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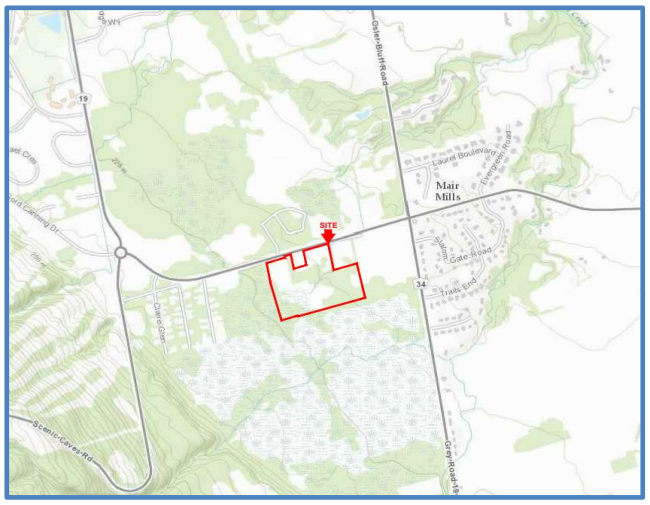
PRELIMINARY GEOTECHNICAL INVESTIGATION



PROPOSED NEW DEVELOPMENT, LOT 15, CONCESSION 1, SOUTH OF GREY ROAD 19 & CROSSWINDS BLVD, TOWN OF BLUE MOUNTAIN, ONTARIO

Prepared for:

Bydem Enterprises Inc.

Project No. FG 23-13473

December 8, 2023

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Project Name:	Preliminary Geotechnical Investigation for Proposed New Development
Project Address:	Lot 15, Concession 1, South of Grey Road 19 & Crosswinds BLVD, Town of Blue Mountain, ONTARIO
Project Number:	FG 23-13473
Issued on:	December 8, 2023
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1. INTRODUCTION

Fisher Engineering Limited (Fisher) was commissioned by Bydem Enterprises Inc. to carry out a preliminary Geotechnical Investigation for the proposed new development at Lot 15, Concession 1, located South of Grey Road 19 and Crosswinds Boulevard in the Town of Blue Mountain, ON, hereinafter referred to as the 'Site'.

The purpose of this investigation was to determine general subsurface conditions in the area of the proposed construction, by advancing eight (8) boreholes.

Discussion of the findings and results of the preliminary Geotechnical Investigation is in accordance with the general terms of reference. This report was prepared specifically and solely for the purpose of assessing geotechnical conditions as they relate to the development of the site with respect to the proposed structures as detailed to Fisher at the time of the investigation.

2. SITE and PROJECT DESCRIPTIONS

Site Settings

The site is located south of Grey Road 19, across from the intersection with Crosswind Boulevard, in the Town of Blue Mountains, and is bounded by Grey Road 19 to the north, beyond which is a residential development, residential properties to the east and undeveloped land to the south and west. The site has an approximate area of 113,000m^2. Refer to Appendix A for Site Location Map (Figure A1).

The southeast corner of the property, which is rectangular in shape, was covered mostly with wetland, forest, with grassed/ vegetated areas and trees within the boundaries. A creek traverses the site from northeast to southwest, effectively separating the development area in northwest and southeast quadrants. At the time of the investigation, the site was occupied by a single-storey building near Grey Road 19, along with storage of equipment.

Topography

The site and slopes gently from west to east and north to south with elevations changing from approximately 224.31m at MW2, located in the northwest corner, to 220.72m asl at MW5, located in the northeast, and 218.72m asl at MW7 located towards the south. Site drainage is generally towards the creek on the east and south side of the northwest quadrant.

Proposed Development

Based on the conceptual development plan, by CMV Group Architects, dated October 25, 2023, the proposed development will consist of two phases: Northwest and Southeast Quadrants. This preliminary investigation covers the northwest quadrant consisting of Blocks A to H of 3 to 5-storey buildings. Design details such as Finished Floor Elevations were not available during the investigation. Ground floor elevations were therefore assumed to be slightly higher than average grade in the area of each building.

3. SCOPE OF GEOTECHNICAL WORK

The geotechnical scope of work includes the following:

- Investigation of subsurface conditions on the site by advancing boreholes, soil sampling and visual evaluation.
- Preparation of a report with comments and recommendations regarding:
    - geotechnical aspects of design and construction of the proposed development.
    - foundation type, ultimate and serviceability bearing capacity.
    - slab-on-grade construction.
    - pavement construction and
    - excavation recommendations etc.

4. FIELD AND LABORATORY WORK

Public and private utilities clearances were carried out by Ontario One-Call and Utility Marx, on behalf of Fisher Engineering, prior to drilling.

Subsurface Investigation

Subsurface soil exploration for the preliminary Geotechnical Investigation was conducted concurrent with drilling for a Phase II ESA on November 13 and 14, 2023 during which eight (8) boreholes (BH1 to BH8) were extended to approximate depths of 5.03m to 6.71m below prevailing grades. Approximate locations of the boreholes and elevations are presented in Appendix A – Borehole Location Plan.

All boreholes were instrumented as monitoring wells on completion of drilling to be used for groundwater testing and sampling. The wells were constructed using 50mm (2”) diameter PVC pipes with 3.05m (10’)

long screens. A clean silica sand pack was placed around the well screens and isolated with bentonite below prevailing grades.

A D-50 Marooka Track mounted drill rig equipped with solid stem augers, supplied by Terra Firma Services, was used for all drilling work under direct supervision of Fisher Engineering personnel. Soil samples were taken at regular intervals using a split–spoon sampler advanced by means of the Standard Penetration Test (SPT) which was conducted in general accordance with ASTM Specification D1586. All recovered soil samples were placed in clear, sealable plastic bags in the field and transported to Fisher Engineering laboratory for further examination, characterization and laboratory analyses.

A description of subsurface conditions encountered at each borehole location is presented in Appendix B - Log of Boreholes.

Laboratory Analyses

Fourteen (14) representatives soil sample from BH1, BH5, BH6 and BH8 were submitted to the laboratory for moisture content tests and four (4) samples for grain size analyses. Four (4) soil samples were submitted for chloride and sulphate tests while sixteen (16) samples were submitted for pH analyses. The samples were tested and classified in general accordance with Unified Soil Classification System, ASTM D 2487 and Standard Practice for Classification of Soil for Engineering Purposed. The laboratory results, which are presented in Appendix C, are consistent with the field description for subsurface soils discussed in Section 5.0.

The soil samples recovered during the investigation will be stored in the Fisher Engineering laboratory for a period of 30 days after submitting this report and will be discarded thereafter unless instructed otherwise by the client.

Site Survey

Elevations at borehole/monitoring well locations were surveyed by Fisher Engineering personnel referencing a temporary benchmark (TBM), transformer pad on the north side of Grey Road 19, having an elevation of 225m asl.

5. SUBSOIL CONDITIONS

Surface and subsurface conditions encountered at borehole locations are shown in Appendix B - Log of Boreholes and are summarized in the following sections. The logs include stratification at borehole locations along with detailed soil descriptions. Variations in soil stratification may occur and should be expected between borehole locations and elsewhere on the site.

Top Soil /Concrete/Fill/Disturbed Soil: A layer of topsoil was observed at the surface of all boreholes with the exception of BH3 in which a 76mm thick concrete layer was encountered. The topsoil/concrete layers were underlain by fill material, consisting of brown/grey & brown, moist to wet, disturbed clayey silt/ sandy silt/ silty sand with trace gravel/roots/topsoil and occasional brick pieces extending to approximate depths of 0.76m to 1.52m bgs as shown in Table 1. Deeper fill observed in BH1, BH3 and BH5 may be disturbed soils and can be further evaluated during construction.

Table 1: Summary of Depth and Elevation of Fill

Borehole No.	BH1 (MW)	BH2 (MW)	BH3 (MW)	BH4 (MW)	BH5 (MW)	BH6 (MW)	BH7 (MW)	BH8 (MW)
Surface Elevation (m asl)	223.72	224.31	223.22	220.77	220.72	223.48	223.58	223.51
Depth of Borehole (m)	6.55	6.10	5.03	6.55	6.55	6.55	6.55	6.71
Elevation at Bottom of Borehole (m asl)	217.17	218.21	218.19	214.22	214.17	216.93	217.03	216.80
Depth of Fill (m)	1.52	0.76	1.52	0.76	1.52	0.76	0.76	0.76
Elevation at Bottom of Fill (m asl)	222.20	223.55	221.70	220.01	219.20	222.72	222.82	222.75

Brown/ Greyish Brown Sandy Clayey Silt Till/Clayey Silt Till: Layers of brown to greyish brown, moist, very stiff to hard sandy clayey silt till to clayey silt till, with trace gravel were encountered below the fill layers in BH1 extending to 3.05m bgs; in BH2 extending to 3.05m bgs; in BH4 and 7 extending to 3.05m bgs; in BH5 extending to 2.29m bgs and in BH6 extending to 2.44m bgs.

Grey Clayey Silt till/ Silty Clay till: Layers of grey, moist, very stiff to hard, clayey silt till, with trace gravel and fine sand, were observed below the brown/greyish brown sandy clayey silt till/clayey silt till layer in BH1, BH4, BH5, BH6 & BH7 extending to approximate depth of 5.49m bgs (termination depth of 6.55m in BH6 & BH7); below fill in BH2 terminating at 6.1m and in BH8 extending to 4.57m bgs.

Brown/ Grey Silty Sand: Layers of grey, moist to wet, dense to very dense silty sand were observed towards the bottom of BH1, BH4, BH5 & BH8, all terminating in this layer at 6.55m to 6.71m bgs, and below the fill in BH3 extending to 3.81m bgs.

Grey Sandy Silt Till: A layer of grey, moist, very dense sandy silt till, with trace clay and gravel, was encountered below the brown silty sand in BH3 which terminated in this layer at 5.03m bgs.

6. GROUNDWATER LEVELS

The boreholes were advanced using dry solid stem auguring and were found to be generally dry on completion of the respective soil investigation. Negligible amount of water was observed at the bottom of BH4, BH5 and BH8. Monitoring wells were installed in all boreholes to observe groundwater levels for water sampling and testing. Approximate locations of the monitoring wells are presented in Appendix A. Measured groundwater depths and elevations are summarized in Table 2.

Table 2: Groundwater Levels and Elevations

Monitoring Wells		MW1	MW2	MW3	MW4	MW5	MW6	MW7	MW8
Surface Elevation (m asl)		223.72	224.31	223.22	220.77	220.72	223.48	223.58	223.51
Depth of Well, m bgs		6.10	6.10	4.57	6.10	6.10	6.10	6.10	6.10
Elevation at well base, m asl		217.62	218.21	218.65	214.67	214.62	217.38	217.48	217.41
In open boreholes on completion	GW level, m bgs	Dry	Dry	Dry	6.10	6.10	Dry	Dry	6.10
	GW Ele, m asl				214.67	214.62			217.41
27-Nov-23	GW level, m bgs	4.94	5.83	0.40	3.14	2.98	0.95	4.86	Dry
	GW Ele, m asl	218.78	218.48	222.82	217.63	217.74	222.53	218.72	

Moisture content values from laboratory tests vary from 9.1% to 18.6% indicating moist to wet conditions.

Based on the above information and visual evaluation of soil samples, it is expected that minor to some amount of groundwater may be encountered during excavations for footings, basements and underground utilities trenches. The quantity of groundwater and rate of discharge will need to be ascertained by way of a hydrogeological investigation, particularly if the buildings will be constructed with basement level(s).

7. GEOTECHNICAL DISCUSSIONS AND RECOMMENDATIONS

7.1 General Discussion

It was understood that the proposed development will consist of 3 to 5-storey buildings with/without basement level. Details of the finished ground floor elevations were not available.

The subsurface investigation showed that the soils in the area of the proposed building, covered by BH1 to BH8, generally consisted of topsoil and fill underlain by native sandy clayey silt till extending to depths of 0.76m to 1.52m below prevailing grade. These were underlain generally by clayey/ sandy silt till to silty sand extending to the maximum investigation depth of 6.55m. Boreholes terminated in native soils at elevations varying from 219.20m to 223.55m asl. Groundwater levels measured in the monitoring wells were between 0.40m and 5.83 bgs.

The following foundation options are recommended based on the observed soil conditions:

7.2 Spread/Strip Footings

The proposed buildings with one basement level may be supported by conventional strip/spread footings, founded on native undisturbed hard sandy clayey silty till/clayey silt till or dense to very dense silty sand.

Recommended approximate founding depths / elevations and corresponding bearing resistance at limit states (SLS and ULS) in the native soils are presented in the Table 3.

Table 3: Foundation Design for Conventional Footings

Building/Borehole	Elevation at BH surface (m asl)	Approx depth of footings at or below		Bearing Pressure	
		m bgs	m asl	at SLS (kPa)	at ULS (kPa)
BH1	223.72	1.7	222.02	300.00	450.00
BH2	224.31	1.0	223.31	300.00	450.00
BH3	223.22	1.7	221.52	300.00	450.00
BH4	220.77	1.2	219.57	300.00	450.00
BH5	220.72	1.7	219.02	300.00	450.00
BH6	223.48	1.0	222.48	300.00	450.00
BH7	223.58	1.0	222.58	300.00	450.00
BH8	223.51	1.0	222.51	300.00	450.00

7.3 General Comments about Footing Construction

- For footings founded at different levels in the vicinity of each other or located adjacent to excavated and backfilled areas, such as footing/sewer/utility trenches/previous excavations etc., the slope of the imaginary line joining the bottom of two footings or the bottom of footings and excavation should not be steeper than 10 horizontal to 7 vertical.
- Footings subject to seasonal winter weather, such as exterior wall and column footings, should be founded at least 1.4m below adjacent finished grades to prevent damage due to frost penetration.
- Base conditions at the footing founding levels should be observed by geotechnical personnel from Fisher, prior to pouring concrete, to ensure that design bearing pressures are being attained.

8. SEISMIC DESIGN CONSIDERATIONS

Site classification for seismic site response **Table 4.1.8.4.A**. is determined from the average Standard Penetration Resistance (N60) and/or estimated undrained shear strength (Su) of the soils within the upper 30m.

Based on the results of standard penetration tests and estimated undrained shear strength from the current geotechnical investigation, site designation for seismic analysis for the proposed building is expected to be "**Class C**" in the hard sandy clayey silt till/ dense silty sand layer. Shear wave velocity tests maybe required to confirm the above site class.

9. BASEMENT WALLS

The basement walls should be designed to resist a pressure “p” at any given depth “h” below the surface, as given by the expression:

$$\boldsymbol{p = 0.4[\Upsilon h + q]}$$

Where: 0.35 is the earth pressure coefficient considered applicable

Υ= 21.0 kN/m^3 is the unit weight of backfill

q = an allowance for surcharge in kPa.

The above equation assumes that a perimeter drainage system will be provided and that the backfill against subsurface walls, where applicable, would be a free draining granular material.

10. EXCAVATION AND BACKFILL

It is anticipated that no major problems will be encountered for the excavation depths for footings and underground utilities. The excavations must however be carried out in accordance with the latest edition of the Occupational Health and Safety Act (OHSA).

For excavations deeper than 1.2m, the sides should be sloped in accordance with the requirements of OHSA. Where this condition cannot be met, a temporary shoring system should be introduced.

Based on the subsurface exploration, the encountered sub soils are dominated generally by fill material underlain generally by very stiff to hard sandy clayey silt till/clayey silt till or dense to very dense sandy silt till to very dense silt till.

For the subject site excavation, in accordance with O. Reg. 213/91, S.226 (1) the moist fill/sand/silty sand can be classified as **Type 3** soils. Native, very stiff to hard clayey silt till or dense sandy silt till can be classified as **Type 2** soils. We sand/silty sand can be classified as **Type 4** soil. As defined by the OHSA, excavation walls within Type 3 soils will require battering back at slopes no steeper than 1H (horizontal):1V (vertical). For Type 2 soils, the bottom 1.2m of trench wall can be vertical. Presence of wet seams/pockets/layers may require flattening of the site slope.

Excavations extending into wet soils should be proceed until they have been brought to moist state by appropriate dewatering.

The material to be used for backfill in service trenches should be suitable for compaction, i.e., free of organics and with moisture content within 2 percent of the optimum moisture value. Backfill material should be compacted in lifts of no more than 200mm in thickness and to at least 98 percent of Standard Proctor Maximum Dry Density (SPMDD) in the upper 1.0m from road subgrade or in settlement sensitive areas. Beyond these zones, a 95% SPMDD compaction criterion is considered acceptable.

Additionally, onsite excavated fill materials and native soils may be used as backfill in service trenches, provided that the excavated materials are free of organic soils /construction debris and are of suitable moisture content.

For backfill against subsurface walls and footings it is recommended that backfill materials consist of Granular Class ‘B’ aggregates. On-site excavated granular material may be acceptable subject to further Site inspection.

11. SHORING

Based on site conditions, if a shoring system is required for excavation/footings to protect adjacent structures, the fourth edition of the Foundation Manual should be referred to for the design of the shoring system. Geotechnical parameters, which are considered applicable for the design of shoring walls and basement are presented in Table 4.

Shoring subject to unbalanced earth pressures must be designed to resist a pressure distribution that can be calculated as follows:

$$p = K [\gamma (h-h_w) + \gamma' h_w + q] + \gamma_w h_w$$

where: p = Lateral earth pressure in kPa acting at depth h

K = parameters are provided below

h = the depth below the ground surface (m)

hw = the depth below the ground water level (m)

γ = the bulk unit weight of soil, (kN/m^3) use 20.0

γ' = the submerged unit weight of the exterior soil, (γ - 9.8 kN/m^3)

q = equivalent value of surcharge on the ground surface in kPa (min 12 kPa)

Table 4: Geotechnical Parameters

SUBSOIL	Unit Weight, γ	Coefficient of Earth Pressure		
	(kN/m^3)	K_a	K_p	K_o
Top soil/ Fill	19	0.33	3.00	0.5
Clayey silt till/Silty clay till	20	0.41	2.46	0.58
Sandy silt/Silty sand (till)	21	0.27	3.69	0.43

12. SLAB ON GRADE CONSTRUCTION

For the building with one basement level, the basement floor slab can be supported by native sandy clayey silt till/clayey silt till and or sandy silt till or silty sand soils.

Exposed subgrade should be proof-rolled in the presence of Fisher soils personnel to detect any compressible, spongy or unstable areas. If isolated pockets of such materials are detected, they should be sub-excavated to competent subsoils and backfilled with approved inorganic materials (Granular A or ¾" crusher lime stone is preferred) compacted to at least 98% of their Standard Proctor Maximum Dry Density (S.P.M.D.D.) in thin layers.

For backfill against subsurface walls and footings it is recommended that backfill materials consist of Granular Class 'B' aggregates.

On completion of foundation work, the floor slab should rest on a well compacted bed of size 19mm clear stone at least 200mm thick. The stone bed would act as a barrier and prevent capillary rise of moisture from the subgrade to the floor slab.

13. UNDERGROUND UTILITIES

Pipe bedding and backfill materials specifications and compaction criteria for water and sewer services should be in accordance with the pipe designer's recommendations and/or local municipal requirements.

Bedding for utilities - For the subject site, it is expected that the underground services would be founded on fill or native clayey silt till to sandy silt till soil. In order to provide uniform support Granular Class 'A'/ 20mm CRL aggregate (crusher run limestone) is generally considered well suited to be used as bedding material. Localized dewatering may be required.

If the excavation is deeper than 1.2m, the sides should be sloped in accordance with requirements of OHSA. If this condition cannot be met, a temporary shoring system or trench box should be introduced.

Trench backfill should be uniformly compacted to a density that minimizes the risk of long-term settlement. Selected on-site excavated native soils/fill (subject to further site review) may be considered suitable for re-use in trench backfilling, provided that organics/construction debris are sorted out and materials are not allowed to be wet. Moisture content should be within 2% of the optimal moisture content.

In normal sewer construction practice, the problem of road settlement largely occurs adjacent to manholes, catch basins and service crossings. In these areas, granular materials are generally required for backfill and compaction.

Backfill in the upper 1.0m from road subgrade or in settlement sensitive areas should be placed in maximum 200mm thick lifts and compacted to 98% SPMDD. Beyond these zones a 95% SPMDD compaction criterion is considered acceptable.

14. PAVEMENT CONSIDERATION

It is expected that associated pavement for driveways and parking areas will be developed on the site. The functional life of a pavement depends directly on subgrade conditions and load carrying capacity of the pavement structure. Typical flexible pavement designs are presented in Table 5.

Table 5: Typical flexible pavement design

Pavement Layer	Compacted Thicknesses		
	Light/Medium Duty Parking	Driveways & Heavy Duty Parking	Internal Roadway
Asphalt top course, HL-3	40mm	40mm	40mm
Asphalt base course, HL-8	40mm	60mm	80mm
Granular 'A' or 20mm crusher run limestone base	150mm	150mm	150mm
50mm crusher run limestone sub-base	150mm	300mm	350mm

- Prior to the construction of asphalt pavement, topsoil, organic soils and construction debris must be removed. The exposed base should be proof-rolled and supervised/approved by geotechnical personnel. Any soft spongy spots detected during proof-rolling should be sub-excavated and replaced with suitable materials and compacted to 98% of their SPMDD. The placement of engineering fill, if any, should be supervised and inspected by Fisher Engineering staff.
- The finished subgrade must be contoured/graded and finally proof-rolled and approved by Fisher before placing the upper granular materials.

- The pavement structure should also meet the minimum municipal 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 O.P.S.S. Form 1150 requirements for specified grades and be compacted at least 92% of their Marshall Densities.
- The subgrade should be prepared as described in Section 12 prior to placement of granular base. The finished sub-grade should be contoured to eliminate depressions and sloped at a minimum of 2% towards catch basins or perimeter ditches/drains 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.

15. CHEMICAL ANALYSES

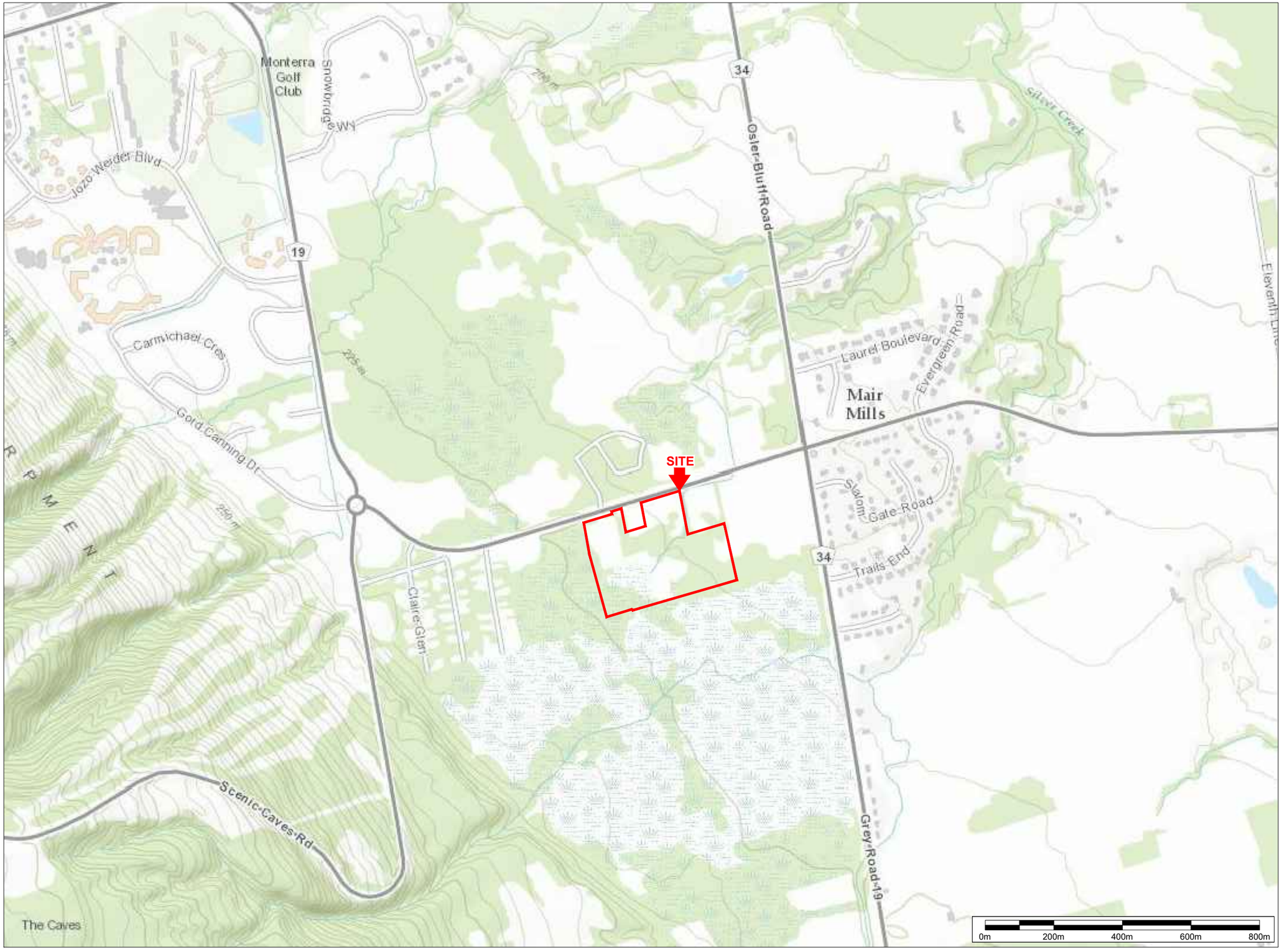
Four (4) soil samples from BH2, BH4 and BH6 and BH8 between depths of 4.57m to 6.71m, were submitted to Fisher Environmental laboratory for chemical analyses related to potential sulphate attack on buried concrete. Results of the analyses are presented in Appendix C.

- The chemical analyses show that sulphate concentration levels in the soil samples are 13 to 91 mg/kg or 0.0013% to 0.009% respectively. According to CSA-A23.1-09 Table 3, the results indicate negligible degree of exposure to sulphate attack (much less than 0.10 to 0.20% for S-3 class exposure).
- Maximum chloride content in the soil samples was 36 ug/g or 0.0036% indicating negligible corrosion of exposed ferrous metals.
- pH levels range from 7.53 to 8.06 and are within the acceptable range of 5-11 for soils.

16. LIMITATIONS

- This report is limited in scope to those items specifically referenced in the text. The discussions and recommendations presented in this report are intended only as guidance for the named client, their design engineers and those directly involved in the project.
- The information on which these recommendations are based is subject to confirmation by engineering personnel at the time of construction.
- Localized variations in subsoil conditions, and particularly fill material, may be present between and beyond the boreholes on which the recommendations are made and will have to be verified during construction. As more specific subsurface information becomes available during excavations on the subject site, this report should be updated.
- 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 subsurface soils and 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 recommended that Fisher be contacted to provide assistance in interpreting the borehole records by anyone undertaking work on/or below the ground surface at this site prior to work been carried out.
- The client expressly agrees that they entered into this agreement with Fisher, both on their own behalf and as agent on behalf of their employees and principals.
- 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 they 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.

APPENDIX A: SITE & LOCATION PLANS



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NORTH

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PROJECT NAME AND ADDRESS

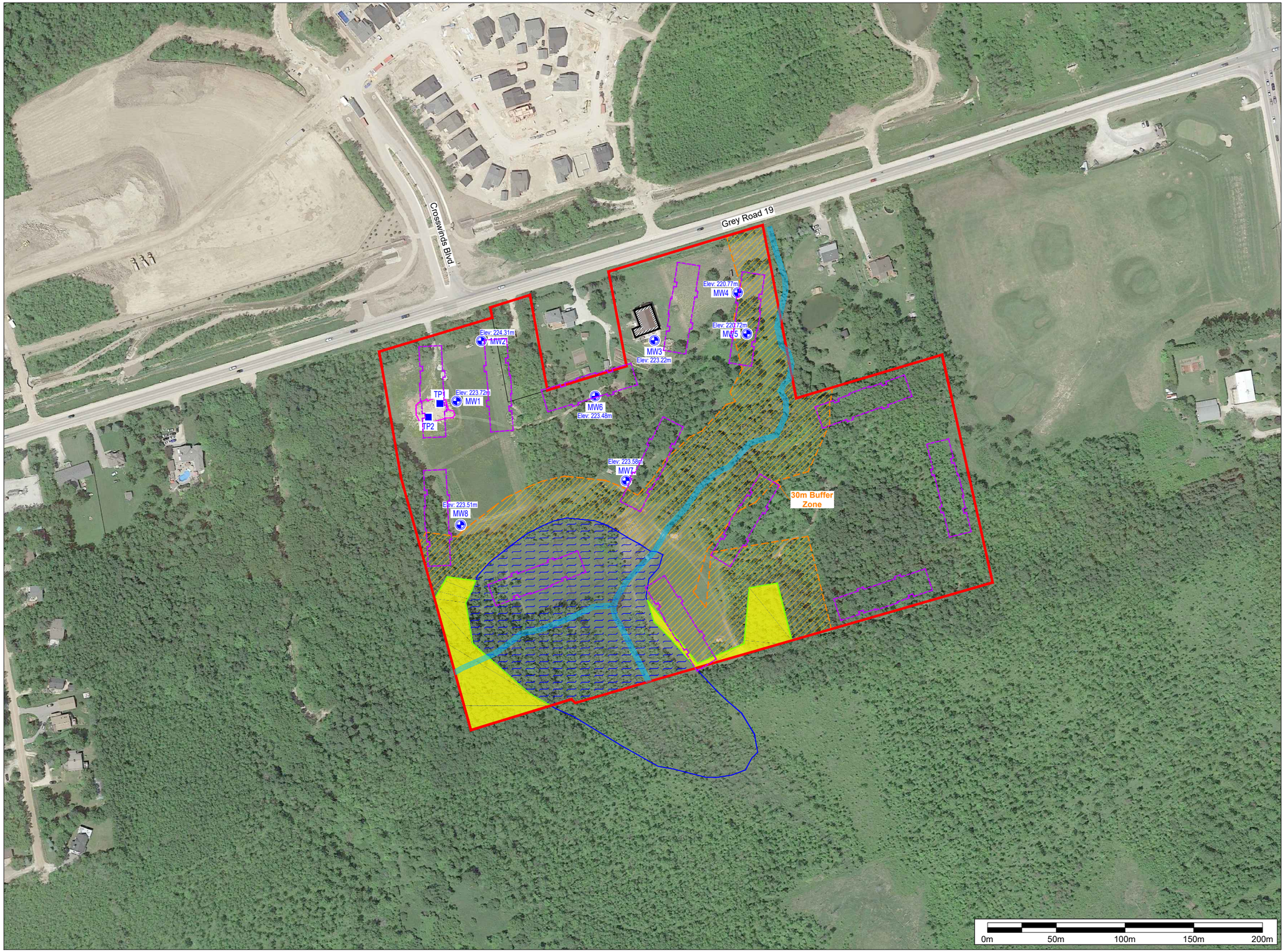
PRELIMINARY GEOTECHNICAL INVESTIGATION

Part of Lot 15, Concession 1, South of Grey Rd. 19 & Crosswinds Blvd., Town of Blue Mountains, ON

FIGURE A1:

SITE LOCATION MAP

PROJECT NO.	SHEET NO.
FE 23-13473	A1
DATE: 1 December 2023	
SCALE: AS SHOWN	



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NORTH

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- SUBJECT SITE BOUNDARY
- EXISTING BUILDING FOOTPRINT
- PROPOSED BUILDING FOOTPRINT
- BOREHOLE WITH MONITORING WELL LOCATION
- STOCKPILE SAMPLE
- WETLAND
- 30m BUFFER ZONE
- FILL STOCKPILE
- WATER BODY
- HAZARD ZONE AS PER ZONING BY-LAW 2018-65

PROJECT NAME AND ADDRESS

PRELIMINARY GEOTECHNICAL INVESTIGATION

Part of Lot 15, Concession 1, South of Grey Rd. 19 & Crosswinds Blvd., Town of Blue Mountains, ON

FIGURE A2:

SITE PLAN WITH BOREHOLE LOCATIONS

PROJECT NO.	SHEET NO.
FE 23-13473	A2
DATE: 1 December 2023	
SCALE: AS SHOWN	

DEVELOPMENT STATISTICS

BLOCK A:
- RETAIL GFA:10,644 SF
- RES. GFA: 21,288 SF
- STOREYS: 3
- UNITS: 48

BLOCK B:
- RETAIL GFA:10,644 SF
- RES. GFA: 21,288 SF
- STOREYS: 3
- UNITS: 48

BLOCK C:
- TOTAL GFA: 31,933 SF
- STOREYS: 3
- UNITS: 72

BLOCK D:
- TOTAL GFA: 31,933 SF
- STOREYS: 3
- UNITS: 72

BLOCK E:
- TOTAL GFA: 31,933 SF
- STOREYS: 3
- UNITS: 72

BLOCK F:
- TOTAL GFA: 42,577 SF
- STOREYS: 4
- UNITS: 96

BLOCK G:
- TOTAL GFA: 53,221 SF
- STOREYS: 5
- UNITS: 120

BLOCK H:
- TOTAL GFA: 42,577 SF
- STOREYS: 4
- UNITS: 96

BLOCK I:
- TOTAL GFA: 53,221 SF
- STOREYS: 5
- UNITS: 120

BLOCK J:
- TOTAL GFA: 53,221 SF
- STOREYS: 5
- UNITS: 120

BLOCK K:
- TOTAL GFA: 53,221 SF
- STOREYS: 5
- UNITS: 120

BLOCK L:
- TOTAL GFA: 53,221 SF
- STOREYS: 5
- UNITS: 120

BLOCK M:
- TOTAL GFA: 53,221 SF
- STOREYS: 5
- UNITS: 120

NORTHWEST QUADRANT
624 UNITS + 21,288 S.F. RETAIL
556 PARKING SPACES

SOUTHEAST QUADRANT
600 UNITS
458 PARKING SPACES

GREY ROAD 19 HOUSING DEVELOPMENT

TOWN OF THE BLUE MOUNTAINS

101 - 20 Camden Street
Toronto, Ontario, M5V 1V1
www.smvarch.com

T 416.506.1600 F 416.506.0956

CMV GROUP architects

SITE PLAN

DATE: Oct 25, 2023 - 1:10pm

GREY ROAD 19 HOUSING DEVELOPMENT

TOWN OF THE BLUE MOUNTAINS

CMV GROUP architects

101 - 20 Camden Street
Toronto, Ontario, M5V 1V1
www.smvarch.com

T 416.506.1600 F 416.506.0956

LOOKING SOUTH-EAST

DATE: Oct 25, 2023 - 1:13pm

GREY ROAD 19 HOUSING DEVELOPMENT

TOWN OF THE BLUE MOUNTAINS

101 - 20 Camden Street
Toronto, Ontario, M5V 1V1
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T 416.506.1600 F 416.506.0956

CMV GROUP architects

VIEW AT ENTRY

DATE: Oct 25, 2023 - 1:09pm

GREY ROAD 19 HOUSING DEVELOPMENT

TOWN OF THE BLUE MOUNTAINS

CMV GROUP architects

101 - 20 Camden Street
Toronto, Ontario, M5V 1V1
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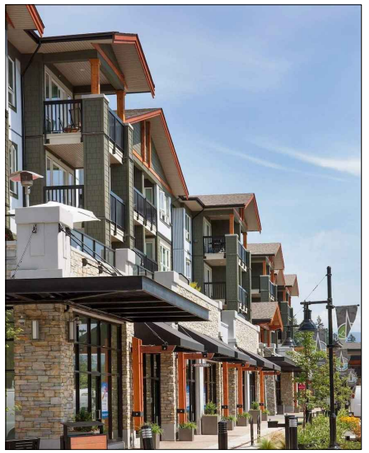
VIEW AT SE QUADRANT

DATE: Oct 25, 2023 - 1:05pm



GREY ROAD 19 HOUSING DEVELOPMENT

TOWN OF THE BLUE MOUNTAINS

101 - 20 Camden Street
Toronto, Ontario, M5V 1V1
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PRECEDENT IMAGES

DATE: Oct 12, 2023 - 12:28pm

APPENDIX B: LOG OF BOREHOLES

FISHER ENGINEERING

LOG OF BOREHOLE

NO. MW1 SHEET. 1 of 1

PROJECT NO.: FE# 23-13472/73

PROJECT NAME: GEOTECHNICAL & PHASE II ESA

LOCATION: South of Grey Rd. 19 & Crosswinds Blvd., Town of Blue Mountains, ON

DRILLING METHOD: Morooka, Solid Stem

DRILLING DATE: 14 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				223.72			
0	0	TOPSOIL: Dark brown clayey silt, trace rootlets, moist		0.30 / 223.42	23-2117-1	SS-1	9
2	1	FILL/Disturbed soil: Grey and light brown clayey silt, some fine sand, wet			23-2117-2	SS-2	25
4				1.52 / 222.20			
6	2	SANDY CLAYEY SILT TILL: Brown to greyish brown, trace gravel, moist, hard				SS-3	36
8						SS-4	47
10	3	CLAYEY SILT TILL: Grey, trace gravel, trace fine sand, moist, hard		3.05 / 220.67		SS-5	48
12	4						
14							
16	5					SS-6	35
18		SILTY SAND: Grey, trace gravel, trace clay, wet, very dense		5.49 / 218.23			
20	6					SS-7	100+
22		End of borehole at 6.55m		6.55 / 217.17			
24	7						
26	8						
28							
30	9						
32							
34	10						

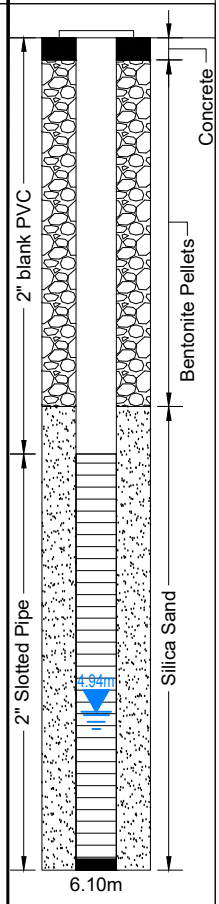
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): on completion: Dry/ On November 27, 2023: 4.94m

DRAWN: T.L. LOGGED: M.M. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. MW2 SHEET. 1 of 1

PROJECT NO.: FE# 23-13472/73

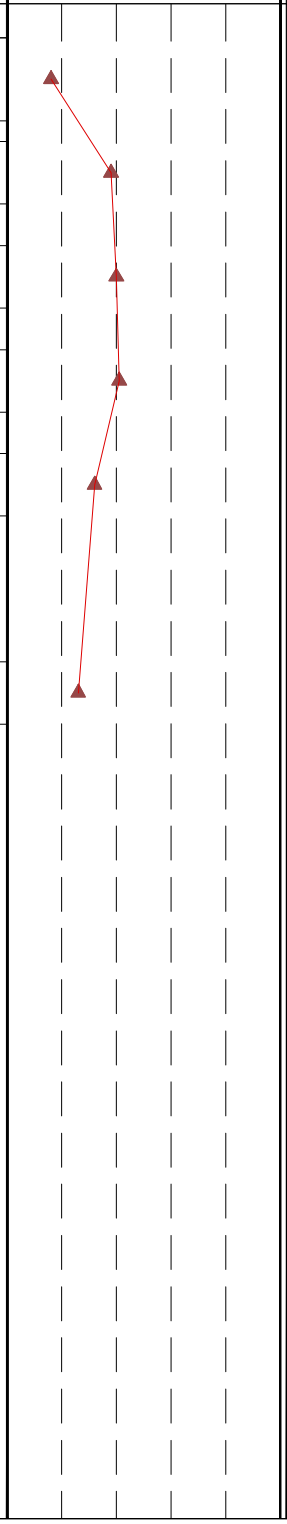
PROJECT NAME: GEOTECHNICAL & PHASE II ESA

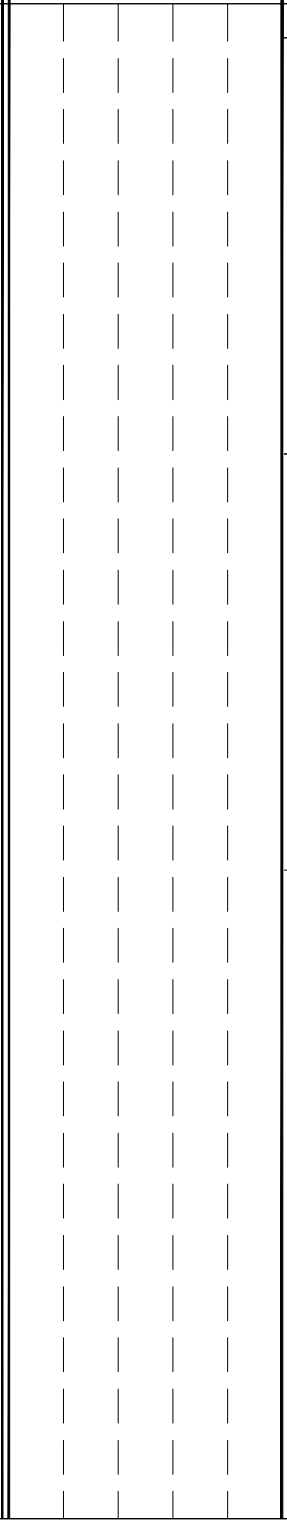
LOCATION: South of Grey Rd. 19 & Crosswinds Blvd., Town of Blue Mountains, ON

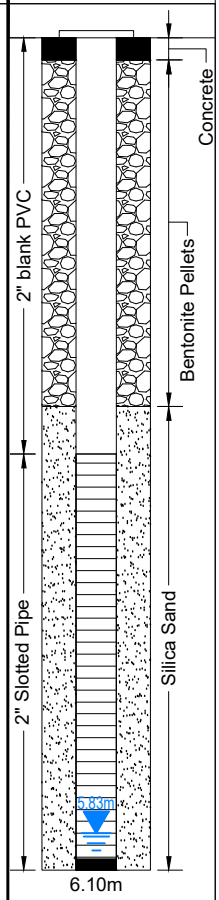
DRILLING METHOD: Morooka, Solid Stem

DRILLING DATE: 14 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				224.31			
0	0	TOPSOIL: Dark brown clayey silt, trace rootlets		0.15 / 224.16	23-2117-3	SS-1	16
2		FILL: Brown sandy silt, some clay, trace gravel, moist		0.76 / 223.55			
4	1	CLAYEY SILT TILL: Grey to brown, trace gravel, trace fine sand, moist, hard				SS-2	38
6	2					SS-3	40
8						SS-4	41
10	3	SILTY CLAY TILL: Grey, trace gravel, moist, very stiff to hard		3.05 / 221.26		SS-5	32
12	4						
14							
16	5					SS-6	26
18					23-2117-4	AG-7	
20	6	End of borehole at 6.14m		6.14 / 218.17			
22	7						
24							
26	8						
28							
30	9						
32	10						
34							







Groundwater Depth (m): on completion: Dry/ On November 27, 2023: 5.83m

DRAWN: T.L. LOGGED: M.M. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. MW3 SHEET. 1 of 1

PROJECT NO.: FE# 23-13472/73

PROJECT NAME: GEOTECHNICAL & PHASE II ESA

LOCATION: South of Grey Rd. 19 & Crosswinds Blvd., Town of Blue Mountains, ON

DRILLING METHOD: Morooka, Solid Stem

DRILLING DATE: 14 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				223.22			
0	0	~76mm CONCRETE					
		FILL/Disturbed soil: Brown silt to sandy silt, trace gravel, wet			23-2117-5	SS-1	0
2	1				23-2117-6	SS-2	17
4				1.52 / 221.70			
6	2	SILTY SAND: Brown, very fine sand, trace clay, trace gravel, moist, dense to very dense				SS-3	34
8						SS-4	89
10	3					SS-5	49
12				3.81 / 219.41			
	4	SANDY SILT TILL: Grey, trace clay, trace gravel, moist, very dense					
14							
16	5			5.03 / 218.19		SS-6	68
		End of borehole at 5.03m					
18							
20	6						
22	7						
24							
26	8						
28							
30	9						
32							
34	10						

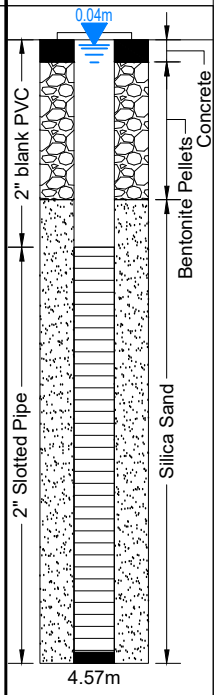
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): on completion: Dry/ On November 27, 2023: 0.40m

DRAWN: T.L. LOGGED: M.M. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. MW4 SHEET. 1 of 1

PROJECT NO.: FE# 23-13472/73

PROJECT NAME: GEOTECHNICAL & PHASE II ESA

LOCATION: South of Grey Rd. 19 & Crosswinds Blvd., Town of Blue Mountains, ON

DRILLING METHOD: Morooka, Solid Stem

DRILLING DATE: 14 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				220.77			
0	0	TOPSOIL		0.15 / 220.62			
2	1	FILL: Grey and brown silty sand, trace gravel, moist		0.76 / 220.01	23-2117-7	SS-1	16
4	1	SANDY CLAYEY SILT TILL: Brown, trace gravel, moist, very stiff to hard				SS-2	20
6	2					SS-3	39
8	2					SS-4	67
10	3	CLAYEY SILT TILL: Grey, trace gravel, trace fine sand, moist, hard		3.05 / 217.72		SS-5	45
12	4						
14	4						
16	5					SS-6	45
18	5			5.49 / 215.28			
20	6	SILTY SAND: Grey, trace clay, wet, dense			23-2117-8	SS-7	33
22	7	End of borehole at 6.55m		6.55 / 214.22			
24	7						
26	8						
28	8						
30	9						
32	10						
34	10						

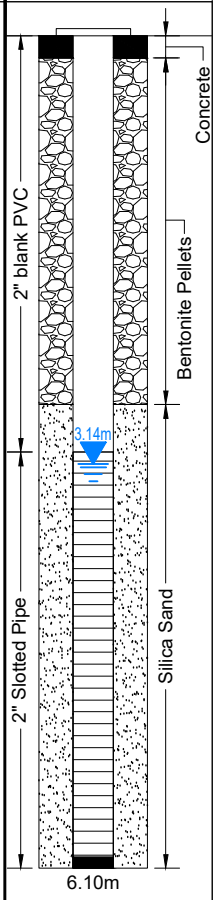
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): on completion: 6.10m/ On November 27, 2023: 3.14m

DRAWN: T.L. LOGGED: M.M. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. MW5 SHEET. 1 of 1

PROJECT NO.: FE# 23-13472/73

PROJECT NAME: GEOTECHNICAL & PHASE II ESA

LOCATION: South of Grey Rd. 19 & Crosswinds Blvd., Town of Blue Mountains, ON

DRILLING METHOD: Morooka, Solid Stem

DRILLING DATE: 14 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				220.72			
0	0	TOPSOIL: Dark brown clayey silt, trace rootlets		0.15 / 220.57	23-2117-9	SS-1	6
2	1	FILL/Disturbed soil: Grey and brown clayey silt, some fine sand, trace gravel, moist			23-2117-10 23-2117-11 (DUP)	SS-2	27
4				1.52 / 219.20			
6	2	SANDY CLAYEY SILT TILL: Brown, trace gravel, moist, very dense				SS-3	55
8		CLAYEY SILT TILL: Grey, trace gravel, trace fine sand, moist, hard		2.29 / 218.43		SS-4	47
10	3					SS-5	51
12	4						
14							
16	5					SS-6	43
18		SILTY SAND: Grey, trace clay, wet, dense		5.49 / 215.23			
20	6					SS-7	37
22		End of borehole at 6.55m		6.55 / 214.17			
24	7						
26	8						
28							
30	9						
32							
34	10						

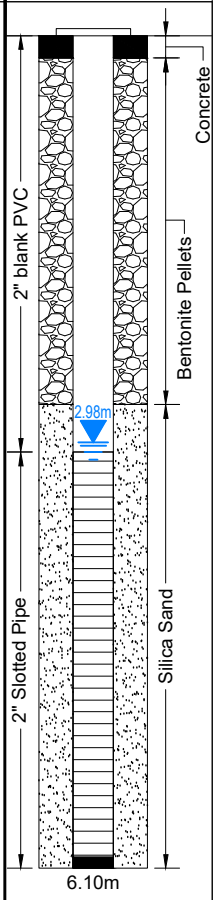
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): on completion: 6.10m/ On November 27, 2023: 2.98m

DRAWN: T.L. LOGGED: M.M. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. MW6 SHEET. 1 of 1

PROJECT NO.: FE# 23-13472/73

PROJECT NAME: GEOTECHNICAL & PHASE II ESA

LOCATION: South of Grey Rd. 19 & Crosswinds Blvd., Town of Blue Mountains, ON

DRILLING METHOD: Morooka, Solid Stem

DRILLING DATE: 13 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				223.48			
0	0	TOPSOIL: Dark brown clayey silt, trace sand, rootlets		0.15 / 223.33	23-2117-12	SS-1	8
2		FILL: Brown clayey silt, some sand, trace gravel		0.76 / 222.72			
4	1	SANDY CLAYEY SILT TILL: Greyish brown, trace gravel, moist, hard				SS-2	43
6	2					SS-3	44
8				2.44 / 221.04		SS-4	50
10	3	CLAYEY SILT TILL: Grey, trace gravel, trace fine sand, moist, hard				SS-5	36
12	4						
14							
16	5				23-2117-13	SS-6	42
18							
20	6					SS-7	59
22	7	End of borehole at 6.55m		6.55 / 216.93			
24							
26	8						
28							
30	9						
32	10						
34							

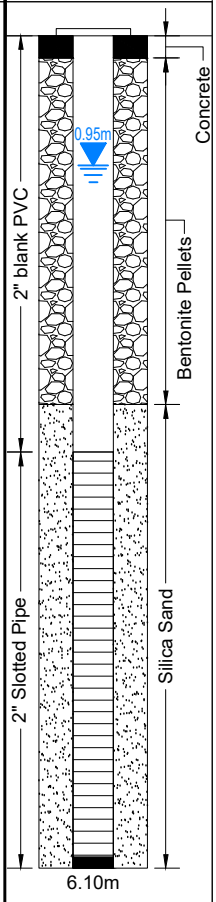
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): on completion: Dry/ On November 27, 2023: 0.95m

DRAWN: T.L. LOGGED: M.M. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. MW7 SHEET. 1 of 1

PROJECT NO.: FE# 23-13472/73

PROJECT NAME: GEOTECHNICAL & PHASE II ESA

LOCATION: South of Grey Rd. 19 & Crosswinds Blvd., Town of Blue Mountains, ON

DRILLING METHOD: Morooka, Solid Stem

DRILLING DATE: 13 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				223.58			
0	0	TOPSOIL: Dark brown clayey silt, rootlets		0.15 / 223.43			
		FILL: Grey and brown clayey silt, some sand, trace bricks, trace gravel, moist			23-2117-14	SS-1	3
2				0.76 / 222.82			
	1	SANDY CLAYEY SILT TILL: Greyish brown, trace gravel, moist, hard			23-2117-15	SS-2	42
4							
6	2					SS-3	47
8						SS-4	36
10	3			3.05 / 220.53			
		CLAYEY SILT TILL: Grey, trace gravel, trace fine sand, moist, hard				SS-5	32
12							
14	4						
16						SS-6	45
	5						
18							
20	6	Sand seam @6.40m to 6.55m				SS-7	32
				6.55 / 217.03			
22		End of borehole at 6.55m					
	7						
24							
26	8						
28							
30	9						
32							
	10						
34							

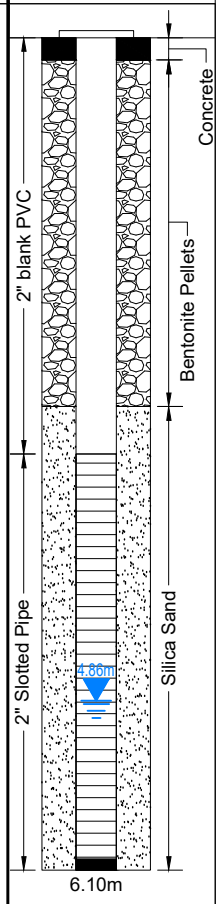
PENETRATION TESTING (SPT) ▲ 20 40 60 80

SHEAR STRENGTH (Kpa) ✚ 40 80 120 160

VAPOUR READING (ppm) □ 20 40 60 80

MOISTURE CONTENT (%) ● 10 20 30 40

PIEZOMETER OR WELL CONSTRUCTION



Groundwater Depth (m): on completion: Dry/ On November 27, 2023: 4.86m

DRAWN: T.L. LOGGED: M.M. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. MW8 SHEET. 1 of 1

PROJECT NO.: FE# 23-13472/73

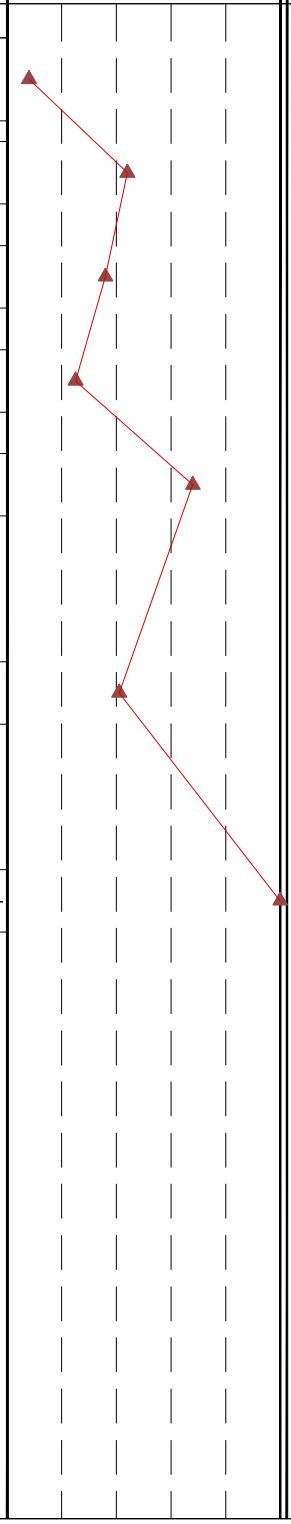
PROJECT NAME: GEOTECHNICAL & PHASE II ESA

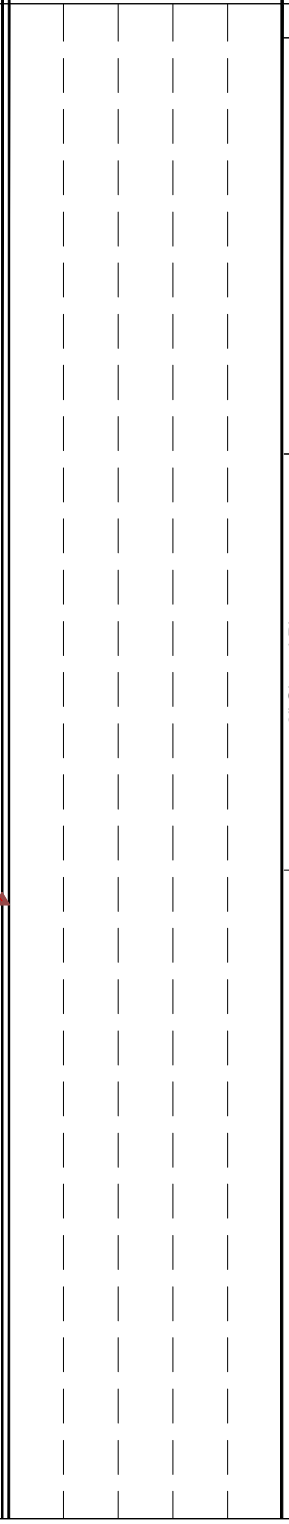
LOCATION: South of Grey Rd. 19 & Crosswinds Blvd., Town of Blue Mountains, ON

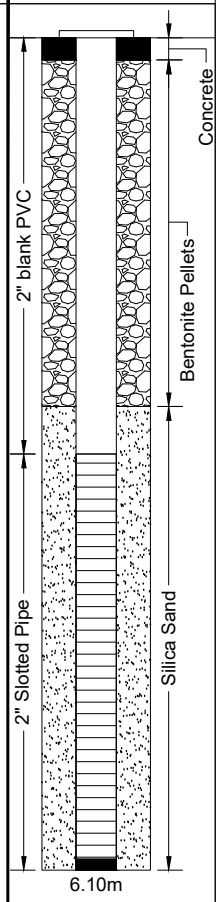
DRILLING METHOD: Morooka, Solid Stem

DRILLING DATE: 13 November, 2023

DEPTH (feet)	DEPTH (meters)	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	LAB ID	Type NO.	"N" VALUE
				223.51			
0	0	TOPSOIL: Dark brown clayey silt, trace rootlets, moist		0.30 / 223.21	23-2117-16	SS-1	8
2		FILL: Grey and brown sandy clayey silt, trace gravel, moist		0.76 / 222.75			
4	1	SANDY CLAYEY SILT TILL: Grey, trace gravel, trace rock pieces, moist, very stiff to hard				SS-2	44
6						SS-3	36
8	2	Sand seam @2.29m to 2.59m				SS-4	25
10	3					SS-5	68
12							
14	4			4.57 / 218.94			
16	5	SILTY SAND: Brown to grey, trace gravel, wet, dense to very dense				SS-6	41
18							
20	6	Grey @6.10m			23-2117-17	SS-7	100+
22	7	End of borehole at 6.71m		6.71 / 216.80			
24							
26	8						
28							
30	9						
32							
34	10						







Groundwater Depth (m): on completion: 6.10m/ On November 27, 2023: Dry

DRAWN: T.L. LOGGED: M.M. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. TP1 SHEET. 1 of 1

PROJECT NO.: FE# 23-13472/73

PROJECT NAME: GEOTECHNICAL & PHASE II ESA

LOCATION: South of Grey Rd. 19 & Crosswinds Blvd., Town of Blue Mountains, ON

DRILLING METHOD: Morooka, Solid Stem

DRILLING DATE: 14 November, 2023

DEPTH (feet)	DEPTH (meters)	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: LAB ID	Type NO.	"N" VALUE	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	PIEZOMETER OR WELL CONSTRUCTION
0	0			N/A						
		TOPSOIL: Dark brown, sandy silt, trace clay, trace gravel		0.30 / 99.70	23-2117-18					
		End of borehole at 0.30m								
2	1									
4										
6	2									
8										
10	3									
12										
14	4									
16										
18	5									
20										
22	6									
24										
26	7									
28										
30	8									
32										
34	9									
	10									

Groundwater Depth (m): on completion: N/A

DRAWN: T.L. LOGGED: M.M. CHECKED: C.W.

FISHER ENGINEERING

LOG OF BOREHOLE

NO. TP2 SHEET. 1 of 1

PROJECT NO.: FE# 23-13472/73

PROJECT NAME: GEOTECHNICAL & PHASE II ESA

LOCATION: South of Grey Rd. 19 & Crosswinds Blvd., Town of Blue Mountains, ON

DRILLING METHOD: Morooka, Solid Stem

DRILLING DATE: 14 November, 2023

DEPTH (feet)	DEPTH (meters)	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: LAB ID	Type NO.	"N" VALUE	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	PIEZOMETER OR WELL CONSTRUCTION
0	0			N/A						
		TOPSOIL: Dark brown, sandy silt, trace clay, trace gravel		0.30 / 99.70	23-2117-19 / 23-2117-20 (DUP)					
		End of borehole at 0.30m								
2	1									
4										
6	2									
8										
10	3									
12										
14	4									
16										
18	5									
20										
22	6									
24										
26	7									
28										
30	8									
32										
34	9									
	10									

Groundwater Depth (m): on completion: N/A

DRAWN: T.L. LOGGED: M.M. CHECKED: C.W.

APPENDIX C: GRAIN SIZE, MOISTURE CONTENT & CHEMICAL ANALYSES

Project Name:	Geotechnical Investigation	***F.E. Lab #:***	23-991
Client:	Bydem Enterprises Inc.	***Date Sampled:***	14-Nov-2023
Project ID:	23-13473	***Date Received:***	21-Nov-2023
Location:	South of Grey Rd. 19 and Crosswinds Blvd. Blue Mountain, Ontario	***Date Reported:***	4-Dec-2023

Certificate of Analysis

Analyses	Matrix	Quantity	Testing Date	Method Reference
Moisture Content	Soil	14	21-Nov-23	ASTM D2216
Grain Size (Sieve Analysis)	Soil	4	01-Dec-23	LS-602
Grain Size (Hydrometer)	Soil	0	N.A.	LS-702
Atterberg test	Soil	0	N.A.	LS-703/704

Authorized by: Behnam Sayad-Pour

Behnam Sayad Pour Zanjani
Geo-Lab Supervisor

400 Esna Park Drive, Unit 15, Markham, ON L3R 3K2
Tel:(905) 475-7755 www.fishereng.com

Certificate of Analysis

Analysis Requested:	Moisture Content	***Sample Description:***	14 Soil Sample(s)

Sample Info	BH1 SS3	BH1 SS4	BH1 SS5	BH1 SS6	BH1 SS7	BH5 SS3
Sample Depth (m)	1.53-1.98	2.29-2.75	3.05-3.51	4.58-5.03	6.1-6.56	1.53-1.98
Moisture Content (%)	9.1	9.5	9.3	10.1	15.7	10.9

Sample Info	BH5 SS4	BH5 SS5	BH5 SS6	BH5 SS7	BH6 SS4	BH6 SS7
Sample Depth (m)	2.29-2.75	3.05-3.51	4.58-5.03	6.1-6.56	2.29-2.75	6.1-6.56
Moisture Content (%)	10.3	9.3	14.9	18.4	9.7	13.3

Sample Info	BH8 SS4	BH8 SS6				
Sample Depth (m)	2.29-2.75	4.58-5.03				
Moisture Content (%)	11.1	18.6				

Certificate of Analysis

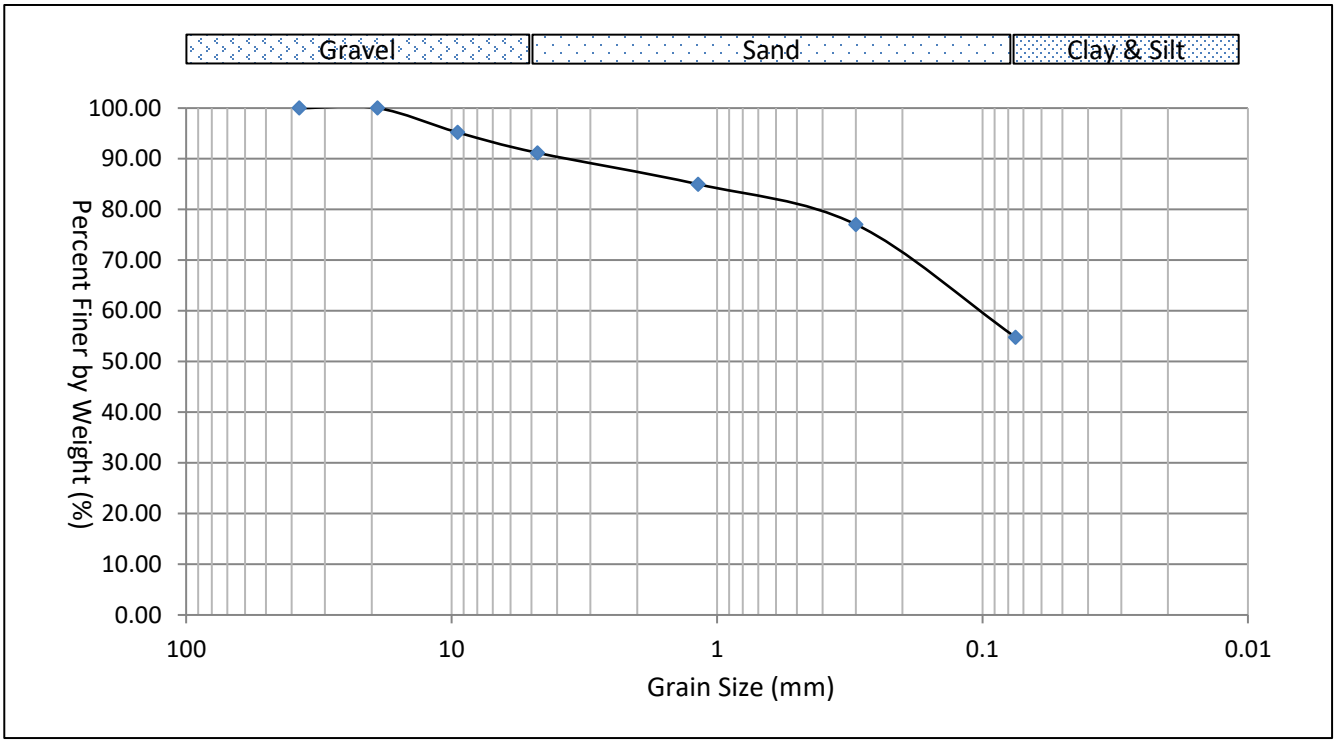
Analysis Requested:	Grain Size (Sieve Analysis)	***Sample Quantity:***	4	Soil Sample(s)

Sample Info	***23-1029 BH1 SS3***	***23-1030 BH1 SS5***	***23-1031 BH5 SS3***	***23-1032 BH5 SS5***		
Sample Depth (m)	***1.53-1.98***	***3.05-3.51***	***1.53-1.98***	***3.05-3.51***		
Grain Size (%)						
>19mm	0.0	0.0	0.0	0.0		
9.5mm-19mm	4.8	0.0	0.0	1.4		
4.75mm-9.5mm	4.0	4.8	1.1	3.7		
1.18mm-4.75mm	6.2	8.5	4.1	2.8		
300um-1.18mm	7.9	7.1	6.5	5.9		
75um-300um	22.3	15.3	14.6	13.7		
<75um	54.8	64.2	73.7	72.5		
Clay and Silt	**54.8**	**64.2**	**73.7**	**72.5**		
Sand	**36.4**	**30.9**	**25.2**	**22.4**		
Gravel	**8.8**	**4.8**	**1.1**	**5.1**		

Grain Size Distribution

Sample ID: 23-1029 BH1 SS3 (1.53-1.98m)

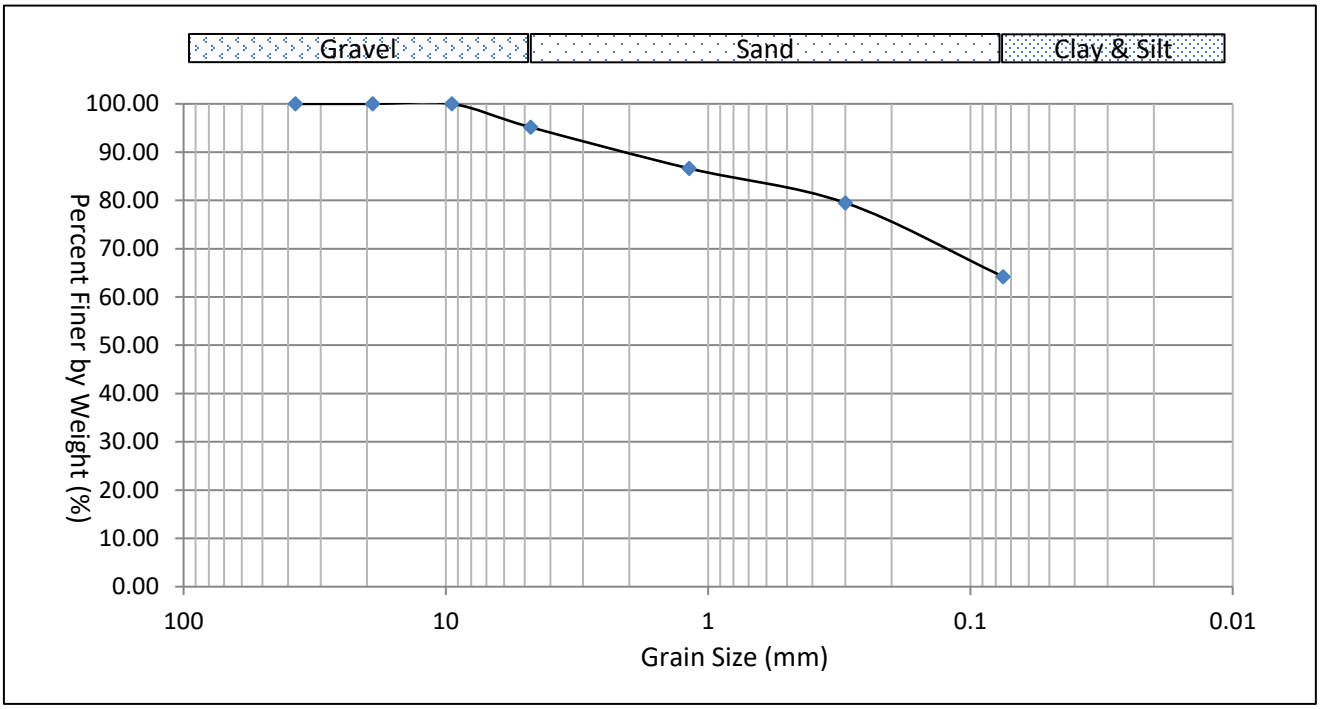
Gravel: 8.8% Sand: 36.4% Clay and Silt 54.8%



Grain Size Distribution

Sample ID: 23-1030 BH1 SS5 (3.05-3.51m)

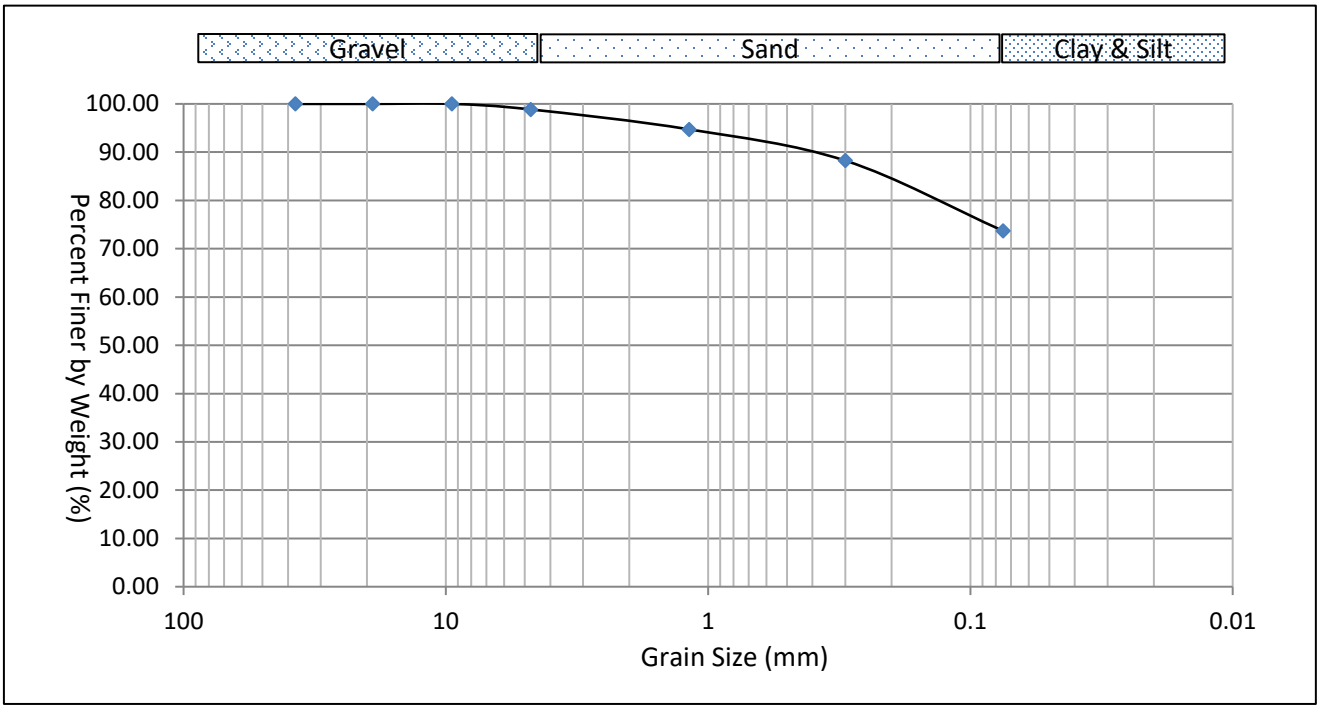
Gravel: 4.8% Sand: 30.9% Clay and Silt 64.2%



Grain Size Distribution

Sample ID: 23-1031 BH5 SS3 (1.53-1.98m)

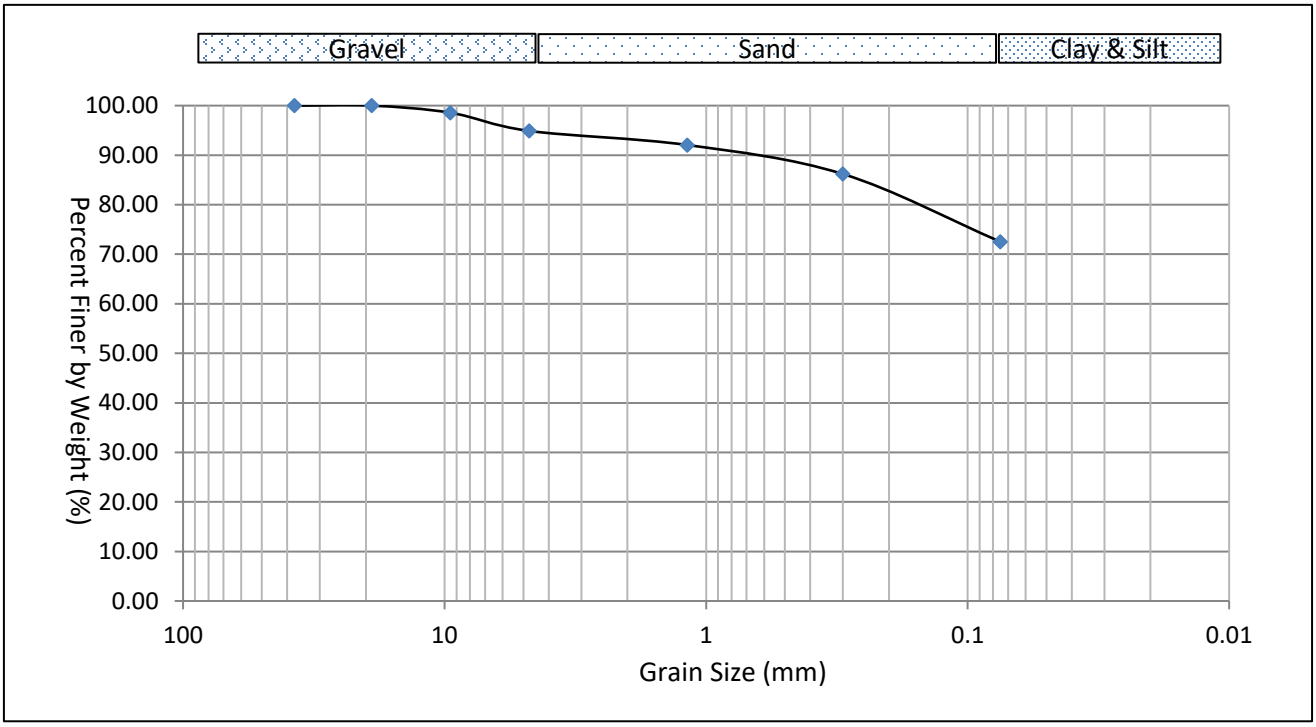
Gravel: 1.1% Sand: 25.2% Clay and Silt 73.7%



Grain Size Distribution

Sample ID: 23-1032 BH5 SS5 (3.05-3.51m)

Gravel: 5.1% Sand: 22.4% Clay and Silt 72.5%



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F.E. Job #: 23-2117Geo
Project Name: Phase II ESA
Project ID: FE-P 23-13472
Date Sampled: 13 & 14-Nov-2023
Date Received: 15-Nov-2023
Date Reported: 21-Nov-2023
Location: Grey Road & Crosswinds Boulevard
The Blue Mountains, ON

Certificate of Analysis

Analyses	Matrix	Quantity	Date Extracted	Date Analyzed	Lab SOP	Method Reference
pH	Soil	16	17-Nov-23	20-Nov-23	pH-EC-SAR F-16	SW-846, 9045D
Chloride	Soil	4	N/A	17-Nov-23	Chloride F-20	SM 4500-Cl-E
Sulphate	Soil	4	17-Nov-23	17-Nov-23	Sulphate F-21	SM 4500-SO_4

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:

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:	pH, Chloride, Sulphate
Sample Description:	20 Soil Sample(s)

Parameter	***23-2117-1*** MW01 0.00-0.61m	***23-2117-2*** MW01 0.76-1.37m	***23-2117-3*** MW02 0.00-0.61m	***23-2117-5*** MW03 0.08-0.61m	***23-2117-6*** MW03 0.76-1.37m	**Soil Standards** *
pH *(pH unit)*	7.52	7.81	7.78	8.84	7.93	(5-11) 5-9

Parameter	***23-2117-7*** MW04 0.00-0.61m	***23-2117-9*** MW05 0.00-0.61m	***23-2117-10*** MW05 0.76-1.37m	***23-2117-11*** MW05 (Dup) 0.76-1.37m	***23-2117-12*** MW06 0.00-0.61m	**Soil Standards** *
pH *(pH unit)*	7.90	7.86	8.02	8.06	7.63	(5-11) 5-9

Parameter	***23-2117-14*** MW07 0.00-0.61m	***23-2117-15*** MW07 0.76-1.37m	***23-2117-16*** MW08 0.00-0.61m	***23-2117-18*** TP-1 0.00-0.30m	***23-2117-19*** TP-2 0.00-0.30m	**Soil Standards** *
pH *(pH unit)*	7.84	8.09	7.65	7.76	7.53	(5-11) 5-9

Parameter	***23-2117-20*** TP-2 (Dup) 0.00-0.30m					**Soil Standards** *
pH *(pH unit)*	7.57					(5-11) 5-9

* Surface soil pH value from 5 - 9, Sub-surface soil pH value from 5-11.

QA/QC Report

Parameter	**LCS**	**AR**	**Duplicate**	**AR**		
	Absolute Difference *(pH Unit)*					
pH *(pH unit)*	7.05	6.90-7.20	0.16	<0.3		

LEGEND:
LCS - Laboratory Control Sample
AR - Acceptable Range

Certificate of Analysis

Analysis Requested:	pH, Chloride, Sulphate
Sample Description:	20 Soil Sample(s)

Parameter	***23-2117-4*** MW02 6.10-6.71m	***23-2117-8*** MW04 6.10-6.71m	***23-2117-13*** MW06 4.57-5.18m	***23-2117-17*** MW08 6.10-6.71m		
	Concentration (µg/g)					
Chloride in Soil	<10	<10	<10	36		

< result obtained was below RL (Reporting Limit).

QA/QC Report

Parameter	**Blank**	**RL**	**LCS**	**AR**	**MS**	**AR**
	(µg/g)		**Recovery (%)**		**Recovery (%)**	
Chloride in Soil	<10	10	113	70-130	109	70-130

Parameter	**Duplicate**	**AR**				
	RPD (%)					
Chloride in Soil	3.1	0-20				

LEGEND:
RL - Reporting Limit
LCS - Laboratory Control Sample
MS - Matrix Spike
AR - Acceptable Range
RPD - Relative Percent Difference

Certificate of Analysis

Analysis Requested:	pH, Chloride, Sulphate
Sample Description:	20 Soil Sample(s)

Parameter	***23-2117-4*** MW02 6.10-6.71m	***23-2117-8*** MW04 6.10-6.71m	***23-2117-13*** MW06 4.57-5.18m	***23-2117-17*** MW08 6.10-6.71m		
Sulphate *(mg/kg)*	23	13	36	91		

< result obtained was below RL (Reporting Limit).

QA/QC Report

Parameter	**Blank**	**RL**	**LCS/Spike**	**AR**	**Duplicate**	**AR**
	(mg/kg)		**Recovery (%)**		**RPD (%)**	
Sulphate	<1	1	103	70-130	4	0-30

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