GROUPE MACH INC.

GEOTECHNICAL SUBSOIL INVESTIGATION REPORT

Property located at 110 O'Connor Street,
Ottawa, Ontario
Lots nº 42 and 43

Prepared by:

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Project nº: PR.GT01.23.0064 rev.1

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Montreal, September 19th, 2025

Project nº: PR.GT01.23.0064 rev.1

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RE: Geotechnical subsoil investigation of the property corresponding to lots nº 42 and 43 located at 110 O'Connor Street in Ottawa, Ontario.

Amended report v.1

Dear Sir,

In accordance with your request, we have carried out a subsoil investigation on the property corresponding to lots nº 42 and 43 located at 110 O'Connor Street, in Ottawa, Ontario, and are pleased to present our report.

We trust that this document contains all the information required to assess the subsoil conditions of the site. We would be pleased to answer any questions which may arise from this study and look forward to being of continued assistance.

Yours very truly,

SOLROC INC.

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Property located at 110 O'Connor Street,
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APPENDIX

1. INTRODUCTION

The services of SOLROC INC. were retained by Mr. Florian Poix, representative of GROUPE MACH INC. to carry out a geotechnical study on the property corresponding to parts of lots nº 42 and 43 located at 110 O'Connor Street in Ottawa, Ontario.

No plans of the future project were currently available. According to the information given by the client, on this property, it is proposed to demolish the existing building with the exception of the foundation walls and the basement levels and constructing a new twenty-five (25) storey residential building with the ground floor as commercial and utilising the existing three (3) basement levels.

The purpose of this geotechnical study, as defined in our proposal n° SQ.GT01.23.05.019 Version 4 sent on June 29th, 2023, and accepted on June 30th, 2022, is to determine the nature and the geotechnical parameters of the underlying soils, the depth and quality of the bedrock, as well as the underground water conditions to guide the structural engineer.

Additionally, the purpose of this amended report is to reflect an increase in the number of stories in the project, from 22 to 25. However, without any meaningful change to the foundation configuration or depth, this change has no impact on the original report.

This study was carried out concurrently with a Multichannel Analysis of Surface Waves (MASW) geophysical study (Project nº: PR.GP01.23.0015) and a hydrogeological study (Project nº: PR.HY01.23.0022) which are developed in separate reports.

Alongside this geotechnical study, M. Jean-Rene Larose, the structural engineer for the project, requested the dimensions of several existing foundations as well as 4 compression tests of the concrete of the foundation walls. The results of these reconnaissance works are also included in the report.

The following document was provided by the client for consultation for the purpose of this study:

- The excerpts of the existing structural plans for the project *Slater – O'Connor* prepared by the firm ADJELEIAN AND ASSOCIATES, dated October 1969 (Project: 555).
- A surveyor's plan named *plan of Lot 43 and Part of Lot 42 (South Slater Street), Part of Lots 42 and 43 (North Laurier Avenue), Registered Plan 3922* prepared by ANNIS, O'SULLIVAN, VOLLEBEKK LTD. dated September 5th, 2019 (job no. 19964-19).

This report contains a description of the work methods used to obtain the outlined results as well as the conclusions and recommendations relative to the geotechnical needs for the proposed project.

2. GENERAL SITE DESCRIPTION

The subject property, legally described as parts of lots nº 42 and 43, is located at 110 O'Connor Street, in a commercial sector of Ottawa.

The subject lots are currently occupied by a fourteen (14) storey commercial building with three basement levels occupying almost the entirety of the property.

Aerial photographs 1965, 1980 and 2004 were consulted to observe any possible physical changes that may have occurred in the subject property and its immediate surrounding sector through time. The aerial photograph from 1965 showed a smaller building with mostly parking spaces occupying the property. The photographs from 1980 and 2001 confirm the presence of the existing building on the property.

Considering O'Connor Street as a north-south axis, the property is bordered to the north by Slater Street, to the south by a property occupied by a commercial building, to the east by O'Connor Street and to the west by a property occupied by a parking structure.

Aerial view dated of 2023 (extract of Google Earth)

The location of the property is shown on the general location plan found at the end of this report (*Annex A)*.

3. FIELD AND INVESTIGATION PROCEDURES

The fieldwork, which was carried out between July 17th and July 26th, 2023, involved drilling five (5) boreholes identified as BH-1 to BH-5 and excavating five (5) test pits identified as TP-1 to TP-5 at the location shown on the plan annexed at the end of the report, under the constant supervision of one of our geotechnical field personnel. Borehole BH-5 was drilled in the neighboring property because of the lack of space on the subject property under study.

3.1 Test pits TP-1 to TP-5

The test pits TP-1 to TP-5 were excavated by means of a KUBOTA KX 008-3 excavator supplied by SOLROC INC. to the depths between 0,76 m and 1,37 m below existing grades.

The test pits permitted to reveal the foundations of the existing building and observe the underlying soils. Groundwater infiltrations, if present, can also be noted as can any significant features such as the stability of the sidewalls, presence of fill debris, particular odours, etc.

3.2 Boreholes BH-1 to BH-3

Boreholes BH-1 to BH-3 were carried out in the 3rd basement level by the company FUSION DRILLING by means of portable equipment for soil and rock sampling at depths ranging between 4,52 m and 4,65 m below the surface of the tested locations. Soil samples were recovered in a continuous manner until the depths of 0,67 m to 1,52 m using a 51 mm I.D. split-spoon sampler, driven into the soil by dropping a weight of 31,8 kg from a height of 760 mm. This method allowed us to simultaneously measure the number of blows required for each 300 mm of penetration, or "N-values". The N-values have been converted to standard N-index values according to the ratio of driven energies in order to satisfy the normalized procedure CAN/BNQ 2501-140 / 2015 « Sols–Essai de pénétration standard (SPT) et échantillonnage au carottier fendu ».

The bedrock was intercepted in the three (3) boreholes between the depths of 0,67 m and 1,52 m below grade. It was sampled with a 48 mm diameter NQ diamond core barrel until the end of the boreholes at the depths of 4,52 m to 4,65 m over varying lengths of 3,00 m and 3,98 m.

After completion of the boreholes and before the removal of the casings, a Casagrande piezometer was installed within boreholes BH-1 for monitoring the groundwater level. The installation details of the Casagrande piezometers are shown on the borehole log BH-1 in Annex B.

3.3 Boreholes BH-4 and BH-5

Boreholes BH-4 and BH-5 were drilled outside of the building by the company GEORGE DOWNING ESTATE DRILLING LTD., by means of a track-mounted CME 55 auger drill rig equipped for soil sampling down between the depths of 13,66 m and 13,84 m below existing grade. Soil samples were recovered in a systematic manner between the depths of 4,67 m and 5,74 m using a 51 mm I.D. split-spoon sampler according to the normalized procedure CAN/BNQ 2501-140 / 2015 « Sols–Essai de pénétration standard (SPT) et échantillonnage au carottier

fendu ». The standard penetration test consists of advancing the sampler into the soil using a 63,5 kg hammer dropped from a height of 760 mm. The number of blows for each 300 mm of penetration, or "N-value", can be related to the relative density of the material sampled.

The bedrock was intercepted in boreholes BH-4 and BH-5 between the depths of 4,67 m and 5,74 m below grade. It was sampled with a 48 mm diameter NQ diamond core barrel until the end of the boreholes at the depths of 13,66 m to 13,84 m over varying lengths of 7,92 m and 9,17 m.

After completion of the boreholes and before the removal of the casings, a Casagrande piezometer was installed within borehole BH-4 for monitoring the groundwater level. The installation details of the Casagrande piezometer are shown on the borehole log BH-4 in Annex B.

In this report, refusal means the level where the split-spoon sampler, the auger, or the excavator can no longer be advanced due to a local obstacle (cobble, boulder, etc.) or due to very dense soil or the probable bedrock.

All the recovered soil and bedrock samples from the boreholes and representative soil samples from the test pits were forwarded to our laboratory where they were visually examined and logged for presentation purposes in this report. The samples will be stored for a period of three (3) months from the date of the report; after this period, they will be discarded, unless other arrangements are made with the client.

3.4 Concrete cores CAR-1 to CAR-4

The four (4) perimeter foundation walls were cored using an electric lever-operated corer fitted with a nominal diameter 101 mm diamond drill bit. The concrete cores were then forwarded to our laboratory where they were visually examined and tested for purposes of this report.

3.5 Surveying

A level survey was conducted, and the elevations of the exterior boreholes which were determined by using a GPS device - SOKKIA GCX3 GNSS RECEIVER (H: 3mm + 0.4 ppm, V: 5mm +0.6 ppm), were 71,42 m (BH-4) and 71,53 m (BH-5).

According to the available information, the ground floor of the existing building has an elevation of 71,20 m, whereas the 3rd basement level has an elevation of 62,82 m.

The sounding locations are shown on the « Location of boreholes and test pits – 3rd basement level » drawing nº GT01.23.0064-1 and the « Location of exterior boreholes » drawing nº GT01.23.0064-2 in Annex D.

4. SUBSOIL CONDITIONS

The stratigraphic profile identified in the boreholes and test pits is summarized below. However, we must refer to the individual borehole and test pit logs in Annex B for a more detailed description of the soil strata encountered.

It should be noted that the classification presented below as well as the borehole and test pit logs in Annex B is only guaranteed at the location where the soundings were carried out. Therefore, any conclusions and recommendations on this information are subject to this limitation. Consequently, Solroc Inc must be notified of any discrepancy detected between the materials described in this report and those encountered during the excavation.

In general, we find the following :

Table nº 1: Summary of the stratigraphy

Soundings	Depth, m (Elevation, m)				
	Asphalt	Concrete slab	Fill[1]	Natural granular deposit[2]	Bedrock[3]
BH-1	-	0 – 0,18 (62,82 – 62,64)	0,18 – 1,52 (62,64 – 61,30)	-	1,52 – 4,52 (61,30 – 58,30)
BH-2	-	0 – 0,17 (62,82 – 62,65)	0,17 – 1,17 (62,65 – 61,65)	-	1,17 – 4,60 (61,65 – 58,22)
BH-3	-	0 – 0,09 (62,82 – 62,73)	0,09 – 0,67 (62,73 – 62,15)	-	0,67 – 4,65 (62,15 – 58,17)
BH-4	0 – 0,05 (71,42 – 71,37)	-	0,15 – 5,33 (71,27 – 66,09)	5,33 – 5,74 (66,09 – 65,68)	5,74 – 13,66 (65,68 – 57,76)
BH-5	-	-	0,0 – 1,52 (71,53 – 70,01)	1,52 – 4,67 (70,01 – 66,86)	4,67 – 13,82 (66,86 – 57,71)
TP-1	-	0 – 0,18 (62,82 – 62,64)	-	-	0,18 – 0,89 (62,64 – 61,93)
TP-2	-	0 – 0,20 (62,82 – 62,62)	0,20 – 0,25 (62,62 – 62,57)	-	0,25 – 0,99 (62,57 – 61,83)
TP-3	-	0 – 0,10 (62,82 – 62,72)	-	-	0,10 – 0,91 (62,72 – 61,91)
TP-4	-	0 – 0,18 (62,82 – 62,64)	0,18 – 0,75 (62,64 – 62,07)	-	-
TP-5	-	0 – 0,23 (62,82 – 62,59)	0,23 – 0,63 (62,59 – 62,19)	-	0,63 – 1,37 (62,19 – 61,45)

1. Fill: The fill material consists of either crushed stone or a mixture of grey, brown and black, humid to saturated, silt, sand and gravel, in variable proportions, with traces of clay and the presence of organic matter, rock

fragments, pebbles and of debris (pieces of concrete, etc.). Very loose to dense. N values varying between 2 and 47 including several refusals of the soil sampler.

2. Granular deposit: The granular deposit consists of a mixture of grey and black, humid, sand, silt and gravel, in variable proportions and of different densities. Compact with N values of 14 and 28 including two (2) refusals of the soil sampler.
3. Rock: Bedrock consists of a black calcareous shale with either alternating beds or passages of grey fossiliferous or shaley limestone and occasional calcite recrystallization. Recoveries varying between de 99% and 100%, with RQD values of 98% to 100%. Based on RQD, bedrock is of excellent quality.

5. GROUNDWATER

During the excavation of the test pits between July 17th to July 21st, 2023, the presence of water was noted at the bottom of the test pits.

After completion of the boreholes and before the removal of the casings, Casagrande piezometers were installed within the boreholes BH-1 and BH-4 for monitoring the groundwater level.

The water levels measured on July 25th (BH-4) and July 28th (BH-1) in the Casagrande piezometers are indicated in the following table nº2:

Table nº 2 – Groundwater level

Location	Borehole	Elevation of the borehole	Level of water	Elevation of the level of water
3rd basement	BH-1	62,82	1,28	61,54
Exterior	BH-4	71,42	5,36	66,06

It should be noted, however, that groundwater conditions may vary according to the prevailing weather conditions.

6. LABORATORY TESTING

6.1 Description of samples

The preliminary description of the soils in the boreholes and test pits was carried out by our geotechnical staff on site during the fieldwork. Thereafter, all samples recovered in the boreholes and test pits were sent to our laboratory for identification and classification.

The soils were identified and classified by the geotechnical ASTM D2488 method according to "Description of Soils (Visual-Manual Procedure)". The rock cores have been described by our geologists.

Below is a list of laboratory test results carried out for this study. The results of the laboratory tests are shown in the report in Annex C.

Table 3: List of laboratory tests

Standard	Quantity
Natural water content BNQ 2501-170	3
Sieve analysis BNQ 2501-025	3
Compression tests of the bedrock ASTM D7012-13	4
Compression tests of concrete Method 14C of the CSA A23.2 Standard	4

6.2 Sieve analysis and natural water content

The results of the laboratory tests for the sieve analysis and water content are summarized in the following table:

Table nº 4: Results of sieve analysis and water content tests

Sample nº Depth (m)	BH4-SS2+3 0,76 – 2,13	BH4-SS4 2,29 – 2,90	BH4-SS4 2,29 – 2,90
Natural water content, W_N %	10,5	6,5	17,3
Sieve analysis (%) Gravel Sand Silt Clay	 16,0 54,5 26,6 2,9	 22,0 60,2 15,3 2,5	 18,5 56,8 22,9 1,8
Description	Silty sand, some gravel, traces of clay	Gravelly sand some silt, traces of clay	Silty sand, some gravel, traces of clay
Classification USCS	Backfill	Backfill	Backfill

6.3 Compressive strength tests of the bedrock

Four (4) selected rock samples recovered from the boreholes were tested in our laboratory for uni-axial compressive strength according to the ASTM D7012-07 standard. The results are summarized and presented in the following table nº 5:

Table n° 5: Compressive Strength results

Bedrock sample	Sample depth (m)	Total unit weight (kN/ m^3)	Compressive strength (MPa)	Grade*
BH1-RC3	1,98 – 2,08	26,0	23	R2 (weak)
BH3-RC3	2,48 – 2,57	24,8	28	R3 (Medium strong)
BH4-RC13	11,29 – 11,38	25,4	29	R3 (Medium strong)

BH5-RC10	10,69 – 10,81	25,8	44	R3 (Medium strong)
Average		25,5	27**	

* According to table 3.5 of the Canadian Foundations Engineering Manual (2013)
** BH5-RC10 not taken into account because value well above the other averages

6.4 Compressive strength tests of concrete in the foundation walls

The concrete cores taken from the foundation wall in the 3rd basement of the existing structure were subjected to compression tests in accordance with method 14C of the CSA A23.2 standard. The results are summarized and presented in the following table:

Table n° 6: Concrete compressive strength results

Sample nº	Type de structure	Masse volumique (kg/m^3)	Résistance en compression (MPa)
CAR-1	Wall	2287	37,4
CAR-2	Wall	2397	39,2
CAR-3	Wall	2382	45,1
CAR-4	Wall	2351	42,3

According to the result of the compressive strength test, the concrete of the foundation walls has good mechanical strength.

7. EXISTING FOUNDATIONS

The test pits were excavated along five 5 existing perimeter columns and foundation walls at the location shown on the attached drawing "Location of boreholes and test pits" (drawing nº GT01.23.0064-1) and permitted to reveal the existing foundations and observe the underlying soils.

- In test pit TP-1, a concrete column rests at the depth of 0,18 m below the surface of the basement slab on a concrete footing of at least 0,89 m in thickness with a footing width of 2,29 m. The footing was imbedded into the bedrock at depth.

- In test pit TP-2, a concrete column rests at the depth of 0,20 m below the surface of the basement slab on a concrete footing of 0,79 m in thickness. The footing rests on the bedrock at a depth of 0,99 m (elevation 61,83 m).

- In test pit TP-3, a concrete column rests at the depth of 0,10 m below the surface of the basement slab on a concrete footing of 0,81 m in thickness with a footing width of 3,07 m. The footing rests on the bedrock at a depth of 0,91 m (elevation 61,91 m).

- In test pit TP-4, a concrete foundation wall rests at the depth of 0,28 m below the surface of the basement slab on a continuous footing with a lateral protrusion of 0,19 m. The

footing rests on the bedrock at a depth of 0,75 m (elevation 62,07 m).

- In test pit TP-5, a concrete foundation wall rests at the depth of 0,23 m below the surface of the basement slab on a continuous footing with a lateral protrusion of 0,81 m. The footing rests on the bedrock at a depth of 1,37 m (elevation 61,45 m).

The entire profile of the existing foundations system is described in greater detail in the test pits logs in Annex B.

8. CONCLUSIONS AND RECOMMENDATIONS

According to the available information, on the property corresponding to parts of lots nº 42 and 43 at 110 O'Connor Street in Ottawa, Ontario, it is proposed to demolish the existing building with the exception of the foundation walls and the basement levels and constructing a new twenty-five (25) storey residential building with the ground floor as commercial and utilising the existing three (3) basement levels.

No plans of the future project were currently available. For discussion purposes, we assume that floor live loads for the building will not exceed 5 kPa at maximum.

The subsoil encountered in boreholes BH-4 and BH-5 consists of heterogenous fill materials, followed by a natural granular deposit until the surface of the bedrock intercepted in the boreholes BH-4 to BH-5 between the depths of 4,67 m to 5,74 m (elevations 65,68 m and 66,86 m) whereas the subsoil encountered in boreholes BH-1 to BH-3 consists of heterogenous fill materials until the surface of the bedrock intercepted between the depths of 1,52 m and 1,65 m (elevations 61,30 m and 62,15 m).

The water levels measured in the Casagrande piezometers were at the depths of 1,28 m (BH-1) (elevation 61,54 m) and 5,36 m (BH-4) (elevation 66,06 m).

Based on the results obtained from the boreholes and test pits and assuming that the results obtained from tested areas are representative of the subsoil conditions across the entire area, the following recommendations are offered:

8.1 Foundation design

8.1.1 Conventional foundations of the existing

The existing foundations are placed between the elevations of ± 61,5 m and ± 62,0 m. At this elevation, the subsoil consists of the bedrock with RQD values ranging between 45% to 93%.

According to the Canadian Foundations Engineering Manual 4th edition, 2013 (section 9), the allowable bearing capacity of the rock can be estimated using the following equation:

$q_a = K_{sp} \times q_{u\text{-}ech}$.

Where,

q_a = allowable bearing capacity
$q_{u\text{-}ech}$ = average resistance in simple compression of rock samples

The empirical coefficient K_{sp}, including a safety factor of 3, is based on distances between the discontinuities in the bedrock. According to table 9.2 of the CFEM 2013, the K_{sp} coefficient is 0,1.

The average simple compression resistance $q_{u\text{-}ech}$ of the tested samples is 27 MPa. The resistance at serviceability limit states (SLS) of sound bedrock is 2,7 MPa. However, based on the examination of rock cores and considering the variable RQD values as well as assuming that the soil conditions at the test locations are the same at the location of the existing building, the bedrock offers an allowable bearing capacity or at serviceability limit states (SLS) of **1000 kPa**.

Under these constraints, the settlement under the new foundations should be negligible.

The bearing capacity at the ultimate limit states (ULS) is 3000 kPa. At this bearing capacity a geotechnical resistance factor Φ of 0.5 should be applied to obtain the factored geotechnical resistance at the ULS (based on table 8.1 of the CFEM 2013).

8.1.2 New conventional foundations

Should the new loads exceed 1000 kPa, we recommend that the existing foundations be increased, or new columns be added. A bearing capacity of 1000 kPa can be used for the design of the new foundations placed on acceptable bedrock.

The bearing surfaces of the foundation must be horizontal and free of any deleterious or friable particles and should be verified by qualified personnel before the footings are poured (*see section 8.1*).

8.1.3 Shale protection

Because of the presence of shale bedrock, steps should be taken to limit the exposure of the bedrock to the air around the foundations by means of a layer of bituminous coating, a layer of granular cushion or a layer of lean concrete in order to avoid reactivity of the shale rock.

A floor drainage system should also be considered to drain the groundwater and avoid potential sulphatic reactions or other contamination from the bedrock that may be spread from the water into the existing concrete foundations and all other concrete structural elements if these concrete elements are susceptible to such contamination.

8.2 Site evaluation for seismic classification

According to Table 4.1.8.4.A. of the 2015 National Building Code of Canada, it is necessary to obtain information from the base of the foundations or pile caps until a depth of 30,0 m, to determine the seismic classification of the site from the standard penetration resistance N_{60}, or the intact shear resistance S_u.

A Multichannel Analysis of Surface Waves MASW geophysical survey was carried out by Solroc Inc. on August 17th, 2023, which is developed in a separate report. For the classification of the site, refer to the geophysical report (Project nº: PR.GP01.23.0015).

8.3 Excavation stability and shoring

All the excavation works should be carried out in accordance with the security code in effect for excavation works by the CNESST. Considering that the work method that will be used is currently unknown, the stability of the short-term excavation slopes and the security of workers and structures to be constructed are under the contractor's responsibility.

For temporary excavations, a slope of 1H: 1V could be used in the fill materials and the fractured bedrock. For the sound bedrock, sub-vertical excavations can be considered for this project. It is recommended to allow for a shelf on the surface of the bedrock by recessing the excavated soil, if present, by at least 0,60 m from the edge of the bedrock excavation and that the excavation line in the bedrock should be prepared using the line-drilling method, before any fracturing and excavation work on the bedrock. Fractured and weathered bedrock can probably be removed with a hydraulic excavator.

This situation must be reassessed during mass excavation. It is recommended to carry out regular inspections of the bedrock walls during the excavation work by qualified geotechnical personnel (geologist or engineer).

According to the available information, the existing foundation walls will be left in place for the project. The walls will probably act as the shoring walls for the project. The method and the design of the temporary supports for the foundation walls during the demolition and construction work are under the contractor's responsibility.

As an indication, the parameters shown in the following table nº 7, in relation with the soils encountered in the boreholes could be used for the calculation of the temporary shoring assuming that the site is well drained.

Table nº 7: Geotechnical parameters of the soils

Parameters / Soil	Fill materials	Natural granular deposit	Fractured bedrock	Sound bedrock
Total humid unit weight density, γ (kN/m^3)	15,7	17,2	21,0	25,5
Total saturated unit weight density, γ (kN/m^3)	18,6	19,4	-	-
Internal friction angle, ϕ, degrees	29	31	39,0	45,0
Coefficient of active earth pressure (Ka)	0,35	0,32	0,23	0,17
Coefficient of passive earth pressure (Kp)	2,87	3,15	4,40	5,83
Coefficient of lateral earth pressure at rest (K_o)	0,52	0,48	0,37	0,29

The lateral pressures to be supported by the temporary shoring must be increased by the overload at ground level. Overload to be considered must include the loads of construction equipment and any other load that could be transferred to the retaining walls for the duration of the work. For the distribution of thrusts, it will be necessary to refer to chapter 26 of the M.C.I.F

To limit the movement of soil behind the shoring (existing foundation walls or otherwise), the calculation should be done using the coefficient of lateral earth pressure at rest, Ko. The recommended value for the ultimate grout/rock bond should be 0,5 MPa.

8.3.1 Underpinning work

Should any excavations reach below the level of the existing foundations, the need for underpinning work should be verified based on the condition and quality of the bedrock the foundations are resting upon. We also recommend carrying out the work after the demolition of the existing building and before the construction of the new building for this purpose to limit the loads placed on the bedrock.

8.4 Anchors

Anchorage design in rock is based on an allowable grout-to-rock bond stress acting over the fixed anchorage length. The allowable bond stress should be smaller than 1 / 30 times the unconfined compressive strength of the grout used. It should not exceed 1300 kPa. Whenever possible, the capacity of an anchor in rock should be established by means of a pull-out test, as recommended in article 26.12.4.3 of the MCIF (2013).

As for the number and size of the anchors, it will be necessary to refer to the structural engineer of the project.

8.5 Groundwater drainage

The groundwater level was measured on July 25th, 2023 and July 28th,2023 in boreholes BH-1 and BH-4 at the depths of 1,28 m (elevation 61,54 m) and 5,36 m (elevation 66,06 m) respectively.

Infiltration caused by runoff or occluded water within the upper soil layers may occur during the excavations, depending on the weather conditions or the time of the year in which the work will be completed. These infiltrations should be able to be removed by wells with pumps placed on the perimeter of the excavation near the sources of infiltration.

Adequate pumping and drainage will be required to reduce and maintain the water level below the bottom of the excavation during the works. The groundwater level must be kept to a minimum depth of 0,6 m under the level of all excavations.

For all information on the debit capacity, the French drains and the under the slab drainage, refer to the hydrogeological study report prepared by SOLROC INC. (Project nº: PR.HY01.23.0022).

Due to space restrictions, the French drains could be installed along the interior perimeter of the foundation walls. Weep holes may be installed or retrofitted to collect any lateral water infiltrations towards the French drains.

In not already waterproofed from the outside, the buried portions of the foundation walls should be waterproofed against moisture and humidity with a waterproofing coating with appropriate concrete adhesion or self-sealing or thermally fused waterproofing membrane.

All products must be submitted to the project architect for approval.

We recommend waterproofing the elevator shaft and installing a water stopper for any new elevator shafts, if present.

8.6 Slab-on-grade

In order to ensure a proper installation for the slab-on-grade, the following precautions must be taken:

- The bearing surface should be free of deleterious materials, if encountered, remoulded and/or frozen soils, loose rock particles down to the bedrock.
- The exposed surface should then be checked by qualified soil personnel to detect any inadequate zones.
- If the ground water is confirmed, install a network of drains as described in the hydrogeological study report (Project nº: PR.HY01.23.0022).
- The area should then be brought up until the base of the slab-on-grade using 0-20 mm crushed stone conforming to local specifications, free of any pyrite materials and according to the local procedures for slab installation. The 0-20 mm DB crushed stone of at least 300

mm in thickness should be compacted to at least 95% of the modified Proctor maximum dry density of the material.

- The crushed stone base should be covered with a polyethylene film as a vapour barrier to protect the slab against humidity.
- All the above operations should be carried out under the supervision of qualified soils personnel.
- The slab-on-grade should be structurally separated from the foundation walls and columns.

9. RECOMMENDATIONS FOR CONSTRUCTION PROCEDURES

9.1 Placement of foundations and site inspection

The bottom of any excavation must be inspected and approved by qualified geotechnical personnel or geologists to ensure that subsurface conditions correspond to those encountered in the soundings and that the foundation is placed within the acceptable bedrock, and to confirm the bearing capacity.

It is also recommended to establish sumps at strategic areas of the construction site to drain all surfaces or groundwater running at the surface of the footing trenches.

In altered and fractured bedrock, we recommend the use of mechanical equipment or hydraulic impact hammers for rock excavation at the bearing surface of the foundations. In sound bedrock, we recommend line drilling followed by blasting if necessary.

Any anomalies (fissures, joints, etc.) or any gaps in the bedrock surface must be reported to the designer so that the dimensions of the foundations are adjusted to the actual bearing capacity obtained after inspection (depending on the actual nature of the bedrock).

It is recommended to carry out a pre-construction survey of neighbouring buildings before any excavation or demolition work and to verify the vibrations generated by the excavation, demolishing or blasting, if used, by means of seismographs.

9.2 Winter conditions

During construction, all exposed surfaces to support the new foundations must be protected against freezing by means of loose straw, tarpaulins, heating, etc.

The action of freezing and thawing can be disastrous for the bearing capacity of the bedrock, and, in this context, it is important to protect the bedrock beneath the foundations of the action of freezing and thawing during construction.

9.3 Backfilling

The interior trenches surrounding the foundation walls and the excavations around any interior columns should be backfilled using class A material (0-20 mm DB crushed stone) compacted in successive thin layers (300 mm) to at least 95 % of the modified Proctor maximum dry density of the granular material. The shale rock should not be used as a backfilling material.

Backfilling and compaction operations should be supervised in order to ensure that proper materials are employed, and that full compaction is achieved.

The crushed stone material used must comply with the standard BNQ 2560-114 « Travaux de génie civil – Granulats » or similar local standards.

10. LIMITATIONS OF OUR INVESTIGATION

This report is carried out in accordance with current standards and practices of geotechnical consultation for the use of the company Groupe Mach Inc., as part of a demolition and reconstruction project of a building at the property corresponding to lots n° 42 and 43 located at 110 O'Connor Street in Ottawa, Ontario. We consider that the information presented and obtained from the boreholes and test pits provides a reasonable representation of site conditions.

The conclusions and recommendations given in this report are based upon the information determined at the tested locations and on the data supplied to us at this time regarding the project to be built. Typically, geological subsurface and groundwater conditions across the site may differ from those encountered at the SOLROC INC. tested locations.

Consequently, should the project outlined in our hypothesis differ from the one which will be built, and should any soil and groundwater conditions exposed across the site differ from those found at the tested locations, we request that we be notified immediately to permit a reassessment of our recommendations.

It is stressed that this report is intended only for the guidance of the construction designer. Bidding contractors or contractors undertaking the works are warned that many more tests and analyses are required to determine the localised underground conditions affecting constructing costs, technique, sequencing, equipment, scheduling, etc. SOLROC INC disclaims any liability to any part, including contractors that interprets or relies upon this report to determine localized underground conditions.

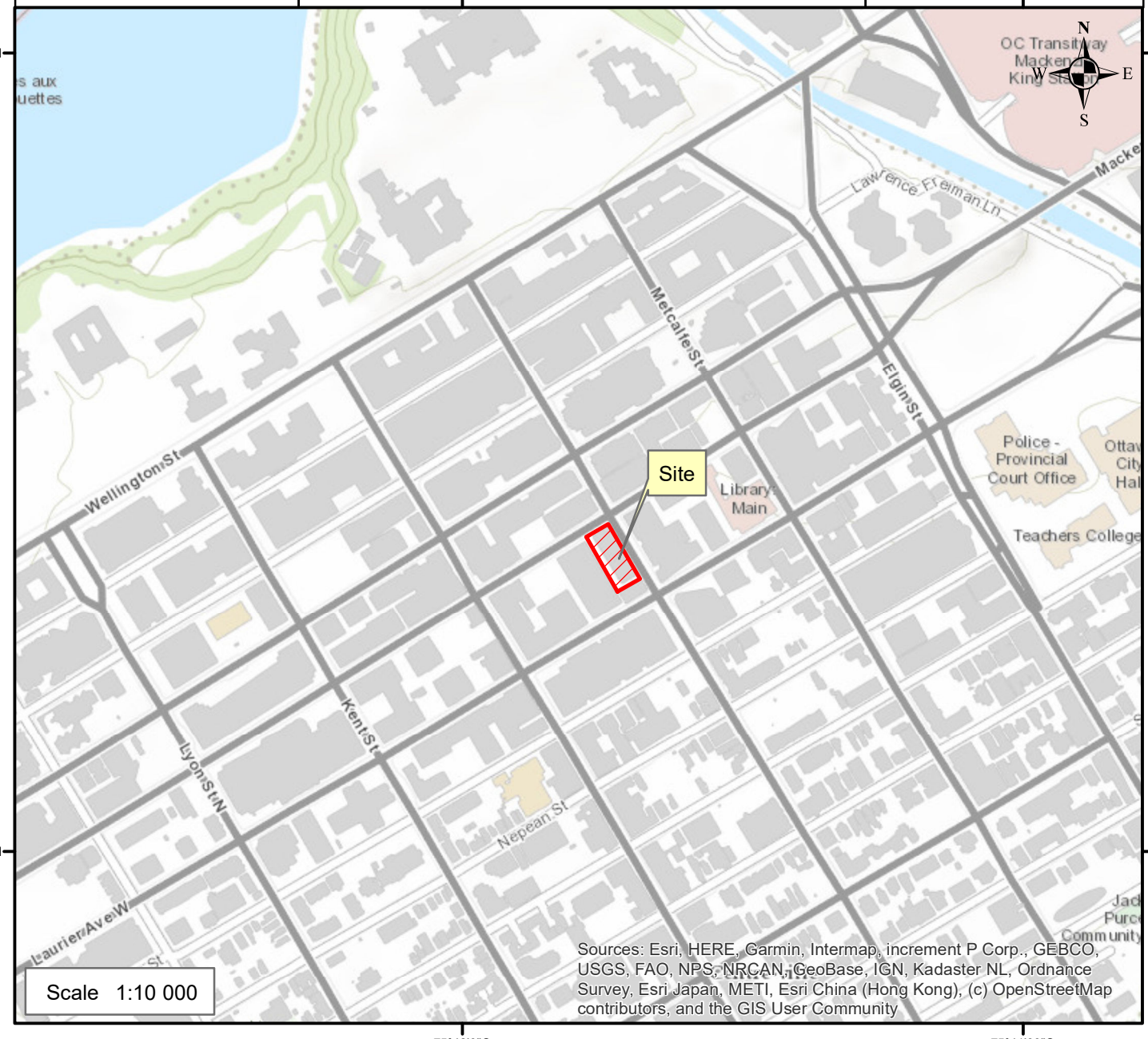
The information contained in this report has no bearing on the environmental aspects of the soil.

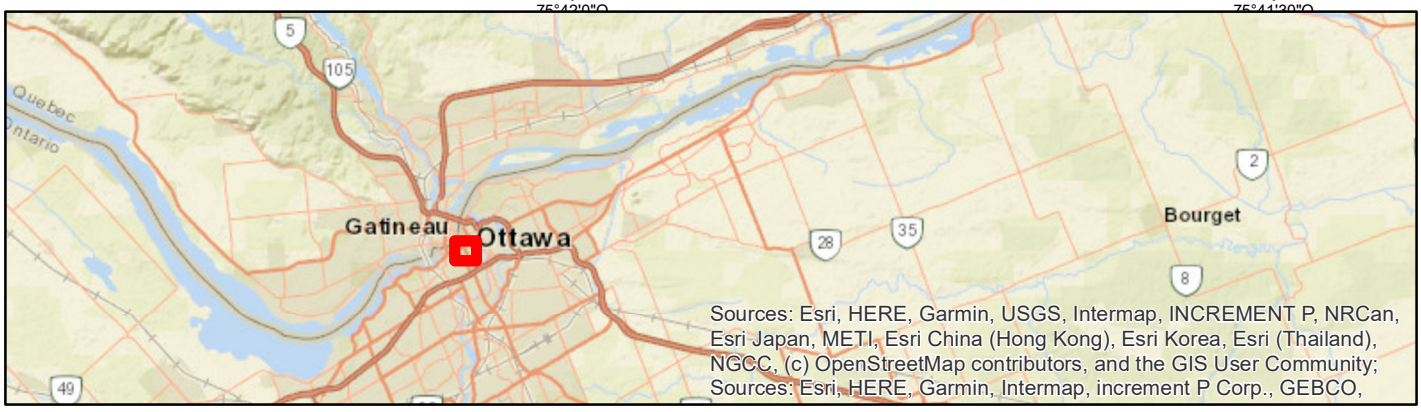
SOLROC INC

Annex A

GENERAL LOCATION PLAN

REF. NO. : PR.GT01.23.0064 Solroc Inc.	Client: Groupe Mach inc. Proj. Geotechnical study Site: 110 O'Connor Street, Ottawa, ON Date: 2023-08-25	**ANNEX A** General location plan





Projection: GCS_WGS_1984

Annex B

BOREHOLE AND TEST PIT LOGS

Project No. : GT01.23.0064
Reference No. :

CLIENT : **Édifice 110 O'Connor Inc.**
PROJECT : **Geotechnical investigation**
SITE : **110 O'Connor Street, Ottawa, Ontario**
LOCATION : **See drawing No. GT01.23.0064-1**

Sheet 1 / 1
Annex No. : **6**
BOREHOLE No. : **1**

MADE BY : **F. C.**
VERIFIED BY : **G. G.**
APPROVED BY : **G. G.**
DATE : **24-07-2023**
DRILLING COMPANY : **Fusion Drilling**
DRILL TYPE : **Manual**
Ø Borehole (mm) : **NW**
Ø Screen (mm) : **19**
Drilling method: **Diamond core**

GEODETIC COORDINATES
Y :
X :
Z (Elevation): **62,82 m**

SAMPLE STATE
INTACT
REMOULDED
LOST OR NOT SAMPLED

SAMPLE TYPE
GP : geoprobe/sedidrill/manual
SS : split spoon
AS : auger
RC : coring

ORGANOLEPTIC SIGNS
N : none
S : slight
M : medium
P : pronounced

Groundwater level:

ELEVATION (m)	DEPTH (m)	SOIL DESCRIPTION	SYMBOL	TYPE SAMPLE and No.	SUB-SAMPLE	STATE	RECUP. %	N or *RQD*	BLOWS/15cm BLOWS/30cm N' N	N	S	M	P	WATER LEVEL	DETAILS	DESCRIPTION
62,82	0,00	Ground surface														
		178mm concrete slab.		RC-A			100									
62,64	0,18	Fill: Compact crushed stone followed by grey and black humid silt.		SS-1			46	49	26-32-17-26 49 24(N)							
				SS-2			25	31	11-16-15-11 31 15(N)					1,28 m on 07-28-2023		
61,54	1,28															
61,30	1,52	Bedrock: Black calcarous shale; Fractured zone from 1,52 to 1,98m.		RC-3			100	*64*								Classe "B"
60,51	2,31	Addition of passages of grey fossiliferous limestone.		RC-4			100	*100*								
59,92	2,90	Alternating beds of black calcarous shale and grey fossiliferous limestone.		RC-5			99	*96*								
59,52	3,30	Black calcarous shale with passages of grey fossiliferous limestone.														Bentonite
58,99	3,83	Alternating beds of black calcarous shale and grey fossiliferous limestone.		RC-6			100	*100*								Silica Sand
58,30	4,52	End of borehole.														

Note(s):

Solroc_Logs-en GEO-sobek-pentest.sty

Project No. : GT01.23.0064 Reference No. :	CLIENT : **Édifice 110 O'Connor Inc.** PROJECT : **Geotechnical investigation** SITE : **110 O'Connor Street, Ottawa, Ontario** LOCATION : **See drawing No. GT01.23.0064-1**	Sheet 1 / 1 Annex No. : **7** BOREHOLE No. : **2**

MADE BY : **F. C.** DATE : **25-07-2023** Ø Borehole (mm) : **NW**

VERIFIED BY : **G. G.** DRILLING COMPANY : **Fusion Drilling** Ø Screen (mm) :

APPROVED BY : **G. G.** DRILL TYPE : **Manual** Drilling method: **Diamond core**

GEODETIC COORDINATES
Y :
X :
Z (Elevation): **62,82 m**

SAMPLE STATE
INTACT
REMOULDED
LOST OR NOT SAMPLED

SAMPLE TYPE
GP : geoprobe/sedidrill/manual
SS : split spoon
AS : auger
RC : coring

ORGANOLEPTIC SIGNS
N : none
S : slight
M : medium
P : pronounced

Groundwater level:

ELEVATION (m)	DEPTH (m)	STRATIGRAPHY SOIL DESCRIPTION	SYMBOL	SAMPLE TYPE SAMPLE and No.	SUB-SAMPLE	STATE	RECUP. %	N or *RQD*	BLOWS/15cm BLOWS/30cm N' N	ORGANOLEPTIC SIGNS N	S	M	P	WATER LEVEL	WELL LAYOUT DETAILS	DESCRIPTION
62,82	0,00	Ground surface														
62,65	0,17	165mm concrete slab.		RC-A			100									
		Fill: Dense brown and black humid sand.		SS-1			72	95	17-38-57 95 47(N)							
62,21	0,61	Becoming dense black sand with fragments of rock.		SS-2			60	R	60-54-30-100 /2cm 84 42(N)							
61,73	1,09	Boulders.		RC-3			53	*29*								
61,65	1,17	Bedrock: Fractured black shale.														
61,55	1,27	Black shale with occasional calcite recrystallisations; Fractured zone from 2,08 to 2,17m.		RC-4			100	*93*								
60,65	2,17	Black calcarous shale; Passages of grey fossiliferous limestone at 2,66m, at 2,78m and at 2,88m.		RC-5			100	*98*								
59,90	2,92	Alternating beds of black calcarous shale and grey fossiliferous limestone.		RC-6			100	*100*								
				RC-7			100	*93*								
				RC-8			98	*98*								
58,22	4,60	End of borehole.														

Note(s):

Solroc_Logs-en GEO-sobek-pentest.sty

Project No. : GT01.23.0064 Reference No. :	CLIENT : **Édifice 110 O'Connor Inc.** PROJECT : **Geotechnical investigation** SITE : **110 O'Connor Street, Ottawa, Ontario** LOCATION : **See drawing No. GT01.23.0064-1**	Sheet 1 / 1 Annex No. : **8** BOREHOLE No. : **3**

MADE BY : **F. C.** DATE : **26-07-2023** Ø Borehole (mm) : **NW**

VERIFIED BY : **G. G.** DRILLING COMPANY : **Fusion Drilling** Ø Screen (mm) :

APPROVED BY : **G. G.** DRILL TYPE : **Manual** Drilling method: **Diamond core**

GEODETIC COORDINATES
Y :
X :
Z (Elevation): **62,82 m**

SAMPLE STATE
- INTACT
- REMOULDED
- LOST OR NOT SAMPLED

SAMPLE TYPE
- **GP** : geoprobe/sedidrill/manual
- **SS** : split spoon
- **AS** : auger
- **RC** : coring

ORGANOLEPTIC SIGNS
- **N** : none
- **S** : slight
- **M** : medium
- **P** : pronounced

Groundwater level:

ELEVATION (m)	DEPTH (m)	STRATIGRAPHY SOIL DESCRIPTION	SYMBOL	SAMPLE TYPE SAMPLE and No.	SUB-SAMPLE	STATE	RECUP. %	N or *RQD*	BLOWS/15cm BLOWS/30cm N' N	ORGANOLEPTIC SIGNS N	S	M	P	WATER LEVEL	WELL LAYOUT DETAILS	DESCRIPTION
62,82	0,00	Ground surface														
62,73	0,09	90mm concrete slab.		RC-A			100									
		Fill: Crushed stone with brown and black humid sand and pieces of concrete.		SS-1			89	R	28-100 /8cm							
62,44	0,38	Boulders.														
62,15	0,67	Bedrock: Fractured black shale.		RC-2			73	*45*								
61,30	1,52	Black shale with calcite recrystallisations.		RC-3			100	*92*								
60,10	2,72	Slightly fractured black shale; Fractured zones from 2,83 to 2,92m, from 3,07 to 3,12m and at 3,29m.		RC-4			100	*68*								
58,81	4,01	Black shale; Fractured zone from 4,05 to 4,10m.		RC-5			100	*86*								
58,17	4,65	End of borehole.														

Note(s):

Solroc_Logs-en GEO-sobek-pentest.sty

Project No. : GT01.23.0064 Reference No. :	CLIENT : **Édifice 110 O'Connor Inc.** PROJECT : **Geotechnical investigation** SITE : **110 O'Connor Street, Ottawa, Ontario** LOCATION : **See drawing No. GT01.23.0064-1**	Sheet 1 / 2 Annex No. : **9** BOREHOLE No. : **4**

MADE BY : **S. P.**	DATE : **24-07-2023**	Ø Borehole (mm) : **NW**	GEODETIC COORDINATES	
VERIFIED BY : **G. G.**	DRILLING COMPANY : **Downing**	Ø Screen (mm) : **19**	Y :	
APPROVED BY : **G. G.**	DRILL TYPE : **CME-55 LC**	Drilling method: **Diamond core**	X :	
			Z (Elevation): **71,42 m**	

SAMPLE STATE: INTACT; REMOULDED; LOST OR NOT SAMPLED

SAMPLE TYPE: **GP** : geoprobe/sedidrill/manual; **SS** : split spoon; **AS** : auger; **RC** : coring

ORGANOLEPTIC SIGNS: **N** : none; **S** : slight; **M** : medium; **P** : pronounced

Groundwater level:

ELEVATION (m)	DEPTH (m)	SOIL DESCRIPTION	SYMBOL	SAMPLE TYPE and No.	SUB-SAMPLE	STATE	RECUP. %	N or RQD	BLOWS/15cm BLOWS/30cm N' N	ORGANOLEPTIC SIGNS N	S	M	P	WATER LEVEL	WELL LAYOUT DETAILS	WELL LAYOUT DESCRIPTION
71,42	0,00	Ground surface														
71,37	0,05	51mm layer of asphalt.														
71,27	0,15	Void.														
		Fill: Very loose humid gravel with a little grey sand and traces of silt.		SS-1			22	3	1-2-1	✳						
70,66	0,76	Becoming very loose grey humid silty sand with a little gravel and traces of clay.		SS-2 (S. A.)			17	4	7-2-2-2	✳						
69,90	1,52	Becoming loose.		SS-3 (S. A.)			42	6	1-2-4-8	✳						
69,13	2,29	Becoming compact grey and black humid gravelly sand with a little silt and traces of clay.		SS-4 (S. A.)			29	14	9-9-5-6	✳						
68,37	3,05	Becoming very loose humid to saturated silty sand with a little gravel and traces of clay.		SS-5 (S. A.)			12	2	1-1-1-1	✳						Class 'B'
67,61	3,81	Becoming with traces of pieces of concrete.		SS-6 (S. A.)			21	3	3-1-2-1	✳						
66,85	4,57	Becoming compact grey and black humid sand and gravel with a little silt.		SS-7			75	12	8-6-6-9	✳						
66,09	5,33															
66,06	5,36	Grey and black humid sand and gravel with a little silt.		SS-8			80	R	50 /13cm	✳				5,36 m on 07-25-2023		
65,68	5,74	Bedrock: Slightly calcarous black shale with occasional calcite recrystallisations.		RC-9			100	*100*								

Note(s):

Project No. : GT01.23.0064 Reference No. :	CLIENT : **Édifice 110 O'Connor Inc.** PROJECT : **Geotechnical investigation** SITE : **110 O'Connor Street, Ottawa, Ontario** LOCATION : **See drawing No. GT01.23.0064-1**	Sheet 2 / 2 Annex No. : **9** BOREHOLE No. : **4**

MADE BY : **S. P.** DATE : **24-07-2023** Ø Borehole (mm) : **NW**

VERIFIED BY : **G. G.** DRILLING COMPANY : **Downing** Ø Screen (mm) : **19**

APPROVED BY : **G. G.** DRILL TYPE : **CME-55 LC** Drilling method: **Diamond core**

GEODETIC COORDINATES
Y :
X :
Z (Elevation): **71,42 m**

ELEVATION (m)	DEPTH (m)	STRATIGRAPHY: SOIL DESCRIPTION	SYMBOL	SAMPLE: TYPE SAMPLE and No.	SUB-SAMPLE	STATE	RECUP. %	N or *RQD*	BLOWS/15cm BLOWS/30cm N' N	ORGANOLEPTIC SIGNS: N	S	M	P	WATER LEVEL	WELL LAYOUT: DETAILS	DESCRIPTION
				RC-10			99	*94*								
63,90	7,52	Slightly calcarous black shale with occasional calcite recrystallisations; Fractured zones from 8,40 to 8,49m and from 8,72 and 8,77m.		RC-11			98	*90*								
62,28	9,14	Slightly calcarous black shale with occasional calcite recrystallisations; Shattered zone from 9,14 to 9,32m.		RC-12			99	*87*								
60,82	10,60	Slightly calcarous black shale with occasional calcite recrystallisations; Shattered zones from 10,67 to 10,75m and from 11,13 to 11,25m.		RC-13			100	*91*								
58,95	12,47	Black calcarous shale														Bentonite
58,51	12,91	Black calcarous shale with passages of grey fossiliferous limestone.		RC-14			91	*85*								Silica Sand
57,76	13,66	End of borehole.														

Solroc_Logs-en GEO-sobek-pentest.sty

Project No. : GT01.23.0064
Reference No. :

CLIENT : **Édifice 110 O'Connor Inc.**
PROJECT : **Geotechnical investigation**
SITE : **110 O'Connor Street, Ottawa, Ontario**
LOCATION : **See drawing No. GT01.23.0064-1**

Sheet 1 / 2
Annex No. : **10**
BOREHOLE No. : **5**

MADE BY : **S. P.** DATE : **25-07-2023** Ø Borehole (mm) : **NW**
VERIFIED BY : **G. G.** DRILLING COMPANY : **Downing** Ø Screen (mm) :
APPROVED BY : **G. G.** DRILL TYPE : **CME-55 LC** Drilling method: **Diamond core**

GEODETIC COORDINATES
Y :
X :
Z (Elevation): **71,53 m**

SAMPLE STATE
INTACT
REMOULDED
LOST OR NOT SAMPLED

SAMPLE TYPE
GP : geoprobe/sedidrill/manual
SS : split spoon
AS : auger
RC : coring

ORGANOLEPTIC SIGNS
N : none
S : slight
M : medium
P : pronounced

Groundwater level:

ELEVATION (m)	DEPTH (m)	SOIL DESCRIPTION	SYMBOL	SAMPLE TYPE and No.	SUB-SAMPLE	STATE	RECUP. %	N or RQD	BLOWS/15cm BLOWS/30cm N' N	ORGANOLEPTIC SIGNS N	S	M	P	WATER LEVEL	WELL LAYOUT DETAILS	WELL LAYOUT DESCRIPTION
71,53	0,00	Ground surface														
71,43	0,10	Fill: Loose brown fine sand with a little silt and the presence of organics. Becoming loose humid 0 - 20mm crushed stone with traces of pieces of concrete.		SS-1			58	7	2-2-5-5	✳						
70,01	1,52	Compact grey and black humid sandy silt with a little gravel.		SS-2			58	14	2-8-6-7	✳						
68,48	3,05	Compact grey and black humid silty sand with a little gravel.		SS-3			100	28	7-12-16-12	✳						
66,96	4,57	No sample recovered.		SS-4			0	R	50 /5cm							
66,86	4,67	Bedrock: Black slightly calcarous black shale.		RC-5			100	*100*								
66,65	4,88	Black slightly calcarous black shale.		RC-6			100	*97*								
65,64	5,89	Black slightly calcarous black shale; Shattered zones from 6,04 to 6,19m, at 6,50m and from 7,35 to 7,47m.														

Note(s):

Project No. : GT01.23.0064
Reference No. :

CLIENT : **Édifice 110 O'Connor Inc.**
PROJECT : **Geotechnical investigation**
SITE : **110 O'Connor Street, Ottawa, Ontario**
LOCATION : **See drawing No. GT01.23.0064-1**

Annex No. : **10**
BOREHOLE No. : **5**

MADE BY : **S. P.** DATE : **25-07-2023** Ø Borehole (mm) : **NW**
VERIFIED BY : **G. G.** DRILLING COMPANY : **Downing** Ø Screen (mm) :
APPROVED BY : **G. G.** DRILL TYPE : **CME-55 LC** Drilling method: **Diamond core**

GEODETIC COORDINATES
Y :
X :
Z (Elevation): **71,53 m**

ELEVATION (m)	DEPTH (m)	STRATIGRAPHY: SOIL DESCRIPTION	SYMBOL	SAMPLE: TYPE SAMPLE and No.	SUB-SAMPLE	STATE	RECUP. %	N or *RQD*	BLOWS/15cm BLOWS/30cm N' N	ORGANOLEPTIC SIGNS: N	S	M	P	WATER LEVEL	WELL LAYOUT: DETAILS	DESCRIPTION
				RC-7			100	*85*								
64,06	7,47	Black slightly calcarous black shale; Shattered zone from 7,47 to 7,62m; Fractured zones from 7,90 to 8,00m, from 8,27 to 8,32m, from 8,46 to 8,48m and from 8,69 to 8,70m.		RC-8			100	*75*								
62,54	8,99	Black slightly calcarous black shale; Shattered zone from 8,99 to 9,16m, from 9,88 to 10,34m and from 10,56 to 10,59m; Occasional passages of fossiliferous limestone from 9,78m.		RC-9			78	*56*								
60,88	10,65	Alternating beds of limestone and shale; Shattered zones from 10,81 to 10,93m and from 11,39 to 11,49m; Fractured zone from 10,98 to 11,21m.														
60,32	11,21	Shaley limestone.		RC-10			92	*62*								
59,24	12,29	Shaley limestone with passages of limestone from 12,86 to 13,13m and from 13,60 to 13,67m; Fractured zone from 13,75 to 13,82m.		RC-11			92	*90*								
57,71	13,82	End of borehole.														

REF. No.: GT01.23.0064

CLIENT : Édifice 110 O'Connor Inc.

PROJ. : Geotechnical investigation

SITE : 110 O'Conner Street, Ottawa, Ontario

TEST : LOCATION: See drawing no. GT01.23.0064-1

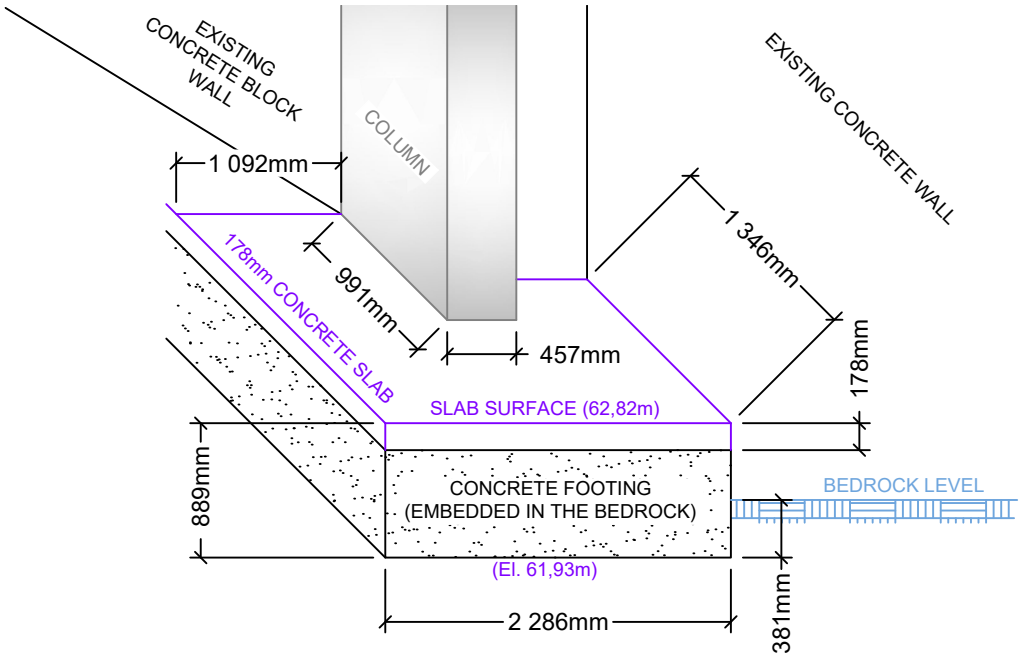
DATE : July 26,2023

TECH.: F. C. SUPER.: G. G.

ANNEX NO.: 1

TEST PIT NO. 1

DEPTH (ELEV.) OF THE LAYER	DEPTH	SYMBOL	SOIL DESCRIPTION	WATER LEVEL	PENETROMETER (KPa)	VANE SHEAR STRENGTH RESISTANCE (KPa)	SAMPLE DEPTH	REMARKS, SAMPLE NO. AND LOCATION	CHEMICAL ANALYSES				
									C_{10}-C_{50}	HAP	MTX	COV	Other
0,00(62,82m)			GROUND SURFACE										
0,18(62,64m)			178mm concrete slab.					TR1-1	0,71m	0,18m			
			Fractured black bedrock.										
0,89(61,93m)	1,00		End of test pit.					Concrete Footing					
	2,00												
	3,00												
	4,00												



SCALE 1:50 SI

GT01.23.0064 - Édifice 110 O'Connor Inc.

REF. No.: GT01.23.0064

CLIENT : Édifice 110 O'Connor Inc.

PROJ. : Geotechnical investigation

SITE : 110 O'Conner Street, Ottawa, Ontario

TEST : LOCATION: See drawing no. GT01.23.0064-1

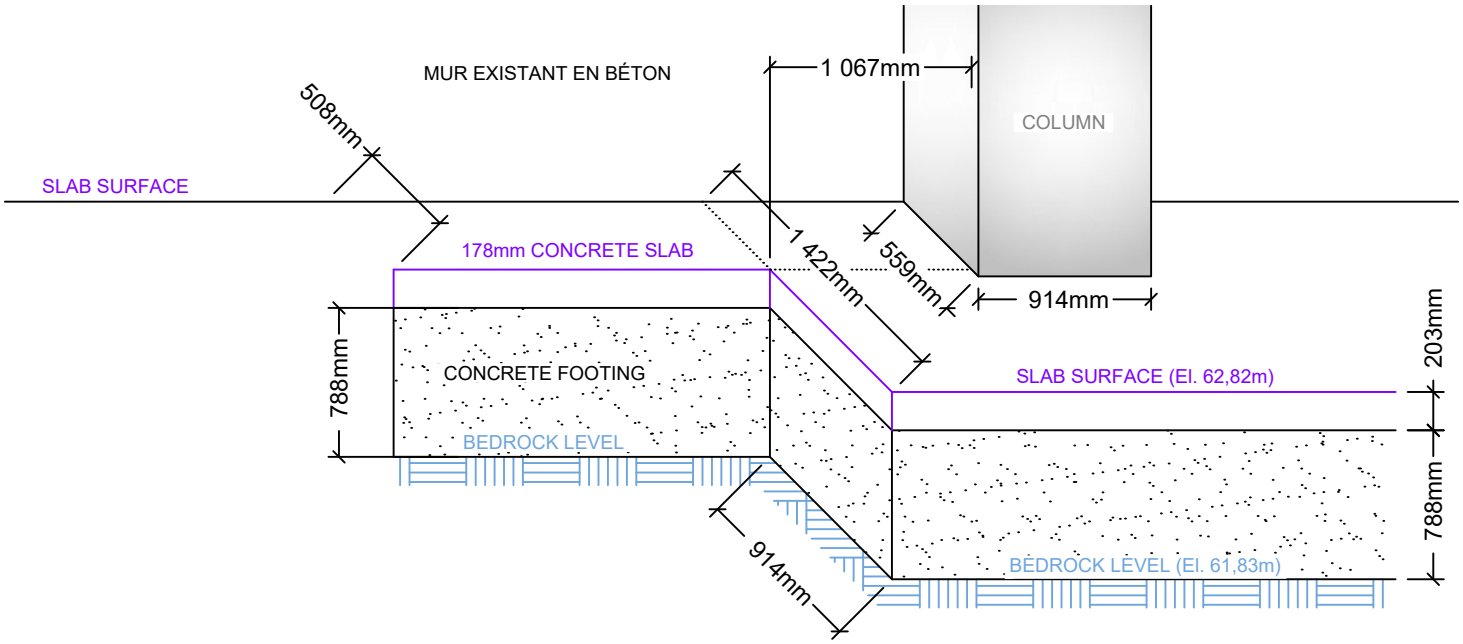
DATE : July 26,2023

TECH.: F. C. SUPER.: G. G.

ANNEX NO.: 2

TEST PIT NO. 2

DEPTH (ELEV.) OF THE LAYER	DEPTH	SYMBOL	SOIL DESCRIPTION	WATER LEVEL	PENETROMETER (KPa)	VANE SHEAR STRENGTH RESISTANCE (KPa)	SAMPLE DEPTH	REMARKS, SAMPLE NO. AND LOCATION	CHEMICAL ANALYSES				
									C_{10}-C_{50}	HAP	MTX	COV	Other
0,00(62,82m)			GROUND SURFACE										
0,20(62,62m)			203mm concrete slab.										
0,25(62,57m)			Fill: Crushed stone.					TR2-1	0,79m	0,20m			
			Fractured black bedrock.					TR2-2					
0,99(61,83m)	1,00		End of test pit.					Concrete Footing					
	2,00												
	3,00												
	4,00												



SCALE 1:40 SI

GT01.23.0064 - Édifice 110 O'Connor Inc.

REF. No.: GT01.23.0064

CLIENT : Édifice 110 O'Connor Inc.

PROJ. : Geotechnical investigation

SITE : 110 O'Conner Street, Ottawa, Ontario

TEST : LOCATION: See drawing no. GT01.23.0064-1

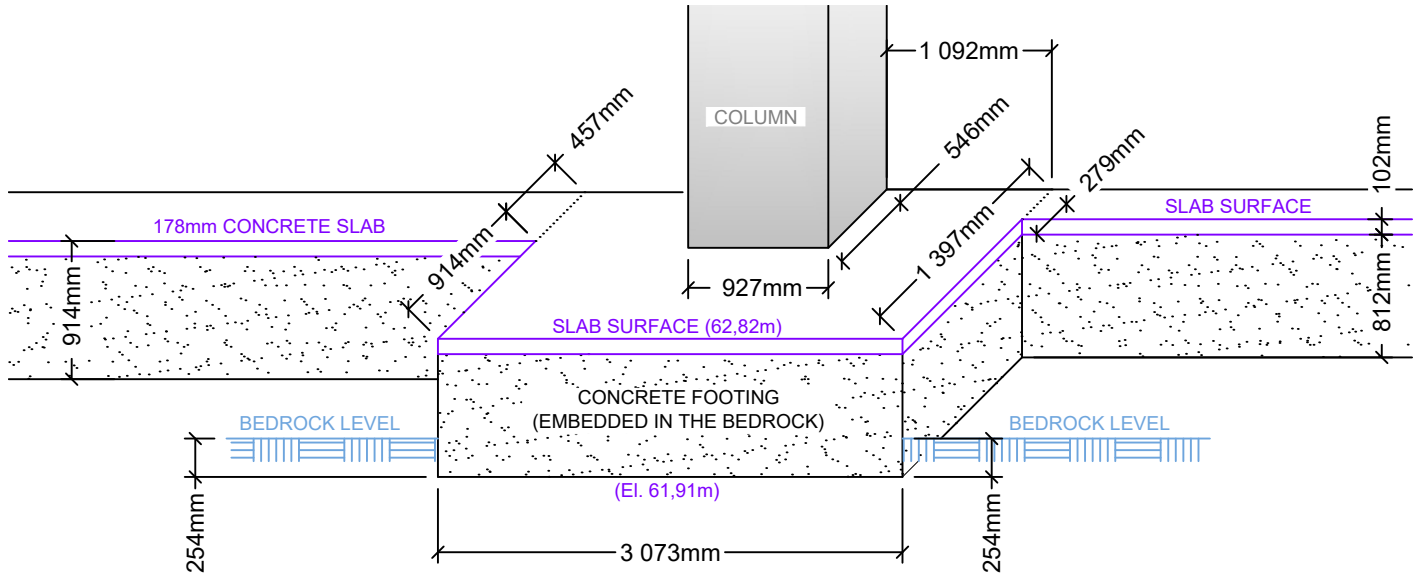
DATE : July 26,2023

TECH.: F. C. SUPER.: G. G.

ANNEX NO.: 3

TEST PIT NO. 3

DEPTH (ELEV.) OF THE LAYER	DEPTH	SYMBOL	SOIL DESCRIPTION	WATER LEVEL	PENETROMETER (KPa)	VANE SHEAR STRENGTH RESISTANCE (KPa)	SAMPLE DEPTH	REMARKS, SAMPLE NO. AND LOCATION	CHEMICAL ANALYSES				
									C_{10}-C_{50}	HAP	MTX	COV	Other
0,00(62,82m)			GROUND SURFACE										
0,10(62,72m)			102mm concrete slab.					TR3-1	0,81m	0,10m			
			Fractured black bedrock.										
0,91(61,91m)	1,00		End of test pit..					Concrete Footing					
	2,00												
	3,00												
	4,00												



SCALE 1:50 SI

GT01.23.0064 - Édifice 110 O'Connor Inc.

REF. No.: GT01.23.0064

CLIENT : Édifice 110 O'Connor Inc.

PROJ. : Geotechnical investigation

SITE : 110 O'Conner Street, Ottawa, Ontario

TEST : LOCATION: See drawing no. GT01.23.0064-1

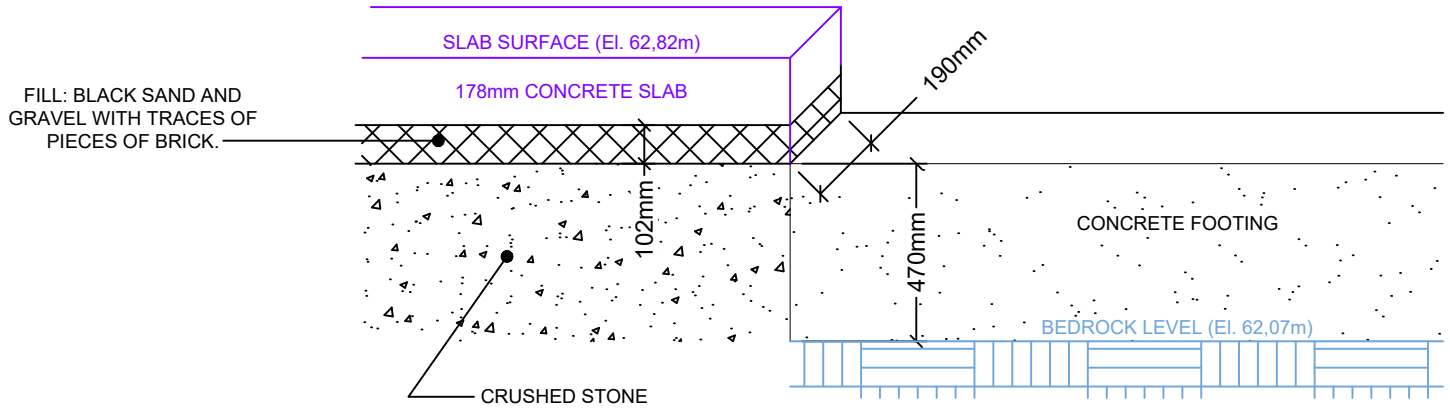
DATE : July 26,2023

TECH.: F. C. SUPER.: G. G.

ANNEX NO.: 4

TEST PIT NO. 4

DEPTH (ELEV.) OF THE LAYER	DEPTH	SYMBOL	SOIL DESCRIPTION	WATER LEVEL	PENETROMETER (KPa)	VANE SHEAR STRENGTH RESISTANCE (KPa)	SAMPLE DEPTH	REMARKS, SAMPLE NO. AND LOCATION	CHEMICAL ANALYSES				
									C_{10}-C_{50}	HAP	MTX	COV	Other
0,00(62,82m)			GROUND SURFACE										
0,18(62,64m)			178mm concrete slab.					TR4-1					
0,28(62,52m)			Fill: Black sand and gravel with traces of pieces of brick.					TR4-2					
0,75(62,07m)			Becoming crushed stone.					Concrete Footing	0,47m	0,28m			
	1,00		End of test pit.										
	2,00												
	3,00												
	4,00												



SCALE 1:20 SI

GT01.23.0064 - Édifice 110 O'Connor Inc.

REF. No.: GT01.23.0064

CLIENT : Édifice 110 O'Connor Inc.

PROJ. : Geotechnical investigation

SITE : 110 O'Conner Street, Ottawa, Ontario

TEST : LOCATION: See drawing no. GT01.23.0064-1

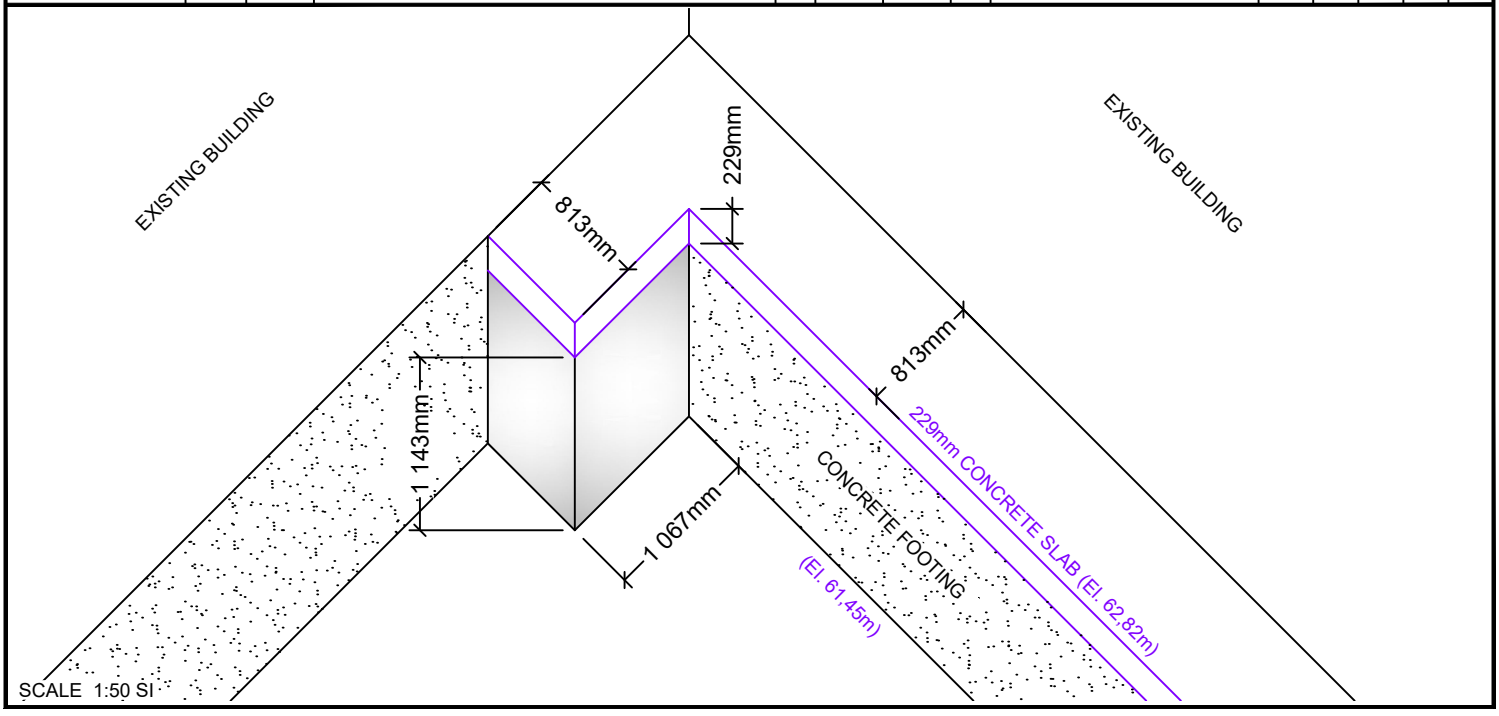
DATE : July 26,2023

TECH.: F. C. SUPER.: G. G.

ANNEX NO.: 5

TEST PIT NO. 5

DEPTH (ELEV.) OF THE LAYER	DEPTH	SYMBOL	SOIL DESCRIPTION	WATER LEVEL	PENETROMETER (KPa)	VANE SHEAR STRENGTH RESISTANCE (KPa)	SAMPLE DEPTH	REMARKS, SAMPLE NO. AND LOCATION	CHEMICAL ANALYSES: C_{10}-C_{50}	HAP	MTX	COV	Other
0,00(62,82m)			GROUND SURFACE										
0,23(62,59m)			229mm concrete slab.										
0,63(62,19m)			Fill: Crushed stone.					TR5-1	1,14m	0,23m			
	1,00		Fractured black bedrock.					TR5-2					
1,37(61,45m)			End of test pit					Concrete Footing					
	2,00												
	3,00												
	4,00												



GT01.23.0064 - Édifice 110 O'Connor Inc.

Annex C

RESULTS OF LABORATORY TESTING

TESTS REPORT
PARTICLE SIZE ANALYSIS

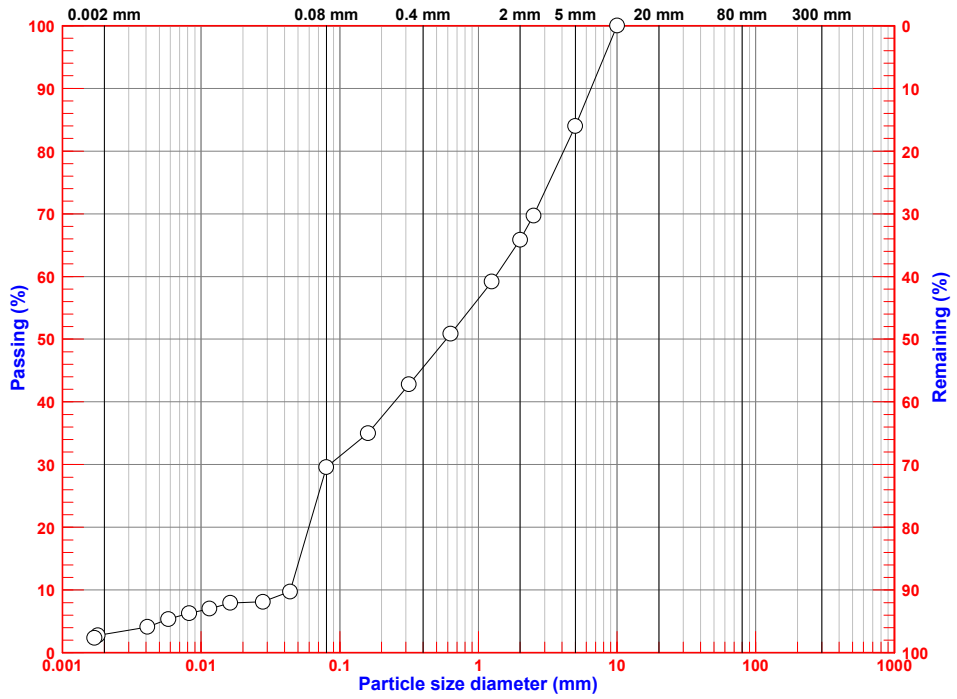
CLIENT :	Édifice 110 O'Connor Inc.	SITE :	110 O'Connor Street, Ottawa, Ontario
PROJECT NUMBER :	GT01.23.0064	PROJECT MANAGER:	G. G.

SAMPLE			
SAMPLE NUMBER :	BH 4 - SS 2+3	DEPTH :	0.76 m - 2.13 m
SAMPLE MASS. :	486.8 grammes	SAMPLE TYPE:	SS
SAMPLED BY :	S.P.	SAMPLING DATE :	2023-07-24

PARTICLE SIZE BY SIEVE ANALYSIS (BNQ2501-025)

Diameter (mm)	Passing (%)
56	100.0
40	100.0
28	100.0
20	100.0
14	100.0
10	100.0
5	84.0
Plateau	-
2.5	69.7
2	65.8
1.25	59.2
0.63	50.9
0.315	42.8
0.16	35.0
0.08	29.6
Plateau	-

PARTICLE SIZE CURVE



PARTICLE SIZE BY SIEVE ANALYSIS (FINES PARTICLES) (BNQ2501-025)

Diameter (mm)	Passing (%)
0.0438	9.7
0.0279	8.1
0.0162	7.9
0.0115	7.0
0.0082	6.3
0.0058	5.4
0.0041	4.1
0.0018	2.8
0.0017	2.4

PARTICLE SIZE DESCRIPTION

Cobble:	0.0 %	**D10:**	0.044	**USCS :**	Backfill
Gravel:	16.0 %	**D30:**	0.084	**Description :**	Silty sand, some gravel, trace clay.
Sand:	54.5 %	**D60:**	1.325		
Silt :	26.6 %	**Cc:**	0.12	**Drs :**	2.70 (presumed)
Clay :	2.9 %	**Cu:**	30.05		

NATURAL WATER CONTENT

TEST	RESULT	COMPLIANCE
Natural water content :	10.5 %	**BNQ 2501-170**

REMARKS :

Presence of elements Dmax = 20 mm

Tests by : Benjamin Drussel	Verified by : George Giannis	Tests date : 2023-08-10 12:27	Report date: 2023-08-10

Fichier: P:\Geotec\StyleLab\Finale\Tests\Lab_Grn_Anglais_Test.sty

TESTS REPORT
PARTICLE SIZE ANALYSIS

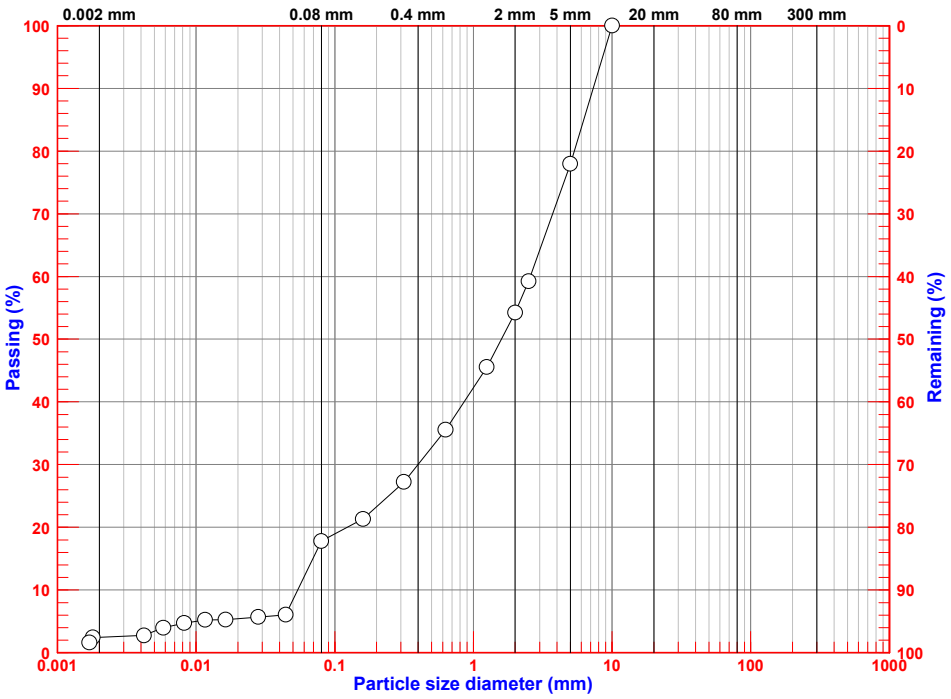
CLIENT :	Édifice 110 O'Connor Inc.	SITE :	110 O'Connor Street, Ottawa, Ontario
PROJECT NUMBER :	GT01.23.0064	PROJECT MANAGER:	G. G.

SAMPLE			
SAMPLE NUMBER :	BH 4 - SS 4	DEPTH :	2.29 m - 2.90 m
SAMPLE MASS. :	203 grammes	SAMPLE TYPE:	SS
SAMPLED BY :	S.P.	SAMPLING DATE :	2023-07-24

PARTICLE SIZE BY SIEVE ANALYSIS (BNQ2501-025)

Diameter (mm)	Passing (%)
56	100.0
40	100.0
28	100.0
20	100.0
14	100.0
10	100.0
5	78.0
Plateau	-
2.5	59.2
2	54.2
1.25	45.5
0.63	35.5
0.315	27.2
0.16	21.3
0.08	17.8
Plateau	-

PARTICLE SIZE CURVE



PARTICLE SIZE BY SIEVE ANALYSIS (FINES PARTICLES) (BNQ2501-025)

Diameter (mm)	Passing (%)
0.0443	6.1
0.0281	5.7
0.0163	5.3
0.0116	5.2
0.0082	4.7
0.0058	4.0
0.0042	2.8
0.0018	2.4
0.0017	1.6

PARTICLE SIZE DESCRIPTION

Cobble:	0.0 %	**D10:**	0.054	**USCS :**	Backfill
Gravel:	22.0 %	**D30:**	0.397	**Description :**	Gravely sand, some silt, trace clay.
Sand:	60.2 %	**D60:**	2.573		
Silt :	15.3 %	**Cc:**	1.13	**Drs :**	2.70 (presumed)
Clay :	2.5 %	**Cu:**	47.64		

NATURAL WATER CONTENT

TEST	RESULT	COMPLIANCE
Natural water content :	6.5 %	**BNQ 2501-170**

REMARKS :

Presence of elements Dmax = 14 mm

Tests by : Benjamin Drussel	Verified by : George Giannis	Tests date : 2023-08-10 12:34	Report date: 2023-08-10

Fichier: P:\Geotec\StyleLab\Finale\Tests\Lab_Grn_Anglais_Test.sty

TESTS REPORT
PARTICLE SIZE ANALYSIS

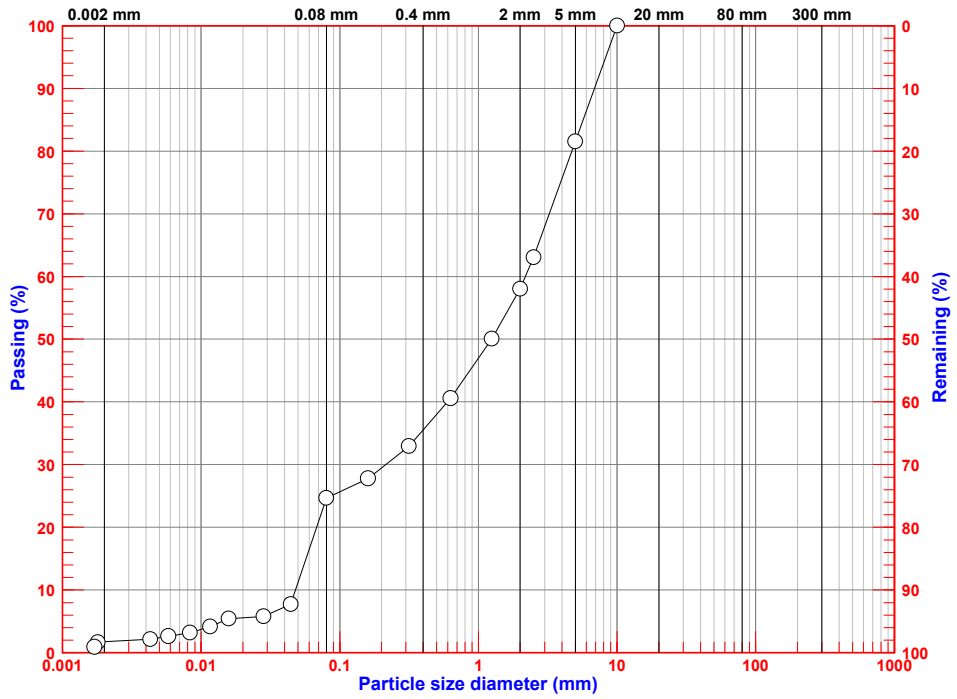
CLIENT :	Édifice 110 O'Connor Inc.	SITE :	110 O'Connor Street, Ottawa, Ontario
PROJECT NUMBER :	GT01.23.0064	PROJECT MANAGER:	G. G.

SAMPLE			
SAMPLE NUMBER :	BH 4 - SS 5+6	DEPTH :	3.05 m - 4.42 m
SAMPLE MASS. :	192.9 grammes	SAMPLE TYPE:	SS
SAMPLED BY :	S.P.	SAMPLING DATE :	2023-07-24

PARTICLE SIZE BY SIEVE ANALYSIS (BNQ2501-025)

Diameter (mm)	Passing (%)
56	100.0
40	100.0
28	100.0
20	100.0
14	100.0
10	100.0
5	81.5
Plateau	-
2.5	63.1
2	58.0
1.25	50.1
0.63	40.6
0.315	32.9
0.16	27.8
0.08	24.7
Plateau	-

PARTICLE SIZE CURVE



PARTICLE SIZE BY SIEVE ANALYSIS (FINES PARTICLES) (BNQ2501-025)

Diameter (mm)	Passing (%)
0.0443	7.7
0.0282	5.8
0.0158	5.4
0.0116	4.2
0.0083	3.2
0.0058	2.6
0.0043	2.2
0.0018	1.7
0.0017	0.9

PARTICLE SIZE DESCRIPTION

Cobble:	0.0 %	**D10:**	0.048	**USCS :**	Backfill
Gravel:	18.5 %	**D30:**	0.214	**Description :**	Silty sand, some gravel, trace clay.
Sand:	56.8 %	**D60:**	2.183		
Silt :	22.9 %	**Cc:**	0.44	**Drs :**	2.70 (presumed)
Clay :	1.8 %	**Cu:**	45.57		

NATURAL WATER CONTENT

TEST	RESULT	COMPLIANCE
Natural water content :	17.3 %	**BNQ 2501-170**

REMARKS :

Presence of wood and elements Dmax = 14 mm

Tests by : Benjamin Drussel	Verified by : George Giannis	Tests date : 2023-08-10 12:41	Report date: 2023-08-10

Fichier: P:\Geotec\StyleLab\Finale\Tests\Lab_Grn_Anglais_Test.sty

SOLROC Inc.

ROCK CORE
COMPRESSIVE STRENGTH DETERMINATION

CLIENT :	**Groupe Mach**	SAMPLING DATE :	**24-26/08/2023**
SITE :	**110 O'Connor, Ottawa, Ontario**	COMPRESSION DATE :	**07/08/2023**
PROJECT MANAGER :	**George Giannis**	MEMO No :	**N/A**
PROJECT No :	**GT01.23.0064**	LABORATORY No :	**23-LG-088/CR/01-04**

GENERAL INFORMATIONS

ROCK DESCRIPTION :	Black shale - Except BH5-RC10 : alternation limestone and shale
ROCK DESCRIPTION BY :	Benjamin Drussel
SAMPLED BY :	S.P.

RESULTS

Number / Reference	Depth (m) Top / Bottom	Average diameter (mm)	Core height (mm)	Height with capping (mm)	Ratio H/D	Mass (g)	Unit weight (kN/m^3)	Force (kN)	MPa
BH1-RC3	**1,98 / 2,08**	55,4	106	106	1,9	679,0	**26,0**	54,7	**23**
BH3-RC3	**2,48 / 2,57**	55,7	83	83	1,5	512,3	**24,8**	72,2	**28**
BH4-RC13	**11,29 / 11,38**	47,3	87	87	1,8	397,7	**25,4**	50,7	**29**
BH5-RC10	**10,69 / 10,81**	47,1	97	97	2,1	444,4	**25,8**	77,4	**44**

* Diameter : 2 readings half sample (Precision 0,5mm)
** Height : With capping, Ø < 2,0 , apply correction factor (Precision 1mm)
*** Flatness : <0,05mm
**** Perpendicularity : <2mm for 200mm (0,5˚)

REMARKS

Realised by: Benjamin Drussel	Date: 10-08-2023	Verified by: George Giannis	Date: 10-08-2023

SOLROC Inc.

DESCRIPTION VISUELLE DE LA CAROTTE ET
DÉTERMINATION DE LA RÉSISTANCE À LA COMPRESSION
CSA-A23.2-14C

CLIENT:	Groupe Mach
SITE:	110 O'connor, Ottawa
PROJET	
No. PROJET:	PR.GT01.23.0064

DATE DU PRÉLÈVEMENT:	17/07/02023
DATE DE RÉCEPTION :	19/07/2023
No. D'ÉCHANTILLON:	CAR1
No. DE LABORATOIRE :	CQ-045-JM/CB/01

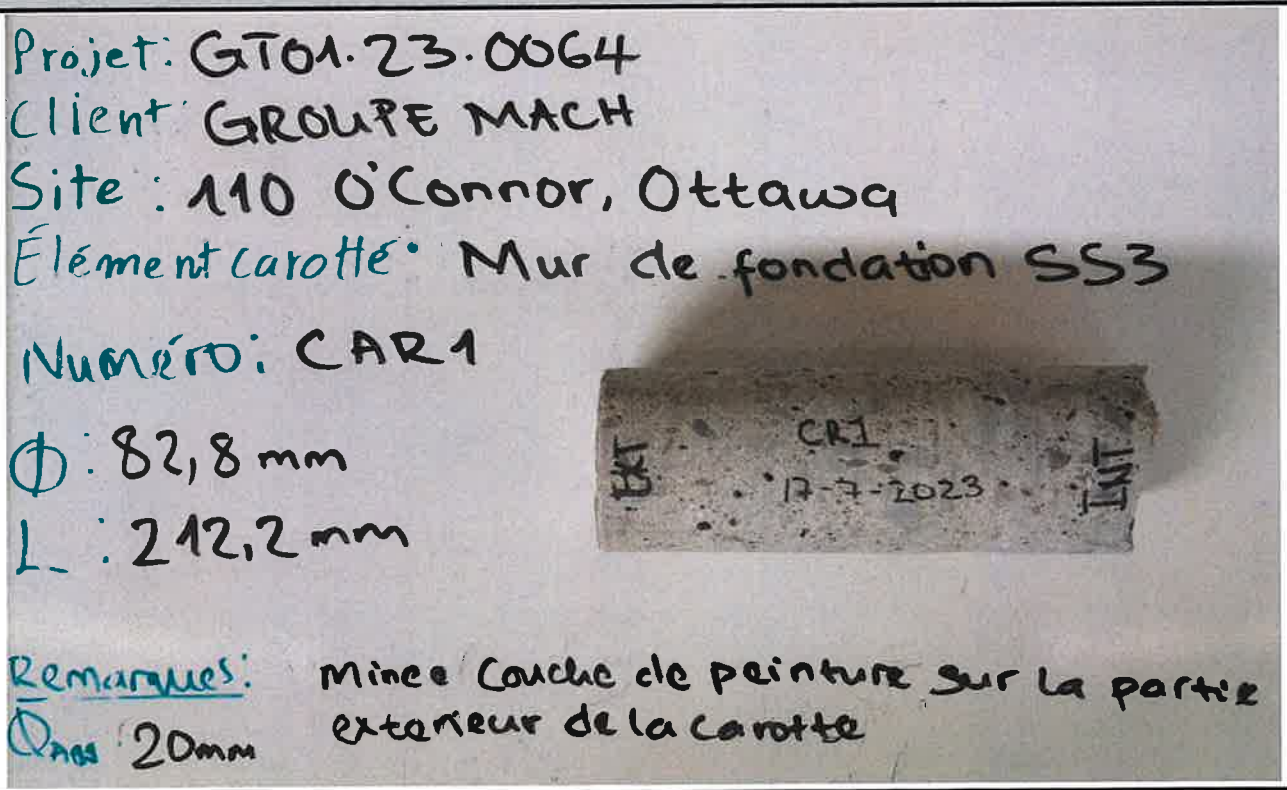
Informations	
Carotte n^0	**CAR 1**
Élément carotté	**Mur Fondation**
Étage et Localisation	**Sou sol 3; à côté du TR1**
Épaisseur totale	**212,2 mm**
Longueur sciée	**200,1 mm**
Diamètre	**94,0 mm**
Masse de la carotte	**2473,4 g**
Caractéristiques du béton	
Diamètre max granulat	**20 mm**
Fissures	**Non**
Adhésion	**Bonne adésion entre la pierre et le ciment**

Remarques

Résultat de l'essai en compression / Masse Volumique	
Résistance en compression:	**37,4 Mpa**
Masse volumique du béton:	**2287 kg/m3**

Photo détail

Description



Réalisé par: Joseph Tajam	Date : 20/07/2023	Vérifié par : George Giannis	Date : 20/07/2023

SOLROC Inc.

DESCRIPTION VISUELLE DE LA CAROTTE ET
DÉTERMINATION DE LA RÉSISTANCE À LA COMPRESSION
CSA-A23.2-14C

CLIENT:	Groupe Mach
SITE:	110 O'connor, Ottawa
PROJET	
No. PROJET:	PR.GT01.23.0064

DATE DU PRÉLÈVEMENT:	17/07/02023
DATE DE RÉCEPTION :	19/07/2023
No. D'ÉCHANTILLON:	CAR2
No. DE LABORATOIRE :	CQ-045-JM/CB/02

Informations	
Carotte n^0	**CAR 2**
Élément carotté	**Mur Fondation**
Étage et Localisation	**Sous Sol 3; Entre TR2 et TR3**
Épaisseur totale	**200,1 mm**
Longueur sciée	**208,9 mm**
Diamètre	**94,0 mm**
Masse de la carotte	**2681 g**

Caractéristiques du béton	
Diamètre max granulat	**20 mm**
Fissures	**Non**
Adhésion	**Bonne Adésion entre la pierre et le ciment**

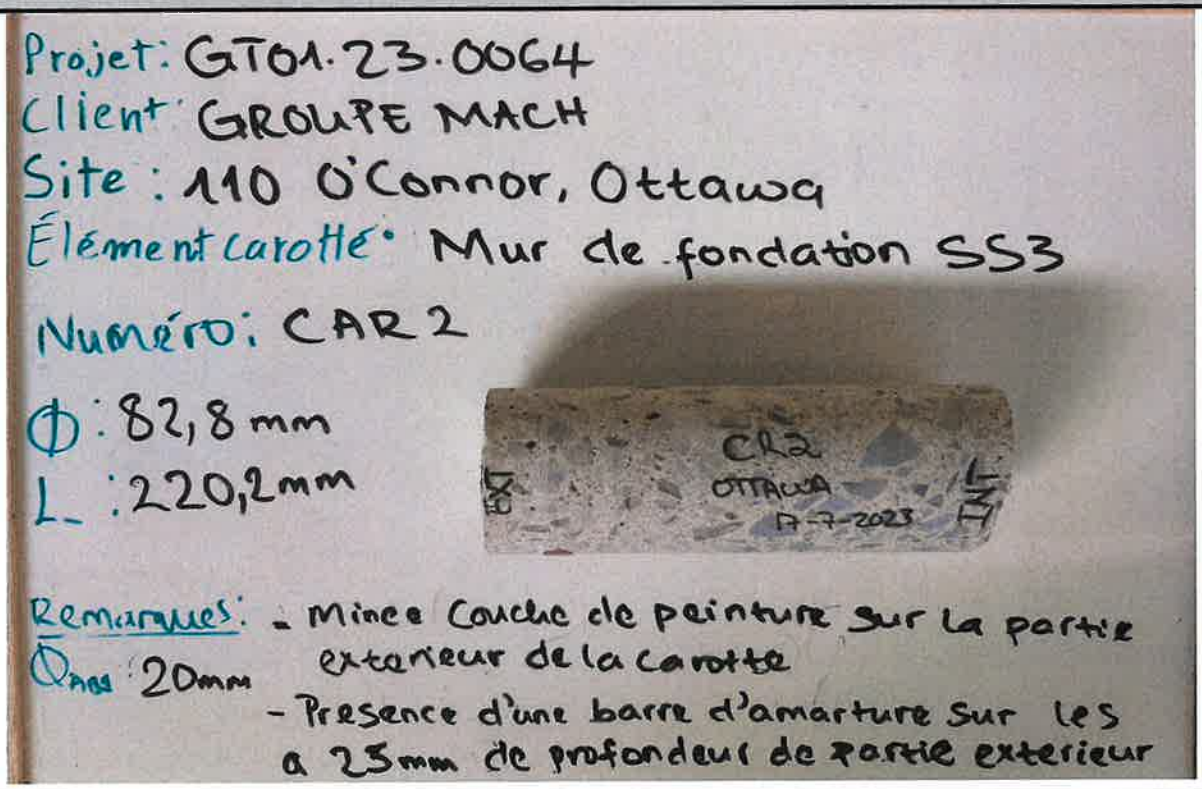
Remarques

- Presence d'une barre d'amarture sur 25mm de la partie exterieur

Résultat de l'essai en compression / Masse Volumique	
Résistance en compression:	**39,2 Mpa**
Masse volumique du béton:	**2397 kg/m3**

Photo détail

Description



Réalisé par: Joseph Tajam	Date : 20/07/2023	Vérifié par : George Giannis	Date : 20/07/2023

SOLROC Inc.

DESCRIPTION VISUELLE DE LA CAROTTE ET DÉTERMINATION DE LA RÉSISTANCE À LA COMPRESSION
CSA-A23.2-14C

CLIENT:	Groupe Mach
SITE:	110 O'connor, Ottawa
PROJET	
No. PROJET:	PR.GT01.23.0064

DATE DU PRÉLÈVEMENT:	17/07/02023
DATE DE RÉCEPTION :	19/07/2023
No. D'ÉCHANTILLON:	CAR3
No. DE LABORATOIRE :	CQ-045-JM/CB/03

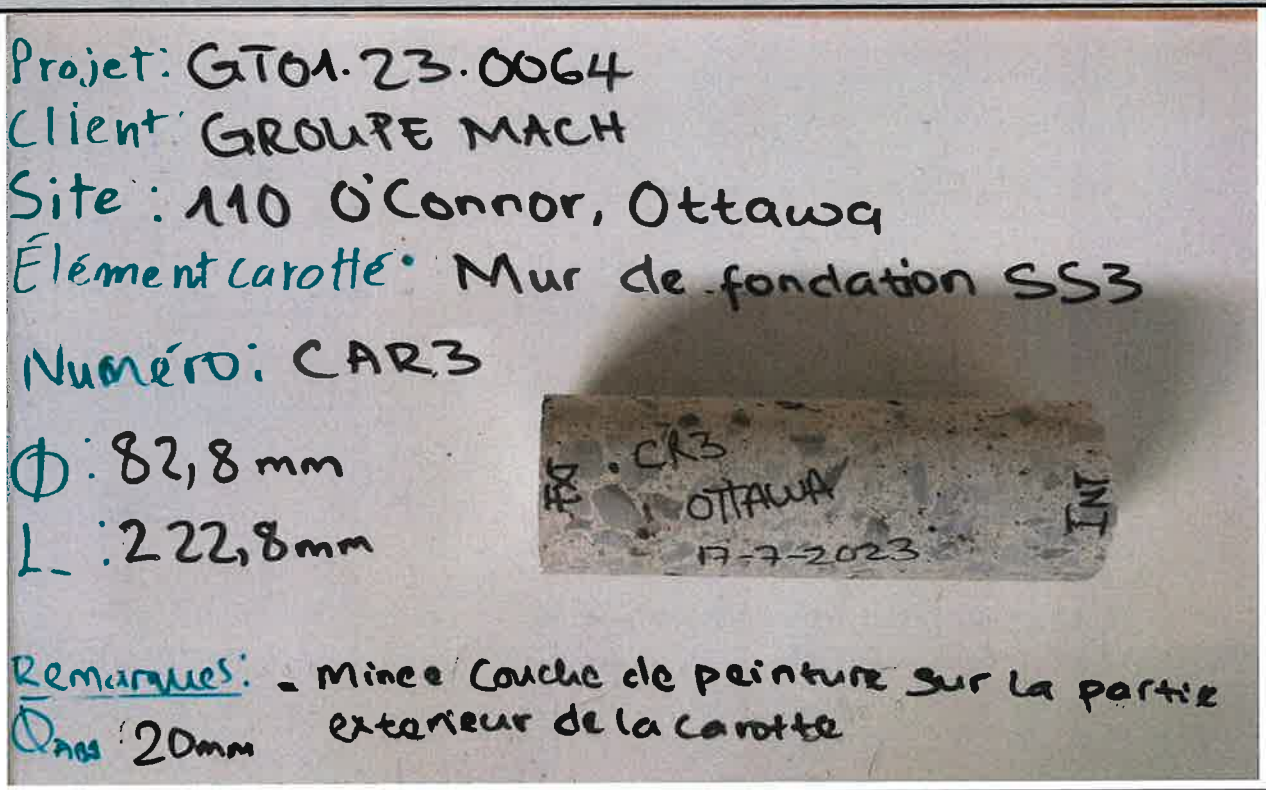
Informations	
Carotte n^0	**CAR 3**
Élément carotté	**Mur Fondation**
Étage et Localisation	**Sous Sol 3, à côté du TR5**
Épaisseur totale	**222,8 mm**
Longueur sciée	**197,5 mm**
Diamètre	**82,8 mm**
Masse de la carotte	**2548,8 g**
Caractéristiques du béton	
Diamètre max granulat	**20 mm**
Fissures	**Non**
Adhésion	**Bonne Adésion entre la pierre et le ciment**

Remarques

Résultat de l'essai en compression / Masse Volumique	
Résistance en compression:	**45,1 Mpa**
Masse volumique du béton:	**2382 kg/m3**

Photo détail

Description



Réalisé par: Joseph Tajam	Date : 20/07/2023	Vérifié par : George Giannis	Date : 20/07/2023

SOLROC Inc.

DESCRIPTION VISUELLE DE LA CAROTTE ET DÉTERMINATION DE LA RÉSISTANCE À LA COMPRESSION
CSA-A23.2-14C

CLIENT:	Groupe Mach
SITE:	110 O'connor, Ottawa
PROJET	
No. PROJET:	PR.GT01.23.0064

DATE DU PRÉLÈVEMENT:	17/07/02023
DATE DE RÉCEPTION :	19/07/2023
No. D'ÉCHANTILLON:	CAR4
No. DE LABORATOIRE :	CQ-045-JM/CB/04

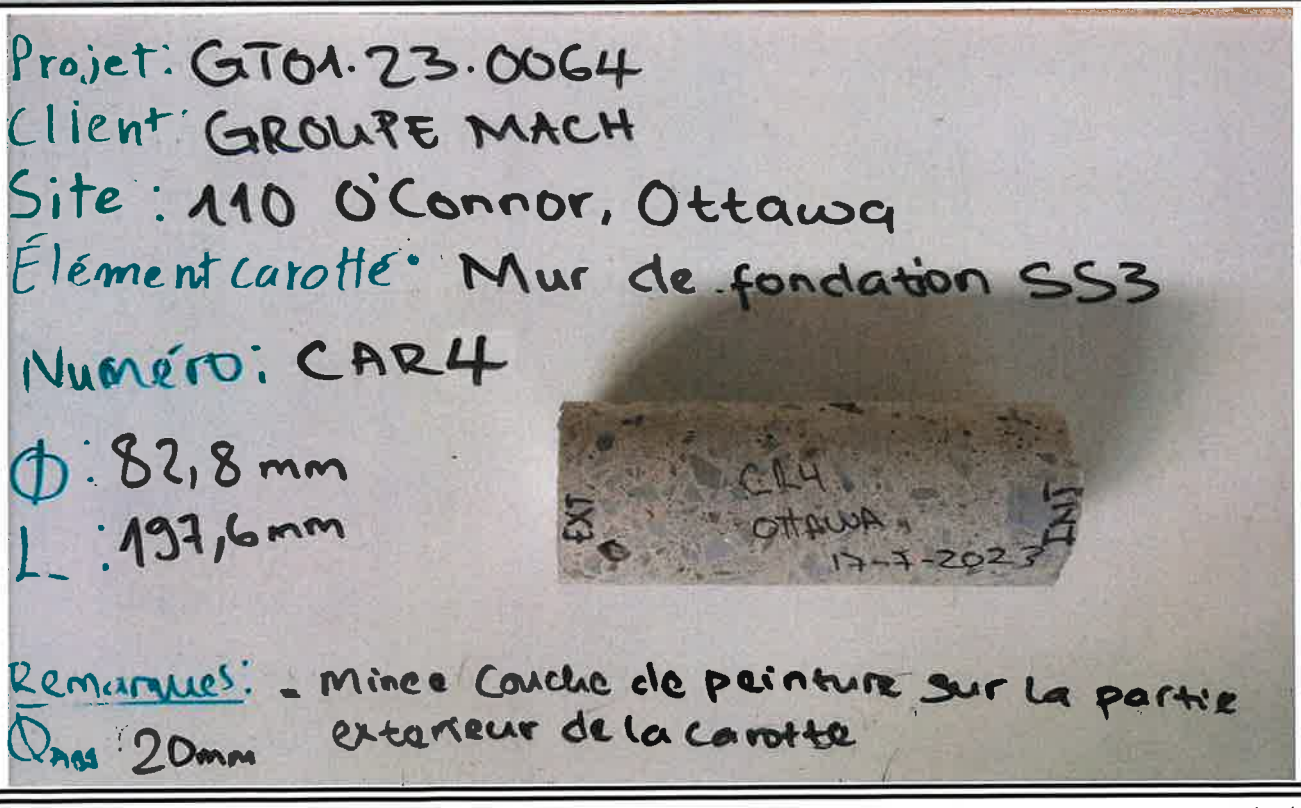
Informations	
Carotte n^0	**CAR 4**
Élément carotté	**Mur Fondation**
Étage et Localisation	**Sous Sol 3, à côté du TR4**
Épaisseur totale	**197,6 mm**
Longueur sciée	**189,4 mm**
Diamètre	**82,8 mm**
Masse de la carotte	**2417,4 g**
Caractéristiques du béton	
Diamètre max granulat	**20 mm**
Fissures	**Non**
Adhésion	**Bonne Adésion entre la pierre et le ciment**

Résultat de l'essai en compression / Masse Volumique	
Résistance en compression:	**42,3 Mpa**
Masse volumique du béton:	**2351 kg/m3**

Photo détail

Remarques

Description



Réalisé par: Joseph Tajam	Date : 20/07/2023	Vérifié par : George Giannis	Date : 20/07/2023

Annex D

LOCATION OF BOREHOLES AND TEST PITS – 3RD BASEMENT LEVEL (DRAWING NO GT01.23.0064G-1)

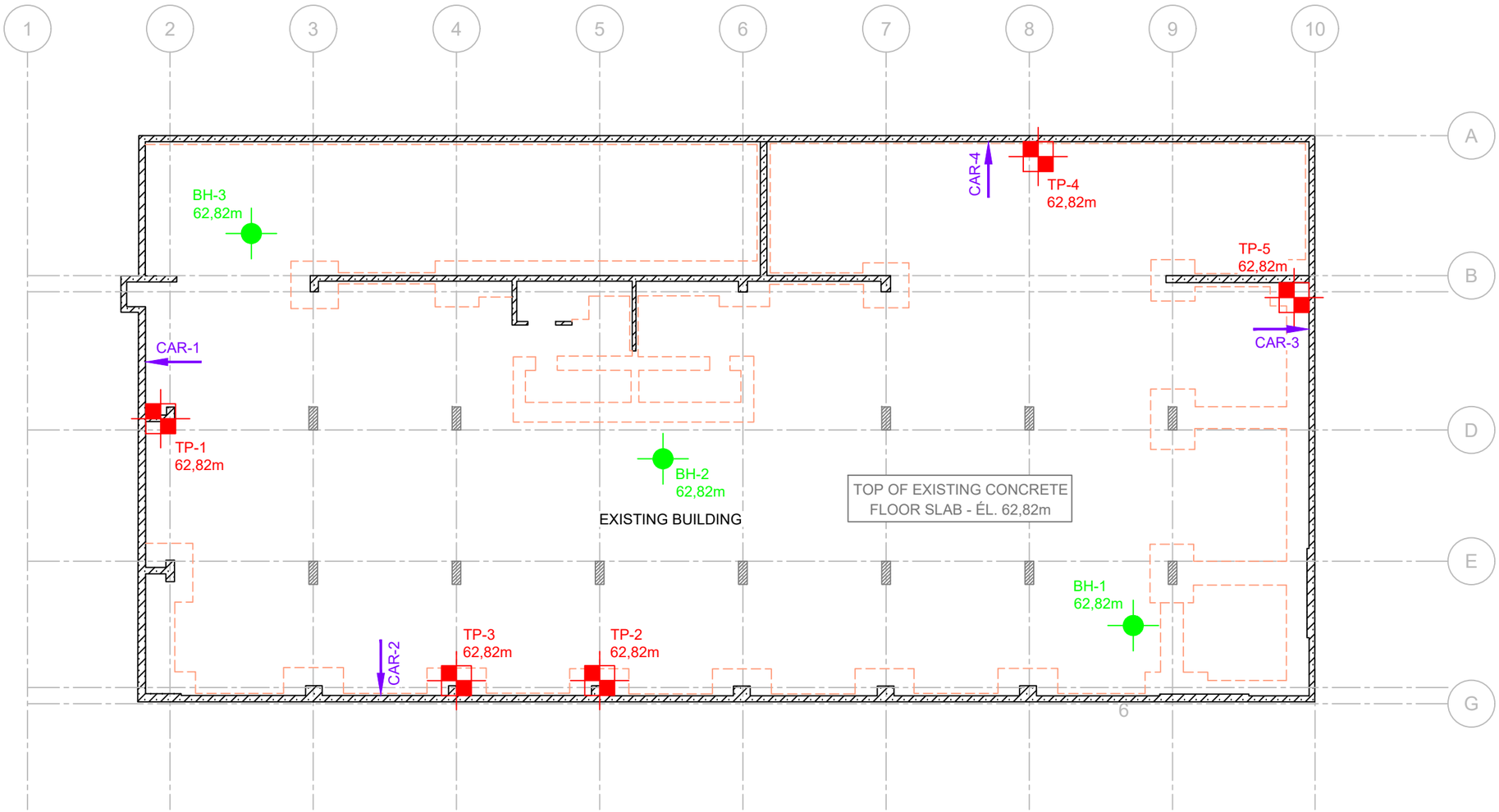
LOCATION OF EXTERIOR BOREHOLES

(DRAWING NO GT01.23.0064G-2)

O'CONNOR STREET SIDE

SLATER STREET SIDE

LAURIER AVENUE WEST SIDE



N

LEGEND

- BOREHOLE
- TEST PIT
- HORIZONTAL CONCRETE CORE

Note: All site information was taken from Plan S1, Revision 4 of Project 555 dated October 8, 1969 as prepared by Adjeleian and Associates, Consulting Engineers.

solroc

ÉDIFICE 110 O'CONNOR INC.

DATE: AUGUST 24, 2023	*APPROVED BY:* G. G.	*DRAWN BY:* D. D.
SCALE: 1:250 SI		

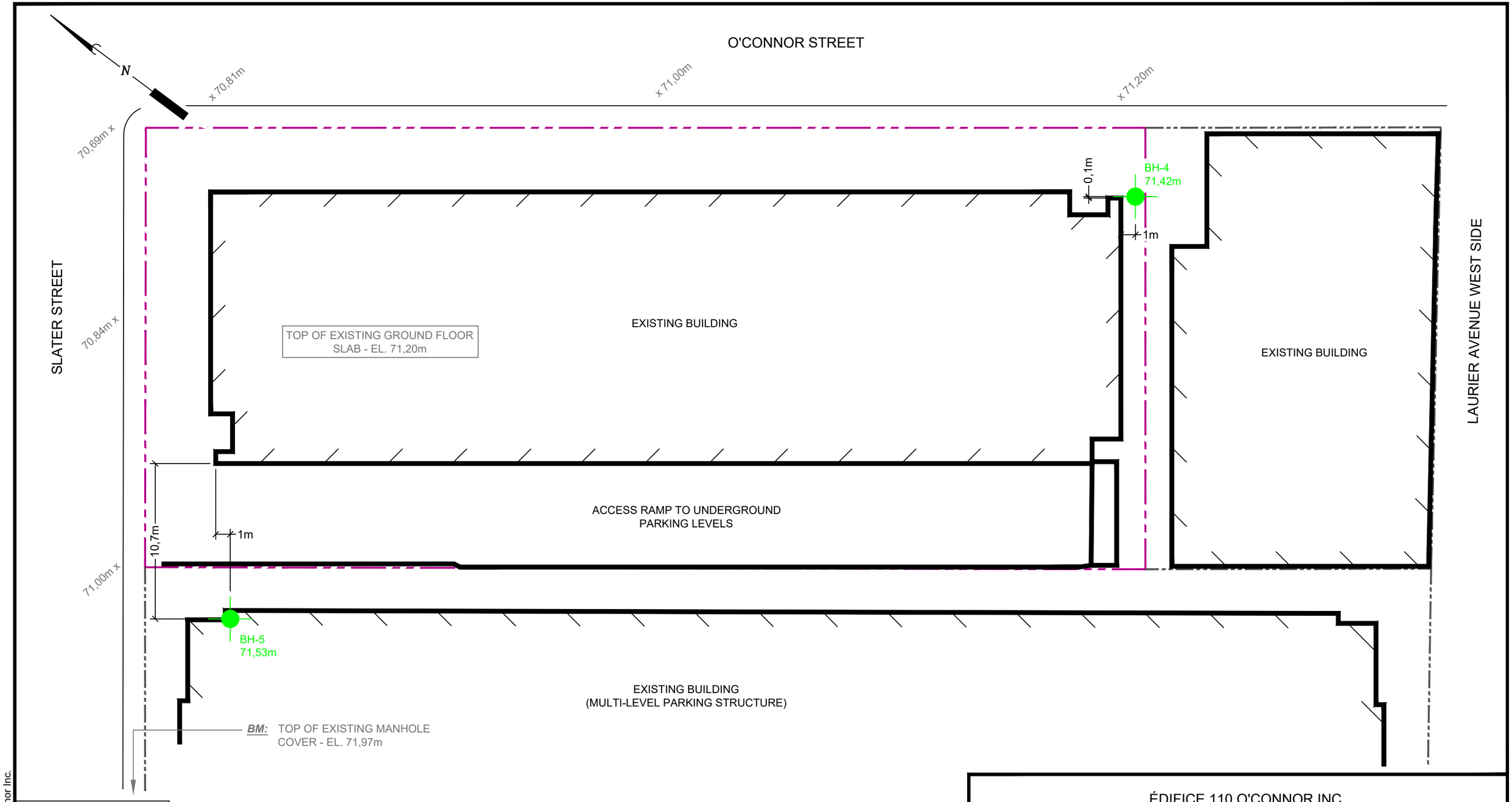
LOCATION OF BOREHOLES, CONCRETE CORES AND TEST PITS - 3rd BASEMENT LEVEL

GEOTECHNICAL INVESTIGATION

110 O'CONNER STREET, OTTAWA - ONTARIO

DRAWING NO.: GT01.23.0064-1

GT01.23.0064 - Édifice 110 O'Connor Inc.



LEGEND

BOREHOLE

Note: All site information was taken from the Surveyor's Certificate from File 19964-19 dated September 5, 2019 prepared by Annis, O'Sullivan Vollebekk Ltd., O. L. S.

ÉDIFICE 110 O'CONNOR INC.

DATE:	AUGUST 24, 2023	*APPROVED BY:* G. G.	*DRAWN BY:* D. D.
SCALE:	1:250 SI		

LOCATION OF EXTERIOR BOREHOLES

GEOTECHNICAL INVESTIGATION

110 O'CONNER STREET, OTTAWA - ONTARIO

DRAWING NO.: GT01.23.0064-2

GT01.23.0064 - Édifice 110 O'Connor Inc.