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PRELIMINARY GEOTECHNICAL INVESTIGATION

PROPOSED NEW DEVELOPMENT, KAWARTHA DOWNS AND SPEEDWAY, 1382 COUNTY RD. 28, FRASERVILLE, ONTARIO

Prepared for:

Romspen Inc.

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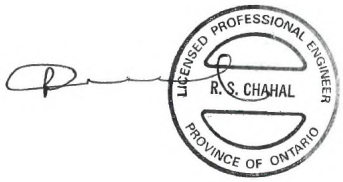
Project No. FE-P 21-11454Geo.

September 9, 2021

Issued to:	Romspen Inc.
Contact:	Mr. Richard Weldon RichardWeldon@romspen.com
Project Name:	Proposed New Development
Project Address:	Kawartha Downs And Speedway, 1382 County Rd. 28, Fraserville, Ontario
Project Number:	FE-P 21-10801Geo
Issued on:	September 9, 2021
Report Prepared by: **(Primary Contact)**	 Rajinder Chahal, P. Eng., Senior Project Engineer 647.227.8473 rajinder@fisherenvironmental.com
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1. INTRODUCTION

Fisher Engineering Limited was retained by Romspen Inc. to carry out a preliminary geotechnical subsurface investigation for the proposed new development at Kawartha Downs and Speedway, 1382 County Rd. 28, Fraserville, Peterborough, Ontario.

The purpose of the geotechnical investigation was to determine the general subsurface conditions in the specific areas at the site and to provide general geotechnical comments/recommendations for the design of the proposed new development/buildings by means of three (3) boreholes.

This report presents the results of the tests performed in accordance with the general terms of reference outlined in the scope of work.

The report has been prepared specifically and solely for the proposed new development in regards to geotechnical aspects of design & construction based on the general lay out provided at the time of investigation.

2. SITE AND PROJECT DESCRIPTION

The Kawartha Downs & Speedway property (#1382) is located on the west side of Peterborough Road 28, north of Syer Line & south of Moore Drive in Fraserville, Township of Cavan Monaghan, County of Peterborough.

Asphalt/gravel tracks exist in the middle/east portion of the lands. Main entrance on the south side of the tracks leads to large asphalt paved parking south-west of the tracks.

Large concrete building was observed at the north-east of the above parking area. Several metal clad buildings exist towards north of the parking area/concrete building.

Borehole 208 was located on the north side of the tracks/stable driveway. Borehole 209 was near the south-west corner of the large asphalt paved parking area. Borehole 210 was placed in the field south of the tracks.

Details of the proposed development such as type of structures, locations, proposed finished floor/grade elevations etc. were not available at the time of investigation.

3. SCOPE OF GEOTECHNICAL WORK

The geotechnical scope of work includes the following:

- Investigation of the subsurface conditions at the site by advancing boreholes, soil sampling and visual evaluation.

- Prepare a geotechnical report with general comments and recommendations regarding:
  - Appropriate foundation depths, type and bearing pressures (SLS & ULS)
  - Engineered fill
  - Seismic site classification.
  - Slab-on-grade construction
  - Pavement construction
  - Excavation

4. METHOD OF INVESTIGATION

The field work for this investigation was carried out on August 10 & 20, 2021, in which a total of three (3) boreholes were advanced to approximate depths of 6.02m to 6.55m below the prevailing grades. The approximate locations of the boreholes and elevations are shown on the attached Borehole Location Plan in Appendix A.

Elevations at borehole locations were established by interpolation from the site topographic details plan dated Feb. 16, 2018 prepared by IBW Surveyors.

All boreholes were advanced using solid stem auguring. The subsurface strata were sampled at regular intervals of depth using a split-spoon sampler following the procedure as detailed in the ASTM Standard specification D1586 for the Standard Penetration Test. Field tests to determine the engineering parameters of the soil were carried out during drilling, which included Standard Penetration Tests (SPT).

All soil samples were taken to our accredited laboratory for final visual assessment, classification and selected moisture content testing & grain size analyses. The samples were tested and classified in general accordance with the Unified Soil Classification System, ASTM D 2487, and Standard Practice for Classification of Soil for Engineering Purposes.

Soil Description and test results are given in the borehole Records attached to this report.

The soil samples recovered during the investigation will be stored in our laboratory for a period of 30 days after which they will be discarded unless further instructions are received.

5. SUBSURFACE CONDITIONS

The subsurface conditions encountered in the boreholes are shown on the Borehole Log Sheets provided in Appendix B.

The boreholes logs include soil stratification at the borehole locations along with detailed soil descriptions. Variations in the soil stratification may occur and should be expected between borehole locations and elsewhere on the site.

FILL

Asphalt underlain by thick layer of granular materials was found at the surface of borehole 209. Topsoil was encountered at the surface of borehole 210. Fill soils were encountered at the surface of borehole 208 and below the granular material/topsoil of boreholes 209 & 210. Fill extended to the approximate depths of 1.75m (no. 208), 1.07m (no. 209) and 0.76m (no. 209) below the prevailing grades. The fill consisted of dark brown to brown sand or sandy silt to silty sand with trace of roots/topsoil/gravel.

BROWN SAND

Brown sand was encountered below the fill soils in boreholes 208 and 210. Relative density of this layer varied from very loose to very dense and it extended to the approximate depth of 1.07m in borehole 210. Borehole 208 was terminated in the sandy deposit around the approximate depth of 6.25m because of refusal to spoon/auguring. Very loose relative density around the depth of 2.3m in the above sandy layer may be due to disturbance during auguring or due to hydrostatic pressure of water.

BROWN SANDY SILT TILL

Fill soil of borehole 209 was underlain by brown sandy silt till. Relative density of this till varied from compact to very dense and it extended to the approximate depth of 3.81m.

GREYISH BROWN/GREY SILT/CLAYEY SILT

Brown sand in borehole 210 was underlain by greyish brown to grey silt to clayey silt. Relative density/consistency of this deposit was found to be compact/stiff and it extended to the approximate depth of 5.33m.

GREY SANDY SILT TILL/SILTY SAND TILL

Brown sandy silt till of borehole 209 and grey clayey silt of borehole 210 were followed by grey sandy silt till/silty sand till. Relative density of these tills varied from compact to very dense.

Boreholes 209 and 210 were terminated in the grey sandy silt/silty sand till around the approximate depths of 6.02m and 6.55m. Occasional cobbles/boulders were encountered while auguring through the very dense sand/sandy silt till deposits.

6. GROUNDWATER CONDITIONS

The boreholes were advanced using dry auguring. Seepage/ground water was measured at the depths of 2.29m (no. 208), 2.59m (no.209) and 4.88m (no. 210) on completion of the respective soil borings.

Monitoring wells were installed in boreholes 208 and 210 for groundwater observations. Groundwater levels/elevations as measured are summarized in the following table:

No.	Elev. at Ground m	Depth of Well/BH m bgs	On Completion		On August 24, 2021	
			GW level m bgs	GW Elev. m asl	GW level m bgs	GW Elev. m asl
BH208(MW)	200.60	6.10	2.29	198.31	1.83	198.77
BH209	207.80	-	2.59	205.21	-	-
BH210(MW)	198.50	6.10	4.88	193.62	1.06	197.44

Based on the above information and visual examination of the soil samples, we conclude that ground water exists in the wet sand encountered in the borehole 208 and sand overlying the relatively impervious silt/clayey silt in borehole 210. Seepage/ground water may also be encountered from the wet seams/layers/pockets trapped in the native till soils and/or fill/granular material.

7. FOUNDATION CONSIDERATIONS

7.1 General Discussion

The proposed development may comprise the construction of one story industrial/commercial buildings with slab-on-grade construction.

However, details of the proposed development such as type of structures, building locations, proposed finished floor/grade elevations etc. were not available at the time of investigation.

The following sections provide general geotechnical recommendations for design and construction for the proposed buildings.

7.2 Foundation Considerations

Boreholes indicate that undisturbed native soils of brown to greyish brown sandy silt till, sand/silty sand or silt/clayey silt can be used for the building support using conventional strip and/or spread footing foundations.

For footings placed over undisturbed native soils, the approximate minimum founding depths/elevations and corresponding factored geotechnical resistance at ULS and geotechnical reaction at SLS are presented in the following table:

B.H. No.	EXISTING GRADE/ ELEVATION, m	APPROX. FOOTING FOUNDING		SOIL BEARING PRESSURE	
		DEPTH, m	ELEV., m	SLS	ULS
208	200.60	1.9 - 2.9	198.7 - 197.7	150	225
		2.9 - 3.9	197.7 - 196.7	240	360
209	207.80	1.2 - 2.3	206.6 - 205.5	200	300
		2.3 - 3.0	205.5 - 204.8	500	750
210	198.50	0.9 - 2.5	197.6 - 196.0	150	225
		2.5 - 4.0	196.0 - 194.5	100	150

For footings founded at different levels in the vicinity of each other or located adjacent to excavated and backfilled areas, such as sewer/utility trenches/previous excavations etc., the slope of the imaginary line joining the bottom of two footings or the bottom of footing and excavation should not be steeper than 10H:7V for till soils and 1.5H:1V for sandy soils.

The base conditions at the footing founding levels should be observed by a soil engineer from our office prior to pouring concrete, to ensure that the design bearing pressures are being attained and soils are in undisturbed state.

For frost protection, a minimum 1.2 m earth cover should be provided for footings exposed to freezing weather conditions such as exterior wall/column footings.

7.3 Earthquake Considerations

The 2012 OBC Subsection 4.1.8 stipulates that a building should be designed to meet the requirements of the Earthquake Load and Effects. The Site Classification for Seismic Site Response (Table 4.1.8.4.A) is determined from the average Standard Penetration Resistance (N_{60}) of the soils within upper 30 m.

Based on the results of standard penetration tests i.e., “N” values from the current geotechnical investigation, the site designation for seismic analysis applicable for the proposed building is expected to be **"Class D"**.

The seismic parameters and analysis requirements are detailed in Subsection 4.1.8 of the 2012 OBC.

7.4 Engineered Fill

Engineered fill may be considered for supporting the proposed building foundations/slab-on-grade construction in the fill/lower areas.

The engineered fill should extend beyond the outer edges of the exterior wall footings by a minimum distance equal to the depth of engineered fill below the footing level or 2.0m, whichever is greater. All the existing fill should be removed from within the engineered fill envelope. Approved clean inorganic fill may be stockpiled for re-use under frost-free/dry weather conditions.

The exposed native subgrade must be inspected by our geotechnical personnel, after the above stripping/excavation operations. The subgrade should be proof rolled to ensure its stability & compactness prior to commencing the backfilling operations. Any wet and/or unstable areas should be sub excavated to competent subsoils.

The engineered fill may consist of granular materials or approved on-site excavated/imported inorganic materials. The use of on-site excavated/imported inorganic materials for engineered fill will be dictated by their natural moisture contents and the weather conditions at the time of placement of fill. Imported inorganic materials should also meet the MECP guidelines.

The engineered fill materials should be placed in 200mm thick layers with each layer being compacted to at least 98% of the Standard Proctor Maximum Dry Density, under full time quality control and density testing by our geotechnical staff.

All the engineered fill operations should be carried out under dry and frost-free conditions. Proper site drainage must be maintained within the engineered fill area during and after completion of

engineered fill. Drainage ditches should be provided to intercept any water flowing into the engineered fill areas.

We recommend that continuous reinforcement steel should be provided in the footings and foundation walls placed over the engineered fill areas. Preferably, the engineered fill should be carried to at least 0.5m above the proposed footing levels to avoid surficial disturbances due to construction equipment, wetting and drying etc. Any building location changes or any excavation activity in the engineered fill areas should be carried out only after consultation with our office.

If the engineered fill is to be left over winter months, adequate earth cover or equivalent must be provided.

The engineered fill placed as described above can support a soil bearing pressure of up to 150kPa (SLS).

7.5 Slab-on-Grade Construction

From boreholes 209 and 210 it appears that most of the fill is free of highly compressible organic soils. The existing fill in borehole 208 area should be further evaluated from footing/service trenches at the time of construction. All the loose fill and any unsuitable fill such as organic/topsoil mixed soils etc. should be removed from the areas to be slabbed.

Exposed subgrade should be proof rolled in the presence of our soils personnel to detect any compressible, spongy or unstable areas. If any isolated pockets of such materials are detected, they should be sub-excavated to competent subsoils and backfilled with approved inorganic materials compacted to at least 95% of their Standard Proctor Maximum Dry Density (S.P.M.D.D.) in thin layers.

Any new fill should consist of approved compactable inorganic soils, placed in thin layers (not exceeding 300mm), and each layer should be compacted to at least 98% of its S.P.M.D.D. under dry and frost-free conditions.

For normal light duty slab-on-grade construction, a 150mm thick bedding layer consisting of granular 'A' or 20mm crusher run material should be specified under the slab-on-grade to serve as a moisture barrier. The bedding layer should be compacted to a minimum of 98% of its S.P.M.D.D.

7.6 Pavement Construction

The functional life of a pavement depends directly on the subgrade conditions and the load carrying capacity of the pavement structure. The following minimum flexible pavement structure thicknesses are recommended.

Minimum Flexible Pavement Structure Thicknesses

PAVEMENT LAYER	COMPACTED THICKNESSES	
	LIGHT DUTY PARKING	DRIVEWAYS/ACCESS ROADS
Asphalt top course, HL-3	40mm	40mm
Asphalt base course, HL-8	40mm	80mm
Granular 'A' or 20mm crusher run limestone base	150mm	150mm
50mm crusher run limestone sub-base or Granular B	200mm	350mm

The pavement structure should also meet the minimum local municipal/regional design requirements, if any, for the proposed development.

The above thicknesses are applicable for dry and stable subgrade conditions during summer season construction only. If the construction is carried out during winter and for unstable subgrade conditions, the thicknesses of granular materials may have to be increased.

The granular base materials should conform to O.P.S.S. Form 1010 specifications and be compacted to at least 98% of their SPMDD's. Similarly, asphaltic concretes should meet the O.P.S.S. Form 1150 requirements for specified grades and be compacted to at least 97% of their Marshall Densities.

Subgrade may be prepared as described in subsections 7.5. All the unsuitable compressible organic and loose fill soils must be removed from the areas to be paved. Exposed subgrade must be proof rolled to ensure its stability and compactness. Upper 1m of subgrade in fill/backfill areas should be compacted to minimum 98% of SPMDD.

Prior to placement of granular bases, the finished sub-grade should be contoured to eliminate depressions and sloped at a minimum of 2% towards the catch basins to facilitate drainage of subgrade and base materials.

Water should not be allowed to accumulate at/near the pavement edges. The importance of sub-grade drainage and regular maintenance and repairs cannot be over-emphasized.

7.7 Excavation

It is understood that the excavation for the proposed structures/services may extend to the depth of 2m or more. According to the Ontario Occupational Health and Safety Act, all excavations deeper than 1.2m should be adequately supported against ground collapse. Caving of any loose fill or wet pockets/layers should be kept in awareness during excavation.

Moist fill, native sand/silty sand and weathered/disturbed silty sand/sandy silt till can be considered as Type 3 Soils and the cut slopes should not be steeper than 1H:1V from the bottom of trench/excavation. Presence of wet seams/pockets/layers may require flattening of the side slopes. Dense to very dense till soils can be considered as Type 2 Soils.

Field review should be carried out at the time of construction to evaluate the impact of site/groundwater conditions. Excavations extending into wet subsoils should not proceed until they have been brought into moist state by appropriate method of dewatering.

The following soil parameters can be used in the evaluation of lateral earth pressures and design of the shoring system.

	FILL	Sand/ Sandy Silt	Silt/Clayey Silt
Unit weight, γ, kN/m^3	18	21.0	21
Coefficient of earth pressure at rest (K_0)	0.50	0.38	0.45
Coefficient of active earth pressure (Ka)	0.40	0.33	0.40
Coefficient of passive earth pressure (Kp)	2.50	3.00	2.50

The excavation sides should be protected to prevent erosion from surface water or water bearing wet pockets/layers.

8. GENERAL CONSIDERATIONS

This report is limited in scope to those items specifically referenced in the text. No other testing and design calculations have been performed except as specifically reported.

The discussions and recommendations presented in this report are intended for the sole guidance of the client named and the design consultants. It should not be relied upon for any other purpose.

The information on which these recommendations are based is subject to confirmation by engineering personnel at the time of construction.

The fact that localised variations in the subsurface conditions may be present between and beyond the boreholes and that those conditions may be significantly different from the general description provided for design purposes should be understood.

Contractors bidding on or undertaking the work should decide on their own investigations, as well as their own interpretations of the factual borehole results. This concern specifically applies to the classification of the subsurface soils and the potential reuse of these soils on/off Site. Contractors must draw their own conclusions as to how the near surface and subsurface conditions may affect them.

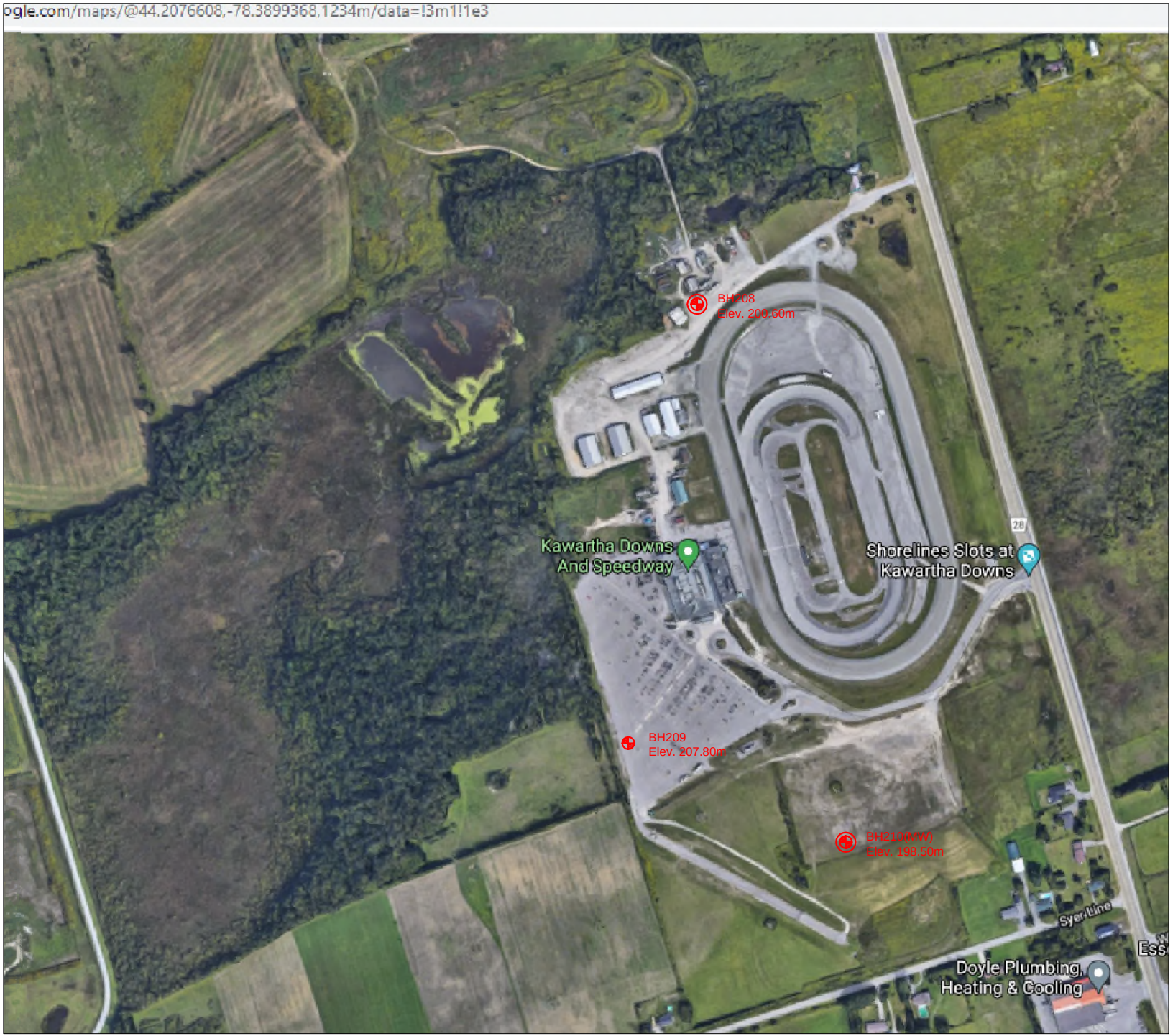
It is strongly urged that Fisher be contacted to provide assistance in the interpretation of the borehole records by anyone undertaking work on/or below the ground surface at this site prior to this work being carried out.

The client expressly agrees that Fisher's employees and principals shall have no personal liability to the client in respect of a claim, whether in contract, tort and/or any other cause of action in law. Accordingly, the client expressly agrees that it will bring no proceedings and take no action in any court of law against any of Fisher's employees or principals in their personal capacity.

9. CLOSING

We trust that the foregoing information is sufficient for your present needs and will be pleased to review the contents of this report in greater detail should you so require. Should you require our services further in this regard, please do not hesitate to contact our office.

APPENDIX A – SITE PLAN



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NORTH

N

LEGEND

Borehole/
Monitoring Well

PROJECT NAME AND ADDRESS

GEOTECHNICAL INVESTIGATION

KAWARTHA DOWNS,
MOORE DRIVE & COUNTY ROAD 28,
PETERBOROUGH, ONTARIO

FIGURE 1:

SITE PLAN WITH BOREHOLE LOCATIONS

PROJECT NO.	SHEET NO.
FE-P 21-11454	1
DATE: SEPTEMBER 2021	
SCALE: AS SHOWN	

APPENDIX B – LOG OF BOREHOLES

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LOG OF BOREHOLE NO. BH208(MW) SHEET. 1 of 1

PROJECT NO.: FE-P 21-11454

PROJECT NAME: Geotechnical Investigation

LOCATION: Kawartha Downs, Moore Dr. & County Rd. 28, Peterborough, ON.

DRILLING METHOD: Geo-Probe, Hollow Stem

DRILLING DATE: August 20, 2021

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID:	TYPE NUMBER	P.I.D. Reading	"N" VALUE
0	0	GROUND SURFACE (m asl)		200.60				
0 - 4	0 - 1	FILL: greyish brown to dark brown sand, trace of silt, gravel, topsoil & topsoil mixed soils, moist.				SS-1		13
						SS-2		9
6	2			1.75/ 198.85		SS-3		13
8 - 12	2 - 4	BROWN SAND: occasional trace of gravel, wet to very moist, very loose to compact.				SS-4		4
						SS-5		24
14 - 20	4 - 6	BROWN SAND: trace of gravel, very wet, very dense.		4.11/ 196.49		SS-6		78
				6.25/ 194.35		SS-7		100
22 - 32	7 - 10	End of Borehole Refusal to augering at 6.25m. WL at 2.29m on completion.						

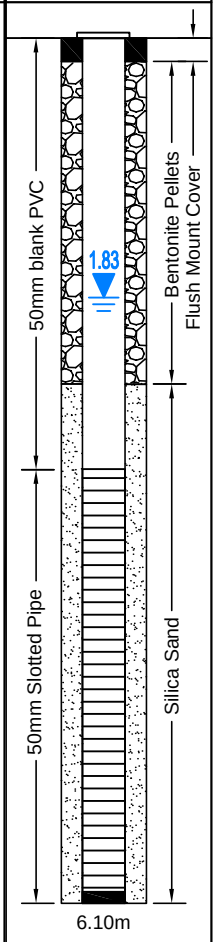
PENETRATION TESTING (SPT) ▲ 20 40 60 80
SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

(Possibly Disturbed)

VAPOUR READING (ppm) □ 20 40 60 80
MOISTURE CONTENT (%) ● 10 20 30 40

19%
20%
20%

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth: on completion: 2.29m; on August 24, 2021: 1.83m

DRAWN: BL LOGGED: ES CHECKED: RC

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LOG OF BOREHOLE NO. BH209 SHEET. 1 of 1

PROJECT NO.: FE-P 21-11454

PROJECT NAME: Geotechnical Investigation

LOCATION: Kawartha Downs, Moore Dr. & County Rd. 28, Peterborough, ON.

DRILLING METHOD: Geo-Probe, Hollow Stem

DRILLING DATE: August 10, 2021

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID:	SAMPLES TYPE NUMBER	P.I.D. Reading	"N" VALUE
		GROUND SURFACE (m asl)		207.80				
0	0	ASPHALT		0.10/ 207.70				
		GRANULAR MATERIAL				SS-1		13
2				0.69/ 207.11				
	1	FILL: brown sandy silt, moist.		1.07/ 206.73		SS-2		8
4								
6	2	BROWN SANDY SILT TILL: trace of clay & gravel, moist to dry, compact to very dense.				SS-3		20
8						SS-4		66
10	3					SS-5		100+
12				3.81/ 203.99				
	4	GREY SILTY SAND TILL: trace of clay & gravel, occasional boulder, dry, very dense.						
14								
16	5					SS-6		100+
18								
20	6			6.02/ 201.78		SS-7		100+
		End of Borehole						
22								
24	7	WL at 2.59m on completion.						
26	8							
28								
30	9							
32								
	10							

PENETRATION TESTING (SPT) ▲ 20 40 60 80
SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80
MOISTURE CONTENT (%) ● 10 20 30 40

9%
11%
7%

PIEZOMETER OR WELL CONSTRUCTION

Groundwater Depth: on completion: 2.59m

DRAWN: BL | LOGGED: PKS | CHECKED: RC

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LOG OF BOREHOLE NO. BH210(MW) SHEET. 1 of 1

PROJECT NO.: FE-P 21-11454

PROJECT NAME: Geotechnical Investigation

LOCATION: Kawartha Downs, Moore Dr. & County Rd. 28, Peterborough, ON.

DRILLING METHOD: Geo-Probe, Hollow Stem

DRILLING DATE: August 10, 2021

DEPTH (feet)	DEPTH (metres)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID:	SAMPLES TYPE NUMBER	SAMPLES P.I.D. Reading	SAMPLES "N" VALUE
		GROUND SURFACE (m asl)		198.50				
0	0	TOPSOIL		0.38/ 198.12		SS-1		5
2		FILL: dark brown to brown silty sand, trace of roots/topsoil, moist.		0.76/ 197.43				
4	1	BROWN SAND: some silt, very moist to wet, compact.		1.07/ 197.43		SS-2		18
6	2	GREYISH BROWN TO GREY SILT TO CLAYEY SILT: occasional trace of gravel, moist, compact/stiff.				SS-3		14
8						SS-4		14
10	3					SS-5		9
12	4							
14								
16	5					SS-6		8
18		GREY SANDY SILT TILL: trace of gravel/clay, moist to very moist, compact to dense.		5.33/ 193.17				
20	6					SS-7		30
22		End of Borehole		6.55/ 191.95				
24	7							
26	8	WL at 4.88m on completion.						
28								
30	9							
32	10							

PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

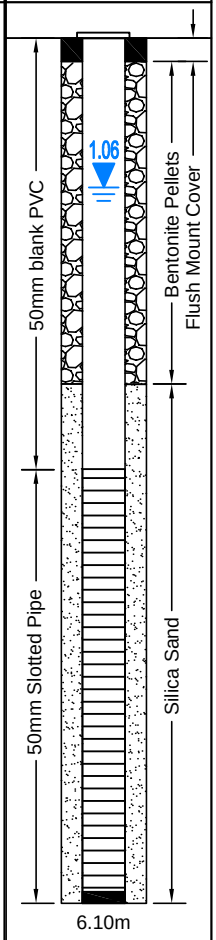
MOISTURE CONTENT (%) ● 10 20 30 40

SS-2: 16%

SS-3: 23%

SS-4: 21%

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth: on completion: 4.88m; on August 24, 2021: 1.06m

DRAWN: BL LOGGED: PKS CHECKED: RC

APPENDIX C – MOISTURE CONTENT AND GRAIN SIZE ANALYSES RESULTS

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Client:	Romspen Investment Corporation	***F.E. Job #:***	21-7160
Address:		***Project Name:***	Geotechnical
		Project ID:	FE-P 21-11454
		Date Sampled:	10 & 19-Aug-21
Tel.:		***Date Received:***	1-Sep-2021
Email:		***Date Reported:***	8-Sep-2021
Attn.:		***Location:***	Kawartha Down

Certificate of Analysis

Analyses	Matrix	Quantity	Date Extracted	Date Analyzed	Lab SOP	Method Reference
Moisture Content	Soil	9	N/A	2-Sep-21	Support Procedures F-99	Carter (1993)
Grain Size	Soil	3	N/A	3-Sep-21	Grain Size F-28	ASTM D6913-04

Fisher Environmental Laboratories is accredited by CALA (the Canadian Association for Laboratory Accreditation Inc.) for specific parameters as required by Ontario Regulation 153/04. All analytical testing has been performed in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act published by Ontario Ministry of the Environment.

Authorized by: Lin Rong

Roger Lin, Ph. D., C. Chem.
Laboratory Manager

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
Ronggen (Roger) Lin
CHEMIST

Results related only to the items tested

Certificate of Analysis

Analysis Requested:	Moisture Content, Grain Size
Sample Description:	9 Soil Sample(s)

Parameter	***21-7160-1*** MW208 0.60-1.50m	***21-7160-2*** MW208 1.50-2.10m	***21-7160-3*** MW208 2.10-2.70m	***21-7160-4*** MW209 0.75-1.20m	***21-7160-5*** MW209 1.50-1.95m	***21-7160-6*** MW209 2.25-2.70m
Geo Moisture Content (%)	19	20	20	9	11	7

Parameter	***21-7160-7*** MW210 0.75-1.20m	***21-7160-8*** MW210 1.50-1.95m	***21-7160-9*** MW210 2.25-2.70m			
Geo Moisture Content (%)	16	23	21			

QA/QC Report

Parameter	**Blank**	**RL**	**LCS**	**AR**	**Duplicate**	**AR**
			Recovery (%)		**RPD (%)**	
Geo Moisture Content (%)	<0.1	0.1	100	70-130	1.1	0-20

LEGEND:

RL - Reporting Limit
LCS - Laboratory Control Sample
AR - Acceptable Range
RPD - Relative Percent Difference

Certificate of Analysis

Analysis Requested:	Moisture Content, Grain Size
Sample Description:	9 Soil Sample(s)

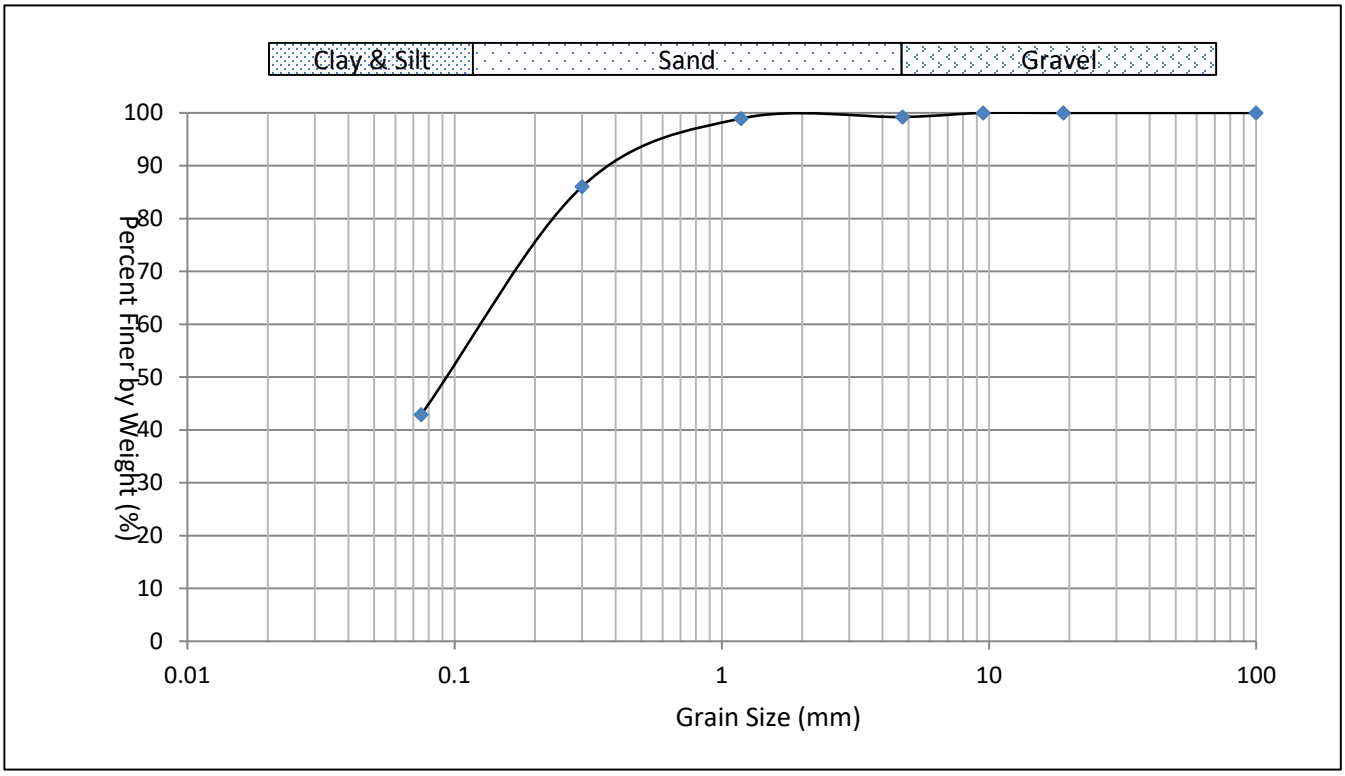
Parameter	***21-7160-3*** MW208 2.10-2.70m	***21-7160-5*** MW209 1.50-1.95m	***21-7160-8*** MW210 1.50-1.95m			
Grain Size (%)						
>19mm	0.0	0.0	0.0			
9.5mm-19mm	0.0	0.0	1.2			
4.75mm-9.5mm	0.8	0.0	3.4			
1.18m-4.75mmm	0.3	0.0	9.2			
300um-1.18mm	12.9	0.6	22.2			
75um-300um	43.2	2.5	25.3			
<75um	42.9	96.9	38.7			
Clay & Silt	**43**	**97**	**39**			
Sand	**56**	**3**	**57**			
Gravel	**1**	**0**	**5**			

Client: Romspen Investment Corporation ***F.E. Job #:*** 21-7160

Grain Size Distribution

Sample ID: 21-7160-3 MW208 2.10-2.70m

Clay & Silt: 43% Sand: 56% Gravel: 1%

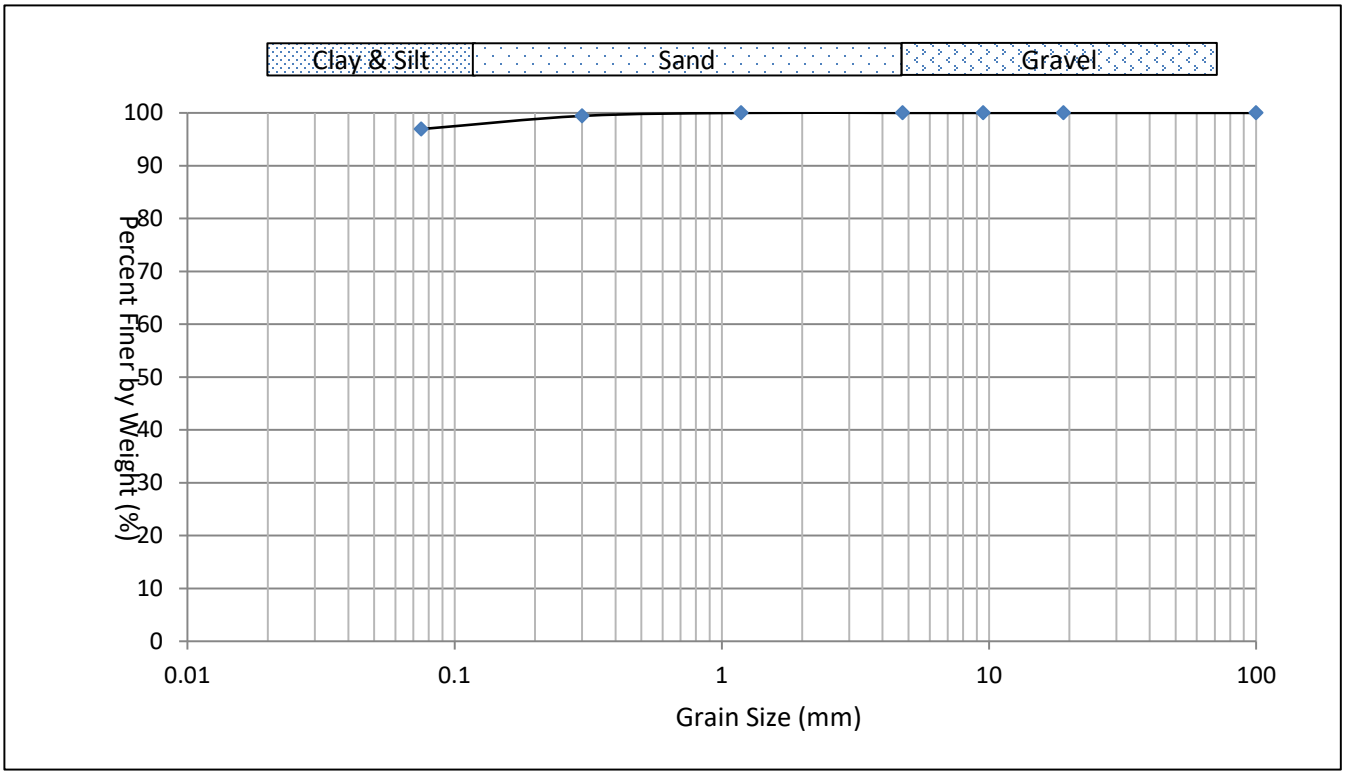


Client: Romspen Investment Corporation ***F.E. Job #:*** 21-7160

Grain Size Distribution

Sample ID: 21-7160-5 MW209 1.50-1.95m

Clay & Silt: 97% Sand: 3% Gravel: 0%



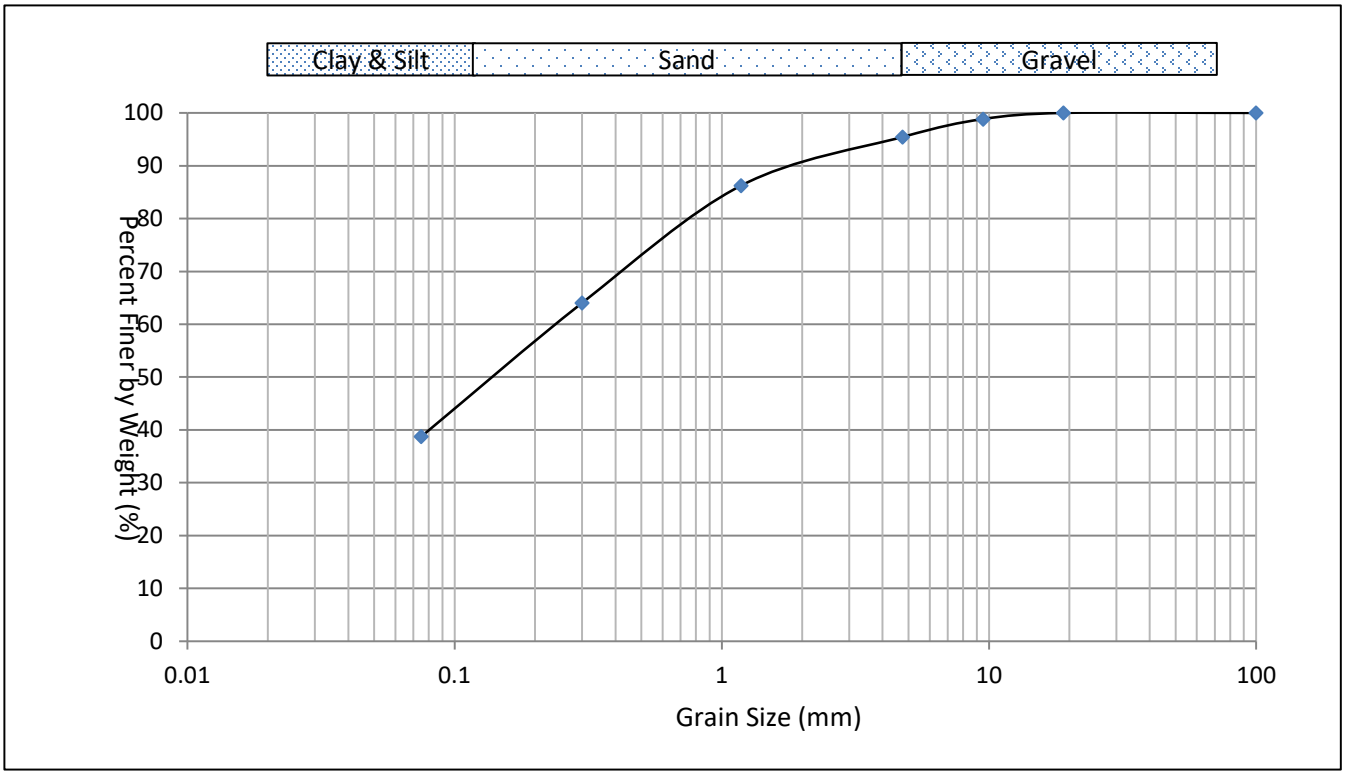
Results related only to the items tested

Client: Romspen Investment Corporation ***F.E. Job #:*** 21-7160

Grain Size Distribution

Sample ID: 21-7160-8 MW210 1.50-1.95m

Clay & Silt: 39% Sand: 57% Gravel: 5%



Results related only to the items tested