HM RB (147 Spadina) LP
474 Wellington Street West, Suite 200
Toronto, ON M5V 1E3

File No. 21-019
August 17, 2021

Attention: Charles Arbez

RE: PRELIMINARY HYDROGEOLOGICAL REVIEW REPORT
147 Spadina Ave, Toronto, Ontario

Grounded Engineering Inc. ("Grounded") is pleased to provide you with this Hydrogeological Review for the site known as 147 Spadina Ave, in Toronto, Ontario.

The following documents are provided as part of this package:

- City of Toronto Hydrogeological Review Summary Form
- Preliminary Hydrogeological Review Report

As part of the development applications process, the City of Toronto requires that both documents are submitted together for review.

We trust that the information contained with this report is adequate for your present requirements. If we can be of further assistance, please do not hesitate to contact us.

Katrina Morgenroth, EIT

Matthew Bielaski, P.Eng., QP_{ESA-RA}
Principal

August 2018

HYDROLOGICAL REVIEW SUMMARY

The form is to be completed by the Professional that prepared the Hydrological Review.
Use of the form by the City of Toronto is not to be construed as verification of engineering/hydrological content.

Refer to the Terms of Reference, Hydrological Review:
Link to Terms of Reference Hydrological Review

For City Staff Use Only:	
Name of ECS Case Manager (Please print)	
Date Review Summary provided to to TW, EM&P	

IF ANY OF THE REQUIREMENTS LISTED BELOW HAVE NOT BEEN INLCUDED IN THE HYDROLOGICAL REVIEW, THE REVIEW WILL BE CONSIDERED INCOMPLETE.
THE GREY SHADED BOXES WILL REQUIRE A CONSISTANCY CHECK BY THE ECS CASE MANAGER.

Summary of Key Information:

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
Site Address	147 Spadina Ave, Toronto, Ontario	Title, i (Exec Sum), 1 (Sec 1)	
Postal Code	M5V 1E3	Title	
Property Owner (on request for comments memo)	HM RB (147 Spadina) LP	Title, i (Exec Sum), 1 (Sec 1)	
Proposed description of the project (if applicable) (point towers, number of podiums)	One 25± storey structure	i (Exec Sum), 1 (Sec 1)	
Land Use (ex. commercial, residential, mixed, institutional, industrial)	Current: commercial Proposed: commercial and residential	i (Exec Sum), 1 (Sec 1)	
Number of below grade levels for the proposed structure	Three (3)	i (Exec Sum), 1 (Sec 1)	
HYDROLOGICAL REVIEW INFORMATION			
Date Hydrological Review was prepared:	2021-08-17	Title	
Who Performed the Hydrological Review (Consulting Firm)	Grounded Engineering Inc.	Title, i (Exec Sum), 2 (Sec 1)	
Name of Author of Hydrological Review	Matthew Bielaski, P.Eng., QP_{ESA-RA}	2 (Sec 1), 12 (Sec 14)	

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HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
Check the directories on the website for Professional Geoscientists and/or Professional Engineers of Ontario been checked to ensure that the Hydrological Report has been prepared by a qualified person who is a licensed Professional Geoscientist as set out in the Professional Geoscientist Act of Ontario or a Professional Engineer? PEO: Professional Engineers of Ontario APGO: Association of Professional Geoscientists of Ontario	✓ Yes	N/A	
Has the Hydrological Review been prepared in accordance with all the following: • Ontario Water Resources Act • Ontario Regulation 387/04 • Toronto Municipal Code Chapter 681-Sewers	✓ Yes	2 (Sec 1)	
Total Volume (L/day) Short Term Discharge of groundwater (construction dewatering) **with safety factor included**	Seepage: 30,000 Rainfall: 28,000 **Total: 58,000 L/day** What safety factor was used? 2	ii (Exec Sum), 8 (Sec 10)	

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
Total Volume (L/day) Short Term Discharge of groundwater (construction dewatering) **without safety factor included**	Seepage: 15,000 L/day	Appendix G	
Total Volume (L/day) Long Term drainage of groundwater (from foundation drainage, weeping tiles, sub slab drainage) **with safety factor included** If the development is part of a multiple tower complex, include total volume for each separate tower	Seepage: 30,000 Infiltration: 1,000 **Total: 31,000 L/day** What safety factor was used? 2	ii (Exec Sum), 8 (Sec 10)	
List the nearest surface water (river, creek, lake)	The nearest waterbody is Lake Ontario, located approximately 1,300 m south of the Property.	3 (Sec 3)	
Lowest basement elevation	78.5 masl – base of excavation 79.0 masl – finish floor elevation	i (Exec Sum), Appendix G	
Foundation elevation	77.5 masl – base of footings	i (Exec Sum)	
Ground elevation	90.3 masl (existing ground surface) Site will be re-graded to 90.0 masl	Appendix G	

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
STUDY AREA MAP			**Review Includes this Information City Staff (Check)**
Study area map(s) have been included in the report.	✓ Yes	Figures 1 & 2	N/A
Study area map(s) been prepared according to the Hydrological Review Terms of Reference.	✓ Yes	Figures 1 & 2 3 (Sec 2)	N/A
WATER LEVEL AND WELLS		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information (City Staff Initial)**
The groundwater level has been monitored using all wells located on site (within property boundary).	✓ Yes	4 (Sec 4 and 5), Figures 2 & 3	
The static water level measurements have been monitored at all monitoring wells for a minimum of 3 months with samples taken every 2 weeks for a minimum of 6 samples. The intent is for the qualified professional to use professional judgement to estimate the seasonally high groundwater level.	✓ Yes	4 (Sec 4 and 5), Appendix A	

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
All water levels in the wells have been measured with respect to masl.	✓ Yes	4 (Sec 5), Appendix A	
A table of geology/soil stratigraphy for the property has been included.	✓ Yes	i (Exec Sum), 3 (Sec 3)	
GEOLOGY AND PHYSICAL HYDROLOGY		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information (City Staff Initial)**
The review has made reference to the soil materials including thickness, composition and texture, and bedrock environments.	✓ Yes	3 (Sec 3)	
Key aquifers and the site's proximity to nearby surface water has been identified.	✓ Yes	3 (Sec 3)	N/A
PUMP TEST/SLUG TEST/DRAWDOWN ANALYSIS		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**
A summary of the pumping test data and analysis is included in the review.	A pumping test was not conducted.	5 (Sec 6.1)	
The pump test been carried out for at least 24 hours if possible. If not, has a slug test been conducted?	A pump test was not conducted. Slug tests were conducted.	6 (Sec 6.2)	
Have the monitoring well(s) have been monitored using digital devices? If yes how frequently?	✓ Yes	4 (Sec 5)	

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
If a slug or pump test has been conducted has the static groundwater level been monitored at all monitoring well(s) multiple times to measure recovery? -prior to the slug or pumping test(s)? -post slug or pumping test(s)?	✓ Yes ✓ Yes ✓ Yes	4 (Sec 5), 5 (Sec 6.2)	N/A
The above noted slug or pump tests have been included in the report.	✓ Yes	6 (Sec 6.2), Appendix D	
WATER QUALITY		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**
The report includes baseline water quality samples from a laboratory. The water quality must be analyzed for all parameters listed in Tables 1 and 2 of Chapter 681 Sewers of the Toronto Municipal Code (found in Appendix A) and the samples must have to be taken unfiltered within 9 months of the date of submission.	✓ Yes	7 (Sec 7), Appendix H	
The water quality data templates in Appendix A have been completed for each sample taken for both sanitary/combined and storm sewer limits.	For sanitary discharge- See the sanitary/combined sewer parameter limit template For storm discharge- See the storm sewer parameter limit template	8-11 of Hydrological Review Summary	

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HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
Qualified professional to list all sample parameters that have violated the Bylaw limits for each sample taken for the sanitary/combined Bylaw limits **If there are any sample parameter Exceedances the groundwater can't be discharged as is.**	Sanitary Combined Sewer: • The ground water sample met the Limits for Sanitary and Combined Sewer Discharge for all parameters analyzed.	7 (Sec 7)	
Qualified professional to list all sample parameters that have violated the Bylaw limits for each sample taken for the storm Bylaw limits. **If there are any sample parameter exceedances the groundwater can't be discharged as is.**	Storm Sewer: • Total Manganese (Result 0.426 mg/L; Limit 0.05 mg/L)	7 (Sec 7)	
The water quality samples have been analyzed by a Canadian laboratory accredited and licensed by Standards Council of Canada and/or Canadian Association for Laboratory Accreditation. List of Canadian accredited laboratories: Standards Council of Canada	✓ Yes	Appendix H	N/A
A chain of custody record for the samples is included with the report.	✓ Yes	Appendix H	
Has the chain of custody reference any filtered sample? If yes, the report has to be amended and re-submitted to include only non-filtered samples.	◯ No	Appendix H	
List any of the sample parameters that exceed the Bylaw limits with the reporting detection limit (RDL) included.	Sanitary Combined Sewer: • The ground water sample met the Limits for Sanitary and Combined Sewer Discharge for all parameters analyzed. Storm Sewer: • Total Manganese (Result 0.426 mg/L; Limit 0.05 mg/L)	7 (Sec 7), Appendix H	

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
A true copy of the Certificate of Analysis report, is included with the report.	✓ Yes	Appendix H	
EVALUATION OF IMPACT		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**
Does the report recommend a back-up system or relief safety valve(s)?	◯ No	8 (Sec 9)	
Does the associated Geotechnical report recommend a back-up system or relief safety valve(s)?	◯ No	n/a	
The taking and discharging of groundwater on site has been analyzed to ensure that no negative impacts will occur to: the City sewage works in terms of quality and quantity (including existing infrastructure), the natural environment, and settlement issues.	Yes	11-12 (Sec 11)	N/A
Has it been determined that there will be a negative impact to the natural environment, City sewage works, or surrounding properties has the study identified the following: the extent of the negative impact, the detail of the precondition state of all the infrastructure, City sewage works, and natural environment within the effected zone and the proposed remediation and monitoring plan?	◯ No	11-12 (Sec 11-12)	N/A

Summary of Additional Information and Key Items (if applicable):

Appendix A:

Chapter 168 – Table 1 Sanitary Combined Sewer Limits

Chapter 168 – Table 2 Storm Sewer Limits

Sample Location: SW – UF – BH 3

Parameter	Table 1 Limit	Table 2 Limit	Units	Sample Result	Sample Result with upper RDL* included	
Inorganics						
BOD	300	15	mg/L	8	8	2
Fluoride	10	n/a	mg/L	0.11	0.11	0.06
TKN	100	n/a	mg/L	12.6	12.6	0.5
pH	6.0 - 11.5	6.0 - 9.5	SU	7.40	7.40	0.05
Phenolics (4AAP)	1	0.008	mg/L	< 0.002	< 0.002	0.002
TSS	350	15	mg/L	15	15	2
Total Cyanide	2	0.02	mg/L	< 0.01	< 0.01	0.01
Metals						
Chromium Hexavalent	2	0.04	mg/L	< 0.0002	< 0.0002	0.0002
Total Mercury	0.01	0.0004	mg/L	< 0.00001	< 0.00001	0.00001
Total Aluminum	50	n/a	mg/L	0.367	0.367	0.001
Total Antimony	5	n/a	mg/L	< 0.0009	< 0.0009	0.0009
Total Arsenic	1	0.02	mg/L	0.0033	0.0033	0.0002
Total Cadmium	0.7	0.008	mg/L	0.000005	0.000005	0.000003
Total Chromium	4	0.08	mg/L	0.0043	0.0043	0.00008
Total Cobalt	5	n/a	mg/L	0.00057	0.00057	0.000004
Total Copper	2	0.4	mg/L	0.0005	0.0005	0.0002
Total Lead	1	0.12	mg/L	0.00021	0.00021	0.00001
Total Manganese	5	0.05	mg/L	0.426	0.426	0.00001
Total Molybdenum	5	n/a	mg/L	0.0017	0.0017	0.00004
Total Nickel	2	0.08	mg/L	0.0019	0.0019	0.0001
Total Phosphorus	10	0.4	mg/L	0.371	0.371	0.003
Total Selenium	1	0.02	mg/L	0.00017	0.00017	0.00004
Total Silver	5	0.12	mg/L	< 0.00005	< 0.00005	0.00005
Total Tin	5	n/a	mg/L	0.0028	0.0028	0.00006
Total Titanium	5	n/a	mg/L	0.0119	0.0119	0.00005
Total Zinc	2	0.04	mg/L	0.003	0.003	0.002
Microbiology						
E.coli	n/a	200	CFU	< 2	< 2	2
Petroleum Hydrocarbons						
Animal/Vegetable Oil & Grease	150	n/a	mg/L	< 4	< 4	4
Mineral/Synthetic Oil & Grease	15	n/a	mg/L	< 4	< 4	4
Volatile Organics						
Benzene	0.01	0.002	mg/L	< 0.0005	< 0.0005	0.0005
Chloroform	0.04	0.002	mg/L	< 0.0005	< 0.0005	0.0005

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Parameter	Table 1 Limit	Table 2 Limit	Units	Sample Result	Sample Result with upper RDL* included	
1,2-Dichlorobenzene	0.05	0.0056	mg/L	< 0.0005	< 0.0005	0.0005
1,4-Dichlorobenzene	0.08	0.0068	mg/L	< 0.0005	< 0.0005	0.0005
Cis-1,2-Dichloroethylene	4	0.0056	mg/L	< 0.0005	< 0.0005	0.0005
Trans-1,3-Dichloropropylene	0.14	0.0056	mg/L	< 0.0005	< 0.0005	0.0005
Ethyl Benzene	0.16	0.002	mg/L	< 0.0005	< 0.0005	0.0005
Methylene Chloride	2	0.0052	mg/L	< 0.0005	< 0.0005	0.0005
1,1,2,2-Tetrachloroethane	1.4	0.017	mg/L	< 0.0005	< 0.0005	0.0005
Tetrachloroethylene	1	0.0044	mg/L	< 0.0005	< 0.0005	0.0005
Toluene	0.016	0.002	mg/L	< 0.0005	< 0.0005	0.0005
Trichloroethylene	0.4	0.0076	mg/L	< 0.0005	< 0.0005	0.0005
Total Xylenes	1.4	0.0044	mg/L	< 0.0005	< 0.0005	0.0005
Semi-Volatile **Organics**						
Di-n-butyl Phthalate	0.08	0.015	mg/L	< 0.002	< 0.002	0.002
Bis (2-ethylhexyl) Phthalate	0.012	0.0088	mg/L	< 0.002	< 0.002	0.002
3,3'-Dichlorobenzidine	0.002	0.0008	mg/L	< 0.0005	< 0.0005	0.0005
Pentachlorophenol	0.005	0.002	mg/L	< 0.0005	< 0.0005	0.0005
Total PAHs	0.005	0.002	mg/L	< 0.001	< 0.001	---
Hexachlorocyclohexane	n/a	0.1	mg/L	Parameter Not In By-Law May 2016		
Misc **Parameters**						
Nonylphenols	0.02	0.001	mg/L	< 0.001	< 0.001	0.001
Nonylphenol Ethoxylates	0.2	0.01	mg/L	< 0.01	< 0.01	0.01
Temperature	< 60	< 40	˚C	7	7	---
PCB	0.001	0.0004	mg/L	< 0.0001	< 0.0001	0.0001

* RDL corresponds to SGS Reporting Detection Limits

Sample Collected: SW – UF – BH 3

Temperature: 7°C

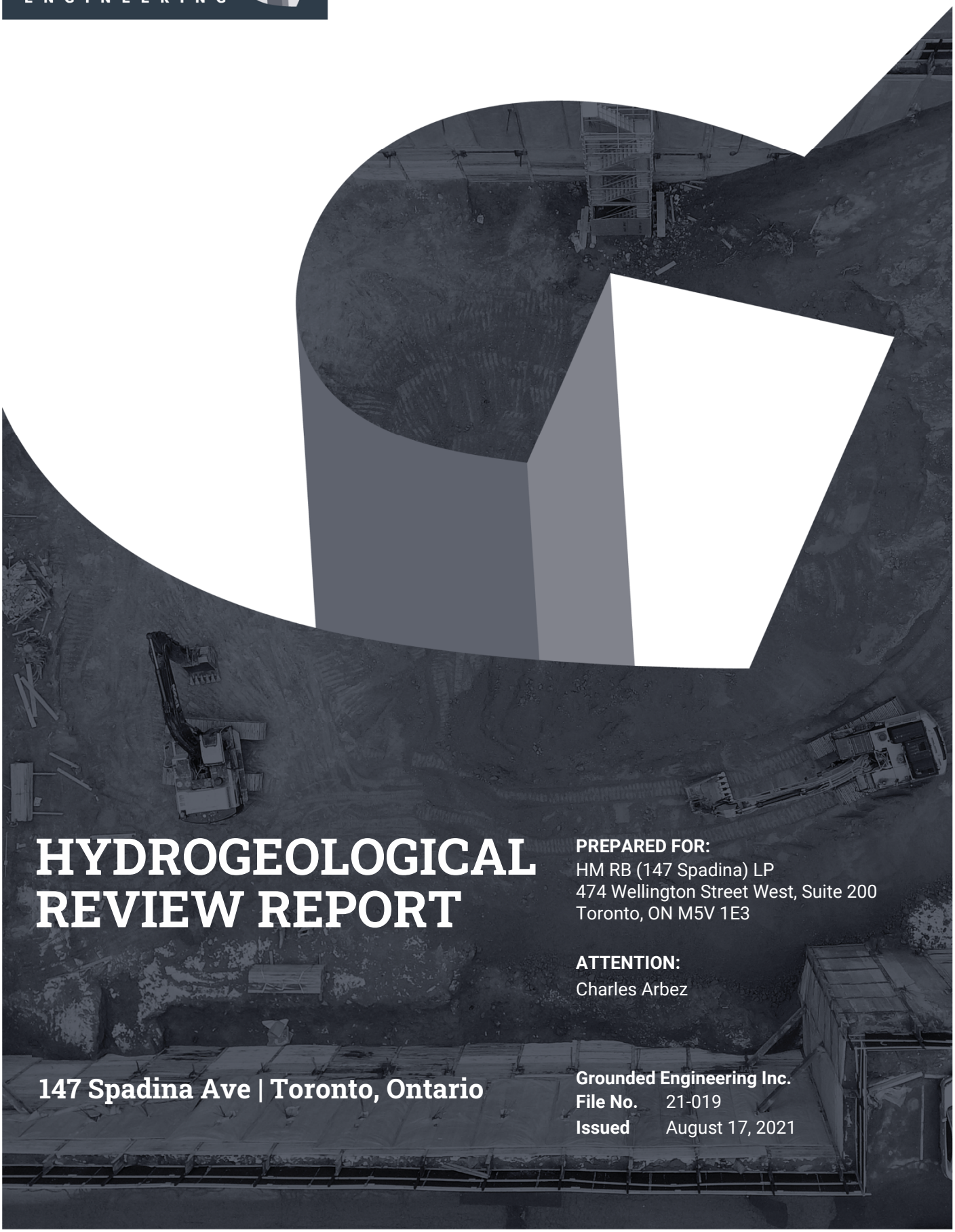
Consulting Firm that prepared Hydrological Report: Grounded Engineering Inc.
Print Name

Qualified Professional who completed the report summary: Matthew Bielaski, P.Eng., QP_{ESA-RA}
Print Name

Qualified Professional who completed the report summary:

Signature Date & Stam

GROUNDED ENGINEERING



HYDROGEOLOGICAL REVIEW REPORT

PREPARED FOR:
HM RB (147 Spadina) LP
474 Wellington Street West, Suite 200
Toronto, ON M5V 1E3

ATTENTION:
Charles Arbez

147 Spadina Ave | Toronto, Ontario

Grounded Engineering Inc.
File No. 21-019
Issued August 17, 2021

12 Banigan Drive, Toronto ON M4H 1E9 | (647) 264-7909 | groundedeng.ca | Grounded Engineering

Executive Summary

Grounded Engineering Inc. (Grounded) was retained by HM RB (147 Spadina) LP to conduct a Hydrogeological Review for the proposed redevelopment of 147 Spadina Ave in Toronto, Ontario (site). The conclusions of the investigation are summarized as follows:

Development Information

Current Development

Development Phase	Above Grade Levels	Below Grade Levels			
		Level #	Lowest Finished Floor		Approximate Base of Footings (masl)
			Depth (m)	Elevation (masl)	
1 Building	2	1 (partial)	Unknown	Unknown	Unknown

Proposed Development

Development Phase	Above Grade Levels	Below Grade Levels			
		Level #	Lowest Finished Floor		Approximate Base of Footings (masl)
			Depth (m)	Elevation (masl)	
1 Building	25±	3	11.0±	79.0±	77.5±

Site Conditions

Site Stratigraphy

Stratum/Formation	Aquifer or Aquitard	Depth Range (mbgs)	Elevation Range (masl)	Hydraulic Conductivity (m/s)
Earth Fill	Aquifer	0.2 – 1.5	90.4 – 89.4	1 x 10-6*
Sunnybrook Till	Aquitard	0.8 – 7.6	89.8 – 82.6	1 x 10-9*
Don Beds	Aquitard	4.6 – 9.1	86.0 – 81.1	1 x 10-8*
York Till	Aquitard	9.1 – 13.7	81.5 – 76.6	2.8 x 10^{-9}**
Weathered Bedrock	n/a	12.2 – 14.4	78.4 – 75.9	1.6 x 10^{-6}***
Sound Bedrock	n/a	13.0 – 16.9	77.6 – 73.7	1 x 10^{-7}*

* Indicates conductivity was estimated using typical published values from Freeze and Cherry (1979).
** Indicates conductivity was estimated using grain size analysis.
*** Indicates conductivity was calculated by Slug Test.

Groundwater Elevation

Monitoring Well ID	Depth Below Grade (m)	Elevation (masl)
BH 1	10.6	79.7
BH 2	6.8	83.8
BH 3	7.5	82.8
BH 4	15.0	75.2
P-MW101	4.0	86.3
P-MW102	4.0	86.5
P-MW103	Dry	Dry

Groundwater Elevation		
P-MW104	Dry	Dry
P-MW105	Dry	Dry
P-MW106	Dry	Dry

Groundwater Quality				
Sample ID	**Sample Date**	**Sample Expiry Date**	**City of Toronto Storm Sewer Limits**	**City of Toronto Sanitary and Combined Sewer Limits**
UF – SW – BH 3	Feb 24, 2021	Aug 24, 2021	Exceeds	Meets

Groundwater Control

Stored Groundwater (pre-excavation/dewatering)			
Volume of Excavation (m^3)	**Volume of Excavation Below Water Table (m^3)**	**Volume of Storage Groundwater (m^3)**	**Volume of Storage Groundwater (L)**
12,800	8,700	2,700	2,636,600

Short Term (Construction) Groundwater Quantity – Safety Factor of 2.0 Used					
Groundwater Seepage		**Design Rainfall Event (25mm)**		**Total Daily Water Takings**	
L/day	**L/min**	**L/day**	**L/min**	**L/day**	**L/min**
30,000	20.8	28,000	19.4	58,000	40.3

Long Term (Permanent) Groundwater Quantity – Safety Factor of 2.0 Used					
Groundwater Seepage		**Infiltration Design Rainfall Event (25mm)**		**Total Daily Water Takings**	
L/day	**L/min**	**L/day**	**L/min**	**L/day**	**L/min**
30,000	20.8	1,000	0.7	31,000	21.5

Zone of Influence	
Zone of Influence (m)	**Maximum Potential Settlement (mm)**
2	9

Regulatory Requirements	
Environmental Activity and Sector Registry (EASR) Posting	Required
Short Term Permit to Take Water (PTTW)	Not Required
Long Term Permit to Take Water (PTTW)	Not Required
Short Term Discharge Agreement City of Toronto	Required
Long Term Discharge Agreement City of Toronto	Required

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FIGURES

APPENDICES

1 Introduction

HM RB (147 Spadina) LP has retained Grounded Engineering Inc. ("Grounded") to provide hydrogeological engineering design advice for their proposed development at 147 Spadina Ave, in Toronto, Ontario.

Property Information	
Location of Property	147 Spadina Ave
Ownership of Property	HM RB (147 Spadina) LP
Property Dimensions (m)	31 by 35
Property Area (m^2)	1085

Existing Development	
Number of Building Structures	1
Number of Above Grade Levels	2
Number of Underground Levels	1 (partial)
Sub-Grade Depth of Development (m)	Unknown
Sub-Grade Area (m^2)	Unknown
Land Use Classification	Commercial

Proposed Development	
Number of Building Structures	1
Number of Above Grade Levels	25±
Number of Underground Levels	3
Sub-Grade Depth of Development (m)	11.5±
Sub-Grade Area (m^2)	1085
Land Use Classification	Mixed commercial and residential

Qualified Person and Hydrogeological Review Information	
Qualified Person	Matthew Bielaski, P.Eng.
Consulting Firm	Grounded Engineering Inc.
Date of Hydrogeological Review	August 17, 2021
Scope of Work	▪ Review of MECP Water Well Records for the area ▪ Review of geological information for the area ▪ Review of topographic information for the area ▪ Advancement of 2 boreholes to a maximum depth of 17 m, which recovered 3m of sound bedrock core and were instrumented with monitoring wells ▪ Advancement of 2 boreholes to a maximum depth of 15 m, which were instrumented with monitoring wells ▪ Completion of a 24-hour pump test (if feasible) ▪ Completion of slug tests in all available monitoring wells ▪ Groundwater elevation monitoring for three (3) months, in 11 monitoring wells present onsite. 6 monitoring wells were installed by Pinchin Ltd. In the overburden. ▪ Groundwater sampling and analysis to the City of Toronto Sewer Use Limits ▪ Assessment of groundwater controls and potential impacts ▪ Report preparation in accordance with Ontario Water Resources Act, Ontario Regulation 387/04, and Toronto Municipal Code Chapter 681

General Hydrogeological Characterization	
Property Topography	The site has an existing ground surface elevation of approximately 90.3 masl. The site will be re-graded to an elevation of 90.0 masl.
Local Physiographic Features	The site is composed of clayey silt till deposits of the Sunnybrook Till, Don Beds, and York Till overlaying Georgian Bay Formation shale bedrock.
Regional Physiographic Features	The West St Lawrence Lowland consists of a limestone plain (elevation 200–250 masl) that is separated by a broad, shale lowland from a broader dolomite and limestone plateau west of Lake Ontario. This plateau is bounded by the Niagara Escarpment. From the escarpment the plateau slopes gently southwest to lakes Huron and Erie (elevation 173 masl). Glaciation has mantled this region with several layers of glacial till (i.e., an unsorted mixture of clay, sand, etc.), the youngest forming extensive, undulating till plains, often enclosing rolling drumlin fields.
Surface Drainage	Surface water is expected to flow to the municipal roads located to the South and West of the site. A downspout extends between the roof of the site and a drain located at grade, on the south of the site, which is used to collect storm water falling on the roof of the site.

2 Study Area Map

A map has been enclosed which shows the following information:

- All monitoring wells identified on site
- All boreholes identified on site
- All buildings identified on site and within the study area
- The property boundaries of the site
- Any watercourses and drainage features within the study area

3 Geology and Physical Hydrogeology

The site stratigraphy, including soil materials, composition and texture are presented in detail on the borehole logs in Appendix A. A summary of stratigraphic units that were encountered at the site are as follows:

Site Stratigraphy

Stratum/Formation	Aquifer or Aquitard	Depth Range (mbgs)	Elevation Range (masl)	Hydraulic Conductivity (m/s)
Earth Fill	Aquifer	0.2 – 1.5	90.4 – 89.4	$1 \times 10^{-6*}$
Sunnybrook Till	Aquitard	0.8 – 7.6	89.8 – 82.6	$1 \times 10^{-9*}$
Don Beds	Aquitard	4.6 – 9.1	86.0 – 81.1	$1 \times 10^{-8*}$
York Till	Aquitard	9.1 – 13.7	81.5 – 76.6	$2.8 \times 10^{-9**}$

* Indicates conductivity was estimated using typical published values from Freeze and Cherry (1979).
** Indicates conductivity was estimated using grain size analysis.

Bedrock

Stratum	Depth Range (mbgs)	Elevation Range (masl)	Hydraulic Conductivity (m/s)
Weathered	12.2 – 14.4	78.4 – 75.9	$1.6 \times 10^{-6***}$
Sound	13.0 – 16.9	77.6 – 73.7	$1 \times 10^{-7*}$

* Indicates conductivity was estimated using typical published values from Freeze and Cherry (1979).
*** Indicates conductivity was calculated by Slug Test.

Surface Water

Surface Water Body	Distance from site (m)	Hydraulically Connected to Property
Lake Ontario	1,300	No

4 Monitoring Well Information

Well ID	Well Diameter (mm)	Ground Surface (masl)	Top of Screen (masl)	Bottom of Screen (masl)	Screened Geological Unit
Monitoring Wells by Grounded					
BH 1	51	90.3	81.1	78.1	York Till
BH 2	51	90.6	81.3	78.2	York Till
BH 3	51	90.3	79.6	76.6	York Till York Till / Weathered Bedrock
BH 4	51	90.2	77.3	74.2	Bedrock
Monitoring Wells by Others (Pinchin Ltd.)					
P-MW101	38	90.3	88.2	85.1	Sunnybrook Till
P-MW102	38	90.5	89.3	86.3	Sunnybrook Till
P-MW103	38	90.5	87.5	84.4	Sunnybrook Till
P-MW104	38	90.3	87.9	85.0	Sunnybrook Till
P-MW105	38	86.2	85.6	84.1	Sunnybrook Till
P-MW106	38	90.1	87.9	84.9	Sunnybrook Till

5 Groundwater Elevations

Table 5.1 - Groundwater Elevations in Monitoring Wells Installed by Grounded

	Groundwater Elevations (masl)			
	BH1	**BH2**	**BH3**	**BH4**
February 24, 2021	-	83.6	82.3	75.2
March 4, 2021	-	83.8	82.7	75.1
March 19, 2021	-	83.6	82.8	75.0
April 1, 2021	-	83.6	82.7	*
April 12, 2021	-	83.8	82.7	*
April 16, 2021	79.7	83.8	82.8	75.2
May 31, 2021	81.1	83.7	82.7	75.2
June 11, 2021	81.3	83.7	82.7	75.1
June 25, 2021	81.7	83.7	82.7	75.1
July 8, 2021	81.6	83.7	82.7	75.1
July 21, 2021	81.8	83.8	82.8	75.1

– indicates monitoring well has not been install yet as of this date.
* indicates no groundwater reading was possible on this date due to wells being inaccessible.

Table 5.2 – Groundwater Elevations in Monitoring Wells Installed by Others

	Groundwater Elevations (masl)					
	P-MW101	**P-MW102**	**P-MW103**	**P-MW104**	**P-MW105**	**P-MW106**
April 29, 2021	88.5	88.6	88.7	88.5	83.4	86.3
June 4, 2021	88.2	86.7	84.9	85.4	84.3	NA
June 6, 2021	-	-	-	-	-	dry
June 11, 2021	86.3	86.6	85.8	85.5	80.4	84.9
June 25, 2021	-	-	dry	dry	dry	dry
July 8, 2021	-	86.5	dry	dry	dry	dry

"–" indicates no groundwater measurement collected on this date.

For basement wall design purposes, the groundwater table is approximately 3.8 metres below existing grade, in the clayey silt deposit of the Sunnybrook Till. This deposit has a low permeability and will yield only minor seepage in the long term. There is also water within discrete fractures in the bedrock, and perched water in the earth fill.

Groundwater levels fluctuate with time depending on the amount of precipitation and surface runoff and may be influenced by known or unknown dewatering activities at nearby sites.

6 Aquifer Testing

6.1 Pump Test

A pump test was not completed at the site. Due to the nature of the soil materials present and slow ground recharge of the aquifer it was not feasible to complete a 24-hour pumping test. Please note however that recovery tests were completed on each of the monitoring wells installed at the site.

6.2 Single Well Response Test (Slug Test)

The hydraulic conductivities from the monitoring wells were determined based on slug tests (single-well response tests). These tests involve rapid removal of water or addition of a "slug" which displaces a known volume of water from a single well, and then monitoring the water level in the well until it recovers. The results of the slug tests were analyzed using the Bouwer and Rice method (1976).

The hydraulic properties of the strata applicable to the site are as follows:

Well ID	Well Screen Elevation (masl)	Screened Geological Unit	Hydraulic Conductivity (m/s)
BH 1	81.1 – 78.1	York Till	2.3×10^{-7}
BH 2	81.3 – 78.2	York Till	4.1×10^{-7}
BH 3	79.6 – 76.6	York Till / Weathered Bedrock	1.6×10^{-6}
BH 4	77.3 – 74.2	Bedrock	3.7×10^{-6}

6.3 Soil Grain Size Distribution

The hydraulic conductivities of various soil types can also be estimated from grain size analyses. An assessment of the grain sizes was conducted using the excel-based tool, HydrogeoSieve XL (*HydrogeoSieve XL ver.2.2, J.F. Devlin, University of Kansas, 2015*). HydrogeoSieve XL compares the results of the grain size analyses against fifteen (15) different analytical methods.

Given our experience in the area as well as published literature, some of the geometric means provided for the soil were biased low by one or more methods. In these instances, the values determined by these methods were excluded from the mean. The table below illustrates the hydraulic conductivity values estimated from the mean of the analytical methods where the soil met the applicable analysis criteria.

Sample ID	Soil Description	Applicable Analysis Methods	Hydraulic Conductivity (m/s)
BH 2 – SS 9	York Till	Alyamani and Sen, Barr, Sauerbrei	8.4×10^{-10}
BH 3 – SS 11	York Till	Alyamani and Sen, Barr, Sauerbrei	9.6×10^{-9}
BH 4 – SS 12	York Till	Alyamani and Sen, Barr, Sauerbrei	7.7×10^{-9}

The results of the analyses are appended.

6.4 Literature

According to Freeze and Cherry (1979), the typical hydraulic conductivity of the strata investigated at the site are:

Stratum/Formation	Hydraulic Conductivity (m/s)
Earth Fill	1×10^{-6}
Sunnybrook Till (clayey silt)	1×10^{-8}
Don Beds (clayey silt)	1×10^{-8}
York Till (silt and clay)	1×10^{-9}
Weathered Bedrock	1×10^{-7}
Bedrock (Shale)	1×10^{-6} to 10^{-13}

7 Water Quality

One (1) unfiltered groundwater sample was collected and analyzed by a Canadian laboratory accredited and licensed by Standards Council of Canada and or Canadian Association for Laboratory Accreditation.

The sample was collected directly from monitoring well 3 on February 24, 2021. The sample was analyzed for the following parameters:

- City of Toronto Municipal Code Chapter 681 Table 1 – Limits for Sanitary and Combined Sewers Discharge
- City of Toronto Municipal Code Chapter 681 Table 2 – Limits for Storm Sewer Discharge

The groundwater sample **exceeded** the **Limits for Storm Sewer Discharge** for the following parameters:

- Manganese (Limit 0.05 mg/L, Result 0.426 mg/L)

The groundwater sample **met** the **Limits for Sanitary and Combined Sewer Discharge** for all parameters analyzed.

A true copy of the analysis report, Certificate of Analysis, and a chain of custody record for the sample are enclosed.

8 Proposed Construction Method

The proposed shoring at the site will consist of conventional soldier piling and lagging.

For design purposes, the stabilized groundwater table is at about Elev. 86.5± m. The water table is present in all the native soil units. The lowest FFE is at about Elev. 79.0± m. Therefore,

- Bulk excavation will extend down to the elevation of the prevailing groundwater table;
- Foundation excavations will extend down to about 8 m below the prevailing groundwater table; and
- Foundation excavations will penetrate dense York Till, which will not yield free-flowing water.

Prior to excavation, positive dewatering to lower the groundwater table will be required to facilitate construction as well as to maintain the integrity of the subgrade for foundation and slab-on-grade support. The water level must be kept at least 1.2 m below the lowest excavation elevation during construction. Failure to dewater prior to excavation will result in unrecoverable disturbance of the subgrade, which will render advice provided for undisturbed subgrade conditions inapplicable. Dewatering of the bedrock is not required.

Dewatering will take some time to accomplish prior to the start of excavation. Stored water within the excavation will need to be considered prior to excavation/dewatering.

It is recommended that a professional dewatering contractor be consulted to review the subsurface conditions and to design a site-specific dewatering system. It is the dewatering contractor's responsibility to assess the factual data and to provide recommendations on dewatering system requirements.

The proposed structures will consist of drained foundations.

The City of Toronto will require Discharge Agreements in the short and long terms, if any water is to be discharged to the storm or sanitary sewers. If a discharge agreement is not feasible or supported by the City, all below-grade structures need to be designed as a fully waterproofed structure with no permanent dewatering.

9 Private Water Drainage System (PWDS)

If the proposed development consists of drained foundations, then a private water drainage system will be required. The total sub floor drain area will be approximately 1085 m^2 based on the drawings which have been provided.

If the development is designed with a private water drainage system, the drainage system is a critical structural element since it keeps water pressure from acting on the basement walls and floor slab. As such, the sump that ensures the performance of this system must have a duplexed pump arrangement for 100% pumping redundancy and these pumps must be on emergency power. The size of the sump should be adequate to accommodate the estimated groundwater seepage. It is anticipated that the groundwater seepage can be controlled with typical, widely available, commercial/residential sump pumps.

If the proposed development is designed as a leak tight structure, then a private water drainage system will not be required. However, the structure must then be designed to resist hydrostatic pressure and uplift forces.

10 Groundwater Extraction and Discharge

Numerical analyses were conducted for both short-term and long-term dewatering scenarios. The modeling was conducted using computer software, which deploys the finite element modelling method. The Finite Element Model (FEM) for groundwater seepage indicates the short term (construction) and long term (permanent) dewatering requirements as provided below. The finite element model results are presented in Appendix G.

The groundwater seepage estimates, which have been provided, represent the steady state groundwater seepage. There will be an initial drawdown of the groundwater before a steady state condition is reached. The rate of the initial drawdown, and therefore discharge, is dependent on the dewatering contractor and how the groundwater is being dealt with at the site. An estimated initial volume of stored groundwater which will require removal before steady state is reached has been provided below.

Please note that if excavation is exposed to the elements, storm water will have to be managed. The short-term control of groundwater should consider stormwater management from rainfall events. A dewatering system should be designed to consider the removal of rainfall from excavation. A design storm of 25 mm has been used in the quantity estimates.

As required by Ontario Regulation 63/16, a plan for discharge must consider the conveyance of storm water from a 100-year storm. The additional volume that will be generated in the occurrence of a 100-year storm event is approximately 102,000 L.

Stored Groundwater (pre-excavation/dewatering)			
Volume of Excavation (m^3)	**Volume of Excavation Below Water Table (m^3)**	**Volume of Storage Groundwater (m^3)**	**Volume of Storage Groundwater (L)**
12,800	8,700	2,700	2,636,600

Short Term (Construction) Groundwater Quantity – Safety Factor of 2 Used					
Groundwater Seepage		**Design Rainfall Event (25mm)**		**Total Daily Water Takings**	
L/day	**L/min**	**L/day**	**L/min**	**L/day**	**L/min**
30,000	20.8	28,000	19.4	58,000	40.3

Long Term (Permanent) Groundwater Quantity – Safety Factor of 2 Used		
Groundwater Seepage	**Infiltration Design Rainfall Event (25mm)**	**Total Daily Water Takings**

L/day	L/min	L/day	L/min	L/day	L/min
30,000	20.8	1,000	0.7	31,000	21.5

Regulatory Requirements	
Environmental Activity and Sector Registry (EASR) Posting	Required
Short Term Permit to Take Water (PTTW)	Not Required
Long Term Permit to Take Water (PTTW)	Not Required
Short Term Discharge Agreement City of Toronto	Required
Long Term Discharge Agreement City of Toronto	Required

Please note:

- The native soils must be dewatered a minimum of 1.2 m below the footing elevation prior to excavation to preserve the in-situ integrity of the native soils during construction dewatering activities. Dewatering of the bedrock is not required. It is anticipated that the groundwater elevation will rise to the elevation of the subfloor drainage in the event of a drained structure or the waterproofing in the event of a leak tight structure.
- The proposed pump schedule for short term construction dewatering has not been completed. As such, the actual peak short term discharge rate is not available at the time of writing this report. The pump schedule must be specified by the dewatering contractor retained.
- The proposed pump schedule for long term permanent drainage has not been completed. As such the actual peak long term discharge rate is not available at the time writing of this report. The pump schedule must be specified by the mechanical consultant.
- A leak-tight structure (structure that has not included a private water drainage system) has not been considered as part of the proposed development at this time.
- On-site containment (infiltration gallery/dry well etc.) has not been considered as part of the proposed development at this time. If this option is considered, additional work will have to be conducted (i.e., infiltration testing).

11 Evaluation of Impact

11.1 Zone of Influence (ZOI)

The Zone of Influence (ZOI) with respect to groundwater was calculated based on the estimated groundwater taking rate and the hydraulic conductivity of the unit which water will be taken at the Property.

The ZOI was calculated using the Sichardt equation below.

Equation: $R_0 = 3000*dH*K^{0.5}$

Where:

dH is the dewatering thickness (m)

K is the hydraulic conductivity (m/s)

Calculation:

Geological Unit	dH (m)	K (m/s)	ZOI (m)
Sunnybrook Till	1.0	1×10^{-9}	0
Don Beds	4.5	1×10^{-8}	1
York Till	3.1	2.8×10^{-9}	1

The ZOI with respect to groundwater seepage at the site is 2± m.

11.2 Land Stability

The impacts to land stability of the proposed short term and long-term dewatering at the site on adjacent structures are summarized as follows:

- The proposed dewatering at the subject site locally lowers the groundwater table within the ZOI by a maximum of 8± m. This has the potential increase of effective stress of approximately 79 kPa in the native soils.
- Based on the change in effective stress and the compressibility of the soil subjected to that change, the proposed dewatering activities will induce a maximum 9 mm of additional settlement in the adjacent soils.
- The maximum induced settlement occurs directly adjacent to the proposed excavation and decreases in a nonlinear fashion with distance away from the excavation.
- For the structures within the public realm adjacent to the site, the dewatering-induced settlement is calculated to be 9 mm or less (depending on the depth of the structure).

On this basis, the impact of the proposed dewatering on the existing adjacent structures is considered by Grounded to be within acceptable limits.

11.3 City's Sewage Works

Negative impacts to City's sewage works may occur in terms of the quantity or quality of the groundwater discharged. This report provided the estimated quantity of the water discharge. However, this report does not speak to the sewer capacities. The sewer capacity analysis is provided under a separate cover by the civil consultant.

The quality of the proposed groundwater discharge is provided in Section 7. As noted in that section, the groundwater sample exceeded the Limits for Storm Sewer Discharge and met the Limits for Sanitary and Combined Sewer Discharge.

As such, additional treatment will be required before the water can be discharged to the Storm Sewer to avoid impacts to the City's sewage works caused by groundwater quality. Additional treatment will not be required before the water can be discharged to the Sanitary and Combined Sewer.

11.4 Natural Environment

There are no natural waterbodies within the ZOI that will be affected by the proposed construction dewatering or permanent drainage. Any groundwater which will be taken from the site will be discharged (if required) into the City's sewer systems and not into any natural water body. As such, there will be no impact to the natural environment caused by the water takings at the site.

11.5 Local Drinking Water Wells

The site is located within the municipal boundaries of the City of Toronto. The site and surrounding area are provided with municipal piped water and sewer supply. There is no use of the groundwater for water supply in this area of Toronto. As such, there will be no impact to drinking water wells.

12 Proposed Mitigation Measures and Monitoring Plan

The extent of the negative impact identified in previous sections will be limited to the ZOI caused by the groundwater taking at the site.

As a result of dewatering and draining the soil, changes in groundwater level have the potential to cause settlement based on the change in the effective stresses within the ZOI.

If adjacent buildings or municipal infrastructure are within the ZOI and will undergo settlement that may be considered unacceptable as identified the Land Stability Section, consideration should be given to implement a monitoring and mitigation program during dewatering activities.

Both the temporary construction dewatering system and the permanent building drainage system must be properly installed and screened to ensure sediments and fines will not be removed, which is typically a primary cause of dewatering related settlement.

13 Limitations

Natural occurrences, the passage of time, local construction, and other human activity all have the potential to alter the subsurface conditions directly or indirectly at or near the project site. Contractual obligations related to groundwater or stormwater control must be considered with attention and care as they relate this potential site alteration.

The hydrogeological engineering advice provided in this report is based on the factual observations made from the site investigations as reported. It is intended for use by the owner and their retained design team. If there are changes to the features of the development or to the scope, the interpreted subsurface information, geotechnical engineering design parameters, advice, and discussion on construction considerations may not be relevant or complete for the project. Grounded should be retained to review the implications of such changes with respect to the contents of this report.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Grounded accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report, including consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

13.1 Report Use

The authorized users of this report are HM RB (147 Spadina) LP and their design team, for whom this report has been prepared. Grounded Engineering Inc. maintains the copyright and ownership of this document. Reproduction of this report in any format or medium requires explicit prior authorization from Grounded Engineering Inc. The City of Toronto may also make use of and rely upon this report, subject to the limitations as stated.

14 Closure

If there are any questions regarding the discussion and advice provided, please do not hesitate to contact our office. We trust that this report meets your requirements at present.

For and on behalf of our team,

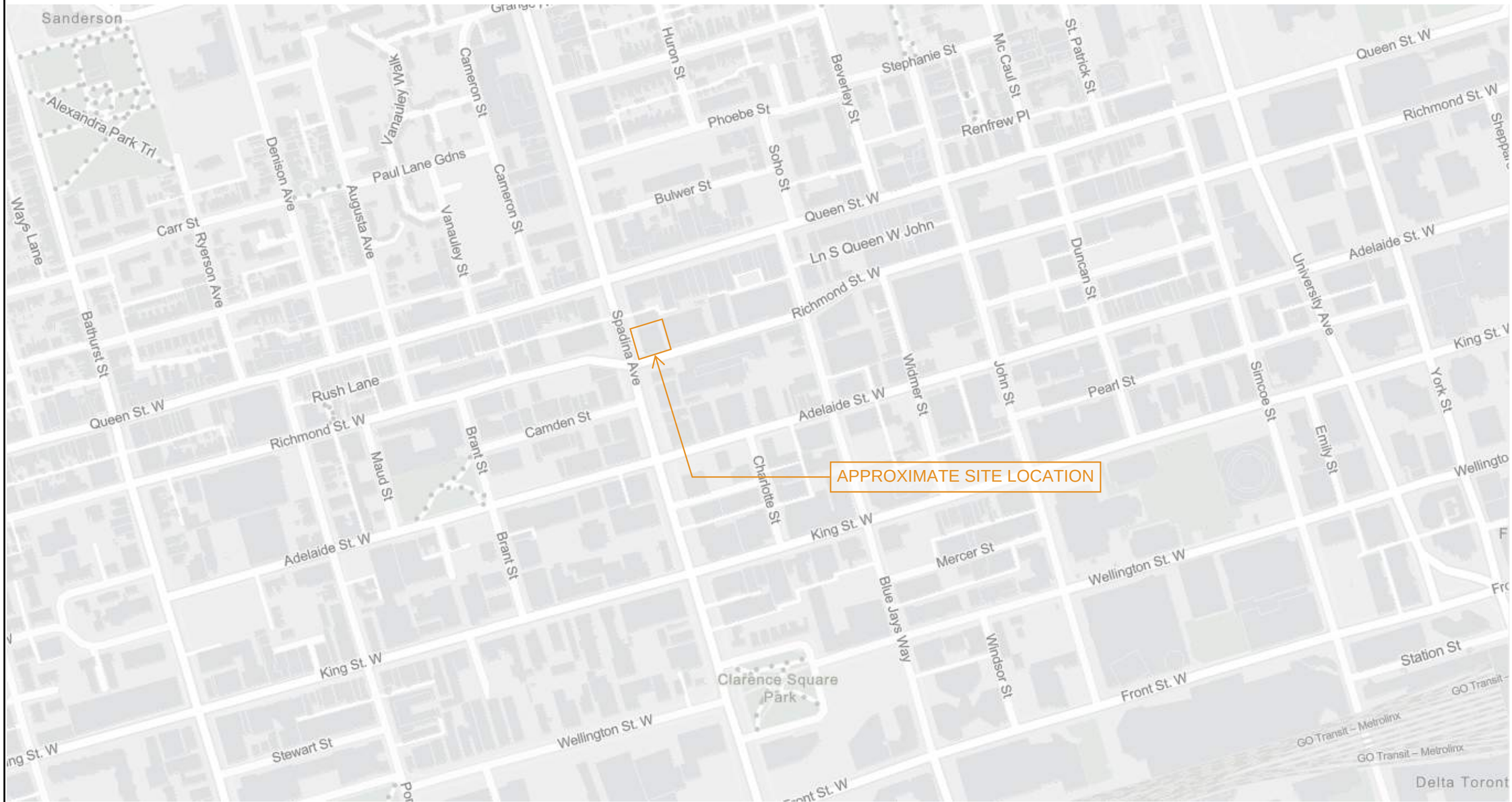
GROUNDED ENGINEERING

Katrina Morgenroth, EIT

Suvish Melanta, P.Eng., QP_{ESA}
Associate

Matthew Bielaski, P.Eng., $QP_{RA\text{-}ESA}$
Principal

FIGURES



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LEGEND

APPROXIMATE SITE LOCATION

Note

Reference

Survey Drawing job no. 16-223.
Certificate date: Nov 3, 2016. Prepared by KRCMAR.

Project

147 SPADINA AVENUE, TORONTO, ONTARIO

Figure Title

SITE LOCATION PLAN

North

Date

AUGUST 2021

Scale

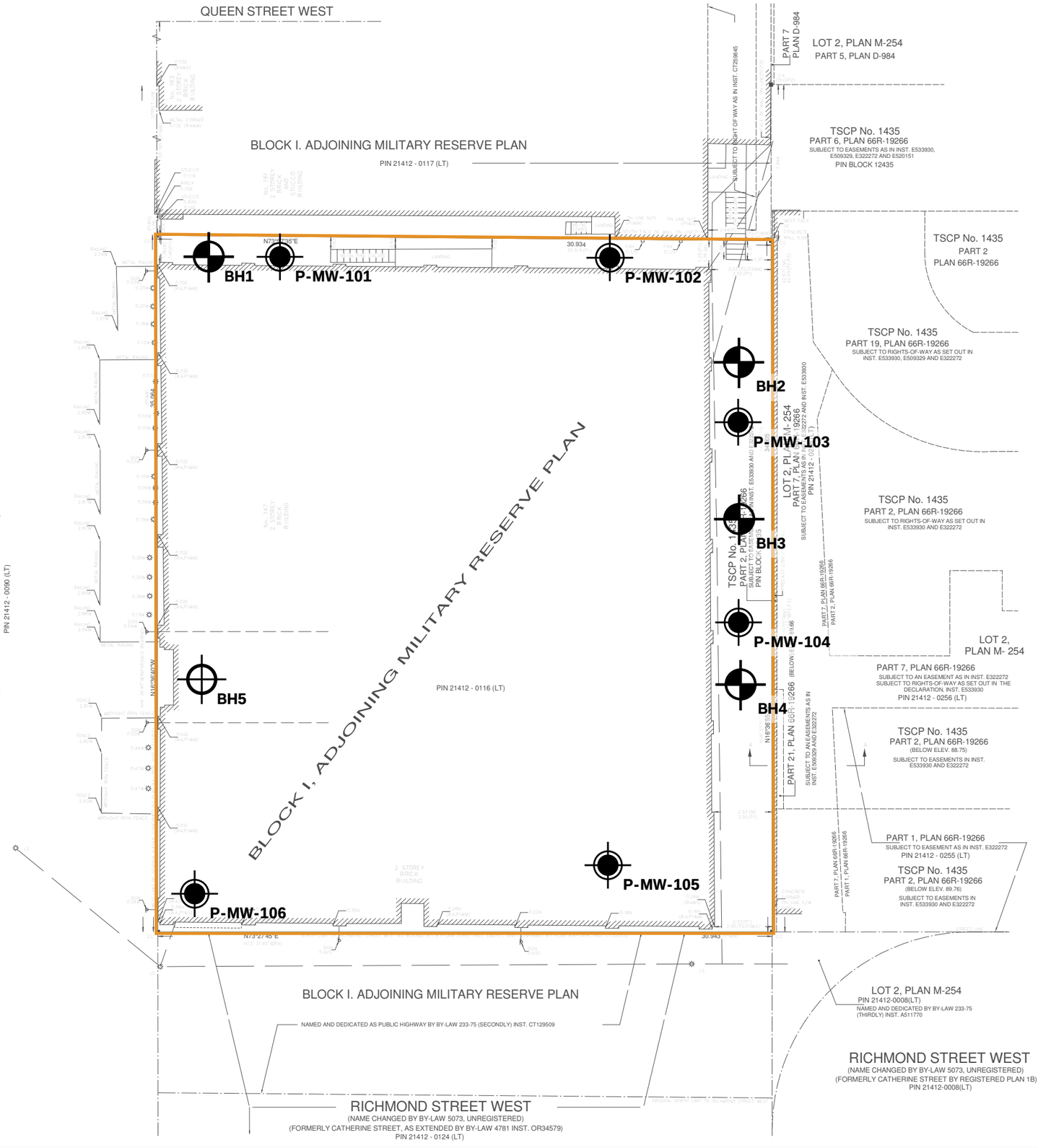
0m 50m 100m

Job No

21-019

Figure No

FIGURE 1



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LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- GROUNDED BOREHOLE / MONITORING WELL LOCATION
- BOREHOLE LOCATION WITH MONITORING WELL BY OTHERS

Note

Reference

Survey Drawing job no. 16-223. Certificate date: Nov 3, 2016. Prepared by KRCMAR.

Project

147 SPADINA AVENUE, TORONTO, ONTARIO

Figure Title

BOREHOLE AND MONITORING WELL LOCATION PLAN (Existing)

North

Date

JULY 2021

Scale

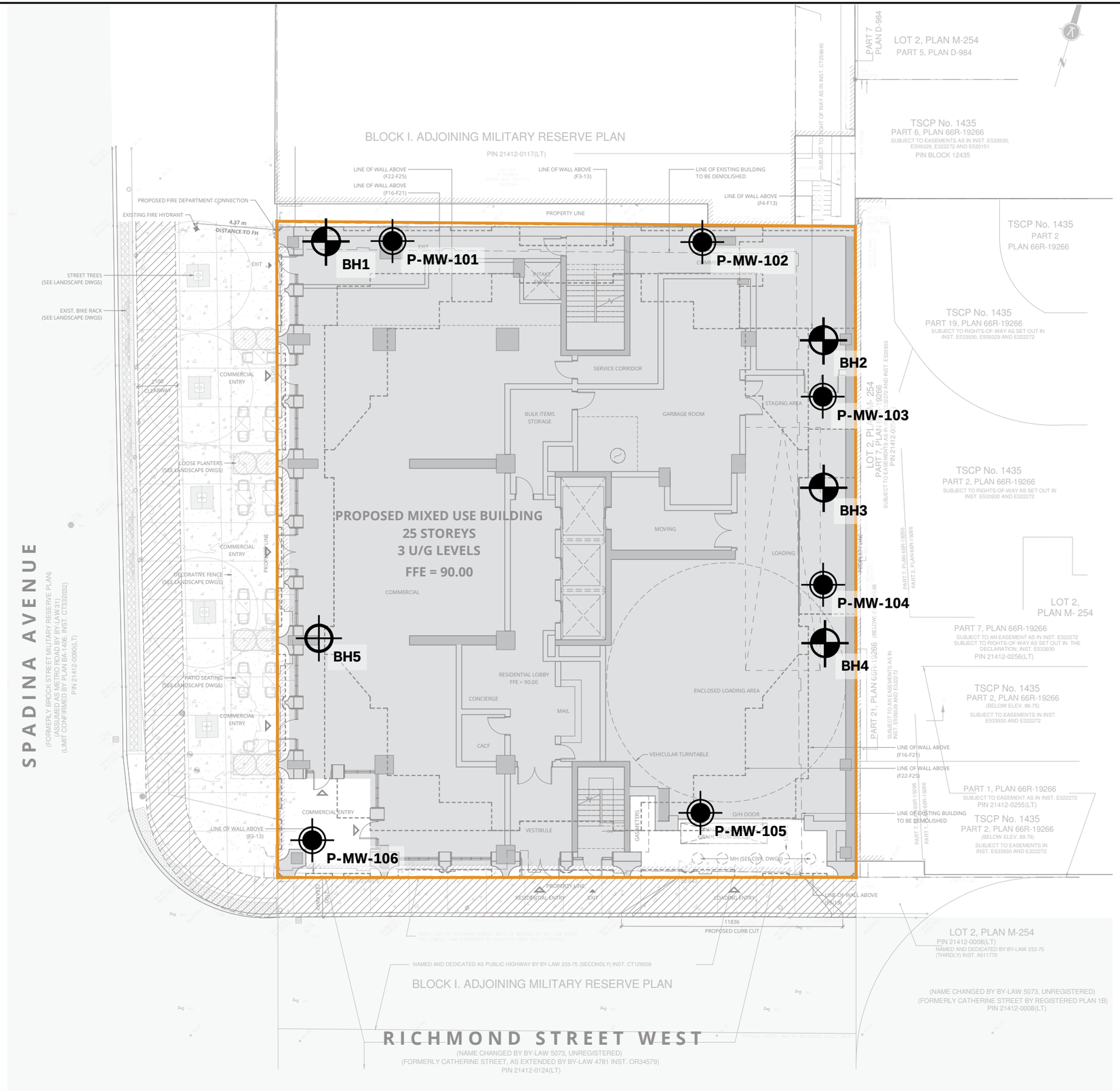
AS INDICATED

Job No

21-019

Figure No

FIGURE 2



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LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- GROUNDED BOREHOLE / MONITORING WELL LOCATION
- BOREHOLE LOCATION WITH MONITORING WELL BY OTHERS

Note

Reference

Architectural Plans, "147 Spadina Avenue, Toronto, Ontario"; File no 20-006, dated August 10, 2021, prepared by Audax Architecture Inc.

Project

147 SPADINA AVENUE, TORONTO, ONTARIO

Figure Title

BOREHOLE AND MONITORING WELL LOCATION PLAN (Proposed)

North

Date

AUGUST 2021

Scale

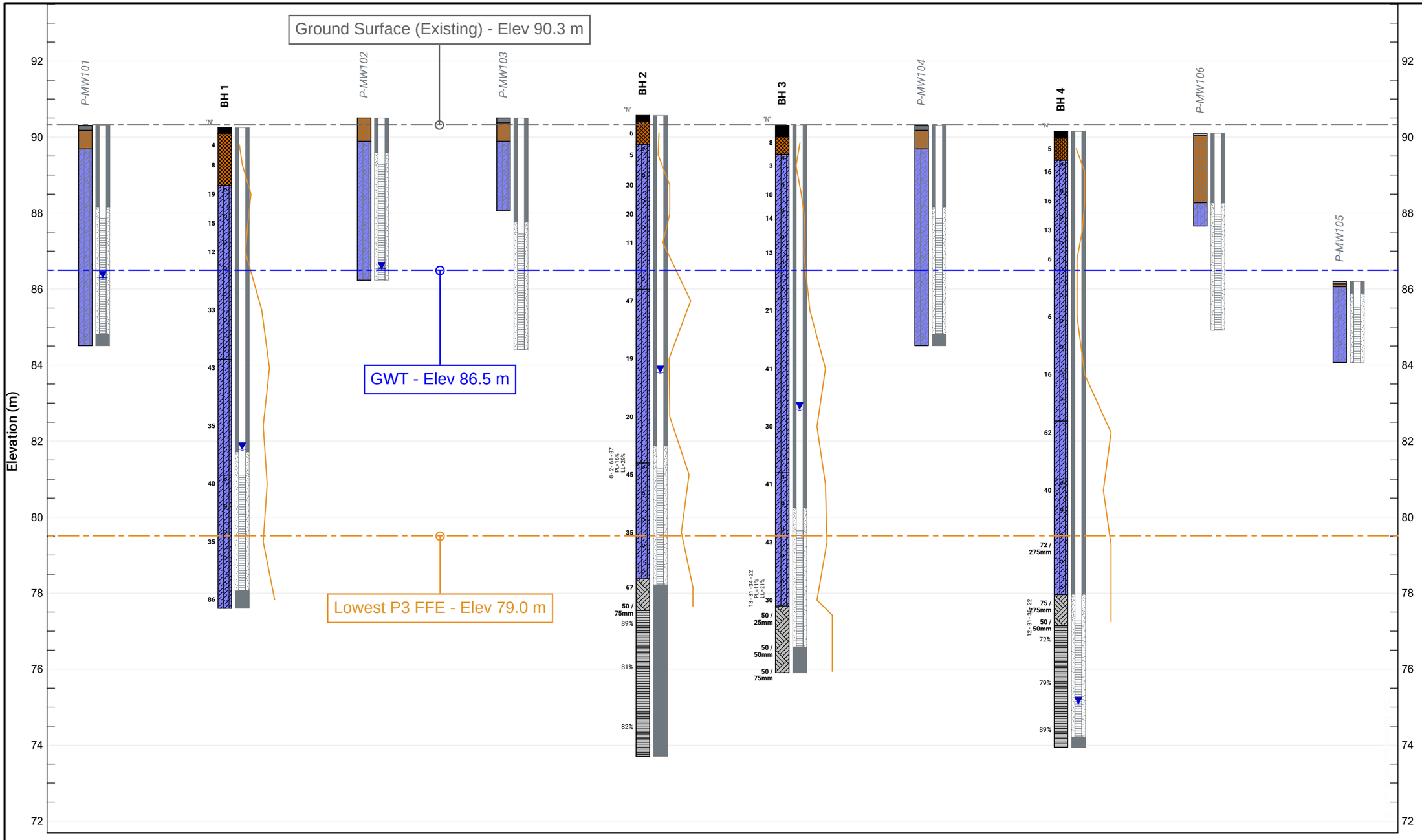
AS INDICATED

Job No

21-019

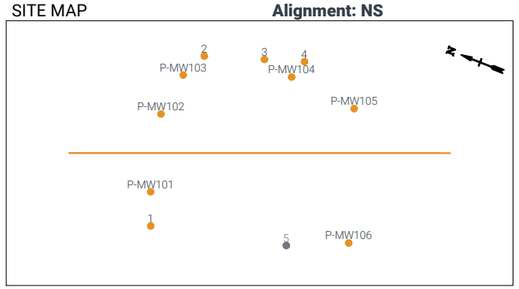
Figure No

FIGURE 3



SITE MAP

Alignment: NS



Boreholes Equally Spaced

LITHOLOGY GRAPHIC LEGEND

- Asphalt
- Fill
- Clayey Silt Till
- Clayey Silt
- Bedrock (inferred)
- Bedrock (cored)
- Concrete
- Sandy Silt Till (clayey)

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LEGEND

- FILL
- GRAVELS (gravel to gravelly sand)
- SILT TO SAND (not till)
- COHESIONLESS TILLS
- COHESIVE SOILS (clayey silt to clay, incl. tills)
- DISTURBED/REWORKED SOILS

- water level, unstabilized
- water level, stabilized

Project

147 SPADINA AVE TORONTO, ON

Figure Title

SUBSURFACE CROSS-SECTION

NS

Date

JULY 2021

Scale

AS INDICATED

Job No

21-019

Figure No

FIGURE 4

APPENDIX A

BOREHOLE LOG TERMINOLOGY

GROUNDED ENGINEERING

SAMPLING/TESTING METHODS

SS: split spoon sample

AS: auger sample

GS: grab sample

FV: shear vane

DP: direct push

PMT: pressuremeter test

ST: shelby tube

CORE: soil coring

RUN: rock coring

SYMBOLS & ABBREVIATIONS

MC: moisture content

LL: liquid limit

PL: plastic limit

PI: plasticity index

γ: soil unit weight (bulk)

G_s: specific gravity

S_u: undrained shear strength

▽ unstabilized water level

▼ 1st water level measurement

▼ 2nd water level measurement most recent

▼ water level measurement

ENVIRONMENTAL SAMPLES

M&I: metals and inorganic parameters

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

VOC: volatile organic compound

PHC: petroleum hydrocarbon

BTEX: benzene, toluene, ethylbenzene and xylene

PPM: parts per million

FIELD MOISTURE (based on tactile inspection)

DRY: no observable pore water

MOIST: inferred pore water, not observable (i.e. grey, cool, etc.)

WET: visible pore water

COHESIONLESS

Relative Density	N-Value
Very Loose	<4
Loose	4 - 10
Compact	10 - 30
Dense	30 - 50
Very Dense	>50

COHESIVE

Consistency	N-Value	Su (kPa)
Very Soft	<2	<12
Soft	2 - 4	12 - 25
Firm	4 - 8	25 - 50
Stiff	8 - 15	50 - 100
Very Stiff	15 - 30	100 - 200
Hard	>30	>200

COMPOSITION

Term	% by weight
trace silt	<10
some silt	10 - 20
silt***y***	20 - 35
sand ***and*** silt	>35

ASTM STANDARDS

ASTM D1586 Standard Penetration Test (SPT)
Driving a 51 mm O.D. split-barrel sampler ("split spoon") into soil with a 63.5 kg weight free falling 760 mm. The blows required to drive the split spoon 300 mm ("bpf") after an initial penetration of 150 mm is referred to as the N-Value.

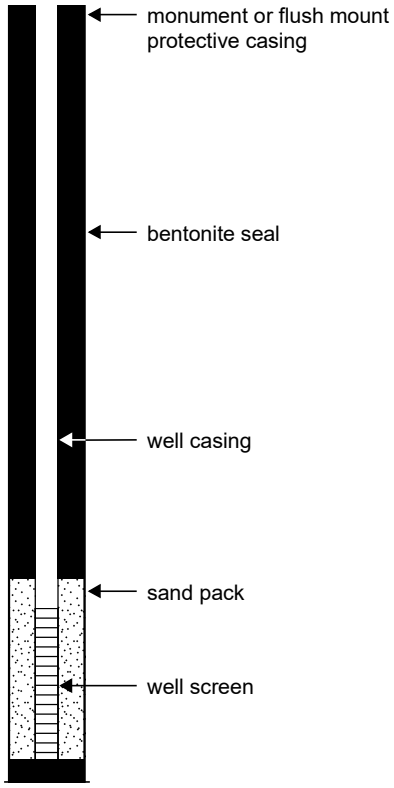
ASTM D3441 Cone Penetration Test (CPT)
Pushing an internal still rod with a outer hollow rod ("sleeve") tipped with a cone with an apex angle of 60° and a cross-sectional area of 1000 mm^2 into soil. The resistance is measured in the sleeve and at the tip to determine the skin friction and the tip resistance.

ASTM D2573 Field Vane Test (FVT)
Pushing a four blade vane into soil and rotating it from the surface to determine the torque required to shear a cylindrical surface with the vane. The torque is converted to the shear strength of the soil using a limit equilibrium analysis.

ASTM D1587 Shelby Tubes (ST)
Pushing a thin-walled metal tube into the in-situ soil at the bottom of a borehole, removing the tube and sealing the ends to prevent soil movement or changes in moisture content for the purposes of extracting a relatively undisturbed sample.

ASTM D4719 Pressuremeter Test (PMT)
Place an inflatable cylindrical probe into a pre-drilled hole and expanding it while measuring the change in volume and pressure in the probe. It is inflated under either equal pressure increments or equal volume increments. This provides the stress-strain response of the soil.

WELL LEGEND



ROCK CORE TERMINOLOGY (MTO SHALE)

TCR **Total Core Recovery** the total length of recovery (soil or rock) per run, as a percentage of the drilled length
SCR **Solid Core Recovery** the total length of sound full-diameter rock core pieces per run, as a percentage of the drilled length
RQD **Rock Quality Designation** the sum of all pieces of sound rock core in a run which are 10 cm or greater in length, as a percentage of the drilled length

Natural Fracture Frequency (typically per 0.3 m) The number of natural discontinuities (joints, faults, etc.) which are present per 0.3m. Ignores mechanical or drill-induced breaks, and closed discontinuities (e.g. bedding planes).

LOGGING DISCONTINUITIES

Discontinuity Type

BP bedding parting
CL cleavage
CS crushed seam
FZ fracture zone
MB mechanical break
IS infilled seam
JT Joint
SS shear surface
SZ shear zone
VN vein
VO void

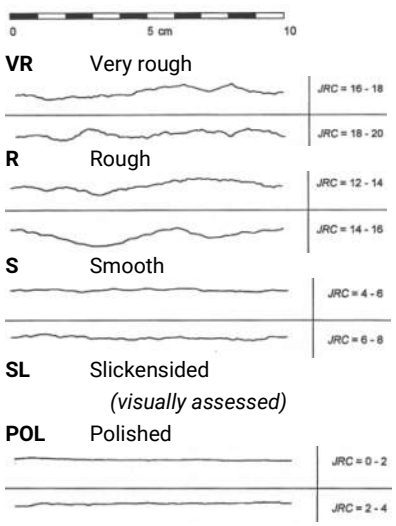
Coating

CN Clean
SN Stained
OX Oxidized
VN Veneer
CT Coating (>1 mm)

Dip Inclination

H	horizontal/flat	0 - 20°
D	dipping	20 - 50°
SV	sub-vertical	50 - 90°
V	vertical	90±°

Roughness (Barton et al.)



VR Very rough
R Rough
S Smooth
SL Slickensided *(visually assessed)*
POL Polished

Spacing in Discontinuity Sets (*ISRM 1981*)

VC	very close	< 60 mm
C	close	60 – 200 mm
M	mod. close	0.2 to 0.6 m
W	wide	0.6 to 2 m
VW	very wide	> 2 m

Aperture Size

T	closed / tight	< 0.5 mm
GA	gapped	0.5 to 10 mm
OP	open	> 10 mm

Planarity

PR	Planar
UN	Undulating
ST	Stepped
IR	Irregular
DIS	Discontinuous
CU	Curved

GENERAL

Degree of Weathering (*after MTO, RR229 Evaluation of Shales for Construction Projects*)

Zone	Degree	Description
Z1	unweathered	shale, regular jointing
Z2	partially weathered	angular blocks of unweathered shale, no matrix, with chemically weathered but intact shale
Z3		soil-like matrix with frequent angular shale fragments < 25mm diameter
Z4a		soil-like matrix with occasional shale fragments < 3mm diameter
Z4b	fully weathered	soil-like matrix only

Strength classification (*after Marinos and Hoek, 2001; ISRM 1981b*)

Grade		UCS (MPa)	Field Estimate (Description)
R6	extremely strong	> 250	can only be chipped by geological hammer
R5	very strong	100 - 250	requires many blows from geological hammer
R4	strong	50 - 100	requires more than one blow from geological hammer
R3	medium strong	25 - 50	can't be scraped, breaks under one blow from geological hammer
R2	weak	5 - 25	can be peeled / scraped with knife with difficulty
R1	very weak	1 - 5	easily scraped / peeled, crumbles under firm blow of geo. hammer
R0	extremely weak	< 1	indented by thumbnail

Bedding Thickness (*Q. J. Eng. Geology, Vol 3, 1970*)

Very thickly bedded	> 2 m
Thickly bedded	0.6 – 2m
Medium bedded	200 – 600mm
Thinly bedded	60 – 200mm
Very thinly bedded	20 – 60mm
Laminated	6 – 20mm
Thinly Laminated	< 6mm

GROUNDED ENGINEERING

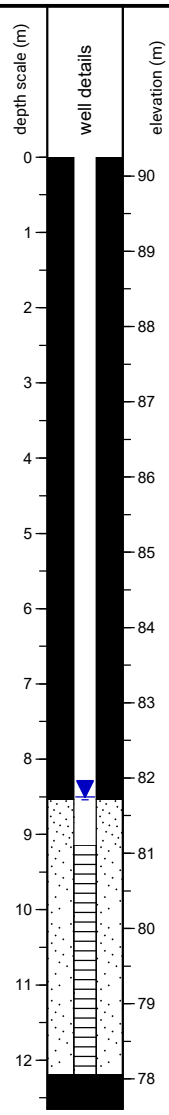
Date Started : Apr 5, 2021
Position : E: 629370, N: 4834056 (UTM 17T)
Elev. Datum : Geodetic

BOREHOLE LOG 1

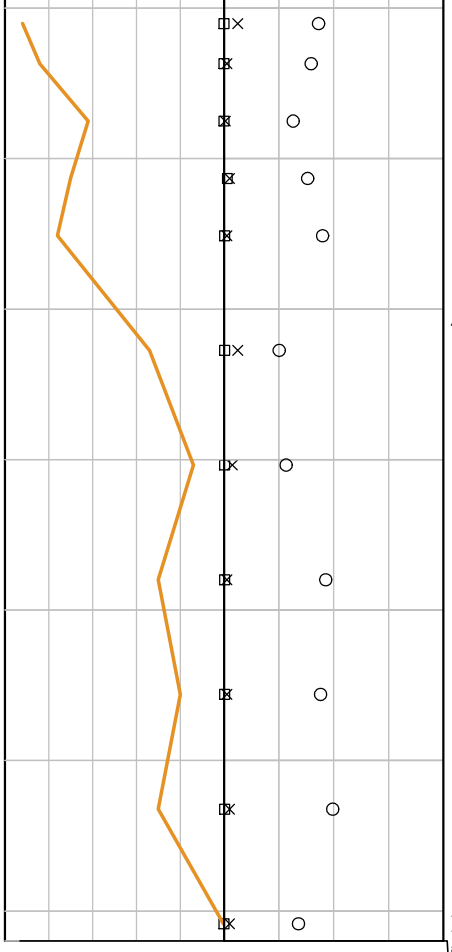
File No. : 21-019 **Project** : 147 Spadina Ave, Toronto, ON **Client** : HM RB (147 Spadina) LP

drill method	elev depth (m)	description	graphic log	number	type	SPT N-value
	90.3	**GROUND SURFACE**				
hollow stem augers OD=215 mm		75mm **ASPHALT**		1	SS	4
		FILL, silt, some clay, trace sand, trace gravel, trace asphalt, trace brick, trace construction debris, loose, dark brown, moist		2	SS	8
	88.8	...at 0.8 m, trace clay, brown and grey				
	1.5	**CLAYEY SILT**, some sand, trace gravel, very stiff to stiff, brown, moist (SUNNYBROOK TILL)		3	SS	19
				4	SS	15
		...at 3.0 m, grey		5	SS	12
		...at 4.6 m, hard		6	SS	33
	84.2					
mud rotary lg OD=135 mm	6.1	**CLAYEY SILT**, trace sand, coarse sand and gravel seams, hard, grey, wet (DON BEDS)		7	SS	43
				8	SS	35
	81.2					
	9.1	**SILT AND CLAY**, trace sand, trace gravel, hard, grey, moist (YORK TILL)		9	SS	40
		...at 10.7 m, wet		10	SS	35
		...at 12.2 m, some shale fragments		11	SS	86
	77.7					
	12.6					

depth scale (m) / well details / elevation (m)



undrained shear strength (kPa): unconfined, field vane, pocket penetrometer, Lab Vane (40 80 120 160)
headspace vapour (ppm): hexane, isobutylene (100 200 300)
SPT N-values (bpf): dynamic cone (10 20 30 40)
moisture / plasticity: PL MC LL (10 20 30)



unstabilized water level

lab data and comments

grain size distribution (%) (MIT) GR SA SI CL

4.3m: auger grinding

12.2m: auger grinding
12.6m: switch over to core attempted but casing was pushed by possible boulder around 5 m depth. Hole terminated.

END OF BOREHOLE
Refusal (obstruction in the hole)

Borehole was filled with drill water upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

GROUNDWATER LEVELS

Date	Water Depth (m)	Elevation (m)
Apr 16, 2021	10.6	79.7
May 31, 2021	9.2	81.1
Jun 11, 2021	9.0	81.3
Jun 25, 2021	8.6	81.7
Jul 8, 2021	8.7	81.6
Jul 21, 2021	8.5	81.8

file: 21-019_gint.gpj

Tech : NP | **PM** : KM | **Rev** : MD

GROUNDED ENGINEERING

Date Started : Feb 19, 2021
Position : E: 629398, N: 4834058 (UTM 17T)
Elev. Datum : Geodetic

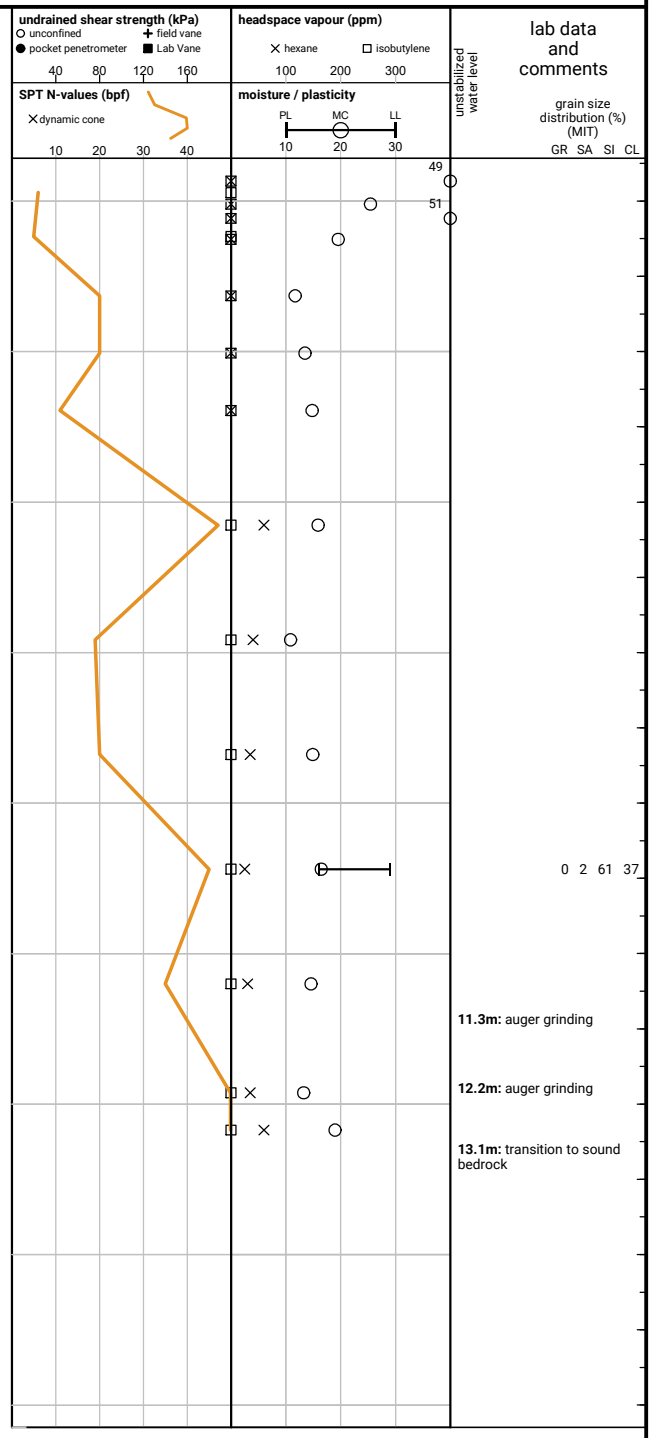
BOREHOLE LOG 2

File No. : 21-019 **Project** : 147 Spadina Ave, Toronto, ON **Client** : HM RB (147 Spadina) LP

drill method	elev depth (m)	description	graphic log	number	type	SPT N-value
	90.6	**GROUND SURFACE**				
hollow stem augers OD=215 mm STR-174		100mm **ASPHALT**		1A	SS	6
	89.8	**FILL**, sandy silt, some construction debris, trace clay, trace asphalt, loose, black, wet		1B		
	0.8			2A	SS	5
				2B		
		CLAYEY SILT, sandy, trace gravel, iron staining, firm, brown and grey, moist (SUNNYBROOK TILL)		3	SS	20
		...at 1.5 m, very stiff		4	SS	20
		...at 3.0 m, stiff		5	SS	11
	86.0					
mud rotary lg OD=135 mm	4.6	**CLAYEY SILT**, trace sand, coarse sand and gravel seams, hard, grey, moist to wet (DON BEDS)		6	SS	47
		...at 6.1 m, very stiff		7	SS	19
				8	SS	20
	81.5					
	9.1	**SILT AND CLAY**, trace sand, trace gravel, trace rock fragments, hard, grey, moist (YORK TILL)		9	SS	45
		...at 10.7 m, some shale and limestone fragments		10	SS	35
	78.4					
	12.2	**INFERRED BEDROCK**, shale and limestone fragments, grey, wet		11	SS	67
	77.6			12	SS	50 / 75mm
Rock coring (HQ) OD=96 mm	13.0	**GEORGIAN BAY FORMATION** (See rock core log for details)		1	RUN	
				2	RUN	
				3	RUN	
	73.7					
	16.9	**END OF BOREHOLE**				

Borehole was filled with drill water upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen



GROUNDWATER LEVELS

Date	Water Depth (m)	Elevation (m)
Feb 24, 2021	7.0	83.6
Mar 4, 2021	6.8	83.8
Mar 19, 2021	7.0	83.6
Apr 1, 2021	7.0	83.6
Apr 12, 2021	6.8	83.8
Apr 16, 2021	6.8	83.8
May 31, 2021	6.9	83.7
Jun 11, 2021	6.9	83.7
Jun 25, 2021	6.9	83.7
Jul 8, 2021	6.9	83.7
Jul 21, 2021	6.8	83.8

file: 21-019_gint.gpj

Tech : DK/NP | **PM** : KM | **Rev** : MD

GROUNDED ENGINEERING

Date Started : Feb 19, 2021
Position : E: 629398, N: 4834058 (UTM 17T)
Elev. Datum : Geodetic

ROCK CORE LOG 2

File No. : 21-019 **Project** : 147 Spadina Ave, Toronto, ON **Client** : HM RB (147 Spadina) LP

depth (m)	graphic log	stratigraphy	Run elev depth (m)	recovery	elevation (m)	shale weathering zones	UCS (MPa) / estimated strength	natural fracture frequency	laboratory testing	notes and comments	elevation (m)
		Rock coring started at 13.0m below grade	**77.6**								
		GEORGIAN BAY FORMATION **Shale**, grey, thinly bedded, weak; joints are horizontal, closed to gapped, clean; interbedded with **limestone**, light grey, very thinly bedded, medium strong	13.0 R1 76.9	TCR = **100**% SCR = **96**% RQD = **89**%				4 2 1			
14		*Overall shale: 81%, limestone: 19%* **... at 13.1 m (Elev. 77.5 m), transition to sound rock**	13.7		77			3			77
		Run 1 : 15% limestone 85% shale	R2 75.3	TCR = **93**% SCR = **89**% RQD = **81**%	76			2 2 1			76
15		Run 2 : 10% limestone 90% shale	15.3					2 0			
			R3	TCR = **98**% SCR = **90**% RQD = **82**%	75			2 2 2		**15.8 / 74.7m:** RZ 50 mm	75
16		Run 3 : 29% limestone 71% shale	73.7		74			1			74
			16.9m								
		END OF COREHOLE									

file: 21-019_gint.gpj

Tech : DK/NP | **PM** : KM | **Rev** : MD

BOREHOLE LOG 3

Date Started : Feb 16, 2021
Position : E: 629401, N: 4834049 (UTM 17T)
Elev. Datum : Geodetic

File No. : 21-019 **Project** : 147 Spadina Ave, Toronto, ON **Client** : HM RB (147 Spadina) LP

drill method : STR-174

elev depth (m)	description	graphic log	number	type	SPT N-value
90.3	**GROUND SURFACE**				
90.0	300mm **ASPHALT**				
0.3 / 89.5	**FILL**, clayey silt, some sand, trace gravel, trace asphalt, trace construction debris, loose, black, moist to wet		1	SS	8
0.8			2A / 2B	SS	3
	CLAYEY SILT, sandy, trace gravel, iron staining, soft, brown, moist (SUNNYBROOK TILL)		3	SS	10
			4	SS	14
	...at 1.5 m, stiff				
	...at 3.0 m, trace sand, grey, wet		5A / 5B	SS	13
85.7					
4.6	**CLAYEY SILT**, trace sand, coarse sand and gravel seams, very stiff to hard, grey, moist (DON BEDS)		6	SS	21
			7	SS	41
			8	SS	30
81.2					
9.1	**SILT AND CLAY**, trace sand, trace gravel, trace rock fragments, hard, grey, moist (YORK TILL)		9	SS	41
	...at 10.7 m, some rock fragments, cobbles inferred		10	SS	43
	...at 12.2 m, shale and limestone fragments		11	SS	30
77.7					
12.6	**INFERRED BEDROCK**, shale and limestone fragments, grey, wet		12	SS	50 / 25mm
			13	SS	50 / 50mm
75.9					
14.4			14	SS	50 / 75mm

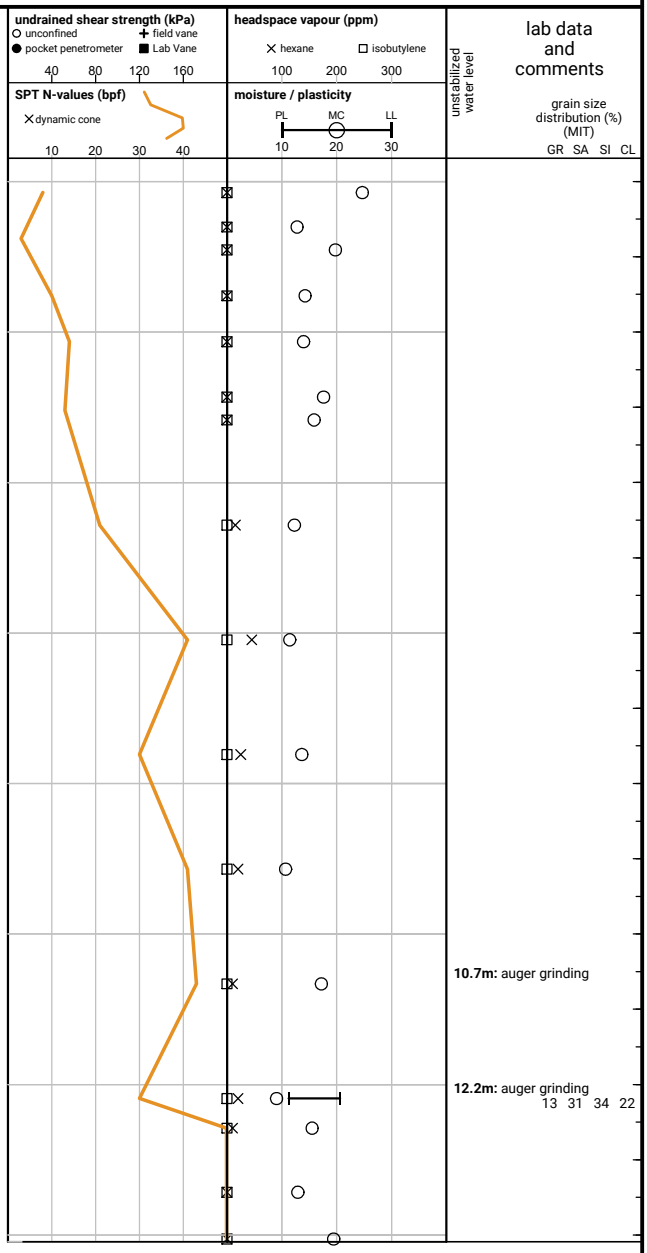
hollow stem augers OD=215 mm

mud rotary lg OD=135 mm

END OF BOREHOLE

Borehole was filled with drill water upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen



GROUNDWATER LEVELS

Date	Water Depth (m)	Elevation (m)
Feb 24, 2021	8.0	82.3
Mar 4, 2021	7.6	82.7
Mar 19, 2021	7.5	82.8
Apr 1, 2021	7.6	82.7
Apr 12, 2021	7.6	82.7
Apr 16, 2021	7.5	82.8
May 31, 2021	7.6	82.7
Jun 11, 2021	7.6	82.7
Jun 25, 2021	7.6	82.7
Jul 8, 2021	7.6	82.7
Jul 21, 2021	7.5	82.8

file: 21-019_gint.gpj

Tech : DK/NP | **PM** : KM | **Rev** : MD

BOREHOLE LOG 4

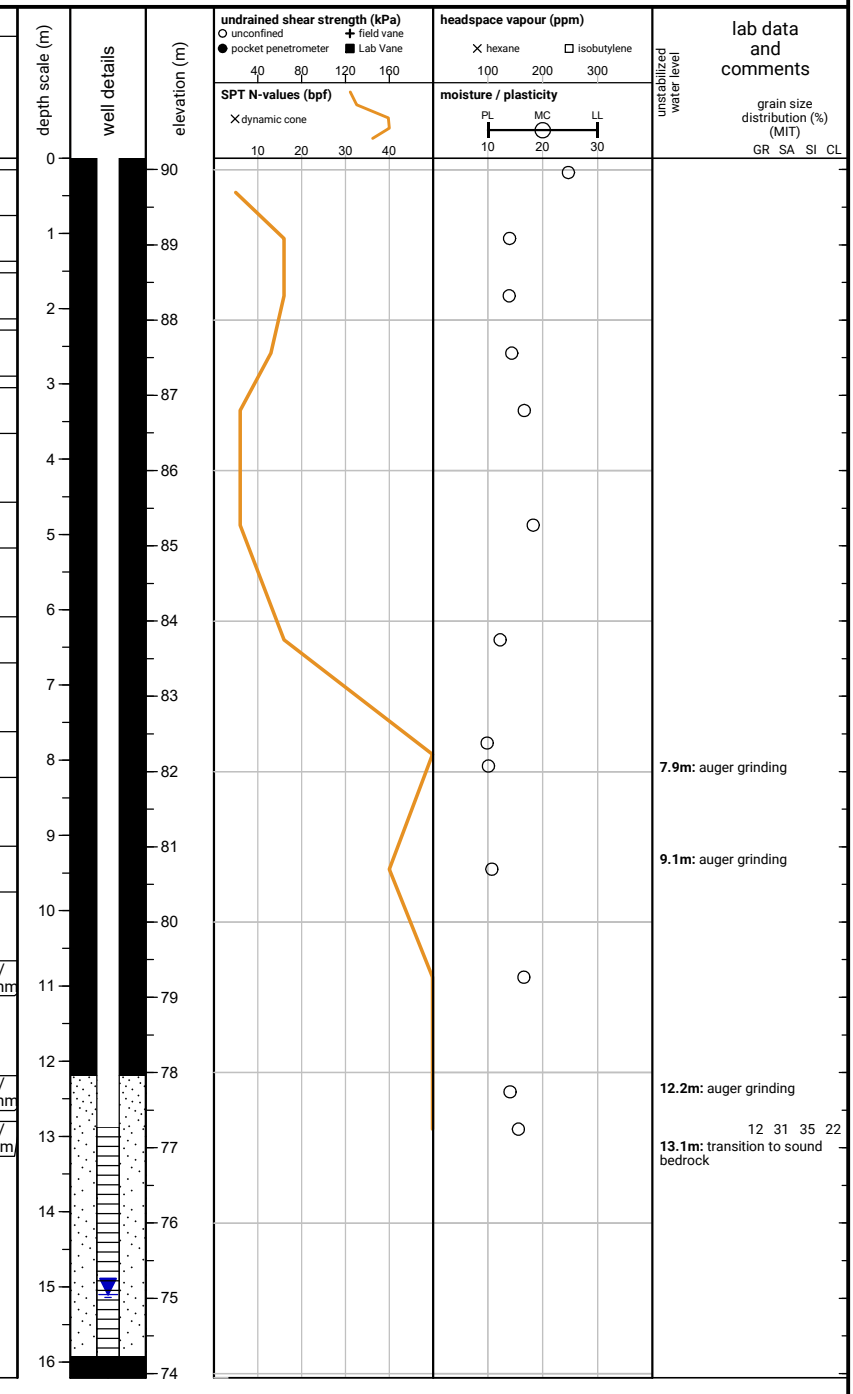
Date Started : Feb 17, 2021
Position : E: 629403, N: 4834043 (UTM 17T)
Elev. Datum : Geodetic

File No. : 21-019 **Project** : 147 Spadina Ave, Toronto, ON **Client** : HM RB (147 Spadina) LP

drill method	elev depth (m)	description	graphic log	number	type	SPT N-value
	90.2	**GROUND SURFACE**				
		175mm **ASPHALT**		1A/1B	SS	5
	89.4	**FILL**, clayey silt, some sand, trace asphalt, trace construction debris, loose, black and brown, moist		2	SS	16
hollow stem augers OD=215 mm	0.8	**CLAYEY SILT**, sandy, trace gravel, very stiff, brown, moist (SUNNYBROOK TILL)		3	SS	16
		...at 2.3 m, stiff		4	SS	13
		...at 3.0 m, firm, grey, wet		5	SS	6
				6	SS	6
		...at 6.1 m, moist and very stiff		7	SS	16
	82.6					
mud rotary lg OD=135 mm	7.6	**CLAYEY SILT**, trace sand, coarse sand and gravel seams, hard, grey, moist (DON BEDS)		8A/8B	SS	62
	81.1					
	9.1	**SILT AND CLAY**, trace sand, trace gravel, trace rock fragments, hard, grey, moist (YORK TILL)		9	SS	40
		...at 10.7 m, wet		10	SS	72 / 275mm
	78.0					
	12.2	**INFERRED BEDROCK**, shale and limestone fragments, grey, wet		11	SS	75 / 275mm
	77.2			12	SS	50 / 50mm
Rock coring (HQ) OD=96 mm	13.0	**GEORGIAN BAY FORMATION** (See rock core log for details)		1	RUN	
				2	RUN	
				3	RUN	
	74.0					
	16.2	**END OF BOREHOLE**				

Borehole was filled with drill water upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen



GROUNDWATER LEVELS

Date	Water Depth (m)	Elevation (m)
Feb 24, 2021	15.0	75.2
Mar 4, 2021	15.1	75.1
Mar 19, 2021	15.2	75.0
Apr 16, 2021	15.0	75.2
May 31, 2021	15.0	75.2
Jun 11, 2021	15.1	75.1
Jun 25, 2021	15.1	75.1
Jul 8, 2021	15.1	75.1
Jul 21, 2021	15.1	75.1

file: 21-019_gint.gpj

Tech : DK/NP | **PM** : KM | **Rev** : MD

GROUNDED ENGINEERING

Date Started : Feb 17, 2021
Position : E: 629403, N: 4834043 (UTM 17T)
Elev. Datum : Geodetic

ROCK CORE LOG 4

File No. : 21-019 **Project** : 147 Spadina Ave, Toronto, ON **Client** : HM RB (147 Spadina) LP

depth (m)	graphic log	stratigraphy	Run elev / depth (m)	recovery	elevation (m)	shale weathering zones (Z1 Z2 Z3 Z4)	UCS (MPa) 5 25 50 100 250 / estimated strength (R1 R2 R3 R4 R5 R6)	natural fracture frequency	laboratory testing	notes and comments	elevation (m)
		Rock coring started at 13.0m below grade	**77.2**								
		GEORGIAN BAY FORMATION **Shale**, grey, thickly bedded, weak; joints are horizontal, closed to gapped, clean; interbedded with **limestone**, light grey, very thinly bedded, medium strong *Overall shale: 80%, limestone: 20%* **... at 13.1 m (Elev. 77.1 m), transition to sound rock**	13.0 R1 76.5	TCR = **129**% SCR = **100**% RQD = **72**%	77			1 + RZ 1 1 1 1 1			77
14		Run 1 : 3% limestone 97% shale	13.7 R2 74.9	TCR = **95**% SCR = **95**% RQD = **79**%	76			3 1			76
15		Run 2 : 16% limestone 84% shale	15.3 R3 74.0	TCR = **97**% SCR = **97**% RQD = **89**%	75			5 2			75
16		Run 3 : 41% limestone 59% shale	**16.2m**		74			1			74
		END OF COREHOLE									

file: 21-019_gint.gpj

Tech : DK/NP | **PM** : KM | **Rev** : MD

GROUNDED ENGINEERING

Date Started : Apr 9, 2021
Position : E: 629375, N: 4834035 (UTM 17T)
Elev. Datum : Geodetic

BOREHOLE LOG 5

File No. : 21-019 **Project** : 147 Spadina Ave, Toronto, ON **Client** : HM RB (147 Spadina) LP

drill method : *D30*

elev / depth (m)	description	graphic log	samples: number	samples: type	samples: SPT N-value
90.0	**GROUND SURFACE**				
89.6	100mm **BRICK**				
0.4	Void space				

END OF BOREHOLE

Dry and open upon completion of drilling.

depth scale (m): 0

well details

elevation (m): 90

undrained shear strength (kPa): unconfined, field vane, pocket penetrometer, Lab Vane — 40 80 120 160

SPT N-values (bpf): dynamic cone — 10 20 30 40

headspace vapour (ppm): hexane, isobutylene — 100 200 300

moisture / plasticity: PL MC LL — 10 20 30

unstabilized water level

lab data and comments

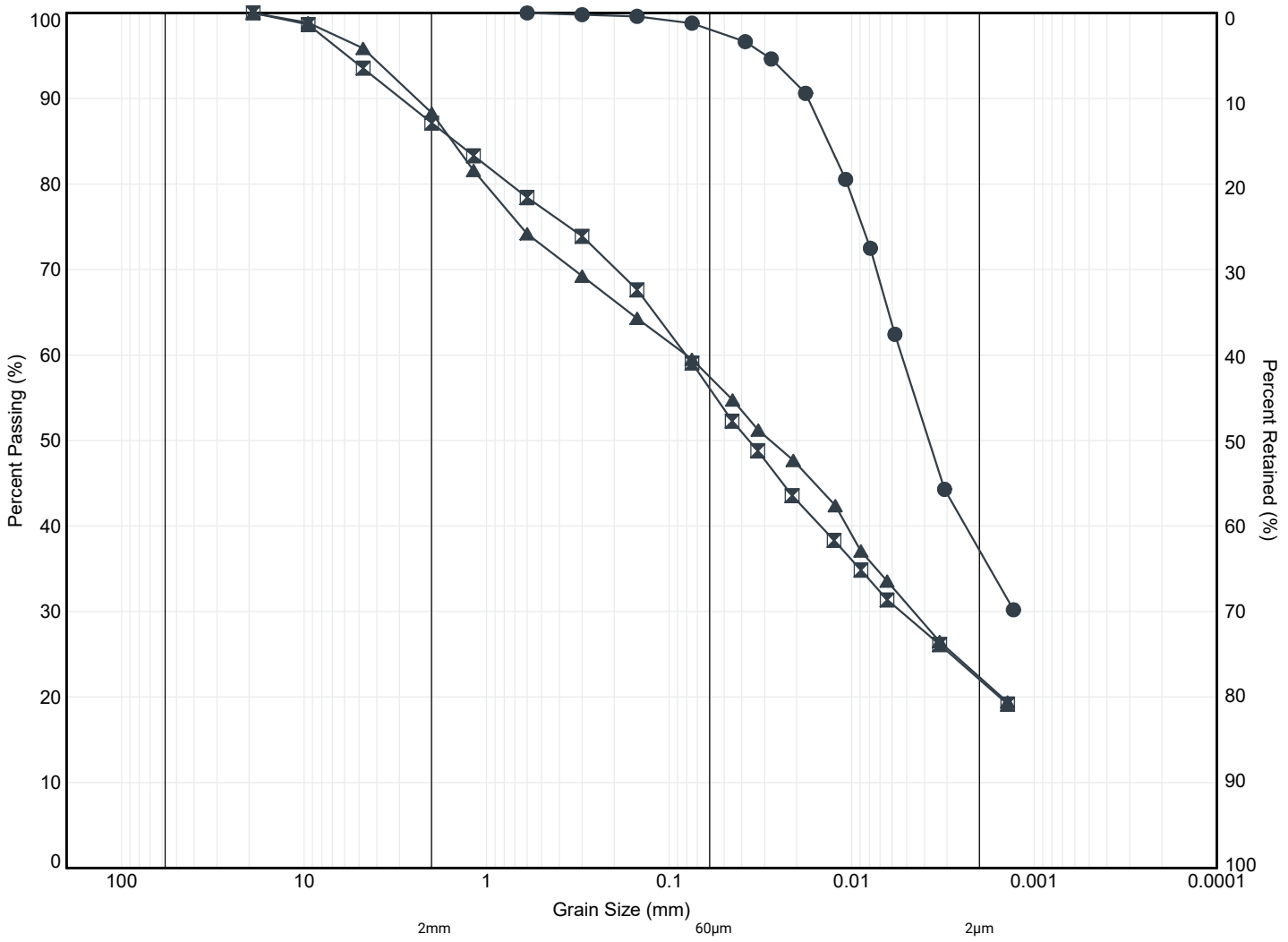
grain size distribution (%) (MIT): GR SA SI CL

0.1m: Void space encountered under floor slab. Borehole terminated due to unsupported floor slab, leading to unsafe drilling conditions.

file: 21-019_gint.gpj

Tech : NP | **PM** : KM | **Rev** : MD

APPENDIX B



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

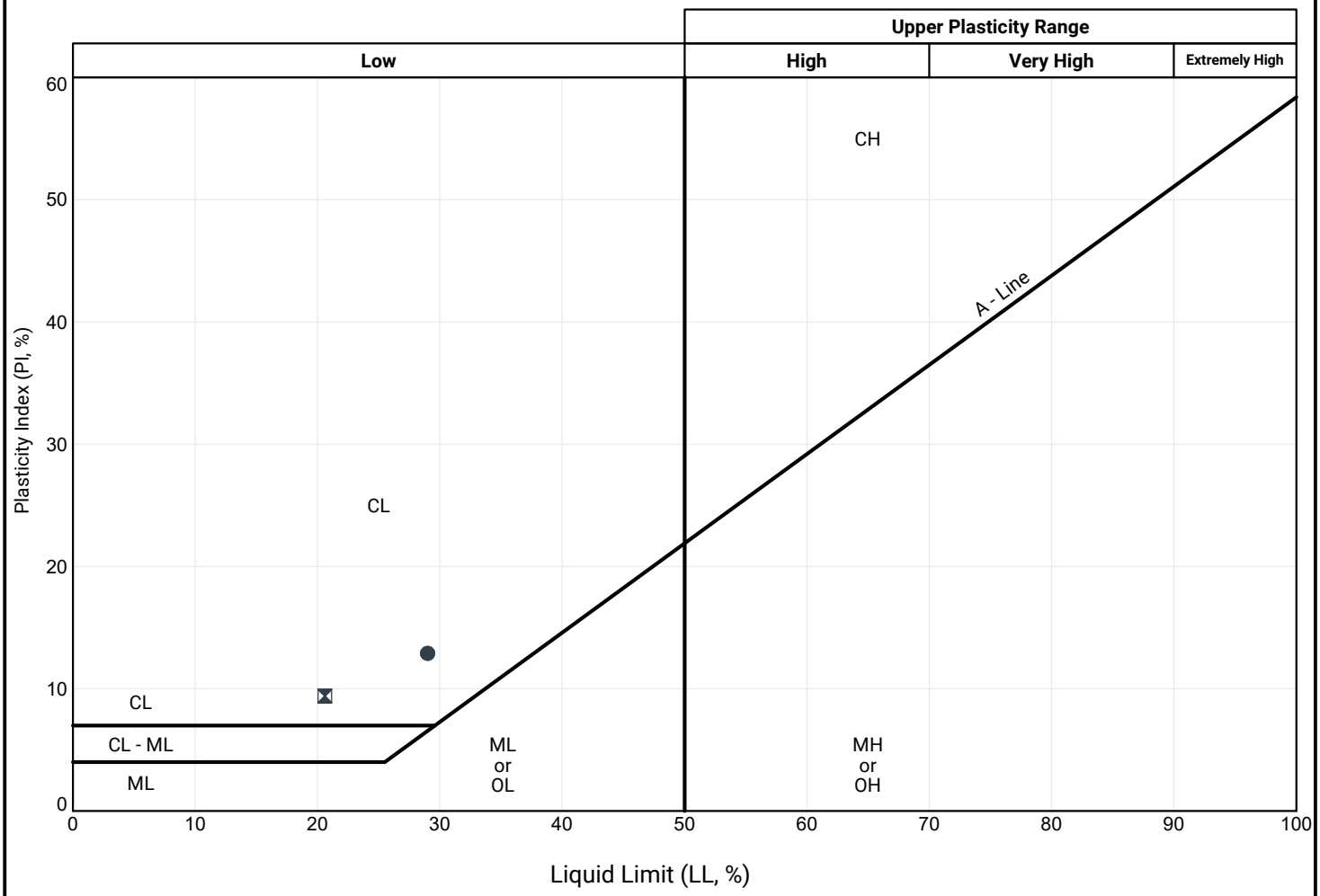
MIT SYSTEM

	Borehole	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
●	**2**	SS9	9.4	81.1	0	2	61	37
⊠	**3**	SS11	12.5	77.8	13	31	34	22
▲	**4**	SS12	12.9	77.2	12	31	35	22

GROUNDED ENGINEERING

Title: **GRAIN SIZE DISTRIBUTION**

File No.: **21-019**



	Borehole	Sample	Depth (m)	Elev. (m)	LL (%)	PL (%)	PI (%)
●	**2**	SS9	9.4	81.1	29	16	13
⊠	**3**	SS11	12.5	77.8	21	11	10

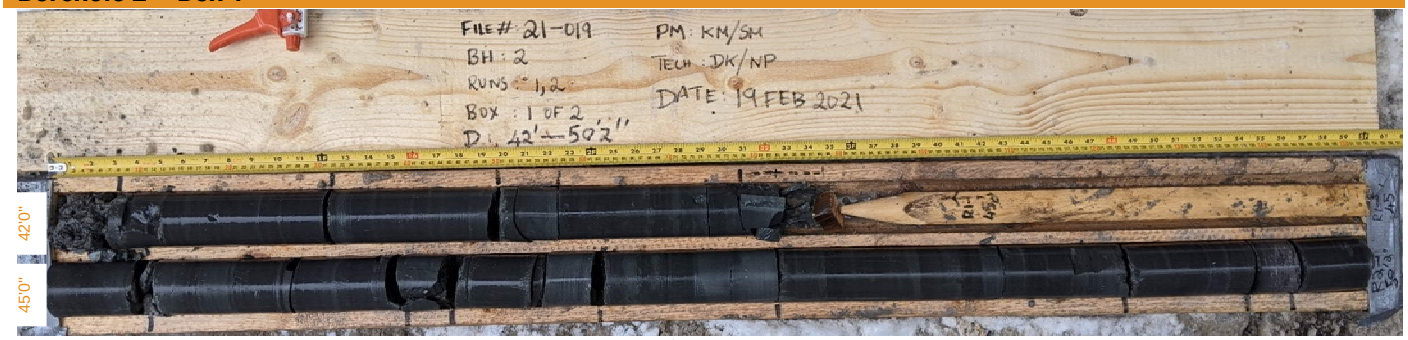
GROUNDED ENGINEERING

Title: **ATTERBERG LIMITS CHART**

File No.: **21-019**

APPENDIX C

Borehole 2 – Box 1



Depth: 13.0 to 15.3 m below grade (Elev. 77.6 to 75.3 m)

Borehole 2 – Box 2

Depth: 15.3 to 16.9 m below grade (Elev. 75.3 to 73.7 m)

Borehole 4 – Box 1

Depth: 13.0 to 15.3 m below grade (Elev. 77.2 to 74.9 m)

Borehole 4 – Box 2

Depth: 15.3 to 16.2 m below grade (Elev. 74.9 to 74.0 m)

APPENDIX D

Log of Borehole: MW101

Project #: 282626.003 **Logged By:** KW

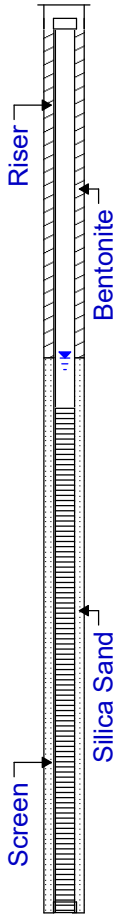
Project: Phase Two Environmental Site Assessment

Client: HM RB (Spadina) Ltd.

Location: 147 Spadina Avenue, Toronto, Ontario

Drill Date: April 29, 2021

SUBSURFACE PROFILE					SAMPLE			
Depth (ft / m)	Symbol	Description	Measured Depth (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration* (ppm) CGI/PID	Laboratory Analysis
0 / 0		Ground Surface	0.00					
		Asphalt			42	1	10/1	Metals and Inorganics, PAHs
		Sand and Silt Fill Dark brown, moist with brick and inferred coal fragments to 0.61 mbgs.	0.61			2	10/1	PHCs (F1-F4)/BTEX and VOCs
1 / 1		***Clayey Silt*** Brown with orange oxidation, some gravel, moist.			63	3	10/1	
2 / 2		Grey oxidation, moist to wet.	2.13			4	0/0	
		Sand Seam Grey, some gravel, silt and clay.	2.44		100	5	0/1	
3 / 3		***Clayey Silt*** Grey, orange oxidation, moist to wet.			100	6	0/0	
4 / 4		Wet at 3.35 mbgs.			100	7	0/0	
5 / 5		Moist to wet at 4.88 mbgs.				8	0/0	
		Wet at 5.49 mbgs.			100	9	0/0	
6 / 6			5.79					
		End of Borehole						
		Sampler refusal at 5.79 mbgs. Augured						



Water level measured at 2.14 mbgs on

Contractor: Strata Drilling Group Inc.

Drilling Method: Direct Push

Well Casing Size: 3.81 cm

Note:
* Soil vapour concentrations measured using a RKI Eagle 2 equipped with a combustible gas indicator (CGI) and a photoionization detector (PID).

Grade Elevation: 90.320 mamsl

Top of Casing Elevation: 90.219 mamsl

Sheet: 1 of 1

Log of Borehole: MW102

Project #: 282626.003 **Logged By:** KW

Project: Phase Two Environmental Site Assessment

Client: HM RB (Spadina) Ltd.

Location: 147 Spadina Avenue, Toronto, Ontario

Drill Date: April 29, 2021

SUBSURFACE PROFILE

Depth (ft / m)	Description	Measured Depth (m)
0 / 0	Ground Surface	0.00
	Sand and Gravel Fill Brown, brick and glass debris throughout.	
1 / 0		0.61
	Dark grey from 0.46 to 0.61 mbgs.	
	Clayey Silt Brown, some gravel, moist to wet.	
2 / 1		
	Grey-brown with orange oxidation at 2.13 mbgs.	
3 / 2		
	Some sand from 2.90 mbgs.	
	Grey below 3.66 mbgs.	
4 / 3		4.27
	End of Borehole	
	Sampler refusal at 4.27 mbgs.	
5 / 4		
6 / 5		

Monitoring Well Details: Riser, Bentonite, Silica Sand, Screen

Water level was measured at 3.85

SAMPLE

Recovery (%)	Sample ID	Soil Vapour Concentration* (ppm) CGI/PID	Laboratory Analysis
100	1	10/1	PHCs (F1-F4)/BTEX and VOCs
100	2	10/0	Metals and Inorganics, PAHs
	3	10/0	
100	4	0/1	
	5	10/1	
100	6	10/0	
	7	0/1	

Contractor: Strata Drilling Group Inc.

Drilling Method: Direct Push

Well Casing Size: 3.81 cm

Note:
* Soil vapour concentrations measured using a RKI Eagle 2 equipped with a combustible gas indicator (CGI) and a photoionization detector (PID).

Grade Elevation: 90.530 mamsl

Top of Casing Elevation: 90.417 mamsl

Sheet: 1 of 1

Log of Borehole: MW103

Project #: 282626.003 ***Logged By:*** KW

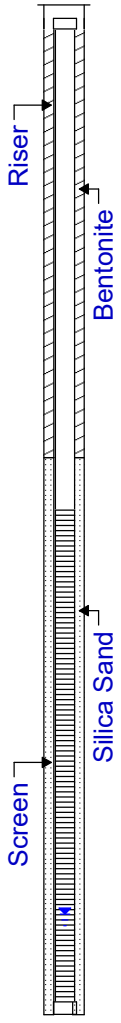
Project: Phase Two Environmental Site Assessment

Client: HM RB (Spadina) Ltd.

Location: 147 Spadina Avenue, Toronto, Ontario

Drill Date: April 26 and 27, 2021

SUBSURFACE PROFILE					SAMPLE			
Depth (ft / m)	Symbol	Description	Measured Depth (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration* (ppm) CGI/PID	Laboratory Analysis
0 / 0		Ground Surface	0.00					
		Asphalt			92	1	0/1	Metals and Inorganics, PAHs
		Sand and Silt Fill Dark brown, moist with brick and debris to 0.61 mbgs.	0.61			2	0/1	PHCs (F1-F4)/BTEX, VOCs
1 / 1		***Clayey Silt*** Brown with orange oxidation, some gravel, moist.			100	3	0/0	
2 / 2		Some sand at 1.22 mbgs.			100	4	0/0	
			2.44					
3 / 4 / 5 / 6		End of Borehole						
		Sampler refusal at 2.44 mbgs. Augured to 6.01 mbgs.						



Water level was measured

Contractor: Strata Drilling Group Inc.

Drilling Method: Direct Push

Well Casing Size: 3.81 cm

Note:
* Soil vapour concentrations measured using a RKI Eagle 2 equipped with a combustible gas indicator (CGI) and a photoionization detector (PID).

Grade Elevation: 90.546 mamsl

Top of Casing Elevation: 90.380 mamsl

Sheet: 1 of 1

Log of Borehole: MW104

Project #: 282626.003 **Logged By:** KW

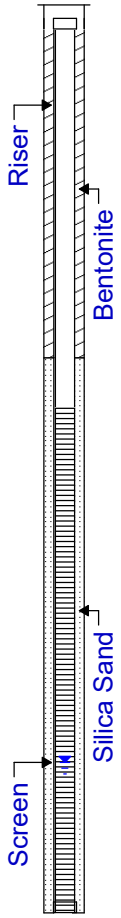
Project: Phase Two Environmental Site Assessment

Client: HM RB (Spadina) Ltd.

Location: 147 Spadina Avenue, Toronto, Ontario

Drill Date: April 26 and 27, 2021

SUBSURFACE PROFILE					SAMPLE			
Depth (ft / m)	Symbol	Description	Measured Depth (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration* (ppm) CGI/PID	Laboratory Analysis
0 / 0		Ground Surface	0.00					
		Asphalt			92	1	0/1	Metals and Inorganics, PAHs
		Sand and Silt Fill Dark brown, moist with brick and inferred coal fragments to 0.61 mbgs.	0.61			2	0/1	PHCs (F1-F4)/BTEX and VOCs
1 / 1		***Clayey Silt*** Brown with orange oxidation, some gravel, moist.			83	3	0/0	
2 / 2		Grey oxidation, moist to wet.	2.13			4	10/0	
		Sand Seam Grey, some gravel, silt and clay.	2.44		100	5	10/0	
3 / 3		***Clayey Silt*** Grey, orange oxidation, moist to wet.			100	6	10/1	Grain Size and pH
4 / 4		Wet at 3.35 mbgs.			100	7	0/0	
		Moist to wet at 4.88 mbgs.				8	0/0	
5 / 5		Wet at 5.49 mbgs.			100	9	0/1	
6 / 6			5.79		100	10	0/0	
		End of Borehole Sampler refusal at 5.79 mbgs. Augured refusal at 5.49 mbgs.						



Water level was measured at 4.91 mbgs on June 4,

Contractor: Strata Drilling Group Inc.

Drilling Method: Direct Push

Well Casing Size: 3.81 cm

Note:
* Soil vapour concentrations measured using a RKI Eagle 2 equipped with a combustible gas indicator (CGI) and a photoionization detector (PID).

Grade Elevation: 90.314 mamsl

Top of Casing Elevation: 90.172 mamsl

Sheet: 1 of 1

Log of Borehole: MW105

Project #: 282626.003 **Logged By:** KW

Project: Phase Two Environmental Site Assessment

Client: HM RB (Spadina) Ltd.

Location: 147 Spadina Avenue, Toronto, Ontario

Drill Date: April 27, 2021

SUBSURFACE PROFILE					SAMPLE			
Depth (ft / m)	Symbol	Description	Measured Depth (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration* (ppm) CGI/PID	Laboratory Analysis
0 / 0		Ground Surface	0.00					
		Concrete			100	1	10/1	PHCs (F1-F4)/BTEX
		Sand and Gravel Fill Black/dark brown.						
		Clayey Silt Grey, some gravel, wet at 0.46 mbfs. Moist to wet at 0.61 mbfs.			100	2	0/1	Metals and Inorangics, PAHs
					100	3	0/0	
			2.13					
		End of Borehole						
		Sampler refusal at 2.13 mbfs.		Water level was measured at 1.88 mbgs on June 4, 2021.				

Monitoring Well Details: Riser, Bentonite, Screen, Silica Sand

Contractor: Strata Drilling Group Inc.

Drilling Method: Direct Push

Well Casing Size: 2.54 cm

Note:
* Soil vapour concentrations measured using a RKI Eagle 2 equipped with a combustible gas indicator (CGI) and a photoionization detector (PID).

Grade Elevation: 86.214 mamsl

Top of Casing Elevation: 86.180 mamsl

Sheet: 1 of 1

Log of Borehole: MW106

Project #: 282626.003 **Logged By:** KW

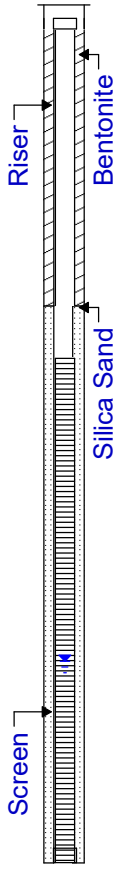
Project: Phase Two Environmental Site Assessment

Client: HM RB (Spadina) Ltd.

Location: 147 Spadina Avenue, Toronto, Ontario

Drill Date: June 4, 2021

SUBSURFACE PROFILE					SAMPLE			
Depth (ft / m)	Symbol	Description	Measured Depth (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration* (ppm) CGI/PID	Laboratory Analysis
0 / 0		Ground Surface	0.00					
		Concrete			50	1	0/1	PHCs (F1-F4)/BTEX, VOCs, PAHs and Metals
		Silty Sand Fill Brown, some gravel, some clay, moist.	0.61					
1 / 0		***Silty Sand Fill*** Brown, light grey moltting, some clay and trace gravel, moist.			55	2	0/0	pH and Grain Size
						3	0/0	
			1.83					
2 / 1		***Sandy Silt*** Orange-brown, some clay, trace gravel, moist.			100	4	0/0	
			2.44					
3 / 2		End of Borehole						
4 / 3								
5 / 4								
6 / 5		Sampler refusal at 2.44 mbgs and auger refusal at 5.18 mbgs.						
7 / 6								



Contractor: Strata Drilling Group Inc.

Drilling Method: Direct Push

Well Casing Size: 5.08 cm

Note:
* Soil vapour concentrations measured using a RKI Eagle 2 equipped with a combustible gas indicator (CGI) and a photoionization detector (PID).

Grade Elevation: 90.069 mamsl

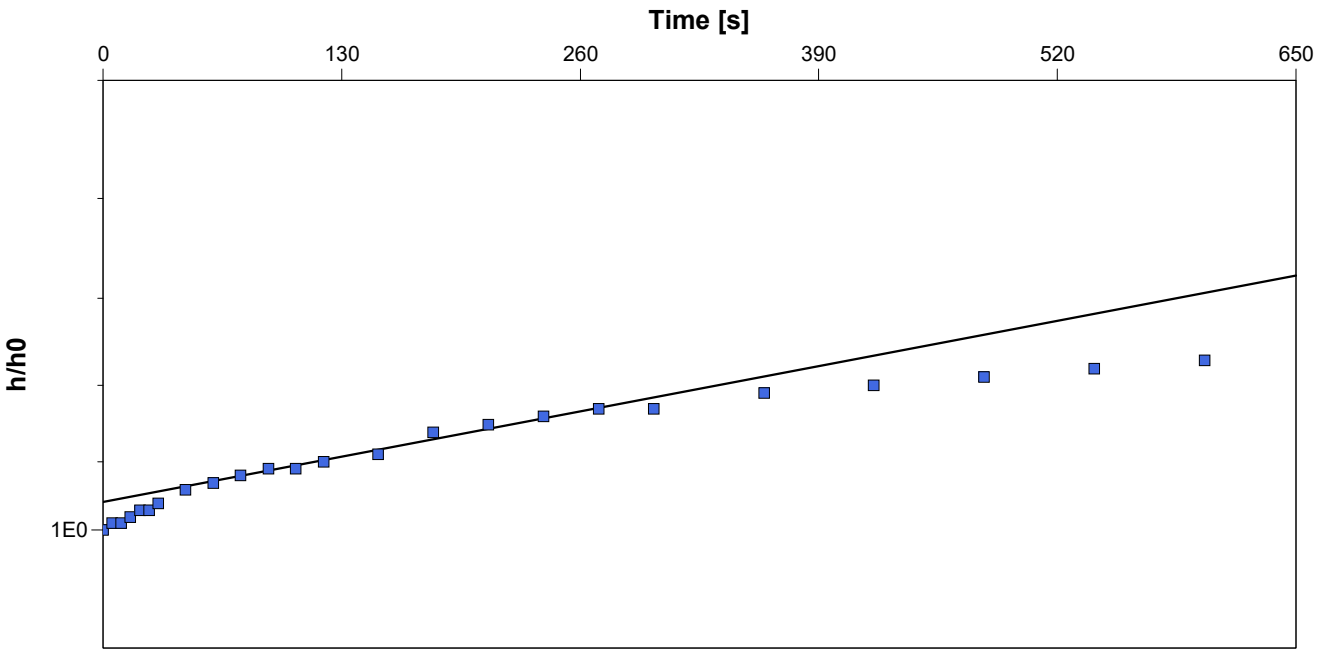
Top of Casing Elevation: 89.987 mamsl

Sheet: 1 of 1

APPENDIX E

GROUNDED ENGINEERING	**Slug Test Analysis Report**
	Project: 147 Spadina Ave
	Number: 21-019
	Client: HM RB (147 Spadina) LP

Location: 147 Spadina Ave, Toronto, ON	Slug Test: BH1	Test Well: BH1
Test Conducted by: DI		Test Date: 2021-04-27
Analysis Performed by: KM	BH1	Analysis Date: 2021-04-27
Aquifer Thickness: 12.60 m		

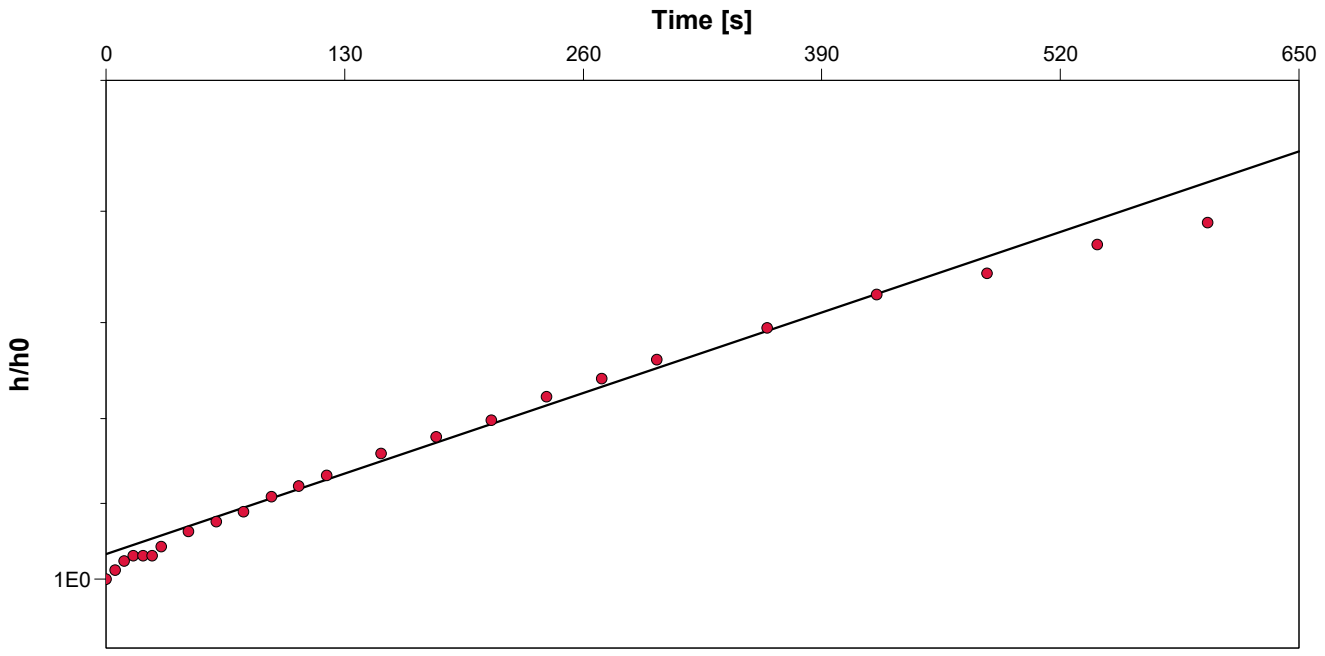


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH1	2.29×10^{-7}	

GROUNDED ENGINEERING	**Slug Test Analysis Report**
	Project: 147 Spadina Ave
	Number: 21-019
	Client: HM RB (147 Spadina) LP

Location: 147 Spadina Ave, Toronto, ON	Slug Test: BH2	Test Well: BH2
Test Conducted by: NP		Test Date: 2021-04-27
Analysis Performed by: KM	BH2	Analysis Date: 2021-04-27
Aquifer Thickness: 12.20 m		

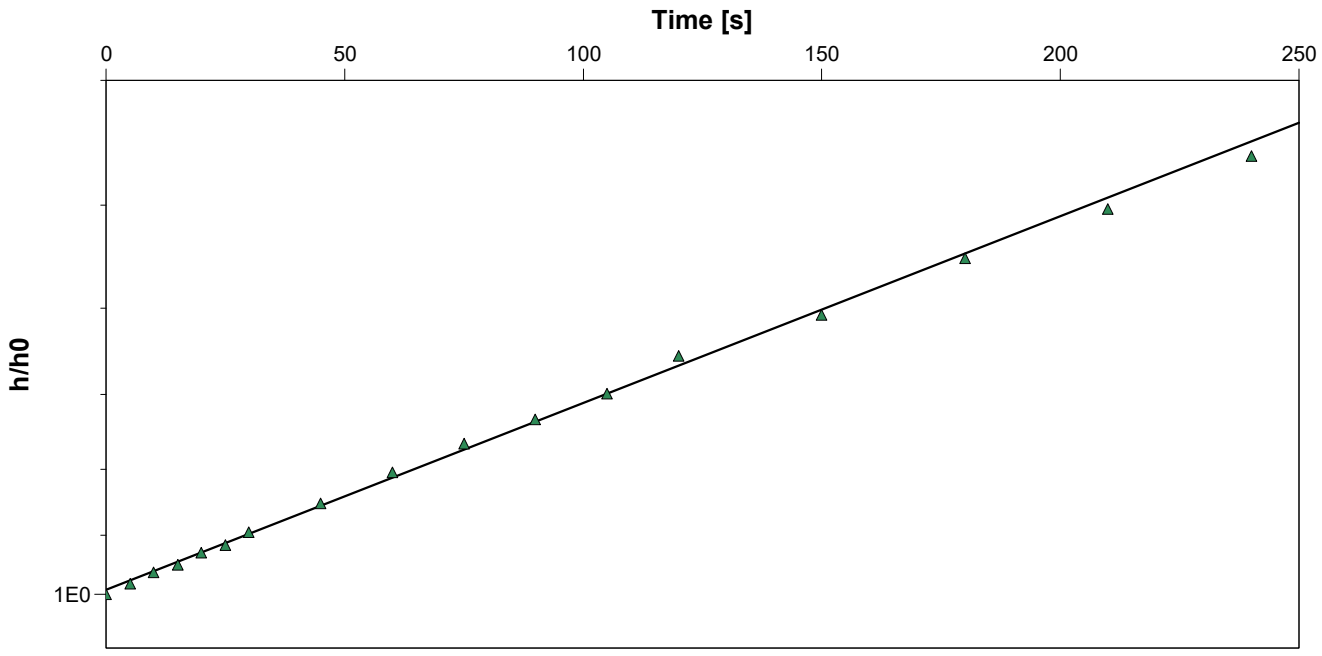


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH2	4.09×10^{-7}	

GROUNDED ENGINEERING	**Slug Test Analysis Report**
	Project: 147 Spadina Ave
	Number: 21-019
	Client: HM RB (147 Spadina) LP

Location: 147 Spadina Ave, Toronto, ON	Slug Test: BH3	Test Well: BH3
Test Conducted by: NP		Test Date: 2021-04-27
Analysis Performed by: KM	BH3	Analysis Date: 2021-04-27
Aquifer Thickness: 13.70 m		

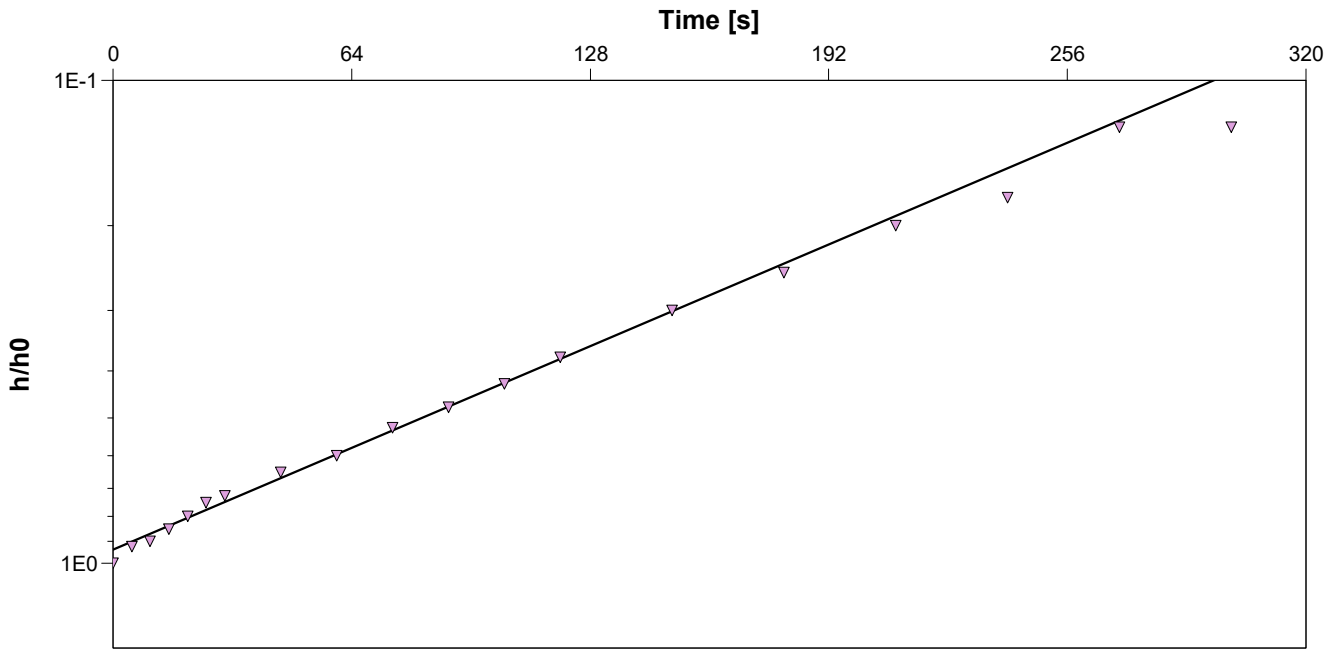


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH3	1.61×10^{-6}	

GROUNDED ENGINEERING	**Slug Test Analysis Report**
	Project: 147 Spadina Ave
	Number: 21-019
	Client: HM RB (147 Spadina) LP

Location: 147 Spadina Ave, Toronto, ON	Slug Test: BH4	Test Well: BH4
Test Conducted by: NP		Test Date: 2021-04-27
Analysis Performed by: KM	BH4	Analysis Date: 2021-04-27
Aquifer Thickness: 15.93 m		



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH4	3.73×10^{-6}	

APPENDIX F

K from Grain Size Analysis Report

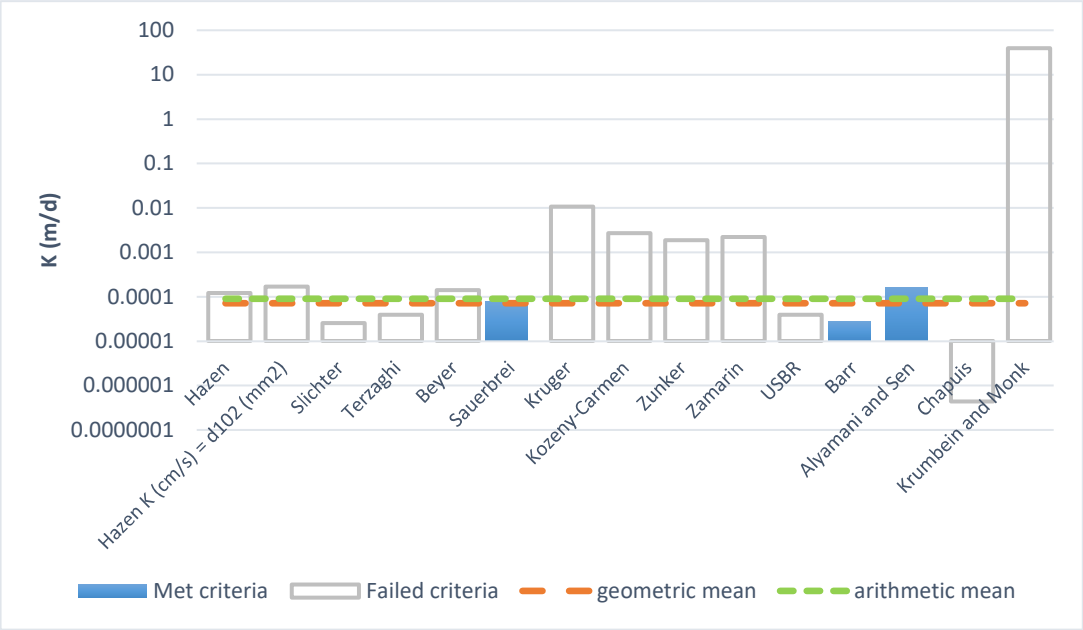
Date: 27-Apr-21

Sample Name: BH2 SS9

Mass Sample (g): 100

T (oC) 20

Poorly sorted clay low in fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	1.4E-07	1.4E-09	0.00	
Hazen K (cm/s) = d_{10} (mm)	2.0E-07	2.0E-09	0.00	
Slichter	3.0E-08	3.0E-10	0.00	
Terzaghi	4.6E-08	4.6E-10	0.00	
Beyer	1.6E-07	1.6E-09	0.00	
Sauerbrei	9.4E-08	9.4E-10	0.00	
Kruger	1.2E-05	1.2E-07	0.01	
Kozeny-Carmen	3.1E-06	3.1E-08	0.00	
Zunker	2.2E-06	2.2E-08	0.00	
Zamarin	2.5E-06	2.5E-08	0.00	
USBR	4.5E-08	4.5E-10	0.00	
Barr	3.3E-08	3.3E-10	0.00	
Alyamani and Sen	1.9E-07	1.9E-09	0.00	
Chapuis	5.1E-10	5.1E-12	0.00	
Krumbein and Monk	4.6E-02	4.6E-04	39.64	
geometric mean	8.4E-08	8.4E-10	0.00	
arithmetic mean	1.1E-07	1.1E-09	0.00	

K from Grain Size Analysis Report

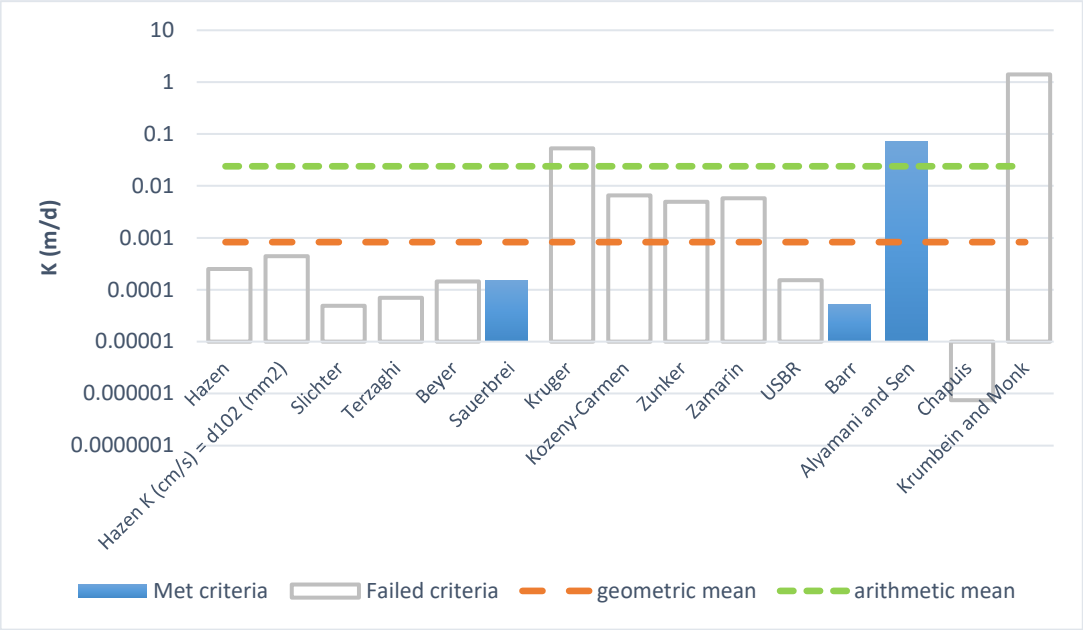
Date: 27-Apr-21

Sample Name: BH3 SS11

Mass Sample (g): 100

T (oC) 20

Poorly sorted silt low in fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	2.9E-07	2.9E-09	0.00	
Hazen K (cm/s) = d_{10} (mm)	5.1E-07	5.1E-09	0.00	
Slichter	5.7E-08	5.7E-10	0.00	
Terzaghi	8.1E-08	8.1E-10	0.00	
Beyer	1.7E-07	1.7E-09	0.00	
Sauerbrei	1.7E-07	1.7E-09	0.00	
Kruger	6.1E-05	6.1E-07	0.05	
Kozeny-Carmen	7.6E-06	7.6E-08	0.01	
Zunker	5.7E-06	5.7E-08	0.00	
Zamarin	6.7E-06	6.7E-08	0.01	
USBR	1.8E-07	1.8E-09	0.00	
Barr	6.1E-08	6.1E-10	0.00	
Alyamani and Sen	8.4E-05	8.4E-07	0.07	
Chapuis	8.6E-10	8.6E-12	0.00	
Krumbein and Monk	1.6E-03	1.6E-05	1.40	
geometric mean	9.6E-07	9.6E-09	0.00	
arithmetic mean	2.8E-05	2.8E-07	0.02	

K from Grain Size Analysis Report

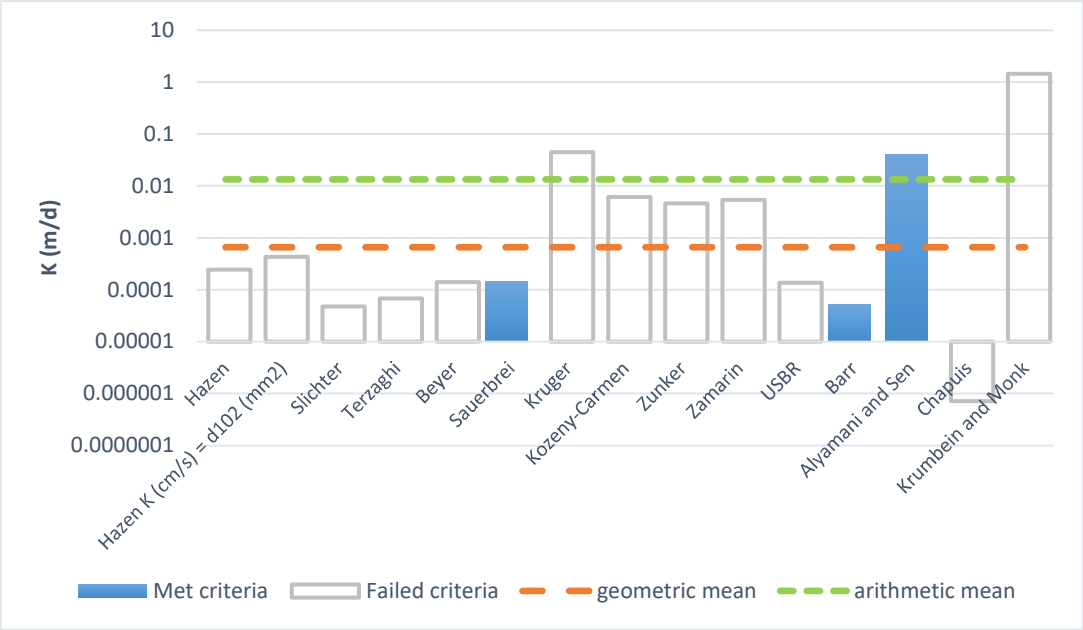
Date: 27-Apr-21

Sample Name: BH4 SS12

Mass Sample (g): 100

T (oC) 20

Poorly sorted silt low in fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	2.8E-07	2.8E-09	0.00	
Hazen K (cm/s) = d_{10} (mm)	5.0E-07	5.0E-09	0.00	
Slichter	5.5E-08	5.5E-10	0.00	
Terzaghi	7.9E-08	7.9E-10	0.00	
Beyer	1.6E-07	1.6E-09	0.00	
Sauerbrei	1.7E-07	1.7E-09	0.00	
Kruger	5.2E-05	5.2E-07	0.04	
Kozeny-Carmen	7.0E-06	7.0E-08	0.01	
Zunker	5.3E-06	5.3E-08	0.00	
Zamarin	6.2E-06	6.2E-08	0.01	
USBR	1.6E-07	1.6E-09	0.00	
Barr	5.9E-08	5.9E-10	0.00	
Alyamani and Sen	4.6E-05	4.6E-07	0.04	
Chapuis	8.2E-10	8.2E-12	0.00	
Krumbein and Monk	1.7E-03	1.7E-05	1.45	
geometric mean	7.7E-07	7.7E-09	0.00	
arithmetic mean	1.6E-05	1.6E-07	0.01	

Adopting the equation form presented in Vukovic and Soro (1992),

$$K = \frac{\rho g}{\mu} N \varphi(n) d_e^2$$

the following values and equations aresubstituted into the appropriate terms to evalute the models listed in the table below. The values of d_e to be entered should be in cm units. The values of K calculated have the units cm/s, except for the Alyamani and Sen model (see footnote).

Source	N	$\varphi(n)$	d_e	Applicable Conditions
Hazen simplified (Freeze and Cherry, 1979)	$10\frac{\mu}{\rho g}$	1	d_{10}	uniformly graded sand, n = 0.375 T = 10 °C
Hazen (1892)[a]	6×10^{-4}	$[1 + 10(n - 0.26)]$	d_{10}	0.01 cm < d_{10} < 0.3 cm U < 5
Slichter (1898)[a]	1×10^{-2}	$n^{3.287}$	d_{10}	0.01 cm < d_{10} < 0.5 cm
Terzaghi (1925)[a]	10.7×10^{-3} smooth grains 6.1×10^{-3} coarse grains	$\left(\frac{n - 0.13}{\sqrt[3]{1-n}}\right)^2$	d_{10}	sandy soil, coarse sand
Beyer (1964)[a]	$5.2 \times 10^{-4} \log\frac{500}{U}$	1	d_{10}	0.006 cm < d_{10} <0.06 cm $1 < U < 20$
Sauerbrei (1932)[a] (Vuković and Soro, 1992)	$(3.75 \times 10^{-5}) \times \tau$ $\tau \cong 1.093 \times 10^{-4} T^2 + 2.102 \times 10^{-2} T + 0.5889$	$\frac{n^3}{(1-n)^2}$	d_{17}	sand and sandy clay d_{17} < 0.05 cm
Krüger (1919)[a]	4.35×10^{-4}	$\frac{n}{(1-n)^2}$	$\frac{1}{\sum_{i=1}^{n} \frac{\Delta w_i}{d_i}}$	medium sand $U > 5$ T = 0 °C
Kozeny-Carmen (1953)[a]	8.3×10^{-3}	$\frac{n^3}{(1-n)^2}$	d_{10} or $\frac{1}{\frac{3}{2}\frac{\Delta w_1}{d_1} + \sum_{i=2}^{n} \Delta g_i \frac{d_i^g + d_i^d}{2 d_i^g d_i^d}}$ $d_1 = \frac{1}{\frac{1}{2}\left(\frac{1}{d_i^g} + \frac{1}{d_i^d}\right)}$	Coarse sand
Zunker (1930)[a]	0.7×10^{-3} for nonuniform, clayey, angular grains 1.2×10^{-3} for nonuniform 1.4×10^{-3} for uniform, coarse grains 2.4×10^{-3} for uniform sand, well rounded grains	$\frac{n}{(1-n)}$	$\frac{1}{\sum_{i=1}^{n} \Delta g_i \frac{d_i^g - d_i^d}{d_i^g d_i^d ln\left(\frac{d_i^g}{d_i^d}\right)}}$	no fractions finer than d = 0.0025 mm
Zamarin (1928)[a]	8.65×10^{-3}	$\frac{n^3}{(1-n)^2} C_n$ $C_n = (1.275 - 1.5n)^2$	$\frac{1}{\sum_{i=1}^{n} \Delta g_i \frac{\ln\left(\frac{d_i^g}{d_i^d}\right)}{d_i^g - d_i^d}}$	Large grained sands with no fractions having d < 0.00025 mm
USBR (United States Bureau of Reclamation) (Bialas, 1966)[a]	$(4.8 \times 10^{-4})(10^{0.3})$	1.0	$d_{20}^{1.15}$	Medium grained sands with U < 5; derived for T = 15 °C
Barr (2001)	$\frac{1}{(36)5C_s^2}$ C_s^2 = 1 for spherical grains C_s^2 = 1.35 for angular grains	$\frac{n^3}{(1-n)^2}$	d_{10}	unspecified
Alyamani and Sen (1993)	1300	1.0	$[I_o + 0.025(d_{50} - d_{10})]$	unspecified
Chapuis (2004)	$\frac{\mu}{\rho g}$	$10^{1.291\xi - 0.6435}$ $\xi = \frac{n}{1-n}$	$d_{10}^{\left(\frac{10^{(0.5304 - 0.2937\xi)}}{2}\right)}$	$0.3 < n < 0.7$ $0.10 < d_{10} < 2.0$ mm $2 < U < 12$ $d_{10}/d_5 < 1.4$
Krumbein and Monk (1942)	7.501×10^{-6}	$e^{(-1.31 \times \sigma_\phi)}$ $\sigma_\phi = \frac{\frac{d_{84\phi} - d_{16\phi}}{4} + \frac{d_{95\phi} - d_{5\phi}}{6.6}}{2}$	$2^{\left(\frac{d_{16\phi} + d_{50\phi} + d_{84\phi}}{3}\right)}$	natural sands with lognormal grain size distribution

* indicates formulas were taken from Vuković and Soro, (1992)
N = constant dependent on characteristics of the porous medium
$\varphi(n)$ = function of porosity
T = water temp. (°C)
g = 980 cm s^{-2}
$\rho = 3.1 \times 10^{-8} T^3 - 7.0 \times 10^{-6} T^2 + 4.19 \times 10^{-5} T + 0.99985$
$\mu = -7.0 \times 10^{-8} T^3 + 1.002 \times 10^{-5} T^2 - 5.7 \times 10^{-4} T + 0.0178$
$\tau = 1.093 \times 10^{-4} T^2 + 2.102 \times 10^{-2} T + 0.5889$
n = porosity as fraction of aquifer volume
d_i^g = the maximum grain diameter in fraction i
d_i^d = the minimum grain diameter in fraction i
d_{10} = grain size (cm) corresponding to 10% by weight passing through the sieves
d_{20} = grain size (cm) corresponding to 20% by weight passing through the sieves
d_{50} = grain size (cm) corresponding to 50% by weight passing through the sieves
d_{60} = grain size (cm) corresponding to 60% by weight passing through the sieves
$U = d_{60}/d_{10}$
Δg_i = the fraction of mass that passes between sieves i and $i+1$ where i is the smaller sieve
Δw_i = fraction of total weight of sample with fraction identifier 'i'
d_i = mean grain diameter of the fraction i
$d_{i\phi}$ = mean grain diameter of the fraction i in phi units ($\phi = \log_2 (d_e/d_o)$, d_e in mm, d_o = 1 mm)
I_o = x-intercept (grain size) of a percent grain retention curve plotted on arithmetic axes and focussing on data below 50% retained

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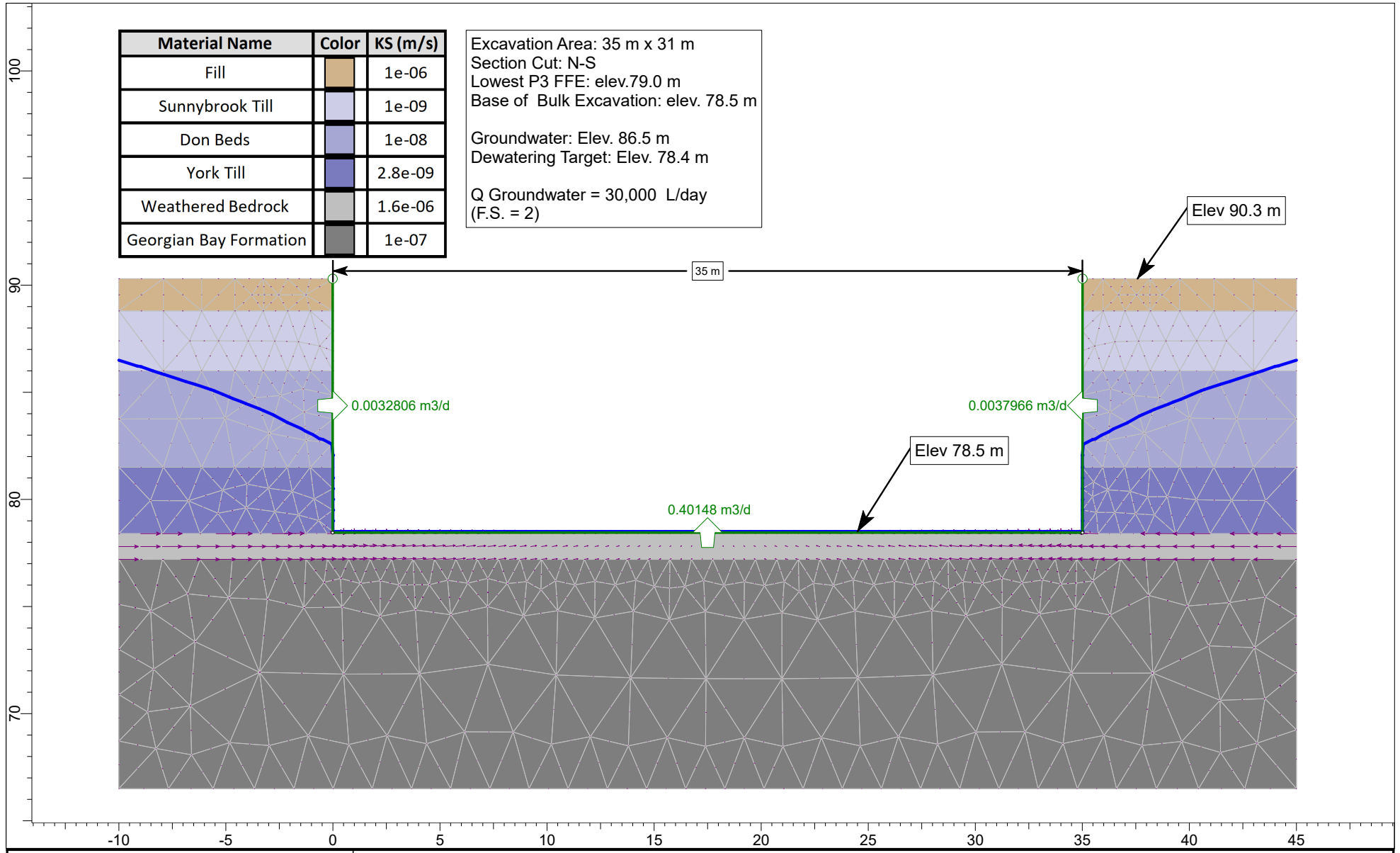
APPENDIX G

Material Name	Color	KS (m/s)
Fill		1e-06
Sunnybrook Till		1e-09
Don Beds		1e-08
York Till		2.8e-09
Weathered Bedrock		1.6e-06
Georgian Bay Formation		1e-07

Excavation Area: 35 m x 31 m
Section Cut: N-S
Lowest P3 FFE: elev.79.0 m
Base of Bulk Excavation: elev. 78.5 m

Groundwater: Elev. 86.5 m
Dewatering Target: Elev. 78.4 m

Q Groundwater = 30,000 L/day
(F.S. = 2)



GROUNDED ENGINEERING

SLIDEINTERPRET 9.018

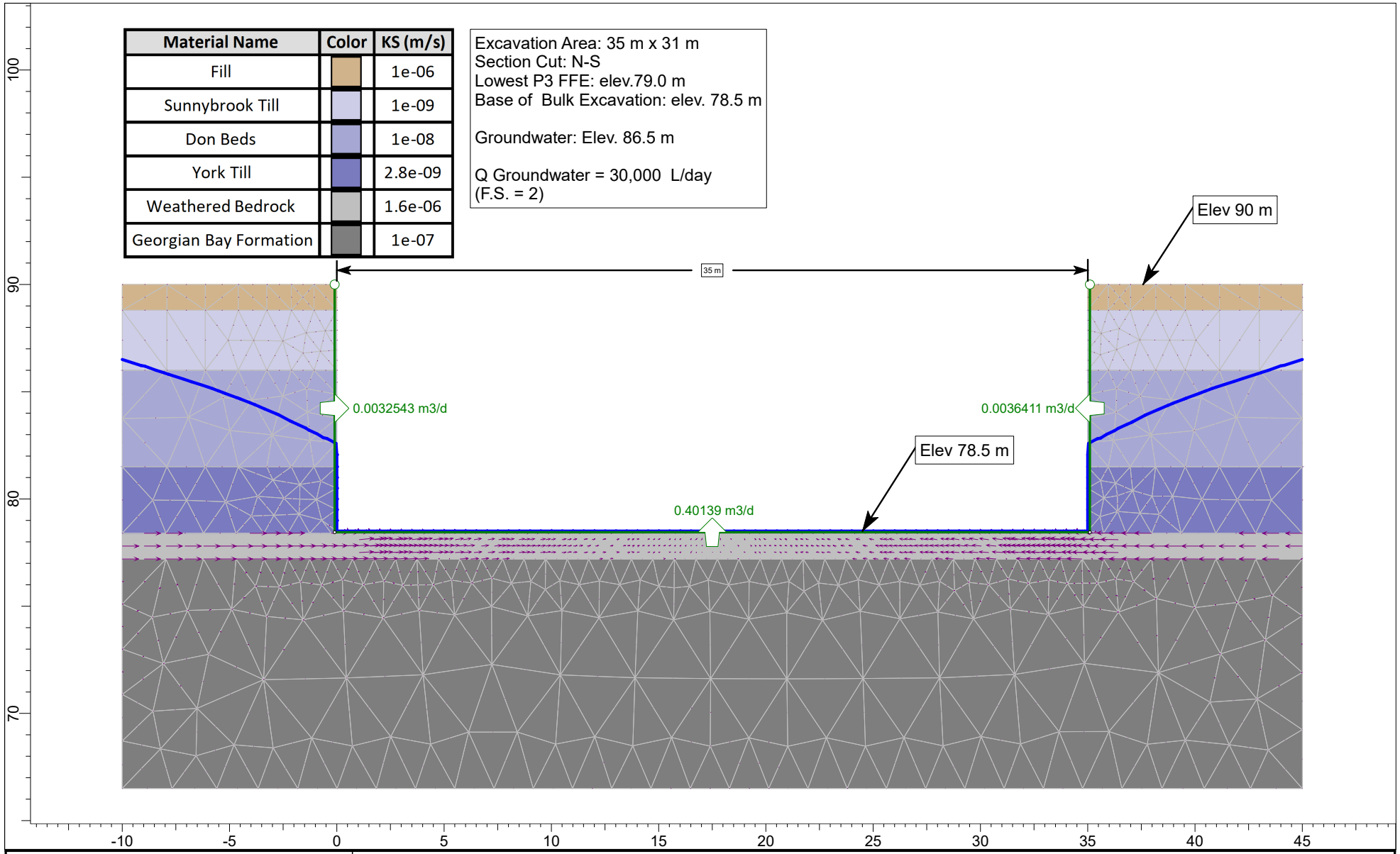
Project	21-019 | 147 Spadina Ave, Toronto		
Analysis Description	Steady State Groundwater FEM	Model	P3 - Short Term Dewatering | Master Scenario
Drawn By	KM	Scale 1:250	Date 2021-08-16
Source	Hydrogeological Report		File Name 21-019 Slide V2 2021-08-13.slmd

Material Name	Color	KS (m/s)
Fill		1e-06
Sunnybrook Till		1e-09
Don Beds		1e-08
York Till		2.8e-09
Weathered Bedrock		1.6e-06
Georgian Bay Formation		1e-07

Excavation Area: 35 m x 31 m
Section Cut: N-S
Lowest P3 FFE: elev.79.0 m
Base of Bulk Excavation: elev. 78.5 m

Groundwater: Elev. 86.5 m

Q Groundwater = 30,000 L/day
(F.S. = 2)



GROUNDED ENGINEERING

SLIDEINTERPRET 9.018

Project	21-019 | 147 Spadina Ave, Toronto		
Analysis Description	Steady State Groundwater FEM	Model	P3 - Long Term Dewatering | Master Scenario
Drawn By	KM	Scale 1:250	Date 2021-08-16
Source	Hydrogeological Report		File Name 21-019 Slide V2 2021-08-13.slmd

SHORT TERM

Excavation Dimensions [m]	
N-S	35
E-W	31
Area (m2)	1085
Perimeter (m)	132

Rainfall Data		
Year	2	100
Hour	3	12
Depth (mm)	25	94
Depth (m)	0.025	0.094

Section		Flow [m3/day]	Length [m]	Volume [L/day]
Base		0.40148	31	12,446
Sides		0.0037966	132	501
Total				12,947
Factor of Safety	2.0			25,894

Storm Events	
2 Year [L/day]	100 Year [L/day]
27,125	102,000

Summary	L/day	L/min
Groundwater	30,000	20.8
Rainfall	28,000	19.4
Total	58,000	40.3

LONG TERM

Excavation Dimensions [m]	
N-S	35
E-W	31
Area (m2)	1085
Perimeter (m)	132

Rainfall Data		
Year	2	100
Hour	3	12
Depth (mm)	25	94
Depth (m)	0.025	0.094

Section		Flow [m3/day]	Length [m]	Volume [L/day]
Base		0.40139	31	12,443
Sides		0.0036411	132	481
Total				12,924
Factor of Safety	2.0			25,847

Infiltration [L/day]
990

Summary	L/day	L/min
Groundwater	30,000	20.8
Infiltration	1,000	0.7
Total	31,000	21.5

APPENDIX H

FINAL REPORT

CA15968-FEB21 R1

21-019, 147 Spadina Ave, Toronto

Prepared for

Grounded Engineering Inc.

FINAL REPORT

First Page

CLIENT DETAILS

Client	Grounded Engineering Inc.
Address	12 Banigan Drive Toronto, Ontario M4H1E9. Canada
Contact	Katrina Morgenroth
Telephone	
Facsimile	
Email	kmorgenroth@groundedeng.ca
Project	21-019, 147 Spadina Ave, Toronto
Order Number	
Samples	Ground Water (1)

LABORATORY DETAILS

Project Specialist	Brad Moore Hon. B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2143
Facsimile	705-652-6365
Email	brad.moore@sgs.com
SGS Reference	CA15968-FEB21
Received	02/25/2021
Approved	03/04/2021
Report Number	CA15968-FEB21 R1
Date Reported	03/04/2021

COMMENTS

RL - SGS Reporting Limit

Nonylphenol Ethoxylates is the sum of nonylphenol monoethoxylate and nonylphenol diethoxylate.

Temperature of Sample upon Receipt: 7 degrees C
Cooling Agent Present:Yes
Custody Seal Present:Yes

Chain of Custody Number:018900

SIGNATORIES

Brad Moore Hon. B.Sc

TABLE OF CONTENTS

Client: Grounded Engineering Inc.
Project: 21-019, 147 Spadina Ave, Toronto
Project Manager: Katrina Morgenroth
Samplers: Deepak Kanraj

PACKAGE: **SANSEW - General Chemistry**
(WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
General Chemistry					
Biochemical Oxygen Demand (BOD5)	mg/L	2	300	15	8
Total Kjeldahl Nitrogen	as N mg/L	0.5	100		12.6
Total Suspended Solids	mg/L	2	350	15	15

PACKAGE: **SANSEW - Metals and Inorganics**
(WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics					
Fluoride	mg/L	0.06	10		0.11
Cyanide (total)	mg/L	0.01	2	0.02	< 0.01
Aluminum (total)	mg/L	0.001	50		0.367
Antimony (total)	mg/L	0.0009	5		< 0.0009
Arsenic (total)	mg/L	0.0002	1	0.02	0.0033
Cadmium (total)	mg/L	0.000003	0.7	0.008	0.000005
Chromium (total)	mg/L	0.00008	4	0.08	0.0043

Client: Grounded Engineering Inc.
Project: 21-019, 147 Spadina Ave, Toronto
Project Manager: Katrina Morgenroth
Samplers: Deepak Kanraj

PACKAGE: **SANSEW - Metals and Inorganics**
(WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics (continued)					
Cobalt (total)	mg/L	0.000004	5		0.00057
Copper (total)	mg/L	0.0002	2	0.04	0.0005
Lead (total)	mg/L	0.00001	1	0.12	0.00021
Manganese (total)	mg/L	0.00001	5	0.05	0.426
Molybdenum (total)	mg/L	0.00004	5		0.0017
Nickel (total)	mg/L	0.0001	2	0.08	0.0019
Phosphorus (total)	mg/L	0.003	10	0.4	0.371
Selenium (total)	mg/L	0.00004	1	0.02	0.00017
Silver (total)	mg/L	0.00005	5	0.12	< 0.00005
Tin (total)	mg/L	0.00006	5		0.0028
Titanium (total)	mg/L	0.00005	5		0.0119
Zinc (total)	mg/L	0.002	2	0.04	0.003

Client: Grounded Engineering Inc.
Project: 21-019, 147 Spadina Ave, Toronto
Project Manager: Katrina Morgenroth
Samplers: Deepak Kanraj

PACKAGE: **SANSEW - Microbiology** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
Microbiology					
E. Coli	cfu/100mL	-		200	< 2↑

PACKAGE: **SANSEW - Nonylphenol and Ethoxylates** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
Nonylphenol and Ethoxylates					
Nonylphenol	mg/L	0.001	0.02	0.001	< 0.001
Nonylphenol Ethoxylates	mg/L	0.01	0.2	0.01	< 0.01
Nonylphenol diethoxylate	mg/L	0.01			< 0.01
Nonylphenol monoethoxylate	mg/L	0.01			< 0.01

PACKAGE: **SANSEW - Oil and Grease** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
Oil and Grease					

Client: Grounded Engineering Inc.
Project: 21-019, 147 Spadina Ave, Toronto
Project Manager: Katrina Morgenroth
Samplers: Deepak Kanraj

PACKAGE: **SANSEW - Oil and Grease** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
Oil and Grease (continued)					
Oil & Grease (total)	mg/L	2			< 2
Oil & Grease (animal/vegetable)	mg/L	4	150		< 4
Oil & Grease (mineral/synthetic)	mg/L	4	15		< 4

PACKAGE: **SANSEW - Other (ORP)** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
Other (ORP)					
pH	No unit	0.05	11.5	9.5	7.40
Chromium VI	mg/L	0.0002	2	0.04	< 0.0002
Mercury (total)	mg/L	0.00001	0.01	0.0004	< 0.00001

PACKAGE: **SANSEW - PAHs** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
PAHs					

Client: Grounded Engineering Inc.
Project: 21-019, 147 Spadina Ave, Toronto
Project Manager: Katrina Morgenroth
Samplers: Deepak Kanraj

PACKAGE: **SANSEW - PAHs** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
PAHs (continued)					
Benzo(b+j)fluoranthene	mg/L	0.0001			< 0.0001

PACKAGE: **SANSEW - PCBs** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
PCBs					
Polychlorinated Biphenyls (PCBs) - Total	mg/L	0.0001	0.001	0.0004	< 0.0001

PACKAGE: **SANSEW - Phenols** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
Phenols					
4AAP-Phenolics	mg/L	0.002	1	0.008	< 0.002

PACKAGE: **SANSEW - SVOCs** (WATER)

Sample Number	8
Sample Name	UF-SW-BH3

Client: Grounded Engineering Inc.
Project: 21-019, 147 Spadina Ave, Toronto
Project Manager: Katrina Morgenroth
Samplers: Deepak Kanraj

PACKAGE: **SANSEW - SVOCs** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
SVOCs					
di-n-Butyl Phthalate	mg/L	0.002	0.08	0.015	< 0.002
Bis(2-ethylhexyl)phthalate	mg/L	0.002	0.012	0.0088	< 0.002
3,3-Dichlorobenzidine	mg/L	0.0005	0.002	0.0008	< 0.0005
Pentachlorophenol	mg/L	0.0005	0.005	0.002	< 0.0005
PAHs (Total)	mg/L	-	0.005	0.002	< 0.001
Perylene	mg/L	0.0005			< 0.0005

PACKAGE: **SANSEW - SVOCs - PAHs** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
SVOCs - PAHs					
7Hdibenzo(c,g)carbazole	mg/L	0.0001			< 0.0001
Anthracene	mg/L	0.0001			< 0.0001
Benzo(a)anthracene	mg/L	0.0001			< 0.0001
Benzo(a)pyrene	mg/L	0.0001			< 0.0001
Benzo[e]pyrene	mg/L	0.0001			< 0.0001
Benzo(ghi)perylene	mg/L	0.0002			< 0.0002
Benzo(k)fluoranthene	mg/L	0.0001			< 0.0001
Chrysene	mg/L	0.0001			< 0.0001

Client: Grounded Engineering Inc.
Project: 21-019, 147 Spadina Ave, Toronto
Project Manager: Katrina Morgenroth
Samplers: Deepak Kanraj

PACKAGE: **SANSEW - SVOCs - PAHs** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
SVOCs - PAHs (continued)					
Dibenzo(a,h)anthracene	mg/L	0.0001			< 0.0001
Dibenzo(a,i)pyrene	mg/L	0.0001			< 0.0001
Dibenzo(a,j)acridine	mg/L	0.0001			< 0.0001
Fluoranthene	mg/L	0.0001			< 0.0001
Indeno(1,2,3-cd)pyrene	mg/L	0.0002			< 0.0002
Phenanthrene	mg/L	0.0001			< 0.0001
Pyrene	mg/L	0.0001			< 0.0001

PACKAGE: **SANSEW - VOCs** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
VOCs					
Chloroform	mg/L	0.0005	0.04	0.002	< 0.0005
1,2-Dichlorobenzene	mg/L	0.0005	0.05	0.0056	< 0.0005
1,4-Dichlorobenzene	mg/L	0.0005	0.08	0.0068	< 0.0005
cis-1,2-Dichloroethene	mg/L	0.0005	4	0.0056	< 0.0005
trans-1,3-Dichloropropene	mg/L	0.0005	0.14	0.0056	< 0.0005
Methylene Chloride	mg/L	0.0005	2	0.0052	< 0.0005
1,1,2,2-Tetrachloroethane	mg/L	0.0005	1.4	0.017	< 0.0005

Client: Grounded Engineering Inc.
Project: 21-019, 147 Spadina Ave, Toronto
Project Manager: Katrina Morgenroth
Samplers: Deepak Kanraj

PACKAGE: **SANSEW - VOCs** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
VOCs (continued)					
Tetrachloroethylene (perchloroethylene)	mg/L	0.0005	1	0.0044	< 0.0005
Trichloroethylene	mg/L	0.0005	0.4	0.0076	< 0.0005

PACKAGE: **SANSEW - VOCs - BTEX** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	UF-SW-BH3
Sample Matrix	Ground Water
Sample Date	24/02/2021

Parameter	Units	RL	L1	L2	Result
VOCs - BTEX					
Benzene	mg/L	0.0005	0.01	0.002	< 0.0005
Ethylbenzene	mg/L	0.0005	0.16	0.002	< 0.0005
Toluene	mg/L	0.0005	0.016	0.002	< 0.0005
Xylene (total)	mg/L	0.0005	1.4	0.0044	< 0.0005
m-p-xylene	mg/L	0.0005			< 0.0005
o-xylene	mg/L	0.0005			< 0.0005

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016 L1	SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016 L2
UF-SW-BH3					
Manganese	SM 3030/EPA 200.8	mg/L	0.426		0.05

QC SUMMARY

Biochemical Oxygen Demand

Method: SM 5210 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0056-FEB21	mg/L	2	< 2	7	30	110	70	130	NV	70	130

Cyanide by SFA

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Cyanide (total)	SKA0214-FEB21	mg/L	0.01	<0.01	ND	10	93	90	110	99	75	125

Fluoride by Specific Ion Electrode

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0371-FEB21	mg/L	0.06	<0.06	ND	10	97	90	110	103	75	125

QC SUMMARY

Hexavalent Chromium by SFA

Method: EPA218.6/EPA3060A | Internal ref.: ME-CA-[ENVISKA-LAK-AN-012

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chromium VI	SKA0216-FEB21	mg/L	0.0002	<0.0002	ND	20	106	80	120	79	75	125

Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-[ENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0030-FEB21	mg/L	0.00001	< 0.00001	ND	20	107	80	120	98	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0146-FEB21	mg/L	0.00005	<0.00005	ND	20	101	90	110	98	70	130
Aluminum (total)	EMS0146-FEB21	mg/L	0.001	<0.001	18	20	108	90	110	126	70	130
Arsenic (total)	EMS0146-FEB21	mg/L	0.0002	<0.0002	16	20	102	90	110	100	70	130
Cadmium (total)	EMS0146-FEB21	mg/L	0.000003	3e-006	12	20	101	90	110	110	70	130
Cobalt (total)	EMS0146-FEB21	mg/L	0.000004	<0.000004	6	20	101	90	110	105	70	130
Chromium (total)	EMS0146-FEB21	mg/L	0.00008	<0.00008	11	20	99	90	110	111	70	130
Copper (total)	EMS0146-FEB21	mg/L	0.0002	<0.0002	5	20	103	90	110	104	70	130
Manganese (total)	EMS0146-FEB21	mg/L	0.00001	<0.00001	5	20	102	90	110	104	70	130
Molybdenum (total)	EMS0146-FEB21	mg/L	0.00004	<0.00004	1	20	102	90	110	106	70	130
Nickel (total)	EMS0146-FEB21	mg/L	0.0001	<0.0001	4	20	100	90	110	104	70	130
Lead (total)	EMS0146-FEB21	mg/L	0.00001	<0.00001	16	20	100	90	110	102	70	130
Phosphorus (total)	EMS0146-FEB21	mg/L	0.003	<0.003	20	20	105	90	110	NV	70	130
Antimony (total)	EMS0146-FEB21	mg/L	0.0009	<0.0009	ND	20	104	90	110	122	70	130
Selenium (total)	EMS0146-FEB21	mg/L	0.00004	<0.00004	13	20	103	90	110	89	70	130
Tin (total)	EMS0146-FEB21	mg/L	0.00006	<0.00006	1	20	97	90	110	NV	70	130
Titanium (total)	EMS0146-FEB21	mg/L	0.00005	<0.00005	1	20	104	90	110	NV	70	130
Zinc (total)	EMS0146-FEB21	mg/L	0.002	<0.002	9	20	100	90	110	117	70	130

QC SUMMARY

Microbiology

Method: SM 9222D | Internal ref.: ME-CA-IENVIMIC-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
E. Coli	BAC9392-FEB21	cfu/100mL	-	ACCEPTED	ACCEPTED							

Nonylphenol and Ethoxylates

Method: ASTM D7065-06 | Internal ref.: ME-CA-IENVIGC-LAK-AN-015

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nonylphenol diethoxylate	GCM0035-MAR21	mg/L	0.01	< 0.01			85	55	120			
Nonylphenol Ethoxylates	GCM0035-MAR21	mg/L	0.01	< 0.01								
Nonylphenol monoethoxylate	GCM0035-MAR21	mg/L	0.01	< 0.01			85	55	120			
Nonylphenol	GCM0035-MAR21	mg/L	0.001	< 0.001			86	55	120			

QC SUMMARY

Oil & Grease

Method: MOE E3401 | Internal ref.: ME-CA-[ENV]GC-LAK-AN-019

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (total)	GCM0100-MAR21	mg/L	2	<2	NSS	20	92	75	125			

Oil & Grease-AV/MS

Method: MOE E3401/SM 5520F | Internal ref.: ME-CA-[ENV]GC-LAK-AN-019

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (animal/vegetable)	GCM0100-MAR21	mg/L	4	<2	NSS	20	NA	70	130			
Oil & Grease (mineral/synthetic)	GCM0100-MAR21	mg/L	4	<2	NSS	20	NA	70	130			

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0381-FEB21	No unit	0.05	NA	1		101			NA		

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0008-MAR21	mg/L	0.002	<0.002	10	10	106	80	120	107	75	125
4AAP-Phenolics	SKA0213-FEB21	mg/L	0.002	<0.002	ND	10	98	80	120	87	75	125

Polychlorinated Biphenyls

Method: MOE E3400/EPA 8082A | Internal ref.: ME-CA-[ENV]GC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Polychlorinated Biphenyls (PCBs) - Total	GCM0009-MAR21	mg/L	0.0001	<0.0001	NSS	30	91	60	140	NSS	60	140

QC SUMMARY

Semi-Volatile Organics

Method: EPA 3510C/8270D | Internal ref.: ME-CA-[ENV]GC-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
7Hdibenzo(c,g)carbazole	GCM0026-MAR21	mg/L	0.0001	< 0.0001	NSS	30	110	50	140	NSS	50	140
Anthracene	GCM0026-MAR21	mg/L	0.0001	< 0.0001	NSS	30	97	50	140	NSS	50	140
Benzo(a)anthracene	GCM0026-MAR21	mg/L	0.0001	< 0.0001	NSS	30	101	50	140	NSS	50	140
Benzo(a)pyrene	GCM0026-MAR21	mg/L	0.0001	< 0.0001	NSS	30	91	50	140	NSS	50	140
Benzo(b+j)fluoranthene	GCM0026-MAR21	mg/L	0.0001	< 0.0001	NSS	30	107	50	140	NSS	50	140
Benzo[e]pyrene	GCM0026-MAR21	mg/L	0.0001	< 0.0001	NSS	30	92	50	140	NSS	50	140
Benzo(ghi)perylene	GCM0026-MAR21	mg/L	0.0002	< 0.0002	NSS	30	103	50	140	NSS	50	140
Benzo(k)fluoranthene	GCM0026-MAR21	mg/L	0.0001	< 0.0001	NSS	30	104	50	140	NSS	50	140
Bis(2-ethylhexyl)phthalate	GCM0026-MAR21	mg/L	0.002	< 0.002	NSS	30	113	50	140	NSS	50	140
Chrysene	GCM0026-MAR21	mg/L	0.0001	< 0.0001	NSS	30	104	50	140	NSS	50	140
di-n-Butyl Phthalate	GCM0026-MAR21	mg/L	0.002	< 0.002	NSS	30	106	50	140	NSS	50	140
Dibenzo(a,h)anthracene	GCM0026-MAR21	mg/L	0.0001	< 0.0001	NSS	30	101	50	140	NSS	50	140
Dibenzo(a,i)pyrene	GCM0026-MAR21	mg/L	0.0001	< 0.0001	NSS	30	96	50	140	NSS	50	140
Dibenzo(a,j)acridine	GCM0026-MAR21	mg/L	0.0001	< 0.0001	NSS	30	106	50	140	NSS	50	140
Fluoranthene	GCM0026-MAR21	mg/L	0.0001	< 0.0001	NSS	30	105	50	140	NSS	50	140
Indeno(1,2,3-cd)pyrene	GCM0026-MAR21	mg/L	0.0002	< 0.0002	NSS	30	103	50	140	NSS	50	140
Pentachlorophenol	GCM0026-MAR21	mg/L	0.0005	< 0.0005	NSS	30	110	50	140	NSS	50	140
Perylene	GCM0026-MAR21	mg/L	0.0005	< 0.0005	NSS	30	106	50	140	NSS	50	140
Phenanthrene	GCM0026-MAR21	mg/L	0.0001	< 0.0001	NSS	30	100	50	140	NSS	50	140
Pyrene	GCM0026-MAR21	mg/L	0.0001	< 0.0001	NSS	30	101	50	140	NSS	50	140

QC SUMMARY

Semi-Volatile Organics (continued)

Method: EPA 3510C/8270D | Internal ref.: ME-CA-[ENVIGC-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
3,3-Dichlorobenzidine	GCM0044-MAR21	mg/L	0.0005	< 0.0005	NSS	30	85	30	130	NSS	30	130

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0369-FEB21	mg/L	2	< 2	0	10	103	90	110	NA		

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen	SKA0010-MAR21	as N mg/L	0.5	<0.5	ND	10	101	90	110	97	75	125

QC SUMMARY

Volatile Organics

Method: EPA 5030B/8260C | Internal ref.: ME-CA-[ENV]GC-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
1,1,2,2-Tetrachloroethane	GCM0378-FEB21	mg/L	0.0005	<0.0005	ND	30	95	60	130	99	50	140
1,2-Dichlorobenzene	GCM0378-FEB21	mg/L	0.0005	<0.0005	ND	30	97	60	130	99	50	140
1,4-Dichlorobenzene	GCM0378-FEB21	mg/L	0.0005	<0.0005	ND	30	96	60	130	99	50	140
Benzene	GCM0378-FEB21	mg/L	0.0005	<0.0005	ND	30	98	60	130	100	50	140
Chloroform	GCM0378-FEB21	mg/L	0.0005	<0.0005	ND	30	97	60	130	99	50	140
cis-1,2-Dichloroethene	GCM0378-FEB21	mg/L	0.0005	<0.0005	ND	30	98	60	130	100	50	140
Ethylbenzene	GCM0378-FEB21	mg/L	0.0005	<0.0005	ND	30	99	60	130	104	50	140
m-p-xylene	GCM0378-FEB21	mg/L	0.0005	<0.0005	ND	30	99	60	130	103	50	140
Methylene Chloride	GCM0378-FEB21	mg/L	0.0005	<0.0005	ND	30	98	60	130	98	50	140
o-xylene	GCM0378-FEB21	mg/L	0.0005	<0.0005	ND	30	99	60	130	103	50	140
Tetrachloroethylene (perchloroethylene)	GCM0378-FEB21	mg/L	0.0005	<0.0005	ND	30	100	60	130	104	50	140
Toluene	GCM0378-FEB21	mg/L	0.0005	<0.0005	ND	30	99	60	130	102	50	140
trans-1,3-Dichloropropene	GCM0378-FEB21	mg/L	0.0005	<0.0005	ND	30	99	60	130	103	50	140
Trichloroethylene	GCM0378-FEB21	mg/L	0.0005	<0.0005	ND	30	99	60	130	103	50	140

QC SUMMARY

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

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

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

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

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

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

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

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

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

LEGEND

FOOTNOTES

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

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

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

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated. This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

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

No: 018900

Page 1 of 1

Laboratory Information Section - Lab use only

Received By: Oleg Mozhlix
Received By (signature):
Received Date: 02.25.21 (mm/dd/yy)
Received Time: 11:00 (hr : min)
Custody Seal Present: Yes ☑ No ☐
Custody Seal Intact: Yes ☑ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: ice pack
Temperature Upon Receipt (°C) 7.7.7
LAB LIMS #: CA-15968-Feb21

REPORT INFORMATION	INVOICE INFORMATION
Company: GROUNDED ENGINEERING	☒ (same as Report Information)
Contact: KATRINA MORGENROTH	Company:
Address: 12 BANIGAN DRIVE TORONTO, ONTARIO, M4H 1E9	Contact:
Phone: 647 264 - 7953	Address:
Fax:	Phone:
Email: KMORGENROTH@GROUNDEDENG	Email:

Quotation #:
P.O. #:
Project #: 21-019
Site Location/ID: 147 SPADINA AVE, TORONTO

TURNAROUND TIME (TAT) REQUIRED

☐ Regular TAT (5-7days)

TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

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

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:

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

REGULATIONS

☑ O.Reg 153/04 ☐ O.Reg 406/19

☐ Table 1 ☒ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☒ Table 3 ☐ Agri/Other
☐ Table ____
Soil Volume ☒ <350m3 ☐ >350m3

Other Regulations: ☐ Reg 347/558 (3 Day min TAT) ☐ PWQO ☐ MMER ☐ CCME ☐ Other: ☐ MISA ☐ ODWS Not Reportable *See note

Sewer By-Law: ☒ Sanitary ☒ Storm Municipality: TORONTO

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	M&I: Field Filtered (Y/N)	M&I: Metals & Inorganics incl CrVI, CN, Hg pH,(B(HWS),EC,SAR-soil) (Cl, Na-water)	M&I: Full Metals Suite ICP metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd,Cr,Co,Cu,Pb,Mo,Ni,	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs ☐ Total ☐ Aroclor	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)	TCLP: Specify TCLP tests ☐M&I ☐VOC ☐PCB ☐B(a)P ☐ABN ☐Ignit.	COMMENTS:
																					Appendix 2: 406/19 Leachate Screening Levels Table :	Sewer Use: STORM + SANITARY Specify pkg:	Water Characterization Pkg General ☐ Extended ☐		
1	UF-SW-BH3	24FEB2021	1:45PM	18	GW	N																X			
2																									
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

Observations/Comments/Special Instructions

Sampled By (NAME): DEEPAK KANRAJ Signature: K. Dya Date: 02/24/2021 (mm/dd/yy)

Relinquished by (NAME): DEEPAK KANRAJ Signature: K. Dya Date: 02/24/2021 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.4
Date of Issue: 22 May. 2020