Geotechnical Investigation

Proposed GBC Residential Enclave Subdivision
516681 7th Line
Clarksburg, Ontario

Client:
Dunn Capital Corporation

Attention: Ken Hale, RPP, MCIP, OALA, CSLA
Vice President, Land Development
and Acquisitions

Type of Document:
Draft Geotechnical Investigation Report

Project Number:
G4603-22-7

JLP Services Inc.
Geotechnical and Environmental Consultants
405 York Road
Guelph, ON
N1E 3H3

Date Submitted:
July 18, 2023

Cc: Dunn Capital Corporation – Attn: Brandon Prest, Vice President, Construction
Tatham Engineering – Attn: Jeremy Acres, C.E.T., Project Manager

Table of Contents

Enclosures

List of Appendices

1. Introduction

JLP Services Inc. (JLP) was retained by Dunn Capital Corporation to carry out a geotechnical investigation for the proposed GBC Residential Enclave Subdivision located at 516681 7 Line in Clarksburg, Ontario.

Although final details concerning the proposed development are unavailable at the time of this report, it is understood that the proposed residential development will consist of detached single-family dwellings with basement and associated municipal site services, roads and storm water management facility.

The purpose of this investigation was to reveal the subsurface soil and groundwater conditions at the site and to determine the relevant soil properties for preliminary recommendations for the design and construction of building foundations, floor slab-on-grade, driveways, site services, roads and storm water management facility.

The conclusions and recommendations given in this report are based on the assumption that the design concept mentioned above will proceed into construction. If changes are made in the design phase and/or during construction, JLP must be retained to review these changes. The outcome of this review may lead to modifications to our recommendations or may require additional field and/or laboratory analyses to determine if the proposed changes are acceptable from a geotechnical standpoint.

2. Site Description

The site is located on east side of 7 Line, south of Club Drive, within the estate of the Georgian Bay Golf Club. The site is currently occupied by a single detached family dwelling surrounded by matured trees. It is surrounded by existing residential dwellings on north side of Club Drive, golf greens on east and south sides, and residences on west side of 7 Line.

The ground surface is gently rolling with the higher grounds at the northeast and south ends of the property. It generally slopes from northwest to southeast towards the golf greens at the Georgian Bay Golf Club. The difference in ground surface elevations is about 8.7m between the

highest and the lowest borehole locations and is typically about 2.6m from the northwest to the southeast borehole locations. The site is densely wooded and consists of a series of trails.

3. Field Work

The fieldwork was carried out on September 27 and 28, 2022 and consisted of six (6) boreholes at the locations shown on the Borehole Location Plan, Enclosure 1.

Prior to the commencement of drilling and sampling operations at the site, the borehole locations were cleared of underground utilities by Ontario One Call contractors.

The boreholes were advanced to the sampling depths by means of a track-mounted, power auger machine, equipped with hollow stem augers and split spoon samplers for soil sampling. Standard Penetration tests were carried out at frequent intervals of depth and the results are shown on the Borehole Logs as N-values. The subsurface soils were visually examined, logged and sampled at the borehole locations.

Ground water conditions were observed in the open boreholes during the drilling and sampling operations. Monitoring wells were installed in four (4) of the boreholes for groundwater monitoring.

JLP Services Inc. engineering staff supervised and directed the fieldwork. The layout of borehole locations was carried out in the field using a handheld global positioning system with UTM coordinates. The coordinates and ground surface elevation at the borehole location were obtained from a portable global positioning system with UTM coordinates and NAD83 Datum supplied by Maxim Environmental and Safety Inc. The approximate coordinates and ground surface elevation at the borehole location are listed in Table 1 below.

Table 1: Borehole Location and Ground Surface Elevations

Borehole	Northing	Easting	Latitude	Longitude	Ground Surface Elevation (m±)
1	49311220	546566	--	--	222.63
2	4931279	546721	--	--	221.33

Borehole	Northing	Easting	Latitude	Longitude	Ground Surface Elevation (m±)
3	4931306	546843	--	--	224.71
4	4931197	546877	--	--	221.82
5	4931197	546746	--	--	228.72
6	4931126	546570	--	--	220.01

4. Subsurface Conditions

Full details of the soil conditions encountered in each borehole are given on the Borehole Logs, Enclosures 2 to 7, inclusive and the following notes are intended to summarize this data.

A layer of **topsoil**, about 450 to 600mm thick, was encountered at the surface of all boreholes. The topsoil consisted of sandy silt, trace gravel, scattered organic pockets and roots and plant fibres. It was black to dark grey in colour. Standard Penetration tests in the topsoil gave N-values ranging between 6 and 17 blows/300mm. The natural moisture content was found to range between 20 and 48%.

Based on the test results, the topsoil is considered to be in a loose to compact state of compactness and in moist condition.

It should be noted that the thickness of topsoil may vary significantly between borehole locations and should not be relied upon to estimate the quantity of topsoil for removal.

A layer of discontinuous **sandy silt** was encountered below the topsoil in Boreholes 1 and 6 to depths of 1.6 and 1.2 metres below grade, respectively. The sandy silt was dark brown to brown in colour and consisted of trace to some gravel, scattered roots and organic inclusions in upper zone. Standard Penetration tests in the sandy silt gave N-values ranging between 15 and 16 blows/300mm. The natural moisture content was found to range between 20 and 26%.

Based on the test results and visual and tactile examination of the soil samples, the deposit of sandy silt is considered to be in a generally compact state of compactness and in moist condition.

Below the topsoil in Boreholes 2, 3, 4 and 5, a discontinuous deposit of **sand** was encountered to depths of 3.5 to 5.8 metres below grade. The sand was dark brown to brown in colour and was fine to coarse grained. It consisted of trace to some silt, trace clay and trace gravel. In Borehole 2, the sand contained scattered gravelly seams. In Borehole 5, the sand contained scattered organic inclusions in upper zone. Standard Penetration tests in this material gave N-values ranging from 12 to over 100 blows/300mm, with typical values between 25 and 38 blows/300mm. The natural moisture content was found to range from 4 to 21%, with typical values between 12 and 16%.

A typical grain size distribution curve for the sand can be found on Enclosure 9. The grain size analysis results indicate 4% of gravel, 80% of sand, 9% of silt and 7% of clay size particles by weight.

Based on the test results and visual and tactile examination of the soil samples, the discontinuous deposit of sand is considered to be in a generally compact to dense state of compactness and in moist to wet condition. It is noted the presence of coarse gravel and/or cobbles, such as in Borehole 4, may have resulted in high N-values and these may not accurately represent the relative density of the sand material.

The deposits of sandy silt in Borehole 1 and sand in Boreholes 4 and 5 were underlain by a discontinuous deposit of **sandy silt till** extending to a depth of about 4.2 metres below grade in Borehole 1 and to the termination depths of Boreholes 4 and 5 at about 6.7 metres below grade. The sandy silt till was brown to grey in colour and consisted of some clay, trace to some gravel and scattered gravel inclusions or occasional cobbles. Standard Penetration tests in this material gave N-values ranging from 14 to 31 blows/300mm. The natural moisture content was found to range from 9 to 24%.

A typical grain size distribution curve for the sandy silt till can be found on Enclosure 8. The grain size analysis results indicate 8% of gravel, 27% of sand, 32% of silt and 33% of clay size particles by weight.

Based on the test results and visual and tactile examination of the soil samples, the discontinuous deposit of sandy silt till is considered to be in a compact to dense state of compactness and in moist to wet condition.

The deposits of sandy silt till in Borehole 1, sand in Boreholes 2 and 3, and sandy silt in Borehole 6 were underlain by a discontinuous deposit of **silt** to the termination depths of Boreholes 1, 2, 3 and 6 at about 6.7 metres below grade. The silt was light brown to grey in colour and consisted of trace sand and scattered fine sand seams in a stratified texture. Standard Penetration tests in this material gave N-values ranging from 17 to 74 blows/300mm. The natural moisture content was found to range from 15 to 20%.

A typical grain size distribution curve and the results of plasticity limits for the silt material can be found on Enclosure 10. The grain size analysis results indicate 4% of gravel, 8% of sand, 74% of silt and 14% of clay size particles by weight. The liquid limit (LL), Plastic Limit (PL) and plasticity index (PI) of the sample of fill material are 13.3%, 11.7% and 1.6%, respectively.

Based on the test results and visual and tactile examination of the soil samples, the deposit of silt is considered to be in a compact to very dense state of compactness and in generally moist condition.

5.0 Groundwater Conditions

Free water was encountered in Boreholes 1, 2 and 6 at about 5.79, 5.79 and 5.80 metres below grade, Elevations 216.84m, 215.54m and 214.21m, respectively on completion of the fieldwork.

In Boreholes 1, 3, 4 and 5, a monitoring well was installed in each of the boreholes, sealed with bentonite between 0.0 and 2.7 metres below grade, for groundwater level monitoring. Free water surfaces were measured at depths and elevations noted in Table 2 below.

Table 2: Observed Groundwater Levels

Location	Ground Elevation (m)	September 27 or 28, 2022		November 8, 2022	
		Depth Below Existing Grade (m±)	Water Level Elevation (m±)	Depth Below Existing Grade (m±)	Water Level Elevation (m±)
BH 1 - well	222.63	5.79	216.84	2.91	219.72
BH 2	221.33	5.79	215.54	--	--
BH 3 - well	224.71	--	--	4.96	219.75
BH 4 - well	221.82	--	--	4.81	217.01
BH 5 - well	228.72	--	--	dry	--
BH 6	220.01	5.80	214.21	--	--

Data loggers and Baro loggers were installed in the monitoring wells to record water levels over the next 12 months as required.

An examination of the soil samples indicated that the materials were generally moist to wet.

It is noted that no sub-artesian water pressure was encountered in any of the boreholes.

Based on the foregoing and the moisture content profiles of the soil samples, the groundwater table at the site is considered to be located at about 3.0 to 5.0 metres below grade, Elevations 217.0m to 219.8m. The groundwater is believed to be originated within the pervious sand and silt deposits.

Seasonal fluctuation of the groundwater level should be anticipated.

6.0 Discussion and Recommendations

6.1 General

The boreholes generally encountered a surficial deposit of topsoil, followed by discontinuous deposits of sandy silt, sand, sandy silt till and silt. The groundwater level at the site appears to

at about Elevation 219.8m along the north side of the property and at about Elevation 217.0m at the south side. Seasonal fluctuation of the groundwater level should be anticipated.

Although final details concerning the proposed development are unavailable at the time of this report, it is understood that the proposed residential development will consist of single detached family dwellings with basement and associated municipal site services, access roads and storm water management facility. Based on the foregoing, the following discussion is therefore considered preliminary. It should be reviewed when more details are available.

6.2 Site Grading

It is assumed some re-grading will be required at the site depending on the final design grades of the proposed subdivision development.

Following clearing and grubbing as required, the surficial topsoil may be removed and stockpiled for re-use and/or off-site disposal. The design site grades may be achieved by cut and fill operations. All cut and fill to support the proposed building lots, site services and pavement areas should be carried out following the procedure for “engineered fill”.

The procedure for “engineered fill” construction would consist of the following:

1. All vegetation, surficial topsoil, buried topsoil and unsuitable fill should be removed from the proposed building lots, site services and pavement areas. Any organic, excessively wet or otherwise deleterious materials should not be used as “engineered fill” material.
2. Existing groundwater monitoring wells and/or potable water wells, if any, should be properly decommissioned in accordance with the Ontario Water Resources Act, R.R.O. 1990, Ontario (O.Reg.) 903 – amended to O.Reg. 128/03.
3. The exposed subgrade should be proofrolled with a heavy-duty equipment, such as a loaded dump truck, and examined by geotechnical personnel from JLP. Any loose or soft areas encountered during the proofrolling process should be further subexcavated and replaced with approved on-site or imported soil material compacted to a minimum of 98% of the Standard Proctor Maximum Dry Density (SPMDD).

4. Low areas can then be brought up to the design pre-grade level with approved on-site or imported soil material placed in maximum 300mm thick lifts and compacted to a minimum of 98% of the SPMDD.
5. Moisture conditioning should be applied to the approved on-site and/or imported soil materials for effective compaction. Some of the on-site soil materials may require air drying before they can be properly compacted.
6. The "engineered fill" under all structures to be supported should extend to at least 1.0 metre laterally beyond the edge of their perimeter at the founding level and at least a distance equal to the depths of the fill pad, at the level of the approved subgrade.
7. Temporary fill slopes should be no steeper than 1 vertical to 2 horizontal and should be protected from surface erosion.
8. All imported fill materials should be assessed by JLP prior to transport to the site in accordance with the "On-Site and Excess Soil Management Regulation", O.Reg. 406/19 and supporting amendments.
9. All imported fill materials should be free from organics and debris and should be tested geotechnically by JLP prior to transport to the site.
10. All topsoil and unsuitable material removal, subgrade preparation, fill placement and compaction should be monitored on a full-time basis by geotechnical staff from JLP to approve materials and to verify that the specified degree of compaction have been achieved.
11. The "engineered fill" should be in place at least three months prior to the construction of buildings over it to minimize potential settlement.

6.3 Site Services

The inverts of the proposed site services are not available at the time of this report. However, it is expected that the storm sewer and watermain inverts will be located at depths ranging between 2 and 4 metres below the finished grades. All sewers and watermains should be protected from frost actions by at least 1.4m of soil cover or equivalent thermal insulation.

Reference to the Borehole Logs indicates that the subgrade will consist of native sandy silt, sandy silt till, sand or silt in generally compact state or "engineered fill" constructed during site grading. The subgrade will generally provide adequate support for the pipes and allow the use

of OPSD 802.010 and/or OPSD 802.031 Class 'B' bedding using OPSS.MUNI 1010 Granular 'A' material.

Clear crushed stone should not be used as bedding as fine-grained particles may migrate into the voids of the stone and cause undesirable settlements. Where the exposed subgrade is less competent than the materials identified in the Borehole Logs, the bedding thickness may have to be increased.

If the trench excavation is above the observed groundwater level, the sides of the open cut excavation should either be cut back at a side slope of 1 vertical to 1 horizontal or supported with trench box or temporary shoring system.

If the trench excavation is below the observed groundwater level, construction dewatering by means of pumping from sump within the excavation or by pumping from well-points may be required to lower the groundwater level to at least 600 mm below the bottom of the trench to facilitate construction. The sides of the open cut excavation should either be cut back at a side slope of 1 vertical to 2 horizontal or supported with trench box or temporary shoring system.

The excavated materials will be generally suitable for re-use as trench backfill provided that they are free of topsoil, organic material and cobbles/boulders. If the on-site materials become wet, they should be air dried prior to re-use as trench backfill. The trench backfill should be placed in maximum 300mm thick layers and uniformly compacted to at least 95% of its Standard Proctor Maximum Dry Density (SPMDD).

The backfill around maintenance holes, catchbasins, valve chambers, thrust blocks and/or service connections should consist of free-draining granular material, such as the OPSS Granular 'B' Type I material and compacted to a minimum of 95% of its SPMDD.

To minimize potential problems and wetting of the subgrade material, backfilling operations should follow closely after excavations, so that only a minimal length of trench is exposed at a time. Should construction be carried out in the winter season, particular attention should be given to make sure no frozen material is used for backfill.

Cobbles and/or boulders may be present in the native sandy silt till deposit, and some difficulty or delays may be anticipated during excavation. Cobbles and/or boulders with nominal diameter larger than 150mm should not be re-used as trench backfill.

6.4 Storm Water Management Facility

Grain size distribution curves were prepared for representative samples of the subsoils obtained at the boreholes. These grain size distribution analyses were performed following applicable ASTM laboratory procedures and are found on Enclosures 8 to 10, inclusive.

The grain size distribution curves were compared to the family of curves presented in the Supplementary Standard SB-6 of the 2012 Building Code Compendium. According to the Unified Soils Classification System and taking into consideration the specific physical nature of the soils, the samples in question are considered to have the properties noted in the following Table 3.

Table 3: Soil Permeability and T-time Estimation

Sample Number	Material					Unified Soils Classification Group	Estimated Co-efficient of Permeability (k) (cm/sec)	Estimated T-time (min/cm)
	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)			
BH1 SS4	Sandy Silt Till	8	27	32	33	(CL)	10^{-4} - 10^{-6}	12 - 50
BH3 SS5	Sand	4	80	9	7	(SW)	10^{-2} - 10^{-4}	4 - 12
BH6 SS3	Silt	4	8	74	14	(ML)	10^{-3} – 10^{-5}	8 - 20

If a storm water management pond is to be constructed for the proposed subdivision, a low permeability liner may be required to maintain a permanent wet pond. The low permeability liner may be constructed with a minimum 1m thick layer of clayey soils conforming to

OPSS.MUNI 1205 requirements. Alternatively, a geosynthetic clay liner, such as Bentofix CNSL, or a synthetic liner, such as Nilex Geomembrane PVC 40 mil or similar products, may be used.

If a geosynthetic or synthetic liner is used, a minimum 300mm thick marker layer should be placed above the liner as an indicator/protective soil cover. The liner should be installed as per manufacturer's guidelines and up to a minimum of 0.6m above the design flood level in the pond. An underdrainage system may be required to relieve the hydrostatic uplift against the liner if the bottom of pond is lower than the highest observed groundwater level in the vicinity of the pond.

6.5 Pavement Design and Construction

All topsoil and any deleterious materials encountered should be stripped from the proposed road pavement areas. The exposed subgrade should be re-compacted from the surface to at least 98% of its standard Proctor maximum dry density (SPMDD) prior to construction of the road pavement. Any loose areas which are detected should be sub-excavated and backfilled with approved imported granular fill. All granular fill materials should be placed in 150 to 200mm thick lifts and compacted to 100% of the SPMDD.

Considering the probable traffic requirements, subgrade conditions and a functional design life of about 15 years, the following pavement structure designs as per the Blue Mountains Engineering Standards are recommended:

Table 4: Recommended Pavement Structures

Pavement Components	Local - Rural (mm)	Collector - Minor (mm)
Asphaltic Concrete – HL3	40	50
Asphaltic Concrete – HL4	40	50
Granular 'A' Base Course	150	150
Granular 'B' Type I Subbase Course	450	450

The granular base and sub-base materials should meet Ontario Provincial Standard Specification OPSS.MUNI.1010 and local requirements and should be compacted to 100% of the Standard Proctor Maximum Dry Density (SPMDD) as per OPSS.MUNI.501 requirements. The asphaltic concrete should conform to OPSS.MUNI.1150 and should be compacted to a minimum of 92.0% of the Maximum Relative Density (MRD) as per OPSS.MUNI.310 requirements.

Frequent inspections by geotechnical personnel from JLP Services Inc. should be carried out during construction to verify the compaction of the subgrade, base courses and asphaltic concrete by in-situ density testing using nuclear gauges.

6.6 Building Foundations

The proposed buildings to be constructed at the site are assumed to be primarily single detached residential dwellings with basements. The proposed buildings can be supported on spread footings founded a minimum of 0.2m into the native undisturbed sandy silt till, sand or silt in compact state of compactness or into the properly constructed “engineered fill” and designed to a geotechnical reaction of 150 kPa at Serviceability Limit States (S.L.S.) and a factored geotechnical resistance of 225 kPa at Ultimate Limit States (U.L.S.).

All exterior footings or footings in unheated areas should be located at least 1.4 metres below finished grade or provided with equivalent thermal insulation for adequate frost protection.

Elevation differences between adjacent footings should not be more than a half of the horizontal distance between them.

It is estimated that the total and differential settlements of spread footings designed to these bearing pressures will be less than 25mm and 20mm respectively, which are normally considered acceptable for the proposed structure.

It is recommended that all foundation excavations be inspected by geotechnical personnel from JLP to ensure the founding soils are similar to those identified in the boreholes or are competent “engineered fill” and that they are capable of supporting the design bearing pressures.

Based on the 2012 Building Code Compendium, the classification of soils for seismic design should be based on the average properties of the top 30 metres of the soil profile. The depth of boreholes were 6.7 metres below existing grade and were terminated in compact to very dense silt or compact to dense sandy silt till. Assuming these deposits extend to depth, the soils at the site may be classified as Site Class 'D' under the site classification for seismic site response of 2012 Building Code Compendium.

6.7 Basement Walls

The basement walls of the proposed buildings may be designed to resist lateral earth pressures and the magnitude of which can be determined from the equation below:

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

where;

p	=	lateral earth pressure, kN/m^2
K	=	active earth pressure coefficient, $K = Ka = 0.33$, if retaining structure is permitted to move, otherwise, $K = Ko = 0.50$
γ	=	bulk unit weight of backfill, use $21\ kN/m^3$
d	=	depth below finished grade, metres
q	=	adjacent surcharge acting close to the wall, kN/m^2

The above equation assumes that there is no hydrostatic pressure build up against the basement walls. As such, the basement walls should be dampproofed and protected with a synthetic vertical drainage layer. A perimeter subdrain system should be installed at footing level outside the building envelope to facilitate drainage. The perimeter subdrain system should consist of 150mm diameter perforated pipe surrounded with a minimum of 300mm of 19mm clear stone all wrapped with a filter fabric, such as Texel 100C or other products with equivalent apparent opening size (AOS).

Water collected in the perimeter drainage system should be directed to the local storm drainage system either by gravity or by a permanent sump pump. Surface runoff around the proposed buildings should be directed away from the building.

Alternatively, the basement walls and floors can be sealed tight using waterproofing systems and designed to resist full hydrostatic pressures.

6.8 Floor Slabs

All topsoil and any deleterious materials encountered should be stripped from the proposed building areas. Any loose material encountered should be sub-excavated and replaced with approved fill. The exposed subgrade should be re-compacted from the surface to a minimum of 98% of the Standard Proctor Maximum Dry Density (SPMDD).

Backfill around the footings and basement walls should be compacted to a minimum of 98% of the SPMDD. The backfill may consist of approved on-site sand and gravel or imported granular materials, such as OPSS Granular 'B' Type I (natural sand, some gravel). All fills should be placed in 150 to 200mm thick lifts and compacted to a minimum of 95% of the SPMDD.

A layer of free-draining material, such as OPSS.MUNI 1004 19mm Clear Stone, at least 150mm thick and nominally compacted, should be placed under the floor slabs to provide a uniform bearing surface and act as a moisture barrier.

The basement floors should be located at least 0.5 metres above the highest observed groundwater level, otherwise sub-floor drainage systems together with continual pumping from the drainage systems will be required.

Around the perimeter of the proposed building, the ground surface should be sloped on a positive grade away from the structure to promote surface water run-off and reduce groundwater infiltration adjacent to the foundations.

Frequent field review and testing by geotechnical personnel from JLP should be carried out during construction to verify the competency of the subgrade and compaction of granular base and/or backfill by in-situ density testing using nuclear gauges.

6.9 Excavation and Groundwater Control

Excavation to reach the footing founding levels will extend to about 1.8 metres below design pre-grades. Excavations must be carried out in accordance with the current Occupation Health and Safety Act (OHSA) and local regulations. For guidance, the side slopes should be cut back to 1 vertical to 1 horizontal as the native sandy silt, sand, sandy silt till, silt or "engineered fill" using native soils as fill are considered to be Type 3 soils within the meaning of the OHSA.

Minor seepage from perched water in the native soil deposits or "engineered fill" should be anticipated during construction. However, it should be possible to control and remove seepage water from these sources or surface water from precipitation by pumping on as and where required basis.

7.0 Statement of Limitation

The Statement of Limitation including the Terms and Conditions of this report is presented on Appendix 'A' is an integral part of this report.

8.0 Closure

We trust this report is satisfactory for your purposes. Should you have any questions, please do not hesitate to contact this office.

Sincerely,
JLP Services Inc.

Alexander Lee, M.Sc. (Eng.), P.Eng.
Senior Geotechnical Engineer

J. Board, B.A.
General Manager, Geotechnical Services

Enclosures

Legend

Project Area

Borehole (JLP, 2022)

N

Notes:
1. The soil types and boundaries are applicable only at the location of the boreholes. Between boreholes, they are assumed and may change substantially. The topsoil thicknessess quoted in the report are used for discussion purposes only and should not be used for estimating purposes.
2. The Ground Surface elevations at the borehole locations were derived from the Temporary Benchmark (TBM) as shown.
3. The soil samples will be retained for three months from the date of issue of the final report and then discarded, unless the client has requested to extend the storage period wit fees.

JLP
Geotechnical & Environmental Consultants

Site Plan
GBC Residential Enclave Subdivision
516681 7 Line,
Clarksburg, Ontario

Date: Oct. 25, 2022	Ref. No. G4603-22-7	
Prepaired By: CL	Checked By: AJ	DWG. No. 1
Source: Google Map	Scale: N.T.S.	

BORING NUMBER BH1

JLP
Geotechnical & Environmental Consultants

CLIENT Dunn Capital Corporation
PROJECT NAME GBC Residential Enclave Subdivision
PROJECT NUMBER G4603-22-7
PROJECT LOCATION 5166817 Line
DATE STARTED 27-9-22 **COMPLETED** 27-9-22
GROUND ELEVATION 222.63 m Geodetic **HOLE SIZE** 150mm
DRILLING CONTRACTOR LST
GROUND WATER LEVELS:
DRILLING METHOD D50. Hollow Stem
AT TIME OF DRILLING ---
LOGGED BY AK **CHECKED BY** AL
AT END OF DRILLING ---
NOTES
AFTER DRILLING 5.79 m / Elev 216.84 m

DEPTH (m)	Well Construction	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)
			TOP SOIL sandy silt, trace gravel, scattered organic pockets and roots; dark grey, moist no odour, no staining.	SS 1	75	5-8-8-20 (16)
			SANDY SILT trace to some gravel, scattered roots and organic inclusions in upper zone; dark brown to brown, moist, compact no odour, no staining.	SS 2	83	5-7-9-11 (16)
2				SS 3	92	7-9-8-10 (17)
			SANDY SILT TILL sandy silt, some clay, trace to some gravel, occassional cobbles and boulders; brown, moist to wet, compact no odour, no staining.	SS 4	100	4-6-8-12 (14)
				SS 5	75	12-9-10-9 (19)
4						
			SILT trace sand, some clay, scattered fine sand seams, stratified; greyish brown to grey, moist, dense no odour, no staining.	SS 6	83	13-19-21-22 (40)
6						
				SS 7	92	11-15-27-33 (42)

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

End of Borehole at 6.7 mbgs.

BORING NUMBER BH2

JLP
Geotechnical & Environmental Consultants

CLIENT Dunn Capital Corporation
PROJECT NAME GBC Residential Enclave Subdivision
PROJECT NUMBER G4603-22-7
PROJECT LOCATION 5166817 Line
DATE STARTED 28-9-22 **COMPLETED** 28-9-22
GROUND ELEVATION 221.333 m Geodetic **HOLE SIZE** 150mm
DRILLING CONTRACTOR LST
GROUND WATER LEVELS:
DRILLING METHOD D50. Hollow Stem
AT TIME OF DRILLING ---
LOGGED BY AK **CHECKED BY** AL
AT END OF DRILLING ---
NOTES
AFTER DRILLING 5.79 m / Elev 215.54 m

DEPTH (m)	Well Construction	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)
0			**TOP SOIL** sandy silt, trace gravel, scattered organic pockets and roots; dark grey, moist no odour, no staining.	SS 1	67	3-3-3-5 (6)
			SAND fine to coarse grained, trace to some silt, trace clay, scattered gravelly seams; brown, moist, compact to dense no odour, no staining.	SS 2	88	8-8-6-6 (14)
2				SS 3	92	5-6-6-6 (12)
				SS 4	100	7-8-8-8 (16)
				SS 5	67	6-11-34-24 (45)
4			**SILT** trace sand, some clay, scattered fine sand seams, stratified; greyish brown to grey, moist, compact to dense no odour, no staining.	SS 6	97	4-8-9-10 (17)
6				SS 7	100	10-14-18-26 (32)

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

End of Borehole at 6.7 mbgs.

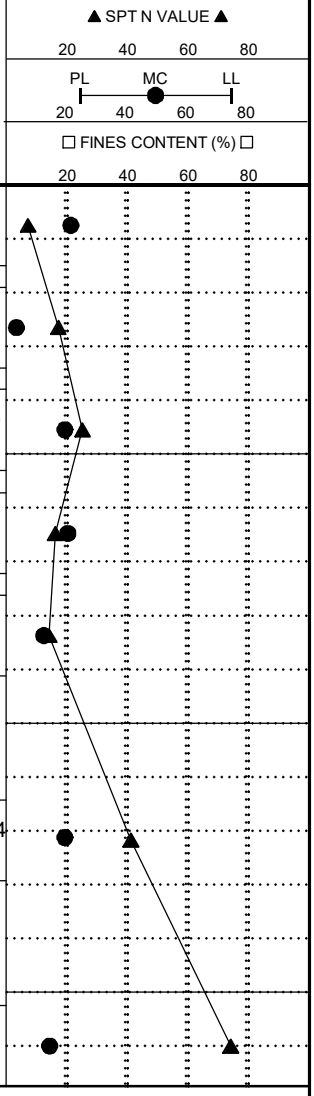
BORING NUMBER BH3

JLP
Geotechnical & Environmental Consultants

CLIENT Dunn Capital Corporation
PROJECT NAME GBC Residential Enclave Subdivision
PROJECT NUMBER G4603-22-7
PROJECT LOCATION 5166817 Line
DATE STARTED 27-9-22 **COMPLETED** 27-9-22
GROUND ELEVATION 224.71 m Geodetic **HOLE SIZE** 150mm
DRILLING CONTRACTOR LST
GROUND WATER LEVELS:
DRILLING METHOD D50. Hollow Stem
AT TIME OF DRILLING ---
LOGGED BY AK **CHECKED BY** AL
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	Well Construction	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)
			TOP SOIL sandy silt, trace gravel, scattered organic pockets and roots; dark grey, moist no odour, no staining.	SS 1	59	4-4-3-5 (7)
			SAND fine to coarse grained, trace to some silt, trace clay, trace gravel inclusions; brown, moist, compact to dense no odour, no staining.	SS 2	75	8-8-9-11 (17)
2				SS 3	88	9-13-12-10 (25)
				SS 4	75	7-9-7-8 (16)
				SS 5	100	4-6-8-8 (14)
4						
				SS 6	50	19-25-16-24 (41)
6			**SILT** trace sand, some clay, scattered fine sand seams, stratified; grey, moist, very dense no odour, no staining.	SS 7	93	14-24-50 (74)

End of Borehole at 6.7 mbgs.



BORING NUMBER BH4

JLP
Geotechnical & Environmental Consultants

CLIENT Dunn Capital Corporation
PROJECT NAME GBC Residential Enclave Subdivision
PROJECT NUMBER G4603-22-7
PROJECT LOCATION 5166817 Line
DATE STARTED 28-9-22 **COMPLETED** 28-9-22
GROUND ELEVATION 221.822 m Geodetic **HOLE SIZE** 150mm
DRILLING CONTRACTOR LST
GROUND WATER LEVELS:
DRILLING METHOD D50. Hollow Stem
AT TIME OF DRILLING ---
LOGGED BY AK **CHECKED BY** AL
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	Well Construction	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)
			TOP SOIL sandy silt, trace gravel, scattered organic pockets and roots; dark grey, moist no odour, no staining.	SS 1	75	2-4-4-7 (8)
			SAND fine to coarse grained, trace to some silt, trace clay, trace gravel inclusions; brown, moist, dense to very dense no odour, no staining.	SS 2	83	11-14-23-26 (37)
2				SS 3	92	8-16-19-17 (35)
				SS 4	100	7-15-23-28 (38)
				SS 5	75	24-50
4			**SANDY SILT TILL** some clay, scattered gravel inclusions; grey, moist to wet, compact to dense no odour, no staining.	SS 6	83	11-11-20-20 (31)
6				SS 7	92	6-7-13-17 (20)

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

End of Borehole at 6.7 mbgs.

BORING NUMBER BH5

JLP
Geotechnical & Environmental Consultants

CLIENT Dunn Capital Corporation
PROJECT NAME GBC Residential Enclave Subdivision
PROJECT NUMBER G4603-22-7
PROJECT LOCATION 5166817 Line
DATE STARTED 28-9-22 **COMPLETED** 28-9-22
GROUND ELEVATION 228.724 m Geodetic **HOLE SIZE** 150mm
DRILLING CONTRACTOR LST
GROUND WATER LEVELS:
DRILLING METHOD D50. Hollow Stem
AT TIME OF DRILLING ---
LOGGED BY AK **CHECKED BY** AL
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	Well Construction	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)
			TOP SOIL sandy silt, trace gravel, scattered organic pockets and roots; black to dark grey, moist no odour, no staining.	SS 1	67	2-2-4-10 (6)
			SAND fine to coarse grained, trace to some silt, trace clay, trace to some gravel, scattered organic inclusions in upper zone; dark brown to brown, moist, compact no odour, no staining.	SS 2	75	8-12-16-25 (28)
2				SS 3	97	10-10-13-14 (23)
				SS 4	100	5-10-13-17 (23)
				SS 5	100	6-13-13-13 (26)
4			**SANDY SILT TILL** some clay, scattered gravel inclusions; grey, moist, compact no odour, no staining.			
				SS 6	83	7-10-11-14 (21)
6						
				SS 7	83	8-11-15-22 (26)

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

End of Borehole at 6.7 mbgs.

BORING NUMBER BH6

JLP
Geotechnical & Environmental Consultants

CLIENT Dunn Capital Corporation
PROJECT NAME GBC Residential Enclave Subdivision
PROJECT NUMBER G4603-22-7
PROJECT LOCATION 5166817 Line
DATE STARTED 27-9-22 **COMPLETED** 27-9-22
GROUND ELEVATION 220.011 m Geodetic **HOLE SIZE** 150mm
DRILLING CONTRACTOR LST
GROUND WATER LEVELS:
DRILLING METHOD D50. Hollow Stem
AT TIME OF DRILLING ---
LOGGED BY AK **CHECKED BY** AL
AT END OF DRILLING ---
NOTES
AFTER DRILLING 5.80 m / Elev 214.21 m

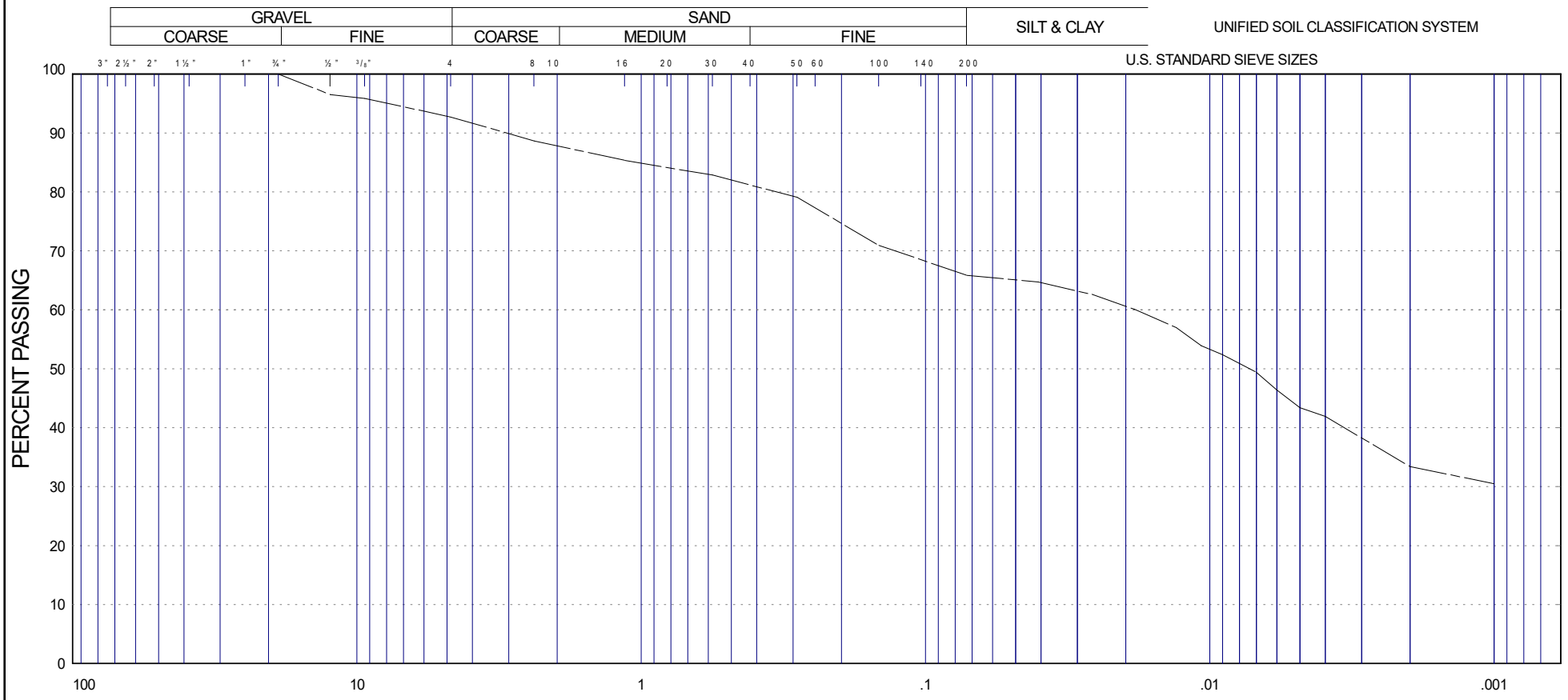
DEPTH (m)	Well Construction	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)
			TOP SOIL sandy silt, trace gravel, scattered organic pockets and roots; dark grey, moist no odour, no staining.	SS 1	50	5-8-9-10 (17)
			SANDY SILT trace gravel; brown, moist, compact no odour, no staining.	SS 2	93	4-6-9-11 (15)
2			**SILT** some clay, trace sand, scattered sand seams, stratified; light brown to grey, moist, compactno odour, no staining.	SS 3	100	6-9-12-15 (21)
				SS 4	100	8-11-13-18 (24)
				SS 5	100	6-10-16-18 (26)
4			becoming grey at 4.5m	SS 6	100	10-12-13-14 (25)
6	▼			SS 7	93	5-7-12-18 (19)

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

End of Borehole at 6.7 mbgs.

GRAIN SIZE DISTRIBUTION

OUR REFERENCE N° G4603-22-6



PROJECT: GBC Residential Enclave Subdivision

LOCATION: 516681 7th Line, Clarksburg, ON

BOREHOLE N°: 1

SAMPLE N°: 4

DEPTH: 2.3 - 2.9 m±

ELEVATION: - m±

COEFFICIENT OF UNIFORMITY:

COEFFICIENT OF CURVATURE:

Classification of Sample and Group Symbol:

SILTY CLAY, some sand, trace gravel (CL-ML)

PLASTIC PROPERTIES

LIQUID LIMIT	% = 18.1
PLASTIC LIMIT	% = 13.6
PLASTICITY INDEX	% = 4.5
MOISTURE CONTENT	% = 15.6

ENCLOSURE N° 8

JLP SERVICES INC.

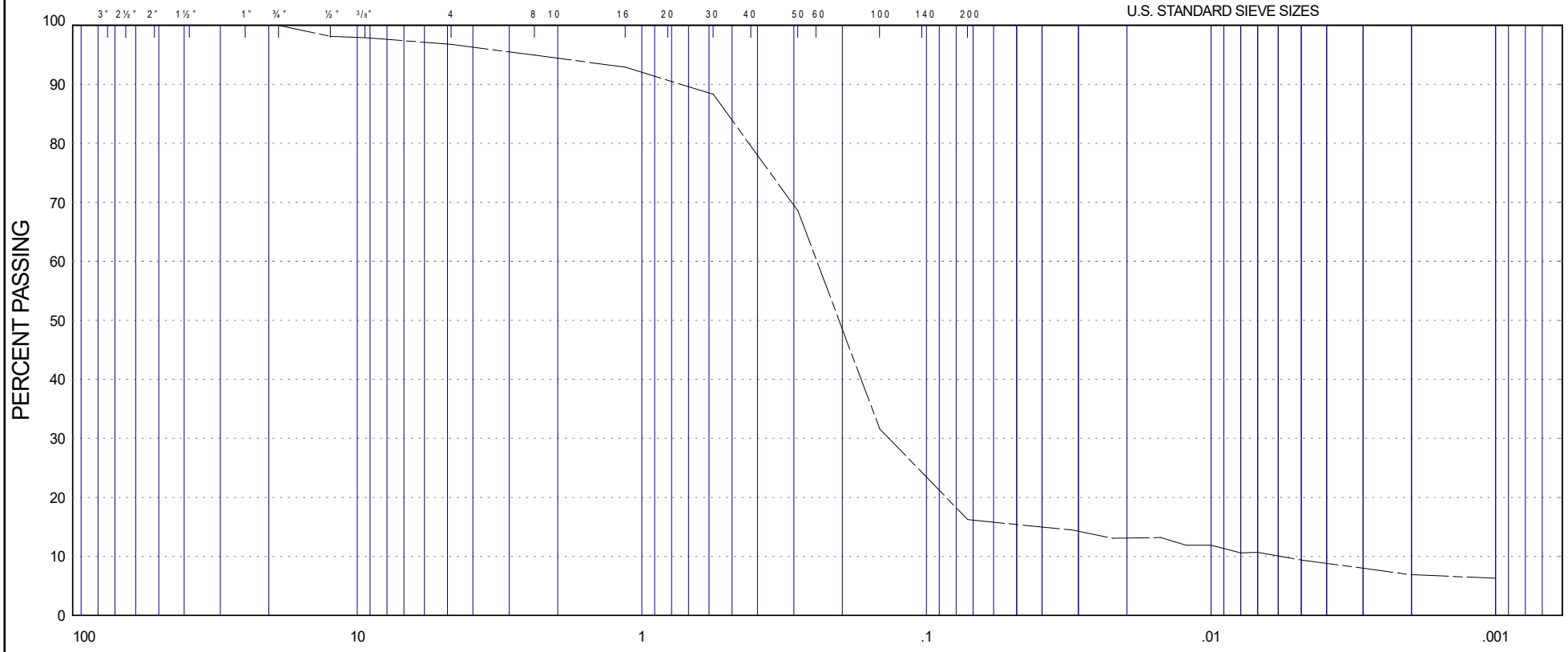
GRAIN SIZE DISTRIBUTION

OUR REFERENCE N° G4603-22-6

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

UNIFIED SOIL CLASSIFICATION SYSTEM

U.S. STANDARD SIEVE SIZES



Grain Size in Millimeters

ENCLOSURE N° 9

PROJECT: GBC Residential Enclave Subdivision

LOCATION: 516681 7th Line, Clarksburg, ON

BOREHOLE N°: 3

SAMPLE N°: 5

DEPTH: 3.0 - 3.6 m±

ELEVATION: - m±

COEFFICIENT OF UNIFORMITY:

COEFFICIENT OF CURVATURE:

Classification of Sample and Group Symbol:

SAND, trace silt, trace clay, trace gravel

PLASTIC PROPERTIES

LIQUID LIMIT	% = -
PLASTIC LIMIT	% = -
PLASTICITY INDEX	% = -
MOISTURE CONTENT	% = 9.8

JLP SERVICES INC.

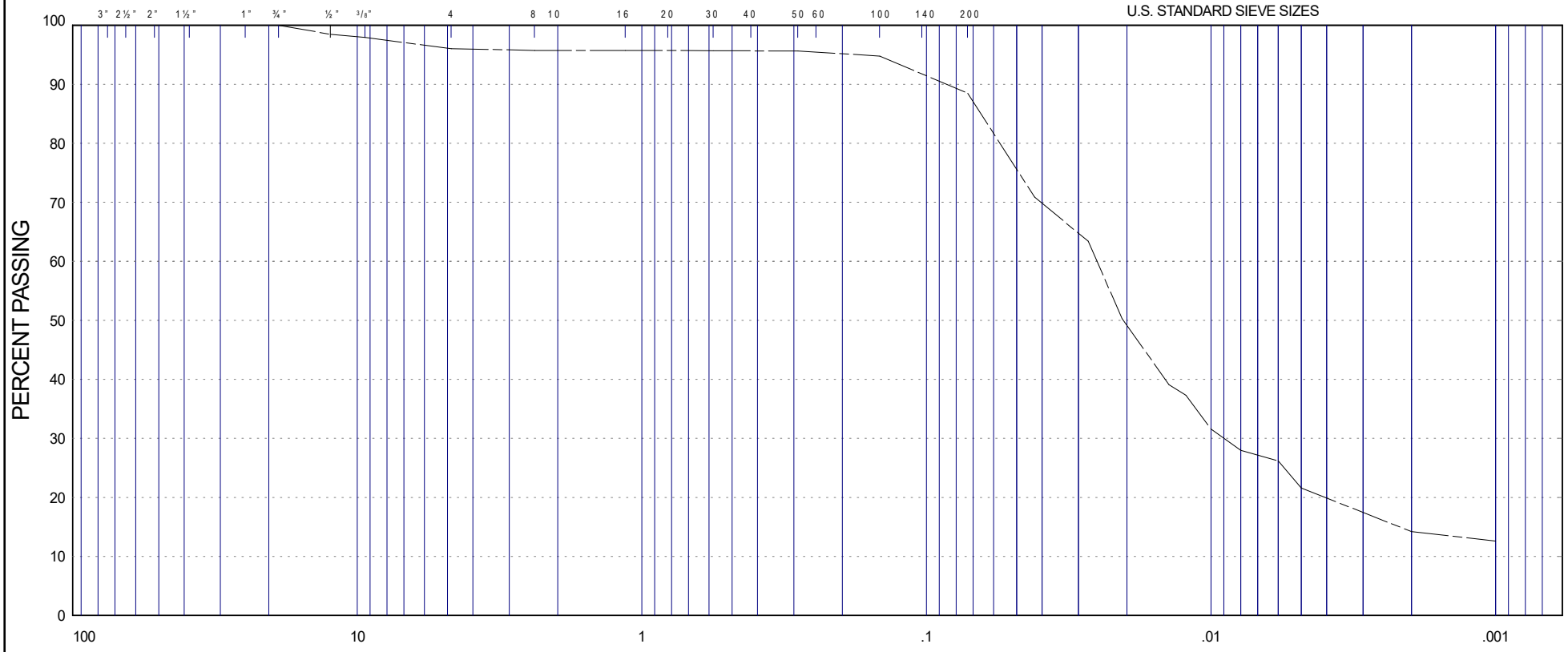
GRAIN SIZE DISTRIBUTION

OUR REFERENCE N° G4603-22-6

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

UNIFIED SOIL CLASSIFICATION SYSTEM

U.S. STANDARD SIEVE SIZES



Grain Size in Millimeters

ENCLOSURE N° 10

PROJECT: GBC Residential Enclave Subdivision

LOCATION: 516681 7th Line, Clarksburg, ON

BOREHOLE N°: 6

SAMPLE N°: 3

DEPTH: 1.5 - 2.1 m±

ELEVATION: - m±

COEFFICIENT OF UNIFORMITY:

COEFFICIENT OF CURVATURE:

Classification of Sample and Group Symbol:

SILT, some clay, trace sand, trace gravel (ML)

PLASTIC PROPERTIES

LIQUID LIMIT	% = 13.3
PLASTIC LIMIT	% = 11.7
PLASTICITY INDEX	% = 1.6
MOISTURE CONTENT	% = 19.0

JLP SERVICES INC.

Appendix A – Limitations and Use of Report

REPORT TERMS AND CONDITIONS

NOTICE: THE FOLLOWING PROVISIONS SET FORTH IMPORTANT QUALIFICATIONS AND LIMITATIONS ON THE FINDINGS AND RECOMMENDATIONS IN THE REPORT AS WELL AS THE USE OF, AND RELIANCE ON, THE REPORT.

1. **DEFINITIONS**. The following capitalized terms have the following meanings:

(a) "**Additional Investigations**" means investigations that JLP has indicated to the Client should be undertaken to take into account any Out-of-Scope Requirements, but that are not otherwise specifically within the scope of investigations conducted for the purpose of the Report.

(b) "**Applicable Laws**" means and includes without limitation all applicable provincial laws, regulations, guidelines, policies, standards, protocols, and objectives administered by the Ministry of the Environment and Climate Change or any other duly-constituted governmental authority, all as in force as of the date of the Report.

(c) "**Client**" means the Client as referred to in the Report.

(d) "**Client Information**" means the information, representations, and instructions provided by the Client, the Client's representatives, and/or others and upon which the Report is based, in whole or in part.

(e) "**Findings**" means the evaluations and conclusions set forth in the Report.

(f) "**JLP**" means JLP Services Inc.

(g) "**Out-of-Scope Requirements**" means special concerns or requirements of the Client in respect of the subject matter of the Report.

(h) "**Recommendations**" mean the findings and recommendations referred to in the Report, taking into account any Out-of-Scope Requirements that were disclosed to JLP prior to the date of the Report.

(i) "**Report**" means the report to which these Terms and Conditions are attached and form part.

(j) "**Report Documents**" means the underlying documents, records, data, and files, in any medium whatsoever, generated in connection with the preparation of the Report, including without limitation, the instructions and objectives communicated to JLP by the Client, communications between JLP and the Client, and other reports, proposals, or documents prepared by JLP for the Client in connection with the Site.

(k) "**Site**" means the site in respect of which the Report was prepared.

(l) "**Site Conditions**" means Site conditions known as a result of, or reasonably imputed by, the investigations that were undertaken as of the date of the Report.

2. **BASIS OF REPORT**. The Report is based on the Site Conditions. Any changes to the Site Conditions after the date of the Report that could or will affect the Site Conditions may or will have a corresponding effect on the Recommendations. The Report does not take into account any (a) Additional Investigations that were not undertaken, or (b) Out-of-Scope Requirements that were not communicated prior to completion of the investigations that were been undertaken as of the date of the Report. Where recommended field services are referred to, they are the minimum services necessary to determine compliance of construction with Applicable Laws,

generally accepted industry-standard practices, and the Recommendations.

3. **RELIANCE & USE**. The Report has been prepared only for the Site and the related design, development, building, or building assessment objectives identified by the Client. The Findings and Recommendations are based on the Site Conditions and the Client Information. In preparing the Report, JLP has relied upon the Client Information and disclaims any responsibility for any inaccuracy, misstatement, omission, unintentional misrepresentation, or other deficiency contained in the Report as a result of such reliance. Unless specifically stated otherwise, the applicability and reliability of the Findings and the Recommendations expressed in the Report are only valid to the extent that (a) there has been no material change to or variation from any of the Client Information, (b) the Client Information contains no untrue statement of a material fact, or (c) the Client Information omits no statement of a material fact necessary in order to make the Client Information not misleading.

   The Report and the Findings and Recommendations are for the sole benefit of the Client. No other party may use or rely upon the Report in whole or in part without the prior written consent of JLP, which may be arbitrarily withheld or conditioned.

   RELIANCE UPON THE REPORT OR ANY OF THE DETERMINATIONS MADE HEREIN BY A THIRD PARTY WITHOUT JLP'S CONSENT IS PROHIBITED AND JLP MAKES NO REPRESENTATION, GUARANTEE, OR WARRANTY IN FAVOUR OF ANY THIRD PARTY WITH RESPECT TO THE REPORT WHATSOEVER. JLP FULLY DISCLAIMS, AND WILL HAVE NO LIABILITY FOR, ANY LOSS, DAMAGES, OR EXPENSES WHICH ANY THIRD PARTY MAY INCUR OR SUFFER AS A RESULT OF THE USE OF OR RELIANCE ON THIE REPORT WHERE JLP HAS NOT EXPRESSLY AUTHORIZED SAME. ANY THIRD PARTY WHO RELIES ON THE REPORT TO ANY EXTENT DOES SO AT SUCH PARTY'S OWN RISK AND COMPLETELY WAIVES ANY AND ALL CLAIMS AGAINST JLP IN CONNECTION WITH THE REPORT, REGARDLESS OF THE THEORY OF LAW (WHETHER IN CONTRACT, TORT, OR ANY THEORY OF LAW COMING INTO EXISTENCE HEREAFTER).

4. **STANDARD OF CARE**. The Report has been prepared in a manner consistent with the degree of care and skill exercised by engineering consultants currently practicing under similar circumstances. No other warranty, expressed or implied, is made or intended in the Report. It is intended that the Findings and Recommendations are meant to assist in reducing the Client's risk associated with environmental impairment at the Site. The Report should not be considered risk mitigation.

5. **ENTIRE REPORT**. The Report also includes the Report Documents. In order to properly understand the Findings and Recommendations, reference must be made to the Report in its entirety. JLP is not responsible for use by any party of a part of the Report only.

6. **GOVERNING FORMAT**. Notwithstanding that JLP may have submitted an electronic version of the Report or any document forming part of the Report, only the signed and sealed physical copy of the Report shall be deemed to be the original and in the event of any dispute or discrepancy, the physical copy shall govern. JLP makes no representation about the compatibility of its electronic or digital file format with the Client's current or future software and/or hardware systems. The documents described herein are JLP's instruments of professional service and shall not be altered without the written consent of JLP.

7. **GENERAL LIMITATIONS**.

   (a) Unless specifically stated otherwise, the Report does not contain environmental consulting advice.

   (b) The Report contains no opinion or determination as to any matters governed by laws other than the laws of the Province of Ontario and the federal laws of Canada applicable therein as of the date hereof.

   (c) During any future development of the Site, conditions not observed during JLP's investigations may become apparent. If this occurs, JLP should be contacted to assess the situation and whether there is a need for additional testing.