1199 NEWMARKET HOLDINGS INC.
GEOTECHNICAL INVESTIGATION

Property located at 1195, Newmarket Street in Ottawa, Ontario
N/Ref.: 13340

ORTAM groupe
RBQ : 8353-4917-04

Prepared by :

Pascal Fhima, Eng., P. Eng.
President and CEO

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ORTAM groupe
RBQ : 8353-4917-04

November, 22nd 2019

Mr. Stanley Zipkin
1199 NEWMARKET HOLDINGS INC.
A-3488 Côte-des-Neiges Road
Montreal, Quebec
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Object: **GEOTECHNICAL STUDY**
Commercial Building of one (1) storey without basement
Property located at 1195, Newmarket Street in Ottawa, Ontario

N/Ref: 13340

Mr. Zipkin,

Following the mandate you granted us, we are pleased to present you our report of the geotechnical study conducted for the Property mentioned above.

We thank you for giving us the opportunity to serve you and hope to engage in future collaborations. Should any further queries arise, please do not hesitate to communicate with us.

Trusting everything is to your complete satisfaction, we remain yours truly.

GROUPE ORTAM INC.

LICENSED PROFESSIONAL ENGINEER
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PROVINCE OF ONTARIO

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1. INTRODUCTION

Mr. Stanley Zypkin of 1199 Newmarket Holdings INC. retained the services of GROUPE ORTAM Inc. (ORTAM), in order to carry out a geotechnical study for a commercial building construction project. The proposed site area for the project is located at property located at 1195, Newmarket Strett in Ottawa, Ontario. The site location plan is presented in Appendix 1.

The proposed project consists in construction of a commercial building of one (1) storey without basement.

The objective of this geotechnical study in the framework of this mandate was to determine the nature and the properties of the soils as well as the bedrock and the groundwater level, if encountered, in view of the foundation design. This report describes the field and laboratory works conducted, presents the results obtained and provide geotechnical recommendations and general comments relating to the above mentioned project.

The report includes appendices as well: a borehole location plan (Appendix 1), boring log (Appendix 2), laboratory testing results (Appendix 3).

This report is subject to certain limiting conditions that result from the inherent nature of geological, geotechnical and hydrogeological profiles of the sites investigated using boreholes. The scope of the study undertaken and its limitations are elucidated at the end of this report. These limiting conditions make up an integral part of this report and the readers are encouraged to become familiar with these conditions in order to facilitate their understanding, interpretation and use of the present document.

2. SITE AND PROJECT DESCRIPTION

2.1 SITE DESCRIPTION

The site is located at 1195, Newmarket Street in Ottawa, Ontario. The site is trapezoidal in shape and covers an area of approximately 10 885 square meters (m^2). The property is currently occupied by a commercial building. Considering the Newmarket Street as oriented East-West, the property is bordered to the North by the railway, to the South by newmarket Street, to the East and to the West by commercial buildings.
One storey building with no basement is present on the eastern part of the property.

2.2 PROJECT DESCRIPTION

The project involves the construction of a commercial building with of one (1) floors without basement. At this time, the project plans are not yet ready.

3. METHODS OF INVESTIGATION

3.1 FIELD INVESTIGATION

The field work, was carried out on August 27th , 2019 and involved the implementation of seven (7) boreholes identified as BH1 to BH7. The location of the boreholes is shown on the enclosed plan (Appendix 1). Boreholes were carried out by means of an auger drill rig to the maximum depth of 6.9 meters below the existing grades. The field work was carried out under the constant supervision of our geotechnical personnel.

The Standard Penetration Test (SPT) is performed by driving a standard split spoon sampler into the ground by blows from a drop hammer of mass 63.5 Kg falling 760 mm. The Sample is driven 600 mm into the soil at the bottom of the borehole, and the number of blows needed for the tube to penetrate each 150 mm up to a depth of 600 mm is recorded. The sum of the number of blows required for the second and third 150 mm of penetration is reported as the SPT blowcount value, commonly termed "Standard Penetration Resistance" or the “N-value”. The N-value provides an indication of the relative density of the subsurface granular soil.

The soil samples have been carefully described on site as well as in our laboratory, by a soil specialist.

The field work included a survey of the boreholes and some important points of the site. The reference point (BM) of the survey is the top of the sump of the municipal sewer system located at the corner of Newmarket street and Bantree street. An arbitrary elevation of 30 m was given to this reference point (see Appendix 1).

All soil samples recovered from the boreholes not used for laboratory tests will be kept for a period of three (3) months from the date of this report, after which they will be destroyed unless otherwise requested by the client.

3.2 LABORATORY TESTING

In order to determine some of the geotechnical characteristics of the soils, and to complete the technical information gathered during fieldwork, the following laboratory testing was carried out on a representative soil sample recovered from the conducted surveys:

– ten (10) sieve analyses (BNQ 2501-025/2013);

– three (3) hydrometer analyses (BNQ 2501-025/2013);

– two (2) determinations of the liquid and plastic limits (ASTM D4318);

Test results are presented in section 4 of this report. All the geotechnical laboratory test reports are enclosed in appendix 3.

4. STRATIGRAPHY OF SUBSOIL AND GROUND WATER CONDITIONS

4.1 STRATIGRAPHY OF SUBSOIL

Details of different soil layers encountered in the borehole locations are presented in the borehole logs in Appendix 2.

In summary, the soils encountered (from the top to the bottom) are described as follows:

4.1.1 FILL MATERIALS

Fill materials encountered in the boreholes consist mostly of medium dense heterogeneous mixture of sand, silt and gravel. At the location of Borehole BH7, fill materials consist of crushed stone type MG-20. This fill

layer, with a thickness ranges between 0.3 m and 1.8 m, is wet and probably contains stones and blocks. It should be noted that, at some places, the fill material can be deeper or shallower

4.1.2 NATIVE SOIL

a) Organic soil

Directly below the fill materials at the location of boreholes BH5, an organic soil was encountered at the depth and elevation shown in table 2. This black layer, with a thickness of 0,3 m is humid.

b) Cohesive soil deposit

Beneath the fill layer at the location of boreholes BH1 and BH6, the native soil composed of a clayey silt with traces of sand (BH1) and of a clay and silt with traces of sand (BH6). This cohesive soil is wet, stiff in consistency and has a thickness of 0.5 and 1.9 m, at the location of BH6 and BH1 respectively. A summary of the geotechnical tests performed on the clay deposit are presented in the following Table 1 and 2, while the detailed laboratory results can be found in Appendix 3. This tests include particles size analysis, water content determination (Wn), Atterberg Limits (LL, PL, and IP, IL).

Table 1- Results of sieve and hydrometer analysis tests

Borehole	Sample	Gravel > 5 mm (%)	Sand < 5 mm and > 80 µm (%)	Silt < 80 µm and > 2 µm (%)	Clay < 2 µm (%)	Water content (%)	Description
BH1	SS-3	0	3	67	29	36	Clayey silt, traces of sand
BH6	SS2B	0	5	47	48		Clay and silt, traces of sans

Table 2- Laboratory test results

BOREHOLE N°	SAMPLE N°	DEPTH (M)	Wn (%)	ATTERBERG LIMITS (%)			
				LL	PL	IP	IL
BH2	SS-3	1.20 – 1.80	25	33	22	11	0,2
BH6	CF-2B	1.10 – 1.20	30	51	23	28	02

Based on the Atterberg limits, the deposit has the characteristics of ***a clay with low plasticity (CL).***

c) Granular soil deposit

Directly under the cohesive soil at the location of borehole BH1 and BH6, under the organic soil layer at the location of borehole BH5 and directly under the fill materials at the location of the other boreholes, the native soil encountered at the depth and elevation shown in table 4 is composed mainly of sand and silt with some gravel and traces of clay. This granular soil is saturated and compact to dense in density and has a thickness ranges between 0.5 (BH6) and 2.6 m (BH4).

Locally at the location of boreholes BH2 and BH3, the upper part of the granular soil is saturated and loose in density. A summary of the geotechnical tests performed on the clay deposit are presented in the following Table 3, while the detailed laboratory results can be found in Appendix 3. This tests include water content and particles size analysis by sieve and by hydrometer.

Table 1 below recapitulates the results obtained and details are presented in Appendix 3 of this report.

Table 3- Results of sieve and hydrometer analysis tests

Borehole	Sample	Gravel > 5 mm (%)	Sand < 5 mm and > 80 µm (%)	Silt < 80 µm and > 2 µm (%)	Clay < 2 µm (%)	Water content, Wn (%)	Description
BH1	SS-4B	0	40	46	14	11.8	Silt and sand, some clay
BH2	SS-4	15	46	40		9.6	Sand and silt, some gravel
BH2	SS-5	30	32	38		7.9	Sandy gravelly silt
BH3	SS-3	2	84	14		16.3	Sand some silt, traces of gravel
BH4	SS-4	4	45	51		11.9	Silt and sand, traces of gravel
BH5	SS-3	15	47	38		8.3	Sand and silt, some gravel
BH6	SS-2A	0	91	9		11.6	Sand, traces of silt
BH7	SS3	15	49	36		-	Sand and silt, some gravel

4.1.3 BEDROCK

The bedrock was encountered at the depth and elevation presented in table 1. Samples of the rock recovered as cores are composed of clay limestone with a rock quality designation index (RQD) ranging between 55% and 90%, corresponding to a rock of poor quality to excellent quality.

It should be noted that the bedrock elevations may vary across the site due to irregularity of the bedrock surface.

Error! Reference source not found. presents an overview of the depth and elevation of each subsoil stratum encountered at the borehole location.

Table 4- Stratigraphic Summary

BOREHOLE/ ELEVATION	DEPTH AND ELAVATION (m)					
	FILL DEPOSIT	**ORGANIC SOIL**	**NATURAL INORGANIC SOIL**		DEPTH OF BEDROCK	**END OF BOREHOLE**
			COHESIVE SOIL	GRANULAR SOIL (TILL)		
BH1/28.8	0.0 – 0.3 (28.8 – 28.5)	-	0.3 – 2.2 (28.5 – 26.6)	2.2 – 4.0 (26.6 – 24.8)	4,0 (24.8)	6.9 (21.9)
BH2/29.0	0.0 – 0.3 (29.0 – 28.7)	-	-	0.3 – 2.8 (28.7 – 26.2)	2.8 (26.2)	4.5 (24.5)
BH3/28.8	0.0 – 1,8 (28.8– 27.0)	-	-	1.8 – 2.4 (27.0 – 26.4)	2.4 (26.4)	5.4 (23.4)
BH4/29.0	0.0 – 0.6 (29.0 – 28.4)	-	-	0.6 – 3.2 (28.4 – 25.8)	3.2 (25.8)	4.5 (24.5)
BH5/28.2	0.0 – 0.9 (28.2 – 27.3)	0.9 – 1.2 (27.3 – 27.0)	-	1.2 – 1.8 (27.0 – 26.4)	1.8 (26.4)	3.0 (25.2)
BH6/28.9	0.0 – 1,1 (28.9– 27.8)	-	1.1– 1.6 (27.8 – 27.3)	1.6 – 2.1 (27.3 – 26.8)	2.1 (26.8)	2.1 (26.8)
BH7/28.7	0.0 – 1,8 (28.7– 26.9)	-	-	1.8 – 2.7 (26.9– 26.0)	2.7 (26.0)	2.7 (26.0)

4.2 GROUNDWATER CONDITIONS

For measuring groundwater levels, five (5) piezometers were installed in boreholes BH1 to BH5. Table 2 below shows the depths and the elevations of water table measured in boreholes BH1 to BH5, on August 2019.

Table 5- Depth and elevation of water table

	WATER LEVEL MEASURED AUGUST, 2019	
	DEPTH (m)	ELEVATION (m)
BH1 (28.8)	1.6	**27.1**
BH2 (29.0)	2.0	**27.0**
BH3 (28.8)	1.8	**27.0**
BH4 (29.0)	2.1	**26.9**
BH5 (28.9)	**1.9**	**27.0**

It should be noted that groundwater levels are, however, expected to fluctuate and can be found at higher or lower elevations during other periods of the year according to the prevailing weather conditions.

5. DISCUSSION AND RECOMMANDATIONS

It is understood that the proposed project will consist of the construction of commercial building of one (1) floor without basement. Based upon the results obtained from the borehole location and assuming them to be representative at subsurface conditions across the entire site, the following recommendations are offered for the proposed project.

5.1 ELEVATIONS

Taking into account the topography of the site and architecture plans, the following elevations are proposed:

- Ground level around the building: 29. 0m
- Finished ground floor: 29.3 m
- Base of the foundations: 27,5 m
- Groundwater level (August 2019): 27.1 m
- Groundwater level (for calculation): 27.5 m
- Depth of bedrock: between 24.8 and 26.8 m

5.2 SPECIFIC GEOTECHNICAL CONCERNS RELATED TO THE SITE

5.2.1 ESSENTIAL PROBLEMS

Specific geotechnical problems related to the site are as follow:

1. The Site is covered with backfill materials that reaches a thickness of 1.8 m at the location of boreholes BH3 and BH7.
2. Presence of an organic soil at the depth of 0.9 m (elevation 27.3 m), in borehole BH5.
3. The bedrock is shallow and at the depth ranging between 1.8 and 4.0 m.
4. The soil at the base of the foundations is heterogeneous. Part of the foundations will be on controlled backfill materials, another part on clayey silt and another again on till deposit.

5.3 FOUNDATIONS SYSTEM

Given the characteristics of the soil encountered at the location of the boreholes, and assuming these soil conditions are representative of the overall subsurface conditions of the Site, the Site is suitable to support conventional Spread and Strip footing foundations. Part of these foundations will be placed on the a clayey silt layer, onother one on a till layer or on a controlled backfill layer.

5.3.1 SHALLOW FOUNDATIONS

Shallow foundations are the very first choice of foundation. They are, first and foremost, cheap and easy to construct compared to other alternatives, such as pile foundations and mat foundations.

5.3.1.1 Bearing capacity

Section 4.1.3 of the "National Building Code 2010" (NBC 2010) requires that the design of foundations is achieved using the limit states method, namely the ultimate limit states (ULS) and serviceability limit states (SLS).

The ultimate limit state defines a limiting stress that should not be exceeded by any conceivable or anticipated loading during the design life of a foundation. The serviceability limit states defines a limiting deformation or settlement of a foundation, which, if exceeded, will impair the function of the structure that is supports.

At the ultimate limit state, stresses at the base of foundations, due to factored loads "$\alpha_n S_n$" should be less than the weighted soil resistance "ΦR" ($\alpha_n S_n < \Phi R$).

The coefficients α_n are greater than 1 and the coefficient Φ is less than 1.

a) Bearing capacity at the ultimate limit state

The bearing capacity at the ultimate limit state was calculated using the shear test parameters of cohesion and angle of internal friction and the soil density of the specimens extracted from the boreholes. The following well known Terzaghi equation with correction terms can be used to calculate the ultimate bearing capacity of conventional spread and strip footing foundations.

$$q_{ult} = CN_cS_c + \gamma_o D_f N_q S_q + 0.5\gamma_1 B\, N_\gamma S_\gamma$$

$S_c=S_q=1+(B/L)(N_q/N_c)$ and

$S_\gamma=1-0.4(B/L)$

Where:

γ_o - Unit weight of soil above foundation level in kN/m³.
γ_1 - Unit weight of soil below foundation level in kN/m³.
C, Ø - Strength parameters of the soil below foundation level in KN/m² and degrees respectively.
B - Width of foundation in (m).
L - Length of foundation in (m).
D_f - Depth of foundation (m)
Nc, , Nq, Nγ - Bearing capacity coefficients dependent on the angle of internal friction of the soil below foundation level.
Sc, , Sq, Sγ - Correction terms dependent on the geometry of foundations.

The ultimate bearing capacity should be calculated using the following geotechnical parameters.

- γ_o = 18 KN/m³.
- γ_1 = 18 KN/m³.
- Cu= 0 kPa
- Ø = 32°.
- D_f =1.5 m
- Nc – Nq – Nγ = 34.3 – 22.1 – 19.5

The ultimate bearing capacity values presented in table 6 are provided as a guideline for the structural engineer. In Ultimate Limit States design (ULS), the factored ultimate bearing capacity obtained with the factor Φ equal to **0.5** must be compared to the design ultimate load combinations. The structural engineer should verify that the design factored load (ultimate load combinations) does not exceed the factored geotechnical resistance (Φq_{ult}).

Table 3 below shows the values of the bearing capacity at the ULS and SLS, depending on the width of the foundations.

b) **Bearing capacity at the serviceability limit state**

In general, the bearing capacity at the serviceability limit state is the pressure that limits settlements to 25 mm. However, taking into account the homogeneous of the soil layers, for this specific project, the bearing

capacity at the serviceability limit state indicated in the table 6 below is the stresses that will cause settlements of 30 mm, with differential settlement less than 19 mm.

Table 6 - Bearing capacity in the Ultimate Limit State (ULS) and Serviceability Limit State (SLS)

Type of footing	Width (m)	Ultimate limit state (kPa)		Serviceability limit state (kPa)
		q_{ultime}	ULS (ϕq_{ultime})	
Strip footing	0.6	350	175	200
	0.9	370	190	160
	1.2	400	200	140
	1.5	430	215	125
	1.8	490	245	110
Spread footing	1.0	544	270	330
	1.2	554	277	275
	1.5	570	285	230
	2.0	596	295	185
	2.5	620	310	160

***Notes**: It is important to note that only the axial loads are considered for these stress levels at the base of the foundation. In the case of the eccentric loads, the eccentricity "e" must be less than one sixth of the width "B" of the foundations (e <B/6) and the maximum stress at the base of the foundation must be lower than the bearing capacity in SLS. The bearing capacity is checked by taking into account the fictitious width B equal to: B '= B-2Xe.*

5.3.1.2 Total and differential settlement

For the bearing capacities at the Serviceability Limit State given in Table 3 above, the total settlement could be lower than 25 mm. However, differential settlement will be lower than the allowable value of 19 mm.

5.3.1.3 Minimum width of the footing

The minimum width of footings is as follow:

Strip footing : B_{min}= 0.6 m

Spread footing : B_{min}= 1.0 m

5.3.1.4 Reinforced concrete foundations

Due to the the characteristics of soil deposits under the foundations and the presence of the clay layer, footings will be of reinforced concrete with reinforcing steel percentage minimum ρ_{min} equal to:

$$\rho_{\min} = \left(\frac{A_a}{A_b}\right)_{\min} = \frac{1.4}{f_y}$$

f_y is the ultimate strength of the steel.

A_a and A_b are respectively the total area of the reinforcement steel and the area of the concrete.

5.4 SLAB ON GRADE

A conventional concrete slab, built on the ground and structurally separated from the foundation walls, can be used in the framework of this project. We recommend the following procedures for the preparation of the ground underneath the slab:

- The fill materials and the organic soils in place should be removed. All disturbed soil beneath the floor slab should also be removed.
- The slab on grade will be brought to the required elevation (see section 5.1) using only well grade granular materials placed in a thin layer not exceeding 300 mm, compacted to at least 95% of the Modified Proctor (PM) of the dry density. The last layer (base course) under the slab will be composed of crushed stones MG-20 of minimal thickness of 300 mm and compacted to a minimum of 95% of the PM.
- The granular materials that will be used as foundation under the slab will have to be DB certified. It should respect the requirements of the Bureau de Normalisation du Québec (BNQ) Standard 2560-500, should not contain any sulphurous minerals such as pyrite and should not consist of shale.
- Before pouring the concrete slab, a polyethylene membrane (0.15 mm thick) should be placed between the concrete and the granular backfill.
- Before pouring the concrete, the exposed grade should be inspected by a qualified soil engineer. Any soft spots or areas of disturbed soil must be removed and replaced with suitable compacted materials.

Following the above recommendation, the slab on grade could be design using a reaction modulus of

45MN/m.

5.5 FROST PROTECTION

The method recommended in the Canadian Foundation Engineering Manual 4th Edition (2013) was used to estimate the depth of frost penetration in the Ottawa area. This method involves the following modified Bergrenn equation, described by Aldrich (1956), Sanger (1963) and Johnston (1981):

$$X = \lambda \frac{\sqrt{2k_f I_s}}{L_s}$$

Where :

X = frost penetration deptn;

– Is = freezing index;

– kf = thermal conductivity of the frozen ground;

– Ls = latent heat of the soil;

– λ = coefficient without unit.

The freezing index for Ottawa has been estimated to be 1000 degrees-days Celcius with a standard deviation of 143 degrees-days Celcius, obtained from BNQ 1809-300/2018. Base on this data,the calculated depth of frost will be in ordrer of 1.80 m.

5.5.1 Building foundation

To limit the effets of frost penetratin, a minimum depth of soil cover of 1.5 m is required for perimeter footings of heated structures.

5.5.2 Underground services

The underground services should be located below the depth of frost penetration of 1,8m in accordance with City of Ottawa specifications.

5.6 EXCAVATION AND SLOPE STABILITY

- The contractor will have to take all necessary precautions in order to ensure the stability of the excavation slopes. Based on the borehole results, stable temporary slopes above the groundwater level in the clayey silt soil or fill materials layer could be excavated with slopes of **1V:2H**.
    - Note: For submerged soil, the slope should be **1V:4H.**
- During the excavation, no excavated materials should be piled, nor machinery or equipment be placed, closer than the distance equivalent to the depth of the excavations.
- No vertical un-braced excavations should be performed in the soil.
- The exposed subsoil should be protected against erosion from water runoff or rain.
- An examination of the slopes should be carried out by a qualified geotechnical engineer during the construction. The stability of the slopes remains the responsibility of the contractor.

Given the fact that the basement will occupy almost the entire area of the property, it will not be possible to respect the safe excavation slopes. Table 5 below shows the Soil parameters for the calculation of the retaining walls.

5.7 SITE DRAINAGE

All grades must provide effective drainage away from the building during and after construction. This report is based on effective drainage for the life of the building and cannot be relied upon if effective drainage is not maintained. To maintain effective drainage, the contractor should respect the short-term and long-term drainage recommendations.

5.7.1 DEWATERIBG

Based on the boreholes results, it is anticipated that excavatin will be below the groundwater. underground water problems are foreseen for excavations that could exceed 1.6 m below existing grades. Groundwater control during excavation may be achieved by conventional sump pum techniques. However, it should be left to the contractor to determine the methods of dewatering necessary to meet the project requirements.

Dewatering effort will depend on number of factors such as excavation depth, season and weather conditions, the length of time the excavation will be open.

5.7.2 LONG-TERM DRAINAGE

Since there is no basement, the French drain on the perimeter of the foundation is not required. However, the trench excavation will be backfilled with a free-draining granular material, which may contain less than ***5% of fine grained and erodible materials***

5.8 PROJECT SITE SEISMICITY AND LIQUEFACTION

5.8.1 SITE SEISMIC CONSIDERATION

As defined by Table 4.1.8.4.A “Site Classification for Seismic Site Response” of the CNBC 2010, the Site classification for seismic response is “C”.

5.8.2 LIQUEFACTION POTENTIAL OF SUB-SOILS

Granular saturated soils tend to lose strength and turn into a liquid-like state when subjected to vibration caused by an earthquake, pile driving or installation of anchors. Given the characteristics of the soil at the base of the foundation, this compact to dense layer of Silt and Till has a low risk of liquefaction.

5.8.3 SWELLING AND SHRINKAGE OF THE CLAY LAYER

During the long periods of dry season, the presence of trees on the site and its surroundings could cause the shrinkage of the clay layer. This will cause differential settlements of shallow foundations. For shallow foundations, the trees should not be planted near the structures (buildings and parking lots).

5.9 WINTER CONSTRUCTION

The subsoils encountered across the site are frost susceptible and freezing conditions could cause problems for the structure. The following recommendations are presented as preventive measures:

- During winter construction, exposed surfaces meant to support floor slabs must be protected against freezing by means of heating, loose straw and tarpaulins, etc.
- Care must be taken so that the sidewalks or asphalt pavement do not interfere with the opening of doors when the soils are subject to frost heave. This problem may be minimized by any one of several means such as:
    - keeping the doors well above the outside grade,

- installing a structural slab at the doors,
- using well-graded backfill and positive drainage.

- The trenches for exterior underground services should be excavated with shallow transition slopes in order to minimize the abrupt change in density between the granular backfill, which is relatively not frost-susceptible, and the more frost-susceptible native soils.

5.10 PARKING LOT

5.10.1 Excavation

At the location of the parking areas, all organic soils and fill materials should be excavated and the structure of pavement must be built in accordance with the recommendations below.

5.10.2 FLEXIBLE PAVEMENT

a) **Subgrade layer**: In order to reach the level of the Subgrade line, a backfill of granular materials of MG-112 type should be put in place, in a layer 300 mm thick (maximum) and compacted at 95% of the Modified Protor (P.M.).

b) **Base course**: the subgrade layer (in accordance with section a) should be followed (above) by a layer of crushed stone (MG-20 type) of minimal thickness of **300 mm (** light vehicles traffic or parking area) or **450 mm** (heavy vehicles traffic or parking area) and compacted to a minimum of **95% of the PM**.

c) **Surface course**: the surface cource is the top course of an asphalt pavement. For light vehicles traffic or parking area, this wearing course should be constructed by dense graded hot mix asphalt (HMA), ESG-14 type of minimal thickness of 70 mm and compacted to a minimum of 98% of the maximum density.

For heavy vehicles traffic or parking area, this wearing course should be constructed by binder course GB-20 type of minimal thickness of 100 mm and compacted to a minimum of 98% of the maximum density, followed by a surface course constructed by dense graded hot mix asphalt (HMA), ESG-10 type of minimal thickness of 60 mm and compacted of 98% of the maximum density.

Note:

1) The granular materials of the base course and and the wearing course should conform to NQ 2560 -114 code and the hot mix asphalt should be formulated according to MTQ 4202.

2) ***Trenches for the construction of sumps should be closed with granular materials free from excessive dust (including coatings), clay or silt, and deleterious materials, such as organics, shale, wood etc.***

5.10.3 LONG TERM DRAINAGE OF PAVEMENT

- To minimize the infiltration of surface water into the pavement, a good surface drainage is required. The pavement should be constructed so as to give to the surface of the pavement, a slope of at least 2% to allow drainage of rainwater to sumps;
- The sumps should be installed at appropriate locations and connected to the municipal sewer system.
- Manholes should be installed whenever the drain lines are changed.

5.10.4 FROST PROTECTION

The mimimum total thickness of the pavement structures proposed is 770 mm. This structres will provide the recommended partial protection against frost in the Ottawa area for a local type pavement according to the AASHTO criteria.

6. QUALITATIVE CONTROL

It is recommended to proceed with a qualitative control of the various steps of the construction in order to ensure the quality of the project.

The excavation work, backfilling and compacting should be supervised in order to ensure that all disturbed soils are adequately excavated at the location of the building and that the controlled fill material is adequate to support the floor slab.

During the construction, vibrations must be controlled to ensure that they are not exceeding the safe limits beyond which liquefaction of the clay layer may cause structural damage to the existing buildings in the vicinity of the construction works.

ORTAM should be retained to provide supervision and testing services during grading, excavation, foundation construction and other geotechnical construction phases of the project.

7. LIMITATIONS OF THE INVESTIGATION

The conclusions of the geotechnical investigation are based on the results of the surveys conducted as well as on our present comprehension of the project.

It is important to emphasize that a geotechnical study consists of point sampling of a site and that the recommendations provided derive from the results obtained at the locations of the surveys only.

It is therefore presumed that these soil conditions are representative of the overall subsurface conditions of the site. Consequently, in the event that the conditions encountered during the work differ from those observed at the location of the surveys, we would appreciate to be immediately informed in order to allow us to modify our recommendations accordingly.

It is also recommended that ORTAM be permitted to review the final shop drawings and specifications in order to verify the items of construction related to geotechnical aspects. If not given the privilege of making such a review, ORTAM will assume no responsibility for misinterpretation of the recommendations of this report.

The information contained in this report is meant for geotechnical purposes only and has no bearing on the environmental aspect of the site.

8. PERSONNEL

Field work has been performed by J. Martin. This report was written by Pascal Fhima, Senior Engineer.

9. QUALIFICATIONS OF THE PERSONNEL

As President, CEO, Mr. Pascal Fhima, Eng., possesses over 21 years experience in Environmental Site Assessments Phase I, Environmental Site Characterizations Phase II, Environmental Site Rehabilitation Phase IV, Environmental Audit of asbestos/mold/pyrite, Geotechnical studies, Cost evaluation, Building appraisals, Thermography, etc.. His credentials include over 150 projects in geotechnical engineering and materials science, beyond 1000 projects in building science and over 5,000 environmental projects, completed since the establishment of ORTAM GROUP INC. (ORTAM).

10. REFERENCES

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2. Code national du bâtiment
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5. Vincent Robitaille, Denis Tremblay, *Mécanique des sols, Théorie et Pratiques*, Modulo, 1997
6. Muni Budhu, Soil Mechanics and Foundations, 2nd edition, 2007
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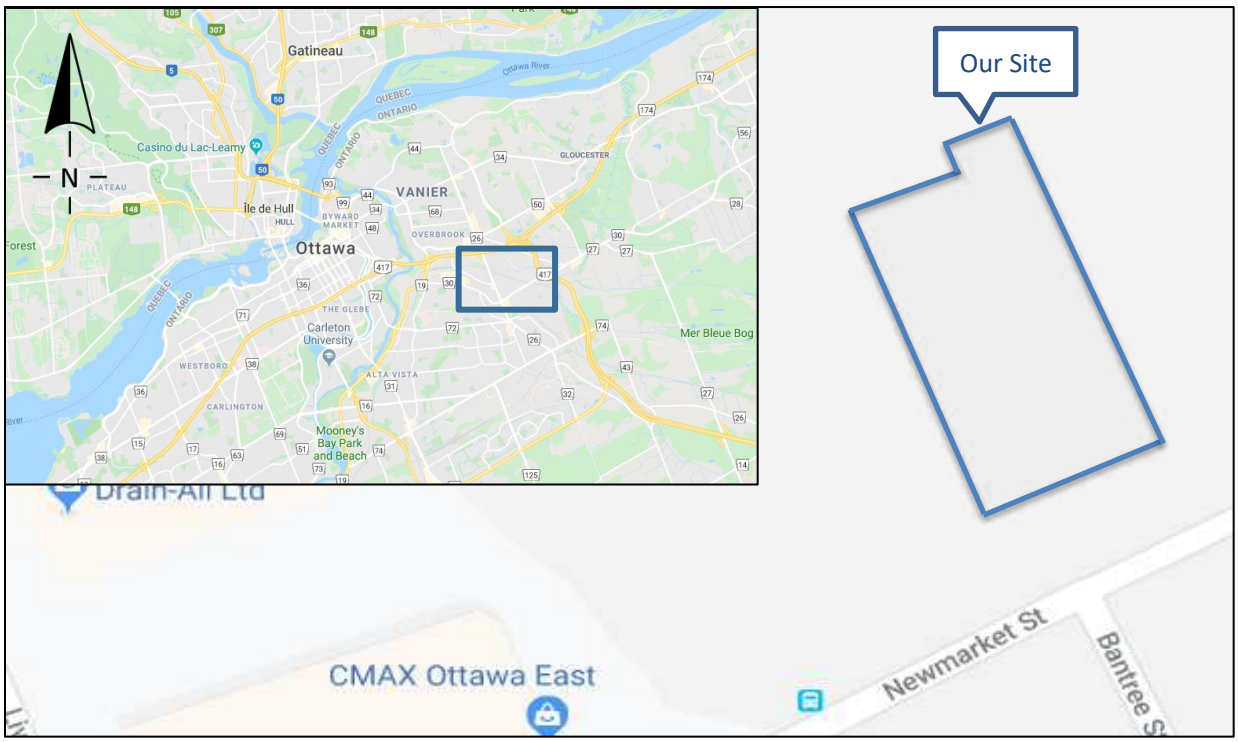
APPENDICES

APPENDIX 1

- Site location
- Location of boreholes

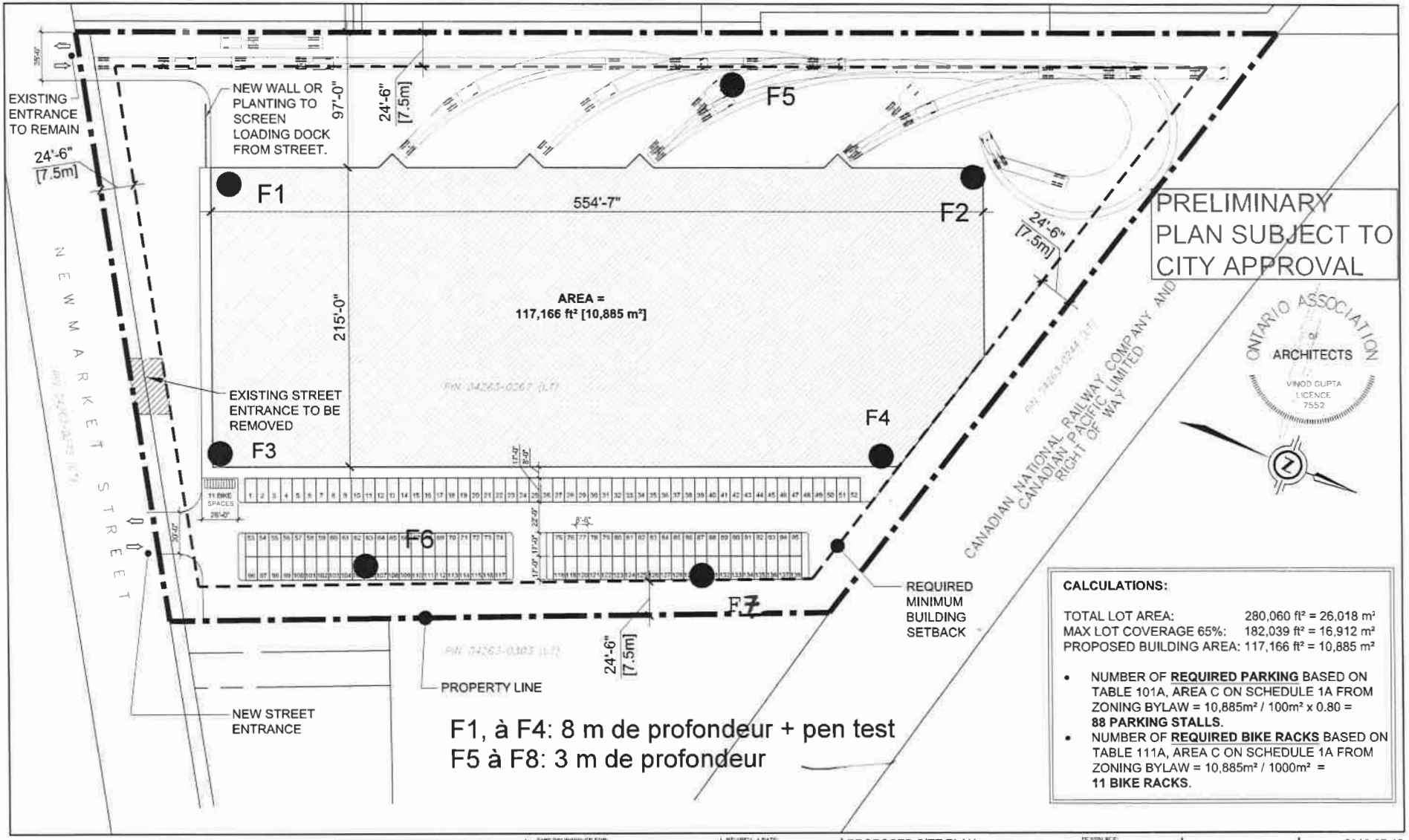
SITE LOCATION

GENERAL SITE LOCATION



Source: Google Map

LOCATION OF BOREHOLES



CALCULATIONS:

TOTAL LOT AREA: 280,060 ft² = 26,018 m²
MAX LOT COVERAGE 65%: 182,039 ft² = 16,912 m²
PROPOSED BUILDING AREA: 117,166 ft² = 10,885 m²

- NUMBER OF **REQUIRED PARKING** BASED ON TABLE 101A, AREA C ON SCHEDULE 1A FROM ZONING BYLAW = 10,885m² / 100m² x 0.80 = **88 PARKING STALLS.**
- NUMBER OF **REQUIRED BIKE RACKS** BASED ON TABLE 111A, AREA C ON SCHEDULE 1A FROM ZONING BYLAW = 10,885m² / 1000m² = **11 BIKE RACKS.**

GUPTA ARCHITECTURE INC.

PAS POUR CONSTRUCTION
NOT FOR CONSTRUCTION

ISSUED FOR:	REVIEW	DATE
INFORMATION	00	2018-12-21

PROPOSED SITE PLAN

1199 NEWMARKET STREET
OTTAWA, ONTARIO.

DESIGN REF: -
DRAWING NO: 18630
REV: -
DESSINE PAR / DRAWN BY: MM
VERIFIE PAR / VERIFIED BY: VG
DATE: 2018-07-12
ECHELLE / SCALE: 1/64"=1'-0"
A02

APPENDIX 2

- Boreholes Logs

ORTAM groupe
RBQ : 8353-4917-04

Client : 1199 NEWMARKET HOLDINGS INC.

Dossier : 13340

RAPPORT DE FORAGE

Projet : Warehouse Newmarket

Site : 1199, Newmarket street, Ottawa

Forage no.: *F-1*
Date : 2019-08-27
Équipement : Foreuse à tarière Mobile Drill
Supervisé par : D. Héon

Type d'échantillon
- **CF :** Cuillère fendue
- **TM :** Tube à paroi mince
- **TE :** Tube d'échantillonnage
- **CR :** Carrotage au diamant
- **VR :** Manuel

État de l'échantillon
- Remanié
- Intact
- Perdu
- Forage au diamant

Graphique
- ▲ : N (pen. standard)
- △ : Nc (pen. dynamique)
- ▼ : C_u (laboratoire)
- ▽ : C_{ur} (laboratoire)
- ● : C_u (chantier)
- ○ : C_{ur} (chantier)

Évidence de contamination
Olfactive/Visuelle
- Inexistant
- Faible
- Moyen
- Fort

Coordonnées
Arbitraire
X : ---
Y : ---
Z : 28,8 m

Niveau d'eau

Date	Niveau	Élév.
2019-09-02	1,6 m	27,1 m

PROFONDEUR - m	NIVEAU - m / PROF. - m	DESCRIPTION	SYMBOLE	NIVEAU D'EAU - m	TYPE et NUMÉRO	ÉTAT	SOUS-ÉCHANTILLON	RÉCUPÉRATION	N, Nc ou RQD	OLFACTIF VISUEL	N ou Nc (coups/300 mm) 50 100 / RÉSISTANCE AU CISAILLEMENT NON-DRAINÉ (kPa) 50 100	ESSAIS DE LABORATOIRE et RÉSULTATS IN SITU	TENEUR EN EAU et LIMITES (%) w_P w w_L 20 40 60 80
	28,8	*Surface du sol actuel*											
	0,0	Asphalte (120 mm).											
	28,6	Remblai : Sable avec un peu de silt, d'argile et de											
	0,1	gravier. Traces de sols organiques.											
	28,5	Silt argileux avec traces de sable. Turquoise.											
	0,3	Oxydé. Humide. Consistance ferme.			CF-1		A	50	20				
							B						
1					CF-2			100	9				
					CF-3			100	11			IP = 11 AG	
2				1,6 m									
					CF-4		A	65	24				
	26,6						B						
	2,2	Till : Silt et sable avec un peu d'argile. Gris.										AG	
		Saturé. Compacité moyenne à très dense.			CF-5			50	22				
3					CF-6			100	R				
	24,8												
4	**4,0**	Roc : Calcaire argileux. Bonne à excellente			CF-7			100	R				
		qualité.											
					CR-1			90	85				
5													
6					CR-2			100	90				
	21,9												
7	**6,9**	Fin du forage.											

REMARQUES : Tube ouvert installé à 6,6 m de profondeur.

Compilé par : J. Martin

ORTAM groupe
RBQ : 8353-4917-04

Client : 1199 NEWMARKET HOLDINGS INC.

Dossier : 13340

RAPPORT DE FORAGE

Projet : Warehouse Newmarket

Site : 1199, Newmarket street, Ottawa

Forage no.: *F-2*
Date : 2019-08-27
Équipement : Foreuse à tarière Mobile Drill
Supervisé par : D. Héon

Type d'échantillon
- **CF :** Cuillère fendue
- **TM :** Tube à paroi mince
- **TE :** Tube d'échantillonnage
- **CR :** Carrotage au diamant
- **VR :** Manuel

État de l'échantillon
- Remanié
- Intact
- Perdu
- Forage au diamant

Graphique
- ▲ : N (pen. standard)
- △ : Nc (pen. dynamique)
- ▼ : C_u (laboratoire)
- ▽ : C_{ur} (laboratoire)
- ● : C_u (chantier)
- ○ : C_{ur} (chantier)

Évidence de contamination
Olfactive/Visuelle
- Inexistant
- Faible
- Moyen
- Fort

Coordonnées
Arbitraire
X : ---
Y : ---
Z : 29,0 m

Niveau d'eau

Date	Niveau	Élév.
2019-09-02	2,0 m	27,0 m

PROFONDEUR - m	NIVEAU - m / PROF. - m	DESCRIPTION	SYMBOLE	NIVEAU D'EAU - m	TYPE et NUMÉRO	ÉTAT	SOUS-ÉCHANTILLON	RÉCUPÉRATION	N, Nc ou RQD	OLFACTIF VISUEL	N ou Nc (coups/300 mm) 50 100 / RÉSISTANCE AU CISAILLEMENT NON-DRAINÉ (kPa) 50 100	ESSAIS DE LABORATOIRE et RÉSULTATS IN SITU	TENEUR EN EAU et LIMITES (%) w_P w w_L 20 40 60 80
	29,0	*Surface du sol actuel*											
	0,0 / 28,7	Remblai de till : Sable et silt graveleux. Brun. Compacité très dense.			CF-1		A	85	66				
	0,3	Sable et silt avec traces d'argile et de gravier. Brun. Oxydé. Humide. Compacité lâche.					B						
1	27,8				CF-2			65	8				
	1,2	Till : Sable et silt avec un peu de gravier. Gris. Humide et localement saturé. Compacité moyenne à très dense.			CF-3			85	24				
	27,2 **1,8**	Devient gris.											
2				2,0 m	CF-4			85	42			AG	
	26,6 **2,4**	Devient silt sableux et graveleux.			CF-5			100	R			AG	
	26,2 **2,8**	Roc : Calcaire argileux. Mauvaise à moyenne qualité.											
3					CR-1			90	55				
4					CR-2			100	45				
	24,5 **4,5**	Fin du forage.											
5													
6													
7													

REMARQUES : Tube ouvert installé à 4,2 m de profondeur.

Compilé par : J. Martin

ORTAM groupe
RBQ : 8353-4917-04

Client : 1199 NEWMARKET HOLDINGS INC.

Dossier : 13340

RAPPORT DE FORAGE

Projet : Warehouse Newmarket

Site : 1199, Newmarket street, Ottawa

Forage no.: *F-3*
Date : 2019-08-27
Équipement : Foreuse à tarière Mobile Drill
Supervisé par : D. Héon

Type d'échantillon
- **CF :** Cuillère fendue
- **TM :** Tube à paroi mince
- **TE :** Tube d'échantillonnage
- **CR :** Carrotage au diamant
- **VR :** Manuel

État de l'échantillon
- Remanié
- Intact
- Perdu
- Forage au diamant

Graphique
- ▲ : N (pen. standard)
- △ : Nc (pen. dynamique)
- ▼ : C_u (laboratoire)
- ▽ : C_{ur} (laboratoire)
- ● : C_u (chantier)
- ○ : C_{ur} (chantier)

Évidence de contamination
Olfactive/Visuelle
- Inexistant
- Faible
- Moyen
- Fort

Coordonnées
Arbitraire
X : ---
Y : ---
Z : 28,8 m

Niveau d'eau

Date	Niveau	Élév.
2019-09-02	1,8 m	27,0 m

PROFONDEUR - m	NIVEAU - m / PROF. - m	DESCRIPTION	SYMBOLE	NIVEAU D'EAU - m	TYPE et NUMÉRO	ÉTAT	SOUS-ÉCHANTILLON	RÉCUPÉRATION	N, Nc ou RQD	OLFACTIF VISUEL	N ou Nc (coups/300 mm) 50 100 / RÉSISTANCE AU CISAILLEMENT NON-DRAINÉ (kPa) 50 100	ESSAIS DE LABORATOIRE et RÉSULTATS IN SITU	TENEUR EN EAU et LIMITES (%) w_P w w_L 20 40 60 80
	28,8	*Surface du sol actuel*											
0	**0,0**	Remblai probable : Sable avec un peu de silt et traces de gravier. Brun. Humide. Traces de sols organiques.			CF-1			50	8				
					CF-2			35	6				
1	27,6												
	1,2	Devient très humide.			CF-3			65	6			AG	
	27,0												
	1,8	Silt et sable avec un peu d'argile. Brun. Oxydé.					A						
2	26,9	Humide. Compacité lâche.		1,8 m	CF-4			50	R				
	1,9	Till : Sable et silt avec un peu de gravier et traces					B						
	26,4	d'argile. Gris. Saturé. Compacité moyenne à très											
	2,4	dense.											
		Roc : Calcaire argileux. Moyenne à excellente qualité.											
3					CR-1			90	65				
4													
					CR-2			90	90				
5	23,4												
	5,4	Fin du forage.											
6													
7													

REMARQUES : Tube ouvert installé à 5,1 m de profondeur.

Compilé par : J. Martin

ORTAM groupe
RBQ : 8353-4917-04

Client : 1199 NEWMARKET HOLDINGS INC.

Dossier : 13340

RAPPORT DE FORAGE

Projet : Warehouse Newmarket

Site : 1199, Newmarket street, Ottawa

Forage no.: *F-4*
Date : 2019-08-27
Équipement : Foreuse à tarière Mobile Drill
Supervisé par : D. Héon

Type d'échantillon
- **CF :** Cuillère fendue
- **TM :** Tube à paroi mince
- **TE :** Tube d'échantillonnage
- **CR :** Carrotage au diamant
- **VR :** Manuel

État de l'échantillon
- Remanié
- Intact
- Perdu
- Forage au diamant

Graphique
- ▲ : N (pen. standard)
- △ : Nc (pen. dynamique)
- ▼ : C_u (laboratoire)
- ▽ : C_{ur} (laboratoire)
- ● : C_u (chantier)
- ○ : C_{ur} (chantier)

Évidence de contamination
Olfactive/Visuelle
- Inexistant
- Faible
- Moyen
- Fort

Coordonnées
Arbitraire
X : ---
Y : ---
Z : 29,0 m

Niveau d'eau

Date	Niveau	Élév.
2019-09-02	2,1 m	26,9 m

PROFONDEUR - m	NIVEAU - m / PROF. - m	DESCRIPTION	SYMBOLE	NIVEAU D'EAU - m	TYPE et NUMÉRO	ÉTAT	SOUS-ÉCHANTILLON	RÉCUPÉRATION	N, Nc ou RQD	OLFACTIF VISUEL	N ou Nc (coups/300 mm) 50 100 / RÉSISTANCE AU CISAILLEMENT NON-DRAINÉ (kPa) 50 100	ESSAIS DE LABORATOIRE et RÉSULTATS IN SITU	TENEUR EN EAU et LIMITES (%) w_P w w_L 20 40 60 80
	29,0	*Surface du sol actuel*											
	0,0	Remblai granulaire : Sable et gravier silteux. Brun. Compacité très dense.			CF-1			100	76				
	28,4												
1	**0,6**	Sable et silt avec traces d'argile et de gravier. Brun. Oxydé. Humide à très humide. Compacité moyenne.			CF-2			65	12				
	27,8												
	1,2	Till : Silt et sable avec traces de gravier. Gris. Saturé. Compacité moyenne à très dense.			CF-3			50	23				
	27,2												
2	**1,8**	Devient très humide.		2,1 m	CF-4			65	40			AG	
					CF-5			100	61				
3					CF-6			100	R				
	25,8												
	3,2	Partie supérieure du roc. Friable.			CF-7			35	R				
4													
					CF-8			100	R				
	24,5												
	4,5	Fin du forage. Refus sur le roc sain probable.											
5													
6													
7													

REMARQUES : Tube ouvert installé à 4,2 m de profondeur.

ORTAM groupe
RBQ : 8353-4917-04

Client : 1199 NEWMARKET HOLDINGS INC.

Dossier : 13340

RAPPORT DE FORAGE

Projet : Warehouse Newmarket

Site : 1199, Newmarket street, Ottawa

Forage no.: *F-5*
Date : 2019-08-27
Équipement : Foreuse à tarière Mobile Drill
Supervisé par : D. Héon

Type d'échantillon
- **CF :** Cuillère fendue
- **TM :** Tube à paroi mince
- **TE :** Tube d'échantillonnage
- **CR :** Carrotage au diamant
- **VR :** Manuel

État de l'échantillon
- Remanié
- Intact
- Perdu
- Forage au diamant

Graphique
- ▲ : N (pen. standard)
- △ : Nc (pen. dynamique)
- ▼ : C_u (laboratoire)
- ▽ : C_{ur} (laboratoire)
- ● : C_u (chantier)
- ○ : C_{ur} (chantier)

Évidence de contamination
Olfactive/Visuelle
- Inexistant
- Faible
- Moyen
- Fort

Coordonnées
Arbitraire
X : ---
Y : ---
Z : 28,2 m

Niveau d'eau

Date	Niveau	Élév.

PROFONDEUR - m	NIVEAU - m / PROF. - m	DESCRIPTION	SYMBOLE	NIVEAU D'EAU - m	TYPE et NUMÉRO	ÉTAT	SOUS-ÉCHANTILLON	RÉCUPÉRATION	N, Nc ou RQD	OLFACTIF VISUEL	N ou Nc (coups/300 mm) 50 100 / RÉSISTANCE AU CISAILLEMENT NON-DRAINÉ (kPa) 50 100	ESSAIS DE LABORATOIRE et RÉSULTATS IN SITU	TENEUR EN EAU et LIMITES (%) w_P w w_L 20 40 60 80
	28,2	*Surface du sol actuel*											
	0,0	Remblai granulaire : Sable et silt graveleux. Brun. Compacité très dense.			CF-1			65	64				
	27,3				CF-2			35	9				
1	**0,9**	Terre végétale. Brun foncé.											
	27,0												
	1,2	Till : Sable et silt avec un peu de gravier. Gris. Saturé. Compacité moyenne à très dense.		▼ 1,5	CF-3			85	R			AG	
	26,4				CF-4			50	R				
2	**1,8**	Partie supérieure du roc.											
	25,2				CF-5			50	R				
3	**3,0**	Fin du forage.											
4													
5													
6													
7													

REMARQUES : Nappe phréatique estimée : 1,5 m (élévation : 26,7 m).

Compilé par : J. Martin

ORTAM groupe
RBQ : 8353-4917-04

Client : 1199 NEWMARKET HOLDINGS INC.

Dossier : 13340

RAPPORT DE FORAGE

Projet : Warehouse Newmarket

Site : 1199, Newmarket street, Ottawa

Forage no.: *F-6*
Date : 2019-08-27
Équipement : Foreuse à tarière Mobile Drill
Supervisé par : D. Héon

Type d'échantillon
- **CF :** Cuillère fendue
- **TM :** Tube à paroi mince
- **TE :** Tube d'échantillonnage
- **CR :** Carrotage au diamant
- **VR :** Manuel

État de l'échantillon
- Remanié
- Intact
- Perdu
- Forage au diamant

Graphique
- ▲ : N (pen. standard)
- △ : Nc (pen. dynamique)
- ▼ : C_u (laboratoire)
- ▽ : C_{ur} (laboratoire)
- ● : C_u (chantier)
- ○ : C_{ur} (chantier)

Évidence de contamination
Olfactive/Visuelle
- Inexistant
- Faible
- Moyen
- Fort

Coordonnées
Arbitraire
X : ---
Y : ---
Z : 28,9 m

Niveau d'eau

Date	Niveau	Élév.
2019-09-02	1,9 m	27,0 m

PROFONDEUR - m	NIVEAU - m / PROF. - m	DESCRIPTION	SYMBOLE	NIVEAU D'EAU - m	TYPE et NUMÉRO	ÉTAT	SOUS-ÉCHANTILLON	RÉCUPÉRATION	N, Nc ou RQD	OLFACTIF VISUEL	N ou Nc (coups/300 mm) 50 100 / RÉSISTANCE AU CISAILLEMENT NON-DRAINÉ (kPa) 50 100	ESSAIS DE LABORATOIRE et RÉSULTATS IN SITU	TENEUR EN EAU et LIMITES (%) w_P w w_L 20 40 60 80
	28,9	*Surface du sol actuel*											
	0,0 / 28,6	Remblai : Sable fin à moyen graveleux avec un peu de silt. Humide.											
	0,3	Remblai probable : Sable avec traces de silt. Oxydé. Humide. Compacité moyenne.			CF-1		A	85	18				
							B						
1	27,8				CF-2		A	65	10			AG	
	1,1	Argile et silt avec traces de sable. Turquoise. Oxydé. Humide. Compacité moyenne.					B					IP = 28 AG	
	27,3				CF-3		A	100	19				
	1,6	Till : Sable et silt avec un peu de gravier et traces d'argile. Gris. Saturé. Compacité moyenne à très dense.					B						
2	26,8			1,9 m	CF-4			100	R				
	2,1	Fin du forage. Refus sur le roc probable.											
3													
4													
5													
6													
7													

REMARQUES : Tube ouvert installé à la base du forage.

Compilé par : J. Martin

ORTAM groupe
RBQ : 8353-4917-04

Client : 1199 NEWMARKET HOLDINGS INC.

Dossier : 13340

RAPPORT DE FORAGE

Projet : Warehouse Newmarket

Site : 1199, Newmarket street, Ottawa

Forage no.: *F-7*
Date : 2019-08-27
Équipement : Foreuse à tarière Mobile Drill
Supervisé par : D. Héon

Type d'échantillon
- **CF :** Cuillère fendue
- **TM :** Tube à paroi mince
- **TE :** Tube d'échantillonnage
- **CR :** Carrotage au diamant
- **VR :** Manuel

État de l'échantillon
- Remanié
- Intact
- Perdu
- Forage au diamant

Graphique
- ▲ : N (pen. standard)
- △ : Nc (pen. dynamique)
- ▼ : C_u (laboratoire)
- ▽ : C_{ur} (laboratoire)
- ● : C_u (chantier)
- ○ : C_{ur} (chantier)

Évidence de contamination
Olfactive/Visuelle
- Inexistant
- Faible
- Moyen
- Fort

Coordonnées
Arbitraire
X : ---
Y : ---
Z : 28,7 m

Niveau d'eau

Date	Niveau	Élév.

PROFONDEUR - m	NIVEAU - m / PROF. - m	DESCRIPTION	SYMBOLE	NIVEAU D'EAU - m	ÉCHANTILLONS: TYPE et NUMÉRO	ÉTAT	SOUS-ÉCHANTILLON	RÉCUPÉRATION	N, Nc ou RQD	OLFACTIF VISUEL	N ou Nc (coups/300 mm) 50 100 / RÉSISTANCE AU CISAILLEMENT NON-DRAINÉ (kPa) 50 100	ESSAIS DE LABORATOIRE et RÉSULTATS IN SITU	TENEUR EN EAU et LIMITES (%) w_P w w_L 20 40 60 80
	28,7	*Surface du sol actuel*											
	0,0	Pierre concassée de type MG-20. Présence de débris d'asphalte.			CF-1			100	R				
	28,1												
	0,6	Remblai : Sable et silt avec un peu de gravier. Brun. Humide. Compacité dense.			CF-2			50	36				
1				▼ 1,5	CF-3			100	37			AG	
	26,9												
	1,8	Till : Sable et silt avec un peu de gravier. Gris. Humide. Compacité très dense.			CF-4			85	51				
2					CF-5			100	R				
	26,0												
	2,7	Fin du forage. Refus sur le roc probable.											
3													
4													
5													
6													
7													

REMARQUES : Nappe phréatique estimée : 1,5 m (élévation : 27,2 m).

Compilé par : J. Martin

ORTAM groupe
RBQ : 8353-4917-04

NOTES EXPLICATIVES SUR LES RAPPORTS DE SONDAGE

DESCRIPTION ET CLASSIFICATION DES SOLS ET DU ROC :

CLASSIFICATION

Argile	<0,002 mm
Silt	0,002 à 0,08 mm
Sable	0,08 à 5 mm
Gravier	5 à 80 mm
Cailloux	80 à 300 mm
Blocs	> 300 mm

TERMINOLOGIE

"traces"	< 10 %
"un peu"	10-20 %
adjectif (silteux, sableux)	20-35 %
nom (silt, sable)	> 35 %

COMPACITÉ DES SOLS GRANULAIRES	INDICE DE PÉNÉTRATION STANDARD "N" (coups/300 mm)
Très lâche	< 4
Lâche	4-10
Compact ou moyenne	10-30
Dense	30-50
Très dense	> 50

CONSISTANCE DES SOLS COHÉRENTS	RÉSISTANCE AU CISAILLEMENT C_u (kPa)
Très molle	< 12
Molle	12-25
Ferme	25-50
Raide	50-100
Très raide	100-200
Dure	> 200

INDICE DE LA QUALITÉ DU ROC

VALEUR "RQD"	QUALITATIF
< 25	très mauvais
25-50	mauvais
50-75	moyen
75-90	bon
> 90	excellent

ÉLÉVATION :

Niveau géodésique ou arbitraire du terrain à l'emplacement du sondage. Le point géodésique ou arbitraire utilisé est défini dans le rapport.

PROFONDEUR :

Profondeur des différents contacts géologiques à partir de la surface du terrain.

ORTAM groupe
RBQ : 8353-4917-04

NOTES EXPLICATIVES SUR LES RAPPORTS DE SONDAGE (suite)

STRATIGRAPHIE :

Chaque formation géologique est décrite selon la terminologie d'usage. Le contact entre les formations géologiques est identifié par une ligne pleine lorsque la profondeur est bien définie ou par une ligne en pointillé. La précision du contact est relatif à la méthode d'échantillonnage et le pourcentage de récupération.

ÉCHANTILLONS :

ÉTAT

La position, la longueur et l'état de chaque échantillon sont montrés dans cette colonne.
Les symboles suivants sont utilisés pour définir l'état de l'échantillon.

 : Remanié  : Intact  : Perdu  : Carotte de roc

TYPE ET NUMÉRO

Le type d'échantillonneur utilisé est défini par l'abréviation indiqué ci-après. La numérotation est continue pour chacun des types.

CF : Cuillère fendue
TM : Tube à paroi mince
VR : Vrac
TE : Tube d'échantillonnage
CR : Carottier diamanté
CFE, VRE, TEE : Échantillonnage environnemental

ESSAIS DE CHANTIER :

N : Indice de pénétration standard
R : Refus à l'enfoncement
k : perméabilité
N_C : Indice de pénétration dynamique au cône
C_u : Résistance au cisaillement non drainé
RQD : Indice de la qualité du roc

RÉCUPÉRATION :

La récupération de l'échantillon est le rapport exprimé en pourcentage de la longueur récupérée dans l'échantillonneur à la longueur enfoncée.

RÉSULTATS DES ESSAIS :

Cette colonne contient à la profondeur correspondante, les essais effectués au chantier ou en laboratoire. Les résultats de ces essais sont soit présentés dans cette colonne, dans le rapport ou dans les certificats des essais de laboratoire.

ESSAIS DE LABORATOIRE :

I_P : Indice de plasticité
w_L : Limite liquide
w_P : Limite plastique
AG : Analyse granulo-sédimentométrique
w : Teneur en eau
γ : Poids volumique
CS : Cône Suédois
CHIM : Analyse chimique
σ_P' : Pression de préconsolidation

APPENDIX 3

- Laboratory testing results

ORTAM groupe
RBQ : 8353-4917-04

CERTIFICAT DE LABORATOIRE - SOL

ANALYSE GRANULOMÉTRIQUE DES SOLS INORGANIQUES

BNQ 2501-025/2013

CLIENT: 1199 NEWMARKET HOLDINGS INC. **DOSSIER:** 13340

PROJET: 1199, Newmarket street, Ottawa **ANALYSE NO:** 19-478-1

DONNÉES GÉNÉRALES			
Description:	Silt argileux avec traces de sable	Prélevé le: 2019-08-27	Par: D. H.
Provenance:	F-1 / CF-3	Analysé le: 2019-09-11	Par: A. P.

ANALYSE GRANULOMÉTRIQUE	
112 mm	100
80 mm	100
56 mm	100
40 mm	100
28 mm	100
20 mm	100
14 mm	100
10 mm	100
5 mm	100
2,5 mm	100
1,25 mm	100
630 µm	100
315 µm	100
160 µm	100
80 µm	96,8

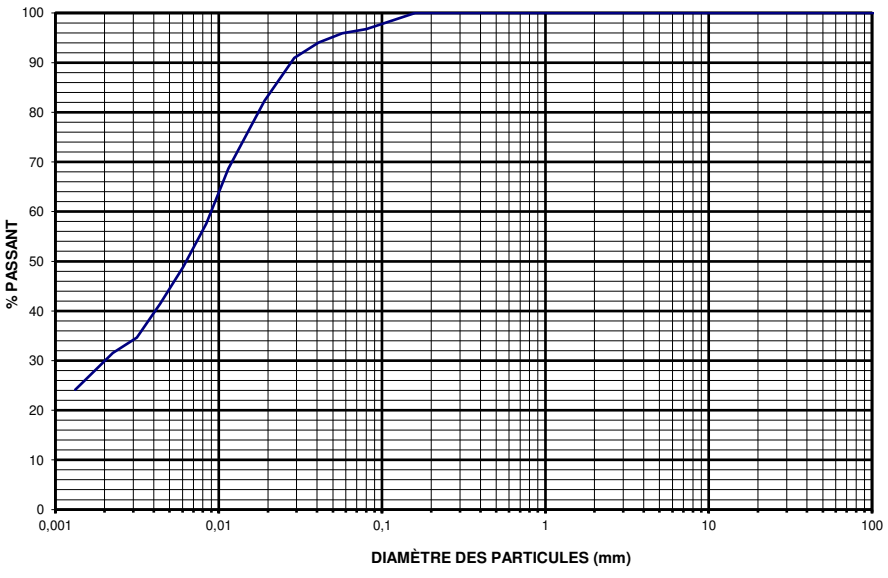
RÉSUMÉ DES ESSAIS	
Argile %	29
Silt %	67
Sable %	3
Gravier %	0

REMARQUES
Teneur en eau : 36 %

SÉDIMENTOMÉTRIE

TEMPS (MIN)	DIAMÈTRE (MM)	% PASSANT
0,5	0,057	95,9
1	0,041	94,1
2	0,029	91,0
5	0,019	82,3
15	0,011	68,7
30	0,008	57,5
60	0,006	48,9
120	0,004	41,5
240	0,003	34,7
480	0,002	31,6
1440	0,001	24,1

COURBE GRANULOMÉTRIQUE



Préparé par: Joël Martin

ORTAM groupe
RBQ : 8353-4917-04

CERTIFICAT DE LABORATOIRE - SOL

ANALYSE GRANULOMÉTRIQUE DES SOLS INORGANIQUES

BNQ 2501-025/2013

CLIENT: 1199 NEWMARKET HOLDINGS INC. **DOSSIER:** 13340

PROJET: 1199, Newmarket street, Ottawa **ANALYSE NO:** 19-478-2

DONNÉES GÉNÉRALES			
Description:	Silt et sable avec un peu d'argile	Prélevé le: 2019-08-27	Par: D. H.
Provenance:	F-1 / CF-4B	Analysé le: 2019-09-11	Par: A. P.

ANALYSE GRANULOMÉTRIQUE	
112 mm	100
80 mm	100
56 mm	100
40 mm	100
28 mm	100
20 mm	100
14 mm	100
10 mm	100
5 mm	100
2,5 mm	100
1,25 mm	100
630 µm	100
315 µm	100
160 µm	100
80 µm	60,3

RÉSUMÉ DES ESSAIS	
Argile %	14
Silt %	46
Sable %	40
Gravier %	0

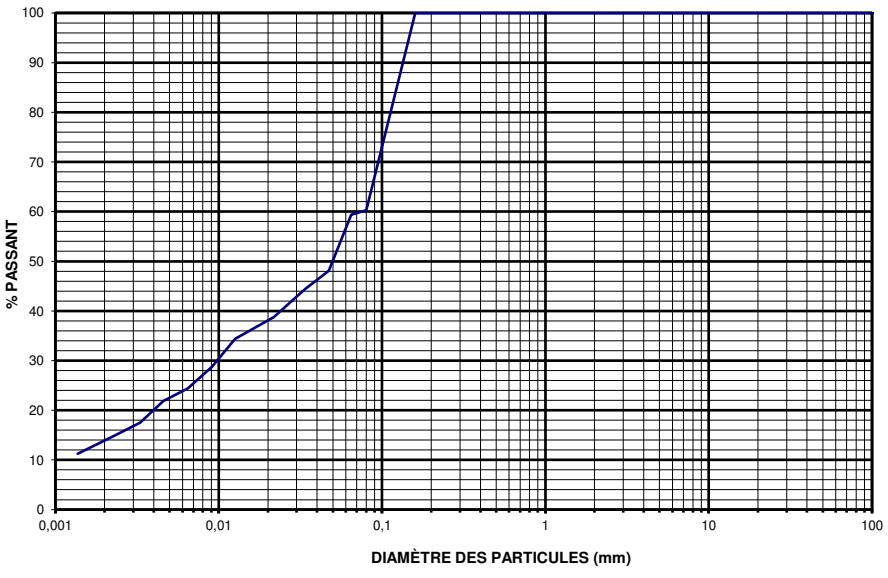
REMARQUES

Teneur en eau : 11,8 %

SÉDIMENTOMÉTRIE

TEMPS (MIN)	DIAMÈTRE (MM)	% PASSANT
0,5	0,065	59,4
1	0,047	48,1
2	0,034	44,4
5	0,022	38,8
15	0,013	34,4
30	0,009	28,8
60	0,006	24,4
120	0,005	21,9
240	0,003	17,5
480	0,002	15,0
1440	0,001	11,3

COURBE GRANULOMÉTRIQUE



Préparé par: Joël Martin

ORTAM groupe
RBQ : 8353-4917-04

CERTIFICAT DE LABORATOIRE - SOL

ANALYSE GRANULOMÉTRIQUE DES SOLS INORGANIQUES

BNQ 2501-025/2013

CLIENT: 1199 NEWMARKET HOLDINGS INC. **DOSSIER:** 13340

PROJET: 1199, Newmarket street, Ottawa **ANALYSE NO:** 19-478-3

DONNÉES GÉNÉRALES			
Description:	Sable et silt avec un peu de gravier	Prélevé le: 2019-08-27	Par: D. H.
Provenance:	F-2 / CF-4	Analysé le: 2019-09-11	Par: A. P.

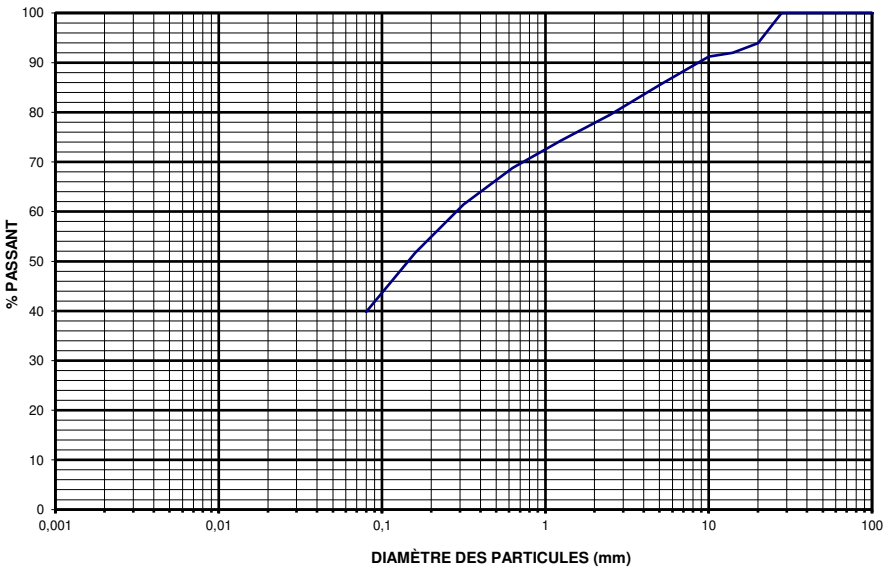
ANALYSE GRANULOMÉTRIQUE	
112 mm	100
80 mm	100
56 mm	100
40 mm	100
28 mm	100
20 mm	94
14 mm	92
10 mm	91
5 mm	85
2,5 mm	80
1,25 mm	74
630 µm	69
315 µm	61
160 µm	52
80 µm	39,8

RÉSUMÉ DES ESSAIS	
Argile %	0
Silt %	40
Sable %	46
Gravier %	15

REMARQUES
Teneur en eau : 9,6 %

SÉDIMENTOMÉTRIE		
TEMPS (MIN)	DIAMÈTRE (MM)	% PASSANT
0,5		
1		
2		
5		
15		
30		
60		
120		
240		
480		
1440		

COURBE GRANULOMÉTRIQUE



Préparé par: Joël Martin

ORTAM groupe
RBQ : 8353-4917-04

CERTIFICAT DE LABORATOIRE - SOL

ANALYSE GRANULOMÉTRIQUE DES SOLS INORGANIQUES

BNQ 2501-025/2013

CLIENT: 1199 NEWMARKET HOLDINGS INC. **DOSSIER:** 13340

PROJET: 1199, Newmarket street, Ottawa **ANALYSE NO:** 19-478-4

DONNÉES GÉNÉRALES

Description:	Silt sableux et graveleux	Prélevé le:	2019-08-27	Par: D. H.
Provenance:	F-2 / CF-5	Analysé le:	2019-09-11	Par: A. P.

ANALYSE GRANULOMÉTRIQUE

112 mm	100
80 mm	100
56 mm	100
40 mm	100
28 mm	100
20 mm	100
14 mm	89
10 mm	84
5 mm	70
2,5 mm	64
1,25 mm	58
630 µm	54
315 µm	49
160 µm	44
80 µm	37,7

SÉDIMENTOMÉTRIE

TEMPS (MIN)	DIAMÈTRE (MM)	% PASSANT
0,5		
1		
2		
5		
15		
30		
60		
120		
240		
480		
1440		

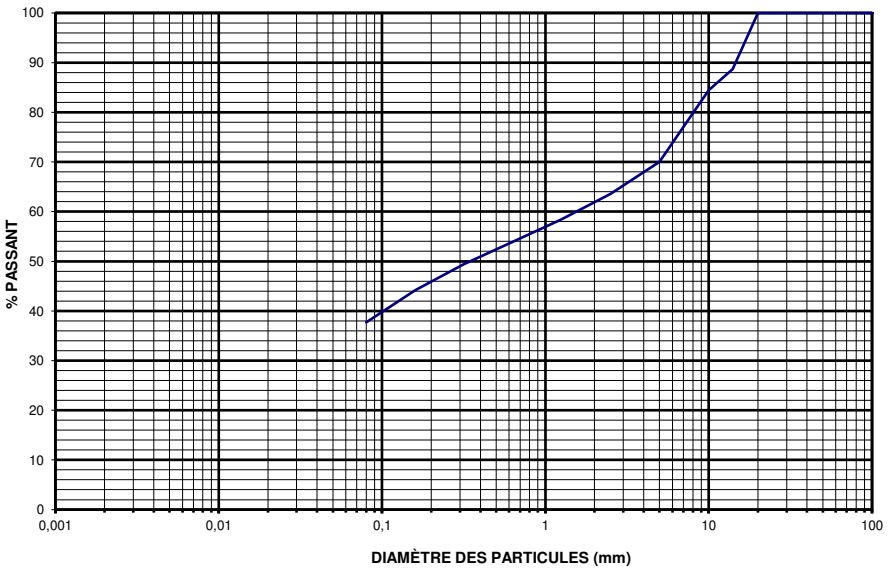
RÉSUMÉ DES ESSAIS

Argile %	0
Silt %	38
Sable %	32
Gravier %	30

REMARQUES

Teneur en eau : 7,9 %

COURBE GRANULOMÉTRIQUE



Préparé par: Joël Martin

ORTAM groupe
RBQ : 8353-4917-04

CERTIFICAT DE LABORATOIRE - SOL

ANALYSE GRANULOMÉTRIQUE DES SOLS INORGANIQUES

BNQ 2501-025/2013

CLIENT: 1199 NEWMARKET HOLDINGS INC. **DOSSIER:** 13340

PROJET: 1199, Newmarket street, Ottawa **ANALYSE NO:** 19-478-5

DONNÉES GÉNÉRALES			
Description:	Sable avec un peu de silt et traces de gravier	Prélevé le: 2019-08-27	Par: D. H.
Provenance:	F-3 / CF-3	Analysé le: 2019-09-11	Par: A. P.

ANALYSE GRANULOMÉTRIQUE	
112 mm	100
80 mm	100
56 mm	100
40 mm	100
28 mm	100
20 mm	100
14 mm	100
10 mm	99
5 mm	98
2,5 mm	96
1,25 mm	93
630 µm	83
315 µm	62
160 µm	31
80 µm	13,8

RÉSUMÉ DES ESSAIS	
Argile %	0
Silt %	14
Sable %	84
Gravier %	2

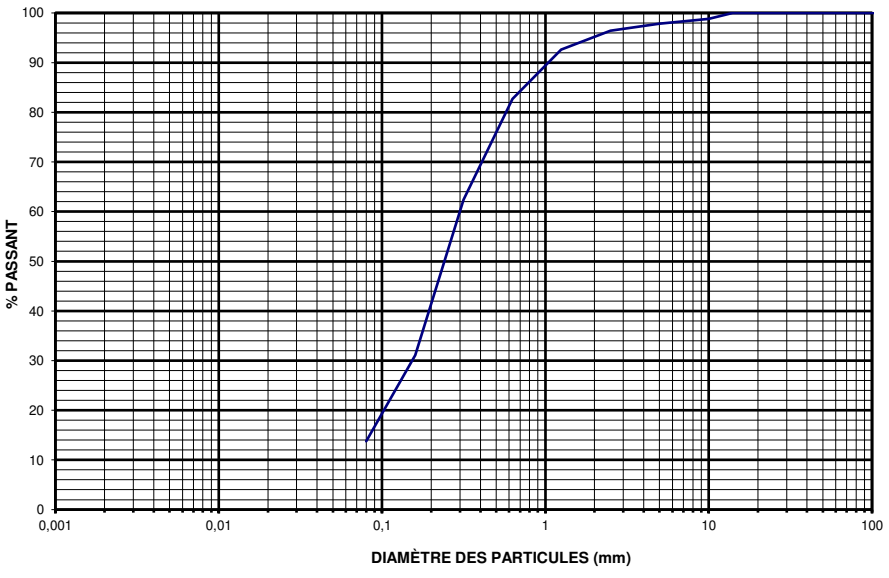
REMARQUES

Teneur en eau : 16,3 %

SÉDIMENTOMÉTRIE

TEMPS (MIN)	DIAMÈTRE (MM)	% PASSANT
0,5		
1		
2		
5		
15		
30		
60		
120		
240		
480		
1440		

COURBE GRANULOMÉTRIQUE



Préparé par: Joël Martin

ORTAM groupe
RBQ : 8353-4917-04

CERTIFICAT DE LABORATOIRE - SOL

ANALYSE GRANULOMÉTRIQUE DES SOLS INORGANIQUES

BNQ 2501-025/2013

CLIENT: 1199 NEWMARKET HOLDINGS INC. **DOSSIER:** 13340

PROJET: 1199, Newmarket street, Ottawa **ANALYSE NO:** 19-478-6

DONNÉES GÉNÉRALES			
Description:	Silt et sable avec traces de gravier	Prélevé le: 2019-08-27	Par: D. H.
Provenance:	F-4 / CF-4	Analysé le: 2019-09-11	Par: A. P.

ANALYSE GRANULOMÉTRIQUE	
112 mm	100
80 mm	100
56 mm	100
40 mm	100
28 mm	100
20 mm	100
14 mm	100
10 mm	99
5 mm	96
2,5 mm	92
1,25 mm	88
630 µm	83
315 µm	76
160 µm	66
80 µm	51,2

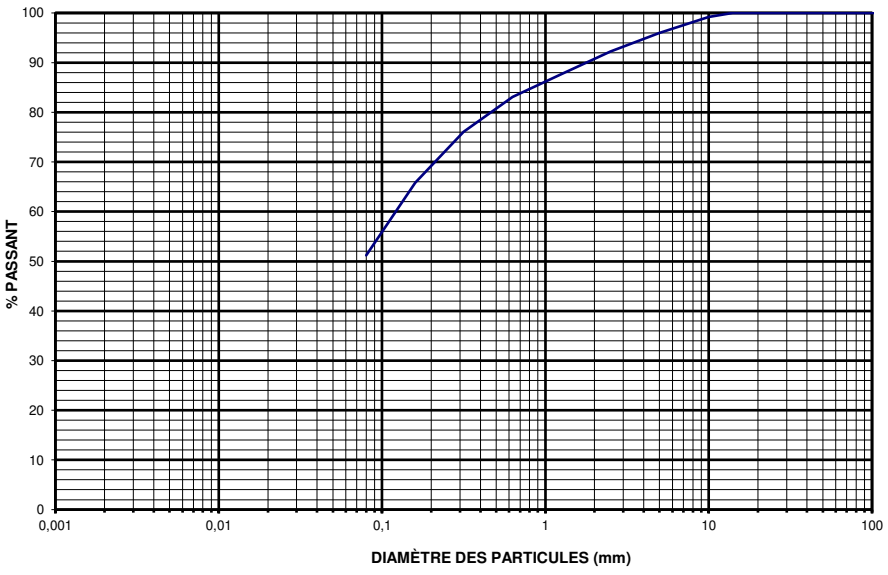
RÉSUMÉ DES ESSAIS	
Argile %	0
Silt %	51
Sable %	45
Gravier %	4

REMARQUES
Teneur en eau : 11,9 %

SÉDIMENTOMÉTRIE

TEMPS (MIN)	DIAMÈTRE (MM)	% PASSANT
0,5		
1		
2		
5		
15		
30		
60		
120		
240		
480		
1440		

COURBE GRANULOMÉTRIQUE



Préparé par: Joël Martin

ORTAM groupe
RBQ : 8353-4917-04

CERTIFICAT DE LABORATOIRE - SOL

ANALYSE GRANULOMÉTRIQUE DES SOLS INORGANIQUES

BNQ 2501-025/2013

CLIENT: 1199 NEWMARKET HOLDINGS INC. **DOSSIER:** 13340

PROJET: 1199, Newmarket street, Ottawa **ANALYSE NO:** 19-478-7

DONNÉES GÉNÉRALES			
Description:	Sable et silt avec un peu de gravier	Prélevé le: 2019-08-27	Par: D. H.
Provenance:	F-5 / CF-3	Analysé le: 2019-09-11	Par: A. P.

ANALYSE GRANULOMÉTRIQUE	
112 mm	100
80 mm	100
56 mm	100
40 mm	100
28 mm	100
20 mm	100
14 mm	99
10 mm	95
5 mm	85
2,5 mm	76
1,25 mm	68
630 µm	62
315 µm	55
160 µm	47
80 µm	38,4

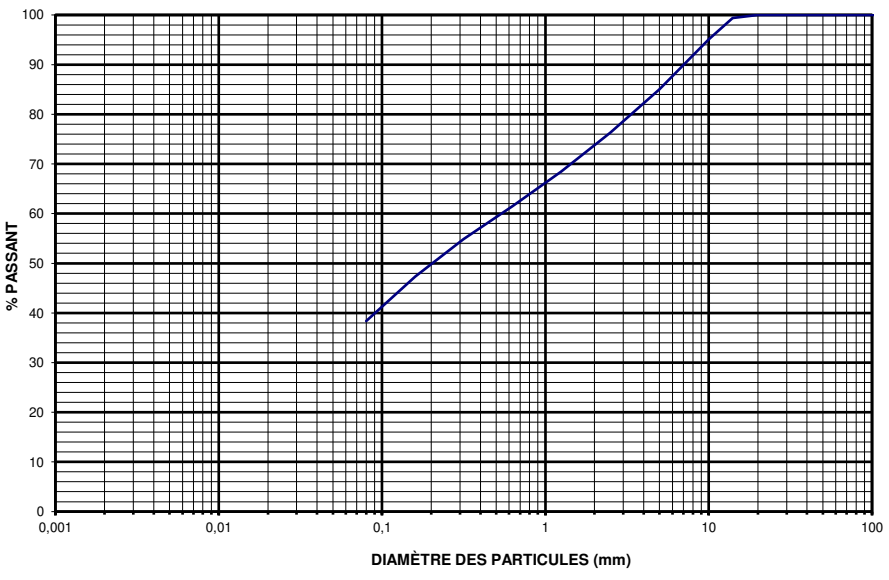
RÉSUMÉ DES ESSAIS	
Argile %	0
Silt %	38
Sable %	47
Gravier %	15

REMARQUES
Teneur en eau : 8,3 %

SÉDIMENTOMÉTRIE

TEMPS (MIN)	DIAMÈTRE (MM)	% PASSANT
0,5		
1		
2		
5		
15		
30		
60		
120		
240		
480		
1440		

COURBE GRANULOMÉTRIQUE



Préparé par: Joël Martin

ORTAM groupe
RBQ : 8353-4917-04

CERTIFICAT DE LABORATOIRE - SOL

ANALYSE GRANULOMÉTRIQUE DES SOLS INORGANIQUES

BNQ 2501-025/2013

CLIENT: 1199 NEWMARKET HOLDINGS INC. **DOSSIER:** 13340

PROJET: 1199, Newmarket street, Ottawa **ANALYSE NO:** 19-478-8

DONNÉES GÉNÉRALES			
Description:	Sable avec traces de silt	Prélevé le: 2019-08-27	Par: D. H.
Provenance:	F-6 / CF-2A	Analysé le: 2019-09-11	Par: A. P.

ANALYSE GRANULOMÉTRIQUE	
112 mm	100
80 mm	100
56 mm	100
40 mm	100
28 mm	100
20 mm	100
14 mm	100
10 mm	100
5 mm	100
2,5 mm	100
1,25 mm	100
630 µm	99
315 µm	90
160 µm	39
80 µm	8,6

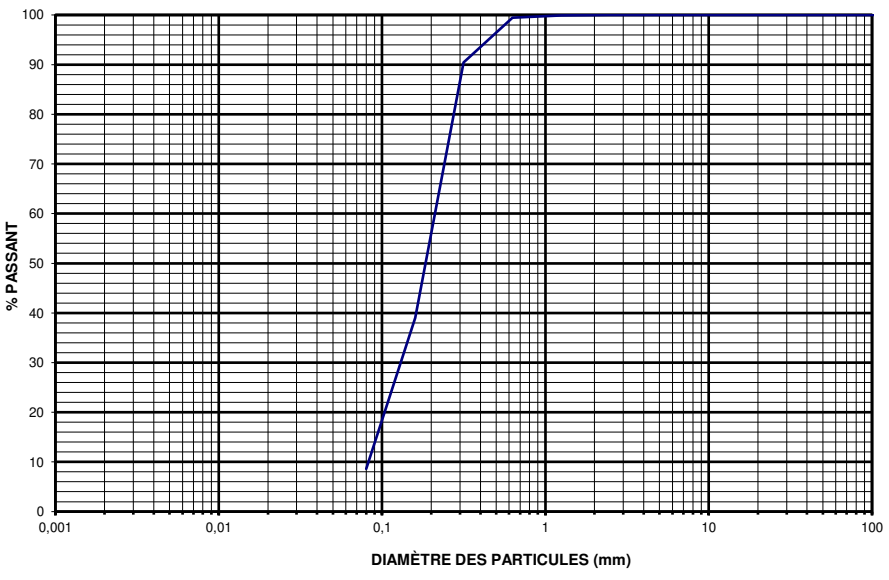
SÉDIMENTOMÉTRIE		
TEMPS (MIN)	DIAMÈTRE (MM)	% PASSANT
0,5		
1		
2		
5		
15		
30		
60		
120		
240		
480		
1440		

RÉSUMÉ DES ESSAIS	
Argile %	0
Silt %	9
Sable %	91
Gravier %	0

REMARQUES

Teneur en eau : 11,6 %

COURBE GRANULOMÉTRIQUE



Préparé par: Joël Martin

ORTAM groupe
RBQ : 8353-4917-04

CERTIFICAT DE LABORATOIRE - SOL

ANALYSE GRANULOMÉTRIQUE DES SOLS INORGANIQUES

BNQ 2501-025/2013

CLIENT: 1199 NEWMARKET HOLDINGS INC. **DOSSIER:** 13340

PROJET: 1199, Newmarket street, Ottawa **ANALYSE NO:** 19-478-9

DONNÉES GÉNÉRALES

Description:	Argile et silt avec traces de sable	Prélevé le:	2019-08-27	Par: D. H.
Provenance:	F-6 / CF-2B	Analysé le:	2019-09-11	Par: A. P.

ANALYSE GRANULOMÉTRIQUE

112 mm	100
80 mm	100
56 mm	100
40 mm	100
28 mm	100
20 mm	100
14 mm	100
10 mm	100
5 mm	100
2,5 mm	100
1,25 mm	100
630 µm	100
315 µm	100
160 µm	100
80 µm	95,3

RÉSUMÉ DES ESSAIS

Argile %	48
Silt %	47
Sable %	5
Gravier %	0

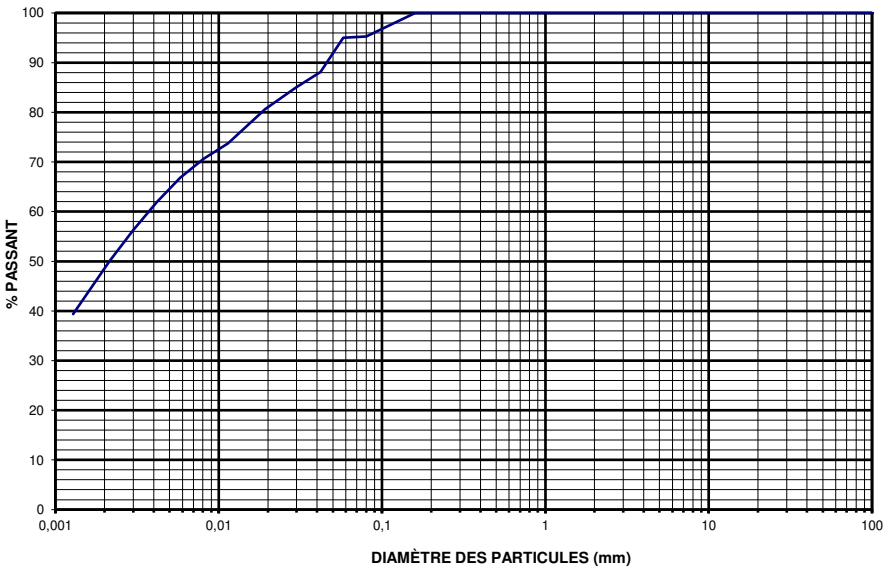
REMARQUES

Teneur en eau : 29,5 %

SÉDIMENTOMÉTRIE

TEMPS (MIN)	DIAMÈTRE (MM)	% PASSANT
0,5	0,058	95,0
1	0,042	88,1
2	0,030	85,0
5	0,019	80,6
15	0,011	73,8
30	0,008	70,6
60	0,006	66,9
120	0,004	61,9
240	0,003	56,3
480	0,002	50,0
1440	0,001	39,4

COURBE GRANULOMÉTRIQUE



Préparé par: Joël Martin

ORTAM groupe
RBQ : 8353-4917-04

CERTIFICAT DE LABORATOIRE - SOL

ANALYSE GRANULOMÉTRIQUE DES SOLS INORGANIQUES

BNQ 2501-025/2013

CLIENT: 1199 NEWMARKET HOLDINGS INC. **DOSSIER:** 13340

PROJET: 1199, Newmarket street, Ottawa **ANALYSE NO:** 19-478-10

DONNÉES GÉNÉRALES			
Description:	Sable et silt avec un peu de gravier	Prélevé le: 2019-08-27	Par: D. H.
Provenance:	F-7 / CF-3	Analysé le: 2019-09-11	Par: A. P.

ANALYSE GRANULOMÉTRIQUE	
112 mm	100
80 mm	100
56 mm	100
40 mm	100
28 mm	100
20 mm	92
14 mm	92
10 mm	90
5 mm	85
2,5 mm	79
1,25 mm	73
630 µm	67
315 µm	59
160 µm	48
80 µm	36,1

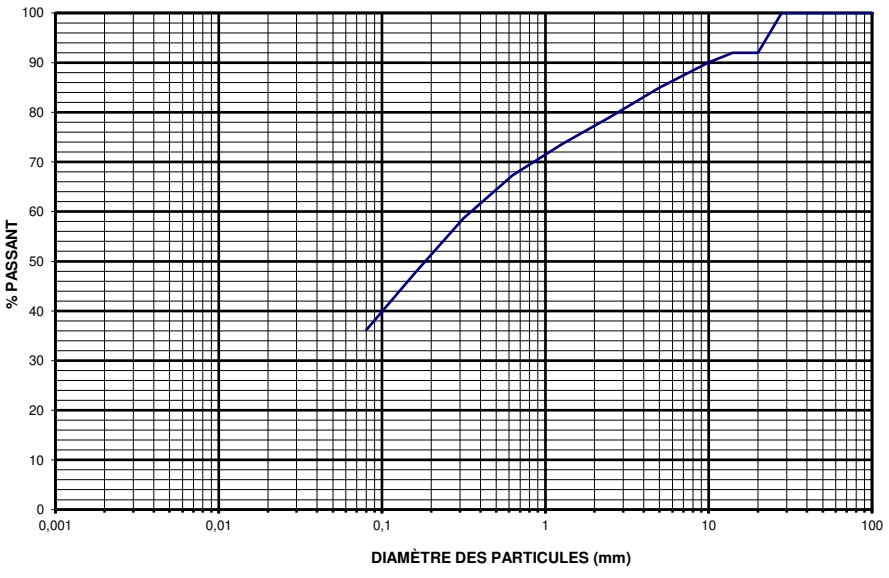
RÉSUMÉ DES ESSAIS	
Argile %	0
Silt %	36
Sable %	49
Gravier %	15

REMARQUES

SÉDIMENTOMÉTRIE

TEMPS (MIN)	DIAMÈTRE (MM)	% PASSANT
0,5		
1		
2		
5		
15		
30		
60		
120		
240		
480		
1440		

COURBE GRANULOMÉTRIQUE



Préparé par: Joël Martin

RBQ : 8353-4917-04

ABAQUE DE PLASTICITÉ

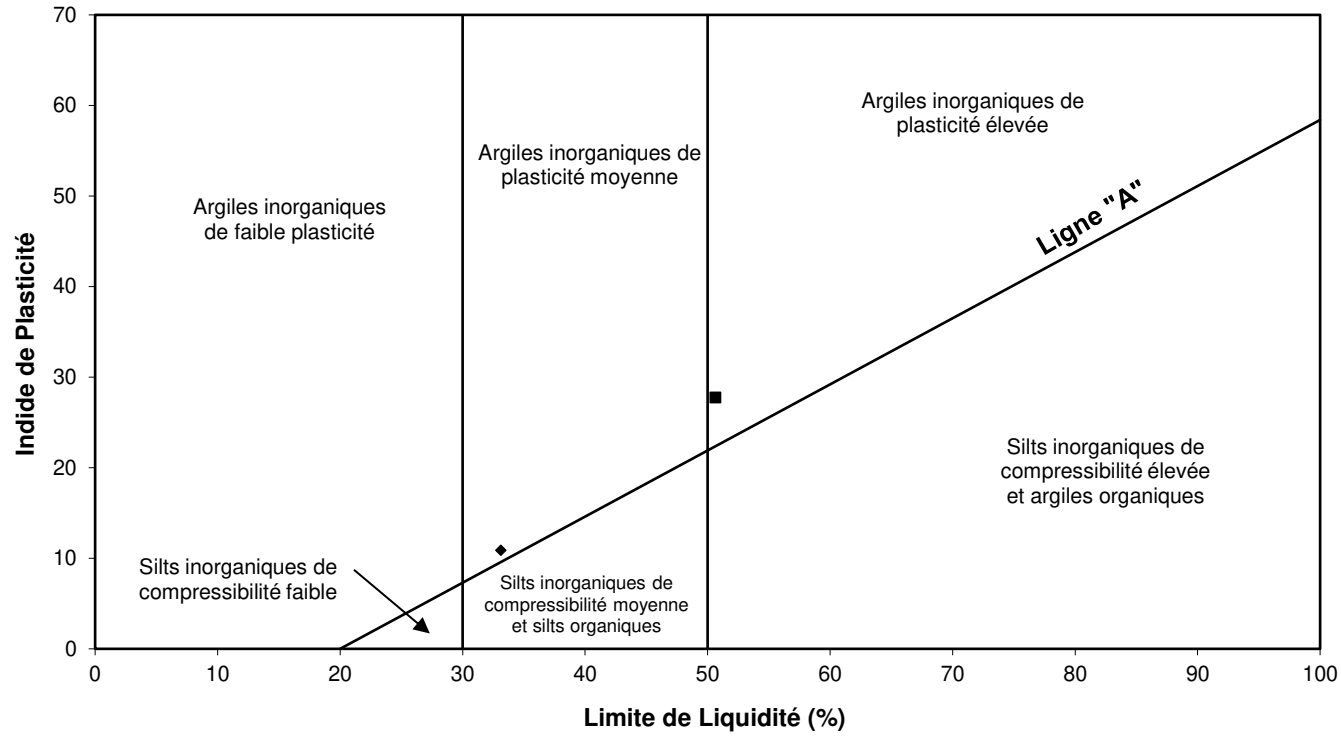
(Compilation des résultats)

CLIENT: **1199 NEWMARKET HOLDINGS INC.**

PROJET: **Warehouse Newmarket**

SITE: **1199, Newmarket street, Ottawa**

DOSSIER: **13340**



Sondage		Échantillon	Profondeur de (m)	à	w (%)	w_L (%)	w_P (%)	I_P	I_L	Description
◆	F-1	CF-3	1,20	1,80	25	33	22	11	0,2	Argile de plasticité moyenne (CL)
■	F-6	CF-2B	1,10	1,20	30	51	23	28	0,2	Argile de plasticité élevée (CH)

Compilé par: Joël Martin