method:	Split Spoon
Depth:	7.5' - 9.5'
Sample Description:	Clayey, Silt with Sand & Gravel - Brown
Sampled By:	Engtec
Sampling Date:	November 5, 2024
Client Sample ID:	N/A
Comments:	Clayey, Silt with Sand & Gravel - Brown

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
37.5	100.0	**0.0426**	32.1
26.5	100.0	**0.0302**	31.0
19	100.0	**0.0193**	29.8
16	100.0	**0.0114**	26.4
13.2	100.0	**0.0081**	24.1
9.5	99.2	**0.0059**	19.5
4.75	96.2	**0.0029**	18.4
2	92.6	**0.0012**	16.1
0.85	89.8	**0.0000**	0.0
0.425	86.0		
0.25	81.3		
0.106	69.1		
0.075	61.1		

Review Status - Laboratory Manager
☑ Reviewed
☐ Not Reviewed

UNIFIED SOIL CLASSIFICATION SYSTEM

	CLAY AND SILT		SAND			GRAVEL	
			Fine	Medium	Coarse	Fine	Coarse
%	17.1	43.9	24.9	6.7	3.6	3.8	0.0

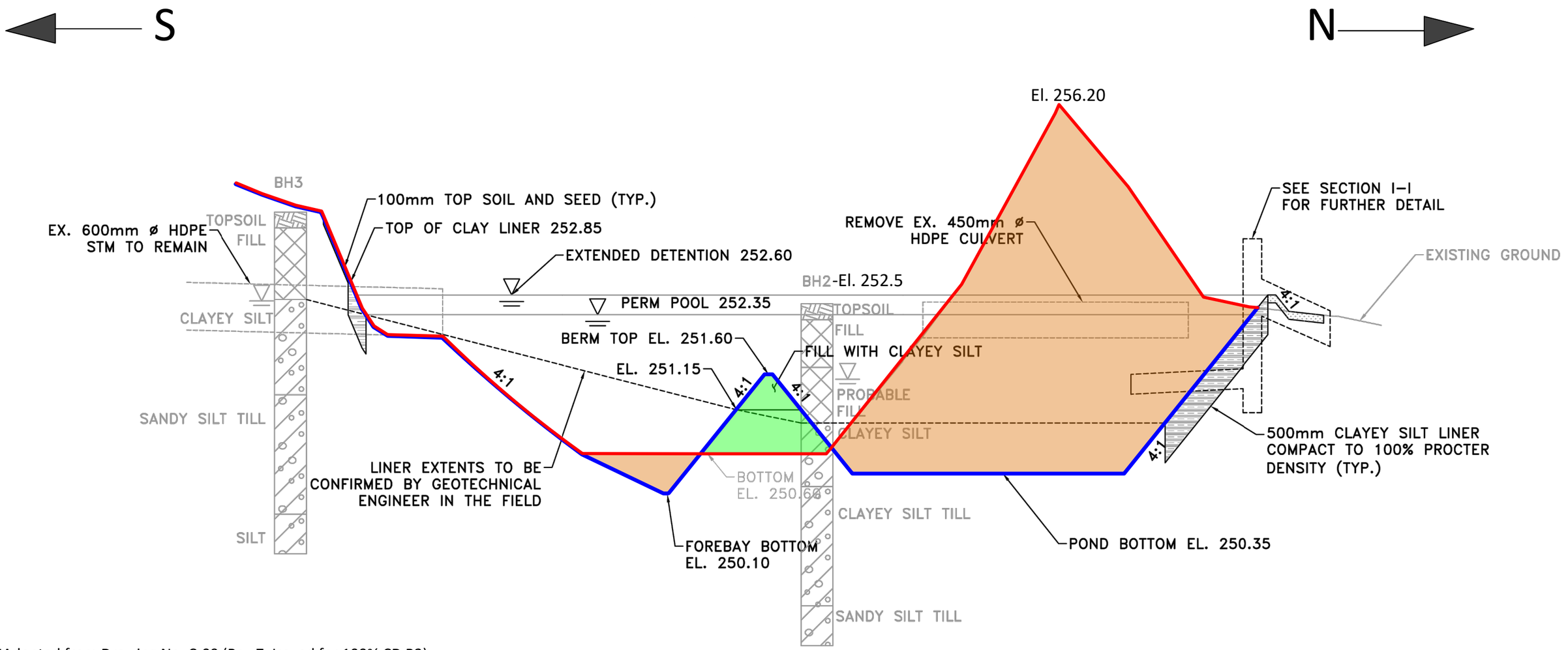


Reported By: Leonardo Pilapil, C.E.T.
Laboratory Supervisor

Approved By: Salman Bhutta ,Ph.D., P.Eng.
Project Manager

Appendix E

Modified Pond Geometry



*Adopted from Drawing No. C-09 (Rev 7, Issued for 100% CD R2), Titled "McMinnows Pond Modifications", dated July 15, 2024

Cut Sections
Fill Sections
Existing Pond
New Modified Pond

Project Name: Geotechnical Investigation for SWM Ponds
Project No. ET24-1438B
Project Location: 3525 Baseline Road, Sutton West
Contract No.
Drawing Title: Section Plan - McMinnows Pond
Drawn By: S.A. Checked By: M.M
Drawing No. 02
Date: Novermber 21, 2024 Scale: NTS

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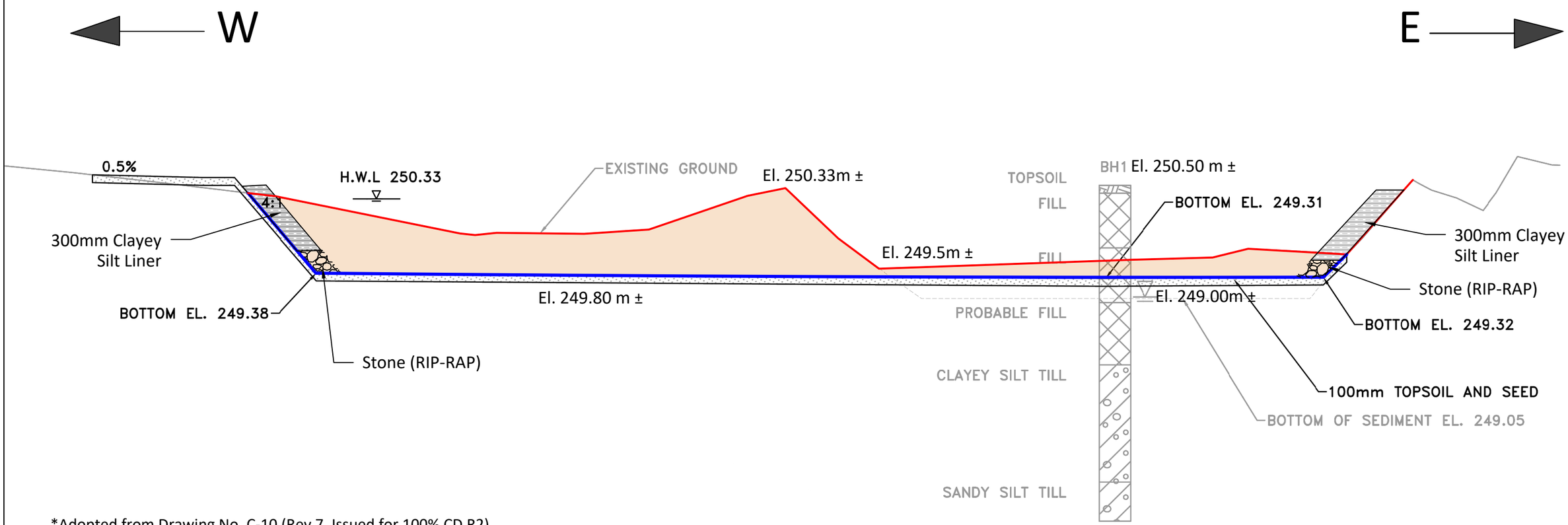
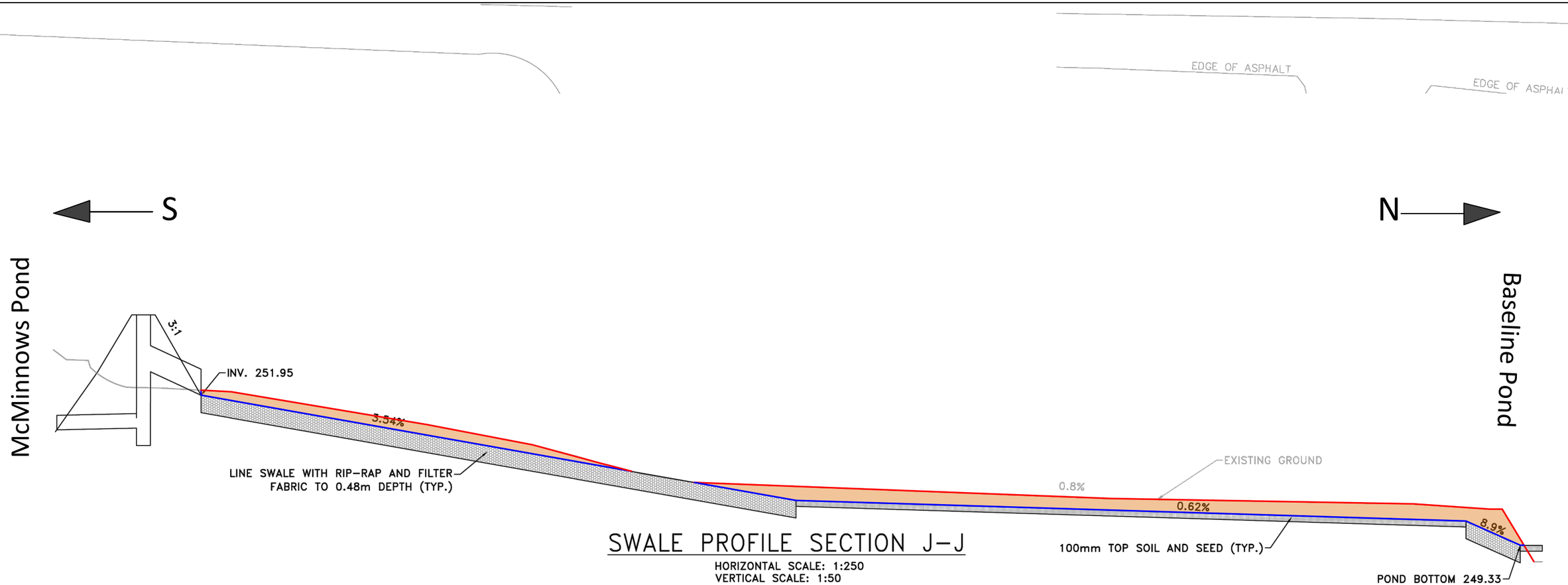


*Adopted from Drawing No. C-10 (Rev 7, Issued for 100% CD R2),
Titled "Pond Sections", dated July 15, 2024

Cut Sections
Fill Sections
Existing Pond
New Modified Pond

Project Name: Geotechnical Investigation for SWM Ponds
Project No. ET24-1438B
Project Location: 3525 Baseline Road, Sutton West
Contract No.
Drawing Title: Section Plan - Baseline Pond
Drawn By: S.A. Checked By: M.M
Drawing No. 03
Date: Novermber 22, 2024 Scale: NTS

Engtec Consulting Inc.
1-2447 Anson Drive
Mississauga, ON, L5S 1G1
Tel: (905) 856-2988



SWALE PROFILE SECTION J-J

HORIZONTAL SCALE: 1:250
VERTICAL SCALE: 1:50

Cut Sections

Fill Sections

Existing Pond

New Modified Pond

Project Name: Geotechnical Investigation for SWM Ponds

Project No. ET24-1438B

Project Location: 3525 Baseline Road, Sutton West - Swale

Contract No.

Drawing Title: Section Plan

Drawn By: S.A. Checked By: M.M

Drawing No. 04

Date: Novermber 22, 2024 Scale: NTS

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