



Terraprobe

Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

**NATURAL HAZARD SETBACK AND
SLOPE STABILITY REQUIREMENTS
PROPOSED RESIDENTIAL DEVELOPMENT
HOME FARM
GREY ROAD 19 AT HELEN STREET
TOWN OF THE BLUE MOUNTAINS, ONTARIO**

Prepared For: MacPherson Builders (Blue Mountains) Limited
40 West Wilmot Street, Unit 6
Richmond Hill, Ontario
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Attention: Mr. Russell Higgins

**File No. 31-14-1013
May 16, 2014
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Distribution:

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Figures 5 to 7: Cross Sections

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1.0 INTRODUCTION

We are pleased to present our report on the slope stability assessment carried out for the proposed residential development in the Town of the Blue Mountains, Ontario. Authorization to complete this investigation was provided by Mr. Russell Higgins on February 10, 2014.

The purpose of the investigation was to determine the soil, rock and groundwater conditions on the site as they pertain to the natural hazards setback along existing slopes and drainage routes beyond which development may be restricted.

Completed previous to this study was an overall geotechnical investigation reported separately (July 4, 2011).

2.0 SITE AND PROJECT DESCRIPTION

The site is located on the east side of Grey Road 19, primarily north of Helen Street, in the Town of the Blue Mountains, Ontario (see Figures 1 to 3).

It is proposed to proceed with design and construction of full municipal services and internal streets associated with a residential development.

The property is currently vacant, land for the most part mostly overgrown with areas of trees and brush. The site generally falls in grade by about 20m from the southwest to northeast (ie: elevation 228 to 208m) on the upper plateau. Further to the east, grades fall significantly ($\pm 15\text{m}$) along a natural ridge.

The current Development Concept Plan is included as Figure 4 of this report.

There are about seven (7) gullies or ravines oriented in an approximate southwest to northeast direction which cut into the property as well as the main ridge slope which will be assessed from a slope stability perspective.

A senior soil engineer visited the site (see Figure 1) on April 28, 2014, to visually inspect the various slope conditions which noted no significant active erosion or signs of historical slope instability along the valley slopes in question.

Terraprobe has previously completed a draft Geotechnical Investigation report for the proposed development under separate cover (July 4, 2011).

3.0 FIELD WORK

The field work associated with this project comprised of the advancement of twenty (20) sampled boreholes to depths of 1.4 to 16.5m below existing grade.

Borehole locations were selected to provide general coverage of the proposed development site. The borehole locations and elevations were surveyed by the client's surveyor and are understood to be referenced to geodetic datum.

The field work was completed between May 25 and June 14, 2011, using a track-mounted D50T power auger provided by a specialist soil drilling contractor.

The sampled boreholes were advanced using Standard Penetration Test methods at regular 0.75 to 1.5 m intervals in each borehole. All soil samples were sealed in plastic containers and returned to our laboratory for further evaluation and testing including moisture content determination and select grain size analyses (attached).

Following completion of the advancement of the boreholes, a standpipe type piezometer comprising of 19 mm diameter PVC tubing slotted at the base was installed in select boreholes as noted on the attached borehole logs.

A return visit was made to the site on July 4, 2011 to measure static water levels in the installed standpipes.

The field work (drilling, sampling, testing) was observed and recorded by a member of our engineering staff, who also transported the samples to our geotechnical testing laboratory.

4.0 SUBSURFACE CONDITIONS

The details of the subsurface conditions encountered at each borehole are presented on the attached Borehole Logs. It should be noted that the conditions are confirmed at the borehole locations only and could vary between and beyond these locations. In addition, the changes in soil stratigraphy delineated on the Borehole

Logs have been inferred from non-continuous sampling. In this regard, the changes should be taken as transitions from one soil type to another as opposed to exact planes of geologic change.

In general, the boreholes encountered about 0 to 600mm of topsoil and/or organic stained sand. The native soils were primarily sandy silt glacial till with some clay and trace to some gravel (see attached grain size analyses). Frequent cobbles and boulders were also present causing difficult augering and excavating conditions.

Boreholes 3, 13, 18, and 20 encountered sand deposits in the area of the existing bluff. Boreholes 1 to 4, 6 to 12 and 14 to 18 were terminated prematurely on probable cobbles and boulders in very dense till soils. Boreholes 3, 10 and 19 were deepened using rock coring techniques on a return visit. Shale to limestone bedrock was confirmed at Borehole 19 below about elevation 186.1m. Probable bedrock was also encountered below about 184.7m at Borehole 20 and about elevation 188.9m at Borehole 13. The remaining boreholes were terminated in overburden soils.

The native soils exhibited moisture contents varying between about 2 to 44% and generally decreased with depth. Some perched groundwater was encountered above and within the sandy silt glacial till soils.

Across the site, Standard Penetration Tests conducted in each borehole generally indicated 'N' values of about 5 to greater than 50 blows per 0.3m of penetration increasing with depth in the native soils. Therefore, these soils are considered to be loose to very dense. The very dense glacial tills with cobbles and boulders were made up of such a tight matrix that the drilling augers could not advance below the depths noted on the logs.

Many of the shallow test holes encountered groundwater within the upper soils at this time. The levels noted during drilling and measured during our return site visits are summarized on the attached borehole logs.

It is anticipated that some fluctuations of the groundwater table will occur seasonally and may be higher during wetter seasons and/or years. Shallow groundwater flow direction appears to be towards the northeast.

Inspection of the eroded gullies depicted generally minor shallow surface flow in an incised channel in the glacial till (see photographs).

5.0 SLOPE ASSESSMENT

The characteristics of the slopes situated across the site are represented by cross sections included as Figures 5 to 7. The sections are taken at the locations selected in consultation with Higgins Engineering, as shown on Figure 4.

The cross section F-F' represents the northeast-facing main ridge slope which shows no evidence of active erosion. For the most part, the main ridge has no distinct watercourse located along the slope toe. The inclination along the slope is generally in the range of 1.3:1 to 2:1 (horizontal to vertical) or flatter with occasional localized steeper sections.

Cross sections A-A' to E-E' represent five (5) of the gully systems that cut southwest to northeast into the site. No active erosion is noted along the banks of these creeks; some of which appear to have only seasonal runoff flow. The inclination along these slopes are generally in the range of 1:1 to 2:1 (horizontal to vertical) or flatter as they are incised into the glacial till. The creeks are generally bedded with cobbles and boulders which now offer significant protection from future erosion potential.

A visual inspection of the site indicates well established vegetation on the majority of the slopes, including ground cover and mid to large sized trees (see attached site photographs).

The slope heights along the main ridge are generally about 15 to 17m from toe to crest. The slope heights along the gully/valley sections on the site range from about 0.5m in the southwest to about 10 to 15m in the northeast (ie: near the main ridge).

6.0 SLOPE STABILITY ANALYSIS

A detailed engineering analysis of the slope stability was carried out using a computerized version (SLOPE/W by GEO-SLOPE International Ltd.) of the Bishop method of analysis. This method of analysis allows calculation of Factors of Safety for hypothetical or assumed failure through the slope. The analysis method is used to assess potential for movements of masses of soil over a specific failure surface which is often curved or circular.

For a specific failure surface the **Factor of Safety (FS)** is defined as the ratio of the available soil strength resisting movement, divided by the gravitational forces tending to cause movement. A Factor of Safety of 1.0 represents a "limiting equilibrium" condition where the slope is at a point of pending failure since the

soil resistance is equal to forces tending to cause movement. A Factor of Safety greater than 1 is required to maintain stability of the slope. The typical Factor of Safety used for engineering design of slopes for stability ranges from about 1.2 to 1.5, for shallow failures depending on the severity of the assumed conditions (groundwater level, seismic loads, tension cracks, etc.).

The analysis was carried out by preparing representative models of the existing slope geometry as provided at the locations of sections shown with subsurface conditions as encountered in the borehole investigation and then analyzing numerous failure surface through the slopes in search of the minimum or critical Factor of Safety for specific conditions (see Figures 8 to 13). This was also completed in order to determine the theoretical stable slope condition with a Factor of Safety of 1.5 for the land use on the plateau above the slope.

The results of the field surveying, topographic mapping, and the borehole information, were input for the slope stability analysis. Many calculations were carried out to examine the Factory of Safety for varying depths of potential mid to deep failure surfaces. The following average soil properties were utilized for the slope strata in the slope stability analysis, based on borehole results.

Soil Strata	Effective Angle of Internal Friction, Φ' (degrees)	Unit Weight, γ (kN/m³)	Cohesion, c' (kPa)
Sand, dense to very dense	37	19	0
Sandy Silt Till, very dense	36	19.5	5
Sandy Silt, compact to dense	38	20	3

The above soil strength parameters are based on effective stress for long-term slope stability.

The results of the slope stability analyses are summarized on the attached Figures 8 to 13. The minimum Factor of Safety calculated by the analyses were as follows;

	Calculated Minimum Factor of Safety for Side Slopes	Shown on Figure
Existing Section A-A'	2.35	8
Existing Section B-B'	1.51	9
Existing Section C-C'	2.14	10
Existing Section D-D'	1.63	11
Existing Section E-E'	2.86	12
Existing Section F-F'	1.98	13

For residential settings (Type C: active land-use), the MNR Policy Guidelines allow a minimum Factor of Safety of 1.3 to 1.5 for slope stability as follows:

TYPE	LAND-USES	DESIGN MINIMUM FACTOR OF SAFETY
A	PASSIVE: no buildings near slope; farm field, bush, forest, timberland, woods, wasteland, badlands, tundra	1.10
B	LIGHT: no habitable structures near slope; recreational parks, golf courses, buried small utilities, tile beds, barns, garages, swimming pools, shed, satellite dishes, dog houses	1.20 to 1.30
C	ACTIVE: habitable or occupied structures near slopes; residential, commercial and industrial buildings, retaining walls, storage/warehousing of non-hazardous substances	1.30 to 1.50
D	INFRASTRUCTURE and PUBLIC USE: public use structures and buildings (i.e. hospitals, schools, stadiums), cemeteries, bridges, high voltage power transmission lines, towers, storage/warehousing of hazardous materials, waste management areas	1.40 to 1.50

Based on the analysis results, the natural undisturbed and well vegetated slope is considered to be adequately stable against slope slides when a 1:1 to 1.1:1 (horizontal to vertical) slope or flatter is experienced with a Factor of Safety of at least 1.5. Figures 9 and 11, at Section B-B' and D-D' respectively, show native, existing and stable slopes with inclinations of about 1:1 to 1.1:1 (horizontal to vertical) and Factors of Safety of about 1.5 to 1.6.

The analysis confirms the observed site conditions of a stable slope for the majority of the site.

Based on this engineering analysis, a slope inclination of 1 to 1 (45°) or flatter is generally required, to obtain a minimum Factor of Safety of 1.5. This slope inclination of 1 to 1 (horizontal to vertical) is considered to be the long term stable slope inclination for the site conditions. For a slope height of about 15m, the stable slope crest position will be about 15m (1 x 15m) measured horizontally from the slope toe. Likewise, for a 5m slope height, the stable slope crest position will be about 5m (1 x 5m). This distance is considered the stable slope allowance or set-back.

Based on the above analysis, the crest of the existing slopes are all currently beyond the stable setback condition for stability.

7.0 TOE EROSION

MNR Policy Guidelines (ref. Natural Hazards Policies (3.1), 2001) also require an erosion allowance setback equal to 100 years of the average annual erosion rate based on at least 25 years of reliable data. A detailed study can be used to calculate the erosion allowance or, a guideline table can be used based on the soil type and watercourse size.

Based on the current observations within the site gullies, the creeks at a distance generally less than 15m from the slope toe, no active erosion along the slope toe, creek width less than 5m and the natural, very dense sandy silt glacial till strata, a toe erosion allowance or setback of 2m is recommended from the MNR Technical Guide. No toe erosion allowance is required for the main ridge slope as there is no water body along or near the ridge toe.

For development control purposes, it is recommended that the average minimum toe erosion allowance or set-back may be used and be measured from the average slope toe position along the gully slopes. This erosion set back is in addition to the stability set back value (i.e. based on 1:1 slope).

In the areas where slopes are locally steeper than 3:1, the above erosion and slope stability allowance setbacks have been applied. In all cases along these gullies and the main ridge the 2m erosion allowance from the existing creeks plus the 1:1 stability allowance will daylight through the existing stable slopes prior to reaching the existing top of bank or crest. Therefore, the long-term stable slope position will be coincident

with the existing crest along these sections and only an access allowance will need to be considered beyond the crest in these areas.

8.0 ACCESS ALLOWANCE

Current policy guidelines for development setbacks are based on slope stability, erosion and access.

MNR suggests an access allowance near slope crests and along one side of a lot, to permit access to slopes for emergency purposes and to carry out stabilization works if necessary. Based on the slope heights of about 0.5 to 17m at this site, it is Terraprobe's opinion that an access allowance of 6m could be considered adequate. This will permit access for excavators, skid-steers and the like if maintenance along the slope is required in the future.

The total development setback is therefore calculated, taken from the main slope toe. The recommended development setback line is shown approximately on the enclosed Figure 4. This line is dependent on the actual slope heights at various points along the slopes. However, it is generally representative of 6m (ie: access allowance) in total from the existing crest of the slope. Along the gullies the erosion and stability allowance will daylight the existing slope, so the 6m access allowance should be measured from the existing slope crest. This will apply to the gully sections where existing slopes are steeper than 3:1 (horizontal to vertical). Where slopes are flatter than 3:1 no hazard allowance or setback will be required from the slope crest as excavation equipment may easily traverse these low slopes as outlined in the MNR Guideline. It is recommended that the final development plan be reviewed with Terraprobe to address any possible localized adjustments in setbacks.

In summary, our analysis has enabled a development setback to be delineated (see Figure 4). Terraprobe has approximately inferred the top of bank/crest location for the existing slopes based on contours from the topographic mapping. It is suggested that all buildings, swimming pools, septic beds, etc. that are proposed on the upper plateau (behind the slope crest) be constructed behind this setback line.

Terraprobe also recommends that the structure(s) be sited to allow space for swales or grading away from the crest such that stormwater/runoff is not directed over the slope in a concentrated manner increasing the potential for surface erosion. Where the slope will remain in its natural state, it would be best if trees were not cut from the existing slope as the deep root structures contribute to surficial stability.

The final grading of constructed slopes on the property should be set at 2:1 (horizontal to vertical) inclination or flatter. If landscaping or grass cutting is required this should at least be at 3:1 (horizontal to vertical) inclinations or flatter. It should also be noted that attempts to provide topsoil and surface protection against runoff on 2:1 slopes may require a few seasons of maintenance until vegetative cover has the opportunity to develop.

Erosion protection within drainage channels will need to be provided in order to support the design velocities and scour anticipated.

It is our understanding that site stormwater will be collected into ponds through lined channels and/or storm sewers and then discharged in a controlled manner to protected surface channels designed by others.

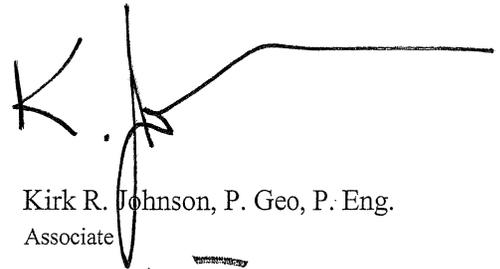
We trust that this report, with attached figures and analyses, will meet your present requirements. If you should have any questions, or if we can be of further assistance, please do not hesitate to contact the undersigned.

Sincerely,
Terraprobe Inc.



Blair E. Goss, P. Eng.
Associate

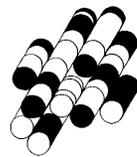
BEG/ct
Barrie Office



Kirk R. Johnson, P. Geo, P. Eng.
Associate



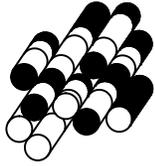
BOREHOLE LOGS



Terraprobe Inc.

BOREHOLE LOGS

SAMPLING METHOD		PENETRATION RESISTANCE		
SS	split spoon	Standard Penetration Test (SPT) resistance ('N' values) is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a standard 50 mm (2 in.) diameter split spoon sampler for a distance of 0.3 m (12 in.).		
ST	Shelby tube			
AS	auger sample	Dynamic Cone Test (DCT) resistance is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a conical steel point of 50 mm (2 in.) diameter and with 60° sides on 'A' size drill rods for a distance of 0.3 m (12 in.).		
WS	wash sample			
RC	rock core			
WH	weight of hammer			
PH	pressure, hydraulic			
SOIL DESCRIPTION - COHESIONLESS SOILS		SOIL DESCRIPTION - COHESIVE SOILS		
Relative Density	'N' value	Consistency	Undrained Shear Strength, kPa	'N' value
very loose	< 4	very soft	< 12	< 2
loose	4 - 10	soft	12 - 25	2 - 4
compact	10 - 30	firm	25 - 50	4 - 8
dense	30 - 50	stiff	50 - 100	8 - 16
very dense	> 50	very stiff	100 - 200	16 - 32
		hard	> 200	> 32
SOIL COMPOSITION		TESTS, SYMBOLS		
	% by weight	MH	mechanical sieve and hydrometer analysis	
'trace' (e.g. trace silt)	< 10	w, w _c	water content	
'some' (e.g. some gravel)	10 - 20	w _l	liquid limit	
adjective (e.g. sandy)	20 - 35	w _p	plastic limit	
'and' (e.g. sand and gravel)	35 - 50	I _p	plasticity index	
		k	coefficient of permeability	
		Y	soil unit weight, bulk	
		φ'	angle of internal friction	
		c'	cohesion shear strength	
		C _c	compression index	
GENERAL INFORMATION, LIMITATIONS				
<p>The conclusions and recommendations provided in this report are based on the factual information obtained from the boreholes and/or test pits. Subsurface conditions between the test holes may vary.</p>				
<p>The engineering interpretation and report recommendations are given only for the specific project detailed within, and only for the original client. Any third party decision, reliance, or use of this report is the sole and exclusive responsibility of such third party. The number and siting of boreholes and/or test pits may not be sufficient to determine all factors required for different purposes.</p>				
<p>It is recommended Terraprobe be retained to review the project final design and to provide construction inspection and testing.</p>				



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LOG OF BOREHOLE ..1..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

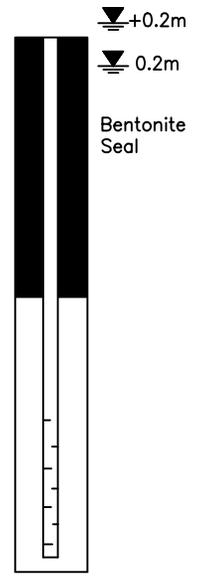
CLIENT: MacPherson Builders (Blue Mountains) Limited

BORING DATE: May 25, 2011

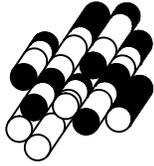
LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD	DEPTH SCALE IN METRES	SOIL PROFILE		SAMPLES		PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION			
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	20	40	60	80	20		40	60	80
CME45 Crawler-mounted Drill Rig / Solid Stem Augers	0	GROUND SURFACE		216.6												
		125mm - Silty TOPSOIL		0.0												
		Brown to Grey	Compact to Very Dense	Moist	1	SS	6	x								
					2	SS	27		x							
		1	SANDY SILT, trace gravel to gravelly, some clay, with frequent cobbles & boulders difficult augering, TILL													
					3	SS	50/150mm									
	2															
	3															
	4	Grinding auger refusal on probable boulders.		212.9	6	AS										
				3.7												
	5															
	6															
	7															
	8															
	9															



- Borehole remained open and dry upon completion of drilling.
- Water level on June 13, 2011 measured at 0.2m above existing grade (elev.216.8m).
- Water level on July 4, 2011 measured at 0.2m (elev. 216.4m).



Terraprobe

LOG OF BOREHOLE ..2..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

CLIENT: MacPherson Builders (Blue Mountains) Limited

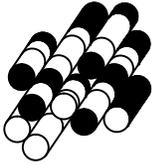
BORING DATE: May 25, 2011

LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT $\times \times \times$				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa							
							20	40	60	80	10	20	30	
0	GROUND SURFACE		221.6											
	175mm - Silty TOPSOIL		0.0											
	Brown to Grey	Compact to Very Dense		1	SS	6	x							
1	SANDY SILT, trace gravel to gravelly, some clay, with frequent cobbles & boulders, difficult augering, TILL			2	AS	18	x							
2	Grey			3	SS	50/125mm								
				4	AS	50/125mm								
3	Grinding auger refusal on probable boulders after three attempts.		218.9											1. Borehole remained open upon completion of drilling. 2. Perched water noted at 0.9m during drilling.
4														
5														
6														
7														
8														
9														

CME45 Crawler-mounted Drill Rig / Solid Stem Augers



Terraprobe

LOG OF BOREHOLE ..3..

PROJECT NAME: Home Farm Subdivision

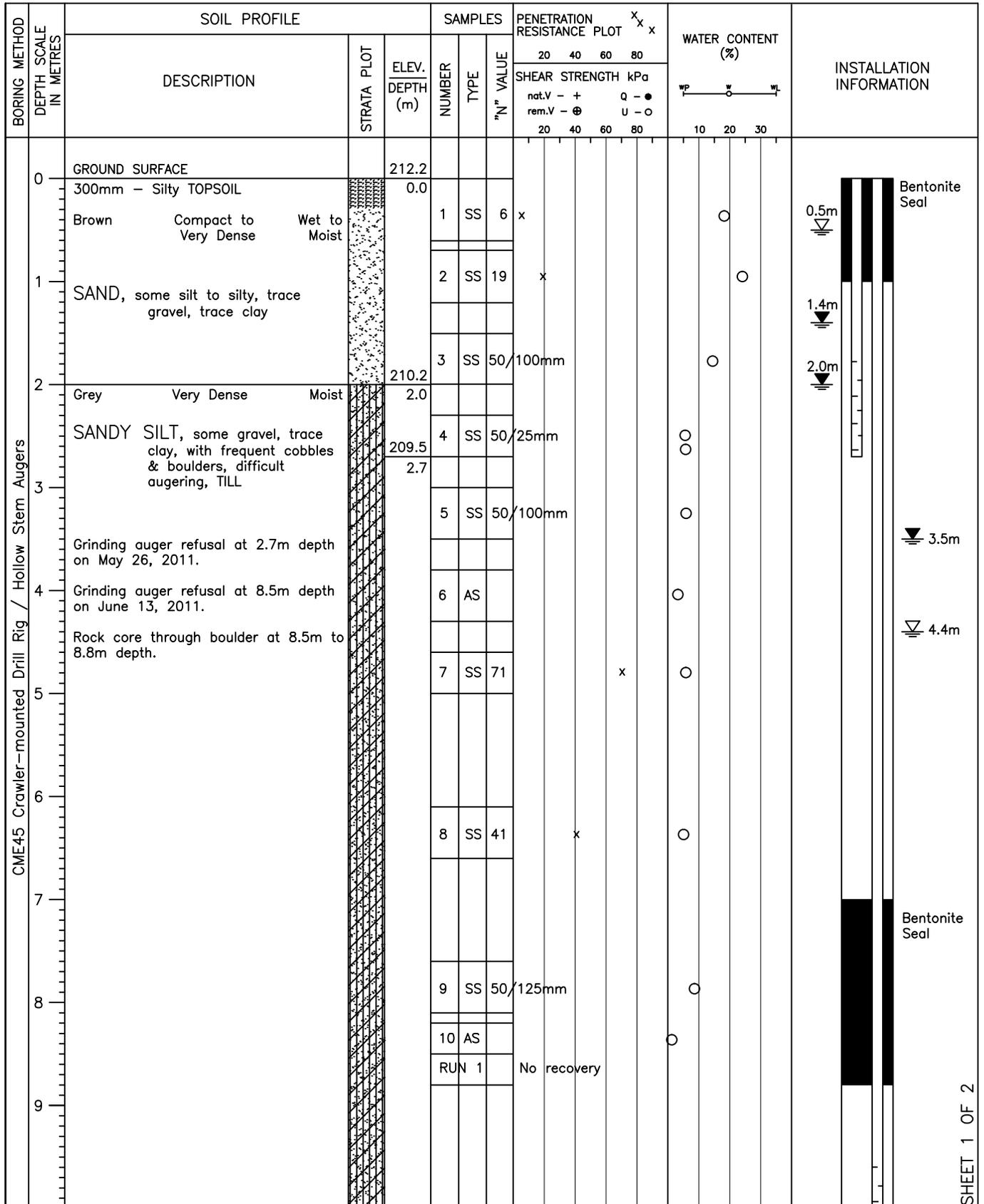
PROJECT No.: 3-11-7059

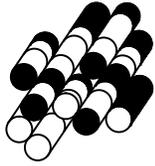
CLIENT: MacPherson Builders (Blue Mountains) Limited

BORING DATE: May 26 & June 13, 2011

LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic





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LOG OF BOREHOLE ..3..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

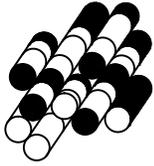
CLIENT: MacPherson Builders (Blue Mountains) Limited

BORING DATE: May 26 & June 13, 2011

LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa							
							20 40 60 80		20 40 60 80					
10	Continued As above.		202.2 10.0											<ol style="list-style-type: none"> Borehole remained open upon completion of drilling. Perched water noted at 0.5m during drilling on May 26, 2011. Water level on June 13, 2011 measured at 1.4m (elev. 210.8m) in 2.7m deep standpipe. Water level noted at 4.4m during drilling on June 13, 2011. Water level on July 4, 2011 measured at 2.0m (elev. 210.2m) in 2.7m deep standpipe and at 3.5m (elev. 208.7m) in 10.6m deep standpipe.
11	End of Borehole.		201.4 10.8	11	SS	50/50mm								
12														
13														
14														
15														
16														
17														
18														
19														



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LOG OF BOREHOLE ..4..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

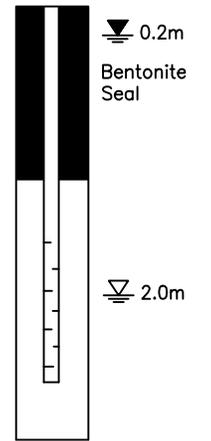
CLIENT: MacPherson Builders (Blue Mountains) Limited

BORING DATE: May 26, 2011

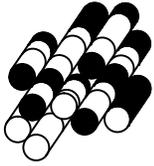
LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE		SAMPLES		PENETRATION RESISTANCE PLOT $\times \times \times$				WATER CONTENT (%)			INSTALLATION INFORMATION		
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa				WATER CONTENT (%)			
							20	40	60	80	10		20	30
0	GROUND SURFACE		215.7											
	600mm - Silty TOPSOIL		0.0											
	Brown to Grey	Dense to Very Dense		1	SS	4 x								
1	SANDY SILT, trace gravel to gravelly, some clay, with frequent cobbles & boulders, difficult augering, TILL			2	SS	53								
2	Grey			3	SS	50/150mm								
				4	SS	50/150mm								
3	Grinding auger refusal on probable boulders.		212.7	5	AS									
			3.0											



1. Borehole remained open upon completion of drilling.
2. Perched water noted in seam at 2m during drilling.
3. Water level on June 13, 2011 measured at 0.2m (elev. 215.5m).



Terraprobe

LOG OF BOREHOLE ..5..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

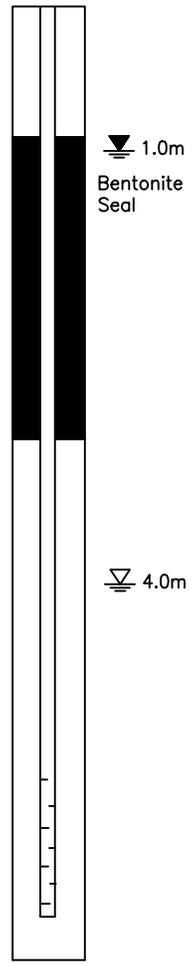
CLIENT: MacPherson Builders (Blue Mountains) Limited

BORING DATE: May 25, 2011

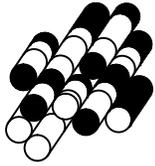
LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION	
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	20	40	60	80	10	20	30		
0	GROUND SURFACE		223.6												
	175mm - Silty TOPSOIL		0.0												
	Brown to Grey	Very Dense Moist		1	SS	9	x								
1	SANDY SILT, trace gravel to gravelly, some clay, with frequent cobbles & boulders difficult augering, wet silt & sand seam at 4 to 4.5m, TILL Grey			2	SS	62			x						
					3	SS	50/100mm								
					4	SS	50/150mm								
					5	SS	75				x				
					6	SS	71				x				
					7	SS	50/75mm								
					217.0										
7	End of Borehole		6.6												
8															
9															



1. Borehole remained open upon completion of drilling.
2. Water level noted at 4m during drilling.
3. Water level on June 13, 2011 measured at 1.0m (elev. 222.6m).



Terraprobe

LOG OF BOREHOLE ..6..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

CLIENT: MacPherson Builders (Blue Mountains) Limited

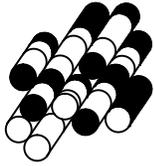
BORING DATE: May 25, 2011

LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT ^x _x ^x _x				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa							
							20	40	60	80	20	40	60	
0	GROUND SURFACE		224.4											
	400mm - Silty TOPSOIL		0.0											
	Brown to Grey	Moist		1	SS	2 x							44	
	Compact to Very Dense													
1	SANDY SILT, trace gravel to gravelly, some clay, with frequent cobbles & boulders difficult augering, TILL			2	SS	18	x							
2				3	SS	38		x						
3	Grey			4	SS	53			x					
4				5	SS	58				x				
4	Grinding auger refusal on probable boulders.		220.6	6	SS	50/12.5mm								
			3.8											
5														
6														
7														
8														
9														

1. Borehole remained open and dry upon completion of drilling.



Terraprobe

LOG OF BOREHOLE ..7..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

CLIENT: MacPherson Builders (Blue Mountains) Limited

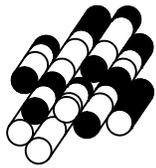
BORING DATE: May 26, 2011

LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa							
							20	40	60	80				
0	GROUND SURFACE		214.2											
	150mm - Silty TOPSOIL		0.0											
	Brown Very Dense Moist to Wet			1	SS	50/100mm								
1	SANDY SILT, some gravel to gravelly		212.9	2	SS	50/150mm								
	Grey Very Dense Moist		1.3											
2	SANDY SILT, trace gravel to gravelly, some clay, with frequent cobbles & boulders, difficult augering, TILL		211.5	3	SS	50/150mm								
				4	SS	50/100mm								
3	Grinding auger refusal on probable boulders.		2.7											
4														
5														
6														
7														
8														
9														

1. Borehole remained open upon completion of drilling.
2. Perched water noted at 1.0m during drilling.



Terraprobe

LOG OF BOREHOLE ..8..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

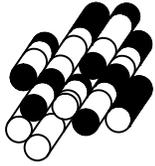
CLIENT: MacPherson Builders (Blue Mountains) Limited

BORING DATE: May 25, 2011

LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION		
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa				WATER CONTENT (%)					
							20	40	60	80						
							nat.V - + Q - ● rem.V - ⊕ U - ○									
							20	40	60	80						
CME45 Crawler-mounted Drill Rig / Solid Stem Augers	0	GROUND SURFACE	223.8											<p>Bentonite Seal 0.6m</p>		
		300mm - Silty TOPSOIL	0.0													
		Brown to Grey Compact to Very Dense Moist		1	SS	12	x									
	1	SANDY SILT, trace gravel to gravelly, some clay, with frequent cobbles & boulders difficult augering, TILL		2	SS	18	x									
				3	SS	50/125mm										
	2			4	SS	50/150mm										
				5	SS	48		x								
3	Grey															
4																
5				6	SS	51				x						
6			218.0	7	SS	50/25mm										
6	Grinding auger refusal on probable boulders.													1. Borehole remained open and dry upon completion of drilling.		
7			5.8											2. Water level on June 13, 2011 measured at 0.6m (elev. 223.2m).		
8																
9																



Terraprobe

LOG OF BOREHOLE ..9..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

CLIENT: MacPherson Builders (Blue Mountains) Limited

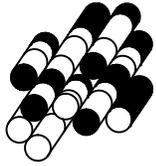
BORING DATE: May 27, 2011

LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE		SAMPLES			PENETRATION RESISTANCE PLOT $\times \times \times$				WATER CONTENT (%)	INSTALLATION INFORMATION			
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	20	40	60			80		
0	GROUND SURFACE		220.2											
	300mm - Silty TOPSOIL		0.0											
	Brown Dense to Very Dense Moist			1	SS	6 x								
1	SANDY SILT, trace gravel to gravelly, some clay, with frequent cobbles & boulders difficult augering, TILL			2	SS	46								
						3	SS	50/125mm						
						4	SS	50/50mm						
3	Grinding auger refusal on probable boulders.		217.3 2.9											
4														
5														
6														
7														
8														
9														

1. Borehole remained open and dry upon completion of drilling.



Terraprobe

LOG OF BOREHOLE ..10..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

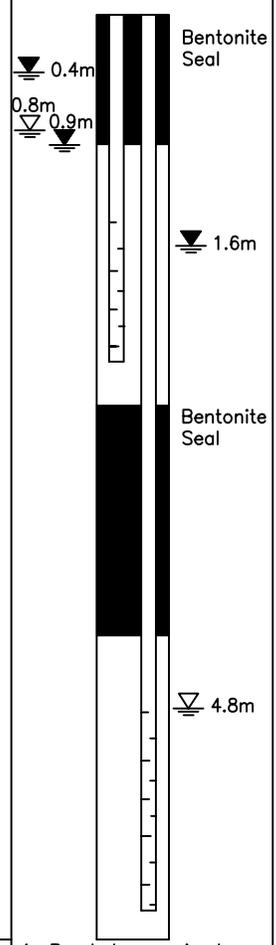
CLIENT: MacPherson Builders (Blue Mountains) Limited

BORING DATE: May 27 & June 14, 2011

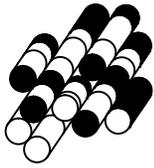
LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa				WATER CONTENT (%)			
							20	40	60	80	w _p — w _l — w _t			
0	GROUND SURFACE		218.7											
	250mm - Silty TOPSOIL		0.0											
	Brown Dense to Very Dense Dry to Moist			1	SS	8	x							
1	SANDY SILT, trace gravel to gravelly, some clay, with frequent cobbles & boulders difficult augering, TILL			2	SS	36		x						
				3	SS	74			x					
2				4	SS	50/75mm								
	Grinding auger refusal at 2.3m on May 27, 2011.		216.4											
	Auger through boulders on June 14, 2011.		2.3											
3				5	SS	50/75mm								
4														
5				6	SS	36		x						
6														
7	End of Borehole		212.3	7	SS	50/100mm								
			6.4											



- Borehole remained open upon completion of drilling.
- Perched water noted at 0.8m during drilling on May 27, 2011.
- Water level on June 13, 2011 measured at 0.4m (elev. 218.3m) in 2.4m deep standpipe.
- Water level noted at 4.8m during drilling on June 14, 2011.
- Water level on July 4, 2011 measured at 0.9m (elev. 217.8m) in 2.4m deep standpipe and at 1.6m (elev. 217.1m) in 6.2m deep standpipe.



Terraprobe

LOG OF BOREHOLE ..11..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

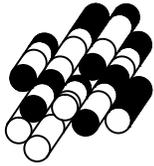
CLIENT: MacPherson Builders (Blue Mountains) Limited

BORING DATE: May 27, 2011

LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	20	40	60	80				
0	GROUND SURFACE		211.8											
	150mm - Silty TOPSOIL Brown Compact to Very Dense Moist		0.0	1	SS	19	x							
1	SANDY SILT, trace gravel to gravelly, some clay, with frequent cobbles & boulders, difficult augering, TILL		210.4	2	SS	50	100mm							
2	Grinding auger refusal on probable boulders after four attempts.		1.4											1. Borehole remained open and dry upon completion of drilling.
3														
4														
5														
6														
7														
8														
9														



Terraprobe

LOG OF BOREHOLE ..12..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

CLIENT: MacPherson Builders (Blue Mountains) Limited

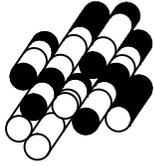
BORING DATE: June 1, 2011

LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE		SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION	
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	20	40	60	80	10	20		30
0	GROUND SURFACE		199.8											
	150mm - Silty TOPSOIL		0.0											
	Brown to Grey	Compact to Very Dense	Moist	1	SS	10	x							
1	SANDY SILT, trace gravel to gravelly, some clay, with frequent cobbles & boulders, difficult augering, TILL			2	SS	52			x					
				3	SS	50/100mm								
				4	SS	50/125mm								
				5	AS	50/50mm								
3	Grinding auger refusal on probable cobbles/boulders.		3.0											
4														
5														
6														
7														
8														
9														

1. Borehole remained open and dry upon completion of drilling.



Terraprobe

LOG OF BOREHOLE ..13..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

CLIENT: MacPherson Builders (Blue Mountains) Limited

BORING DATE: June 1, 2011

LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	20	40	60	80	10	20	30	
0	GROUND SURFACE		205.4											
	Dark Brown Compact Moist		0.0	1	SS	14	x							
	SILTY SAND, some topsoil, FILL		204.8											
1	Brown Dense to Very Dense Moist to Wet		0.6	2	SS	45		x						
	SANDY SILT, fine, to some sand, trace clay			3	SS	46		x						
				4	SS	80			x					
				5	SS	72				x				
				6	SS	50/150mm								
				7	SS	50/125mm								
				8	SS	50/125mm								
			196.9											
9	Brown Very Dense to Compact Moist to Wet		8.5											
	SAND, fine, some to trace silt			9	SS	50/125mm								

D50T Crawler-mounted Drill Rig / Hollow Stem Augers

3.1m

Bentonite Seal

Bentonite Seal

4.5m



Terraprobe

LOG OF BOREHOLE ..13..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

CLIENT: MacPherson Builders (Blue Mountains) Limited

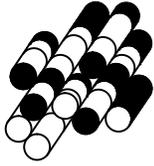
BORING DATE: June 1, 2011

LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT $\times \times \times$				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa							
							20	40	60	80	nat.V - +	rem.V - ⊕	U - ○	
10	Continued As above		195.4											
11			10.0											
12				10	SS	23								
13			192.0											
14	Grey Compact Wet SILT, trace fine sand, trace clay		13.4											
15														
16			188.9											
17	Grinding auger refusal on probable bedrock.		16.5											
18														
19														

- Borehole remained open upon completion of drilling.
- Water level noted at 4.5m and 13.4m during drilling.
- Water level on June 13, 2011 measured at 3.1m (elev. 202.3m) in 5.3m deep standpipe and 13.5m (elev. 191.9m) in 16.3m deep standpipe.



Terraprobe

LOG OF BOREHOLE ..14..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

CLIENT: MacPherson Builders (Blue Mountains) Limited

BORING DATE: May 27, 2011

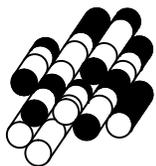
LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT $\times \times \times$				WATER CONTENT (%)	INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa					
							20	40	60	80		
0	GROUND SURFACE		209.6									
	450mm - Silty TOPSOIL		0.0									
	Brown Very Dense Moist			1	SS	6 x						
1	SANDY SILT, trace gravel to gravelly, some clay, with frequent cobbles & boulders, difficult augering, TILL			2	SS	50/75mm						
	Grinding auger refusal on probable boulders after two attempts.		208.1									
2			1.5									
3												
4												
5												
6												
7												
8												
9												

1. Borehole remained open and dry upon completion of drilling.

CME45 Crawler-mounted Drill Rig / Solid Stem Augers



Terraprobe

LOG OF BOREHOLE ..15..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

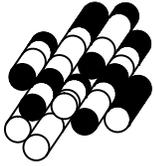
CLIENT: MacPherson Builders (Blue Mountains) Limited

BORING DATE: May 27, 2011

LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT $\times \times \times$				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa							
							20	40	60	80	nat.V - +	rem.V - ⊕	U - ○	
0	GROUND SURFACE		216.4											<p>Bentonite Seal</p> <p>1.6m</p>
	300mm - Silty TOPSOIL		0.0											
	Brown Dense to Very Dense Moist			1	SS	7	x							
1	SANDY SILT, trace gravel to gravelly, some clay, with frequent cobbles & boulders, difficult augering, TILL			2	SS	36		x						
2				3	SS	50	150mm							
			213.8	4	SS	50	125mm							
3	Grinding auger refusal on probable boulders.		2.6											<p>1. Borehole remained open and dry upon completion of drilling.</p> <p>2. Water level on June 13, 2011 measured at 1.6m (elev. 214.8m).</p>
4														
5														
6														
7														
8														
9														



Terraprobe

LOG OF BOREHOLE ..16..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

CLIENT: MacPherson Builders (Blue Mountains) Limited

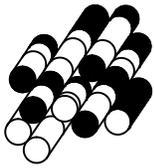
BORING DATE: May 27, 2011

LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa				WATER CONTENT (%)			
							20	40	60	80	20	40	60	
0	GROUND SURFACE		221.8											
	150mm - Silty TOPSOIL		0.0											
	Brown Very Dense Moist			1	SS	6 x								
1	SANDY SILT, trace gravel to gravelly, some clay, with frequent cobbles & boulders, difficult augering, TILL			2	SS	52			x					
2				3	SS	50/150mm								
			219.5	4	SS	50/125mm								
	Grinding auger refusal on probable boulders after two attempts.		2.3											1. Borehole remained open and dry upon completion of drilling.
3														
4														
5														
6														
7														
8														
9														

CME55 Crawler-mounted Drill Rig / Solid Stem Augers



Terraprobe

LOG OF BOREHOLE ..17..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

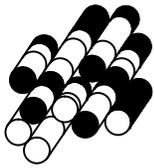
CLIENT: MacPherson Builders (Blue Mountains) Limited

BORING DATE: May 25, 2011

LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT $\times \times$				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa							
							20	40	60	80	10	20	30	
0	GROUND SURFACE		226.1											
	150mm - Silty TOPSOIL		0.0											
	Brown to Grey	Compact to Very Dense	Moist	1	SS	17	x						40	
1	SANDY SILT, trace gravel to gravelly, some clay, with frequent cobbles & boulders difficult augering, TILL			2	SS	32		x						
				3	SS	50/100mm								
				4	SS	50/150mm								
	Grey			5	SS	50/100mm								
				6	SS	50/50mm								
5	Grinding auger refusal on probable boulders.		221.4											
			4.7											1. Borehole remained open and dry upon completion of drilling.



Terraprobe

LOG OF BOREHOLE ..18..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

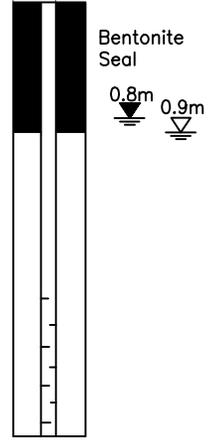
CLIENT: MacPherson Builders (Blue Mountains) Limited

BORING DATE: June 1, 2011

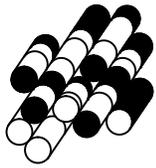
LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	20	40	60	80	SHEAR STRENGTH kPa			
							nat.V - + Q - ● rem.V - ⊕ U - ○							
0	GROUND SURFACE		190.8											
	300mm - TOPSOIL		0.0											
	Brown Compact Moist			1	SS	5 x								
1	SILT, trace sand, trace clay		189.6	2	SS	22								
	Brown Very Dense Wet		1.2											
2	SAND, trace silt, trace gravel		188.7	3	SS	50/100mm								
	Grey Very Dense Wet		2.1											
3	SILTY GRAVELLY SAND, with cobbles/boulders		187.8	4	AS	50/100mm								
				5	AS	50/25mm								
	Grinding auger refusal on probable boulders.		3.0											
4														
5														
6														
7														
8														
9														



1. Borehole remained open upon completion of drilling.
2. Water level noted at 0.9m during drilling.
3. Water level on June 13, 2011 measured at 0.8m (elev. 190.0m).



Terraprobe

LOG OF BOREHOLE ..20..

PROJECT NAME: Home Farm Subdivision

PROJECT No.: 3-11-7059

CLIENT: MacPherson Builders (Blue Mountains) Limited

BORING DATE: May 31, 2011

LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	20	40	60	80	10	20	30	
0	GROUND SURFACE		189.9											<p>Bentonite Seal 0.6m 0.7m</p>
	250mm - TOPSOIL		0.0											
	Brown Compact to Very Dense Moist to Wet			1	SS	12	x							
1	SILTY SAND & GRAVEL, with cobbles/boulders			2	SS	39		x						
			188.0	3	SS	50								
2	Brown to Grey Compact to Very Dense Wet		1.9											
	SAND, fine, some silt			4	SS	21	x							
			185.9	5	SS	55			x					
4	Grey Very Dense Wet		4.0											
	SILT, trace fine sand			6	SS	86				x				
5	Dark Grey Very Dense Wet		5.2											
	SHALE, weathered, with wet seams		183.8											
6	Grinding auger refusal on probable bedrock.		6.1											
7														
8														
9														

- Borehole caved at 2.5m upon completion of drilling.
- Water level noted at 0.7m during drilling.
- Water level on June 13, 2011 measured at 0.6m (elev. 189.3m).

GRAIN SIZE ANALYSIS



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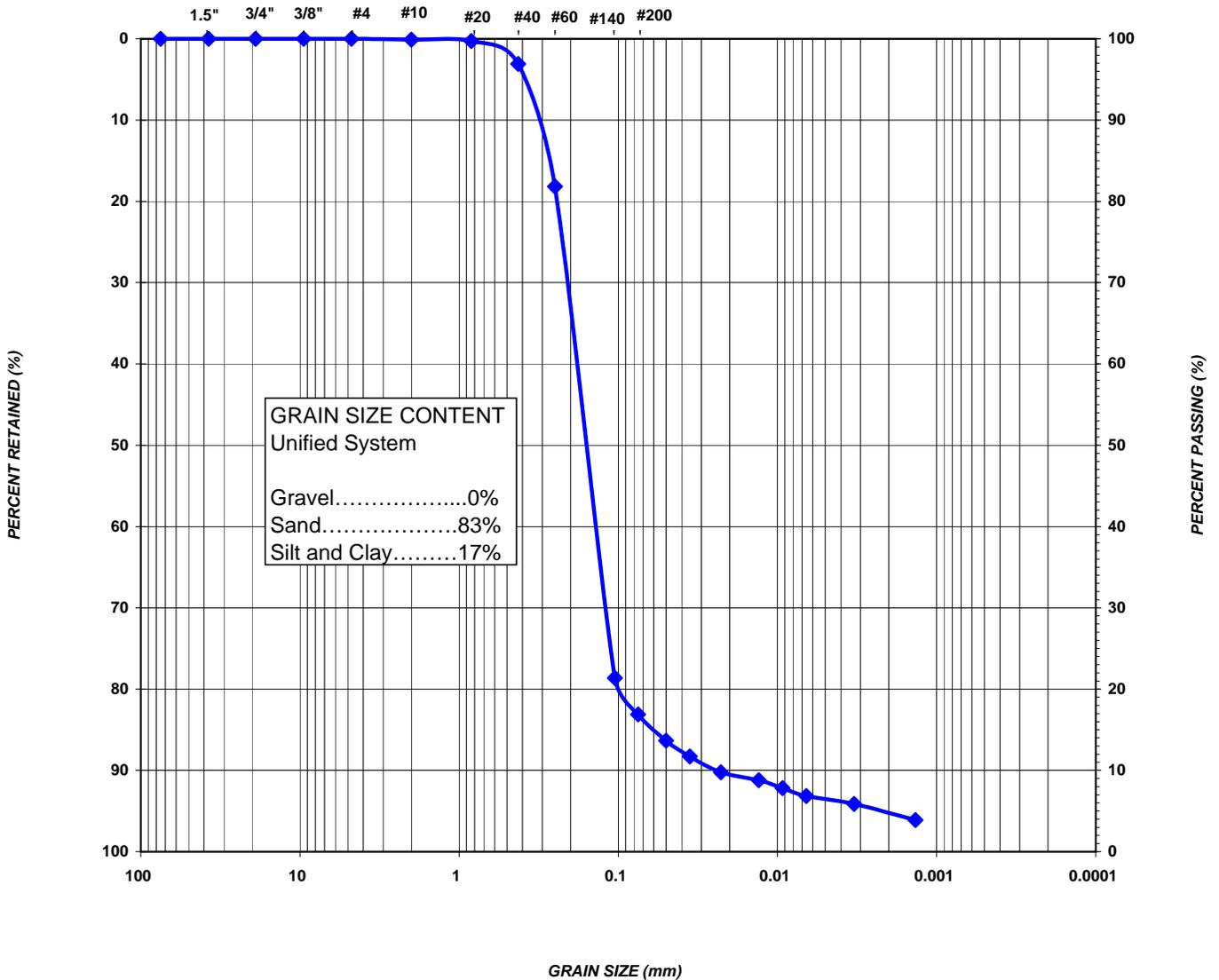
PROJECT: Home Farm Subdivision
 LOCATION: Town of the Blue Mountains, ON
 CLIENT: MacPherson Builders (Blue Mountains) Ltd.
 c/o Higgins Engineering Ltd.

FILE NO.: 3-11-7059
 LAB NO.: 442a
 SAMPLE DATE: May-31-11
 SAMPLED BY: B.H.

BOREHOLE NUMBER: 3 SAMPLE DEPTH: 2.5' to 4'
 SAMPLE NUMBER: 2
 SAMPLE LOCATION: as above
 SAMPLE DESCRIPTION: Sand, some silt, trace clay

GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



MIT SYSTEM	GRAVEL			COARSE	MEDIUM	FINE	SILT	CLAY
	SAND							
UNIFIED SYSTEM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY		
	GRAVEL		SAND					



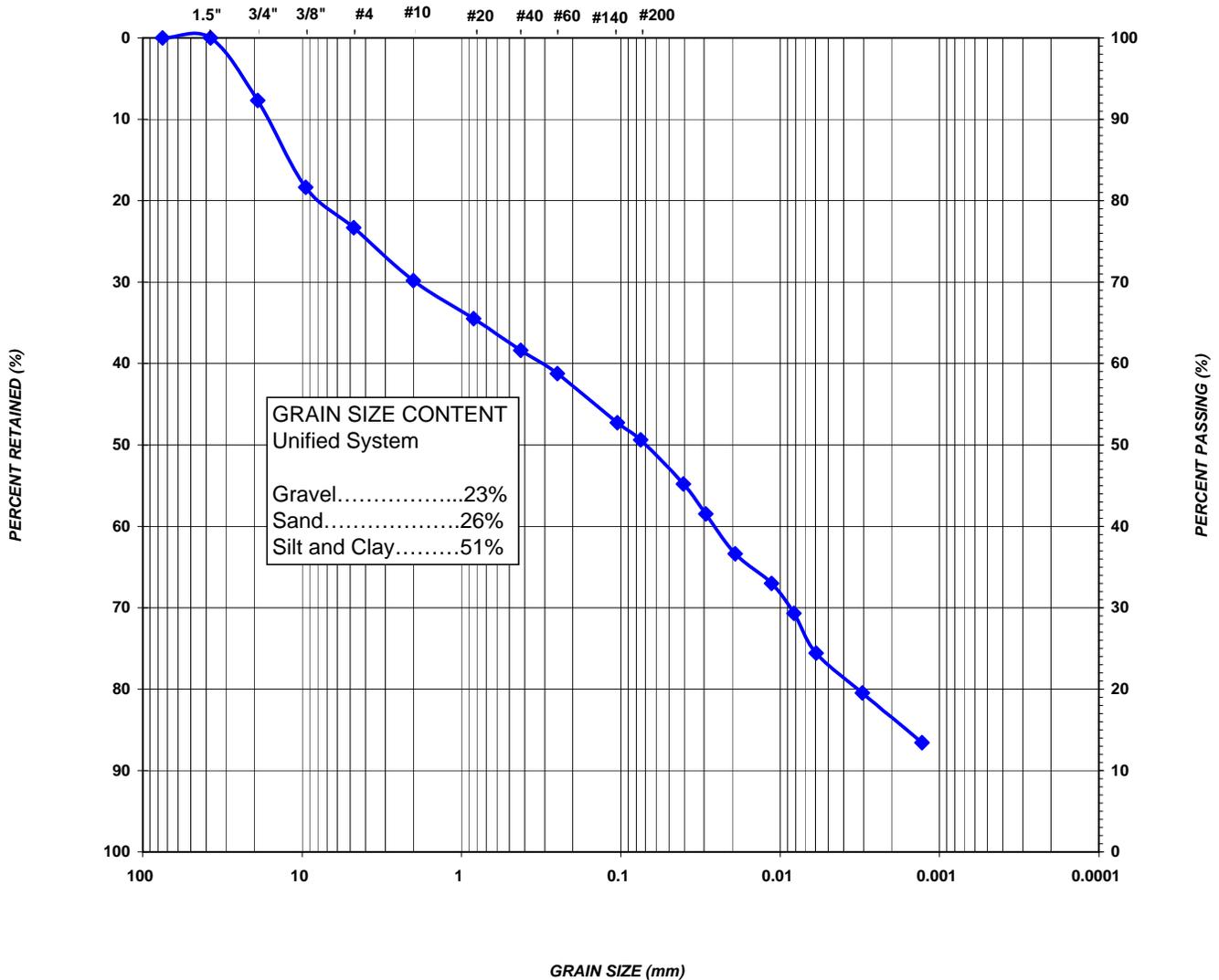
PROJECT: Home Farm Subdivision
 LOCATION: Town of the Blue Mountains, ON
 CLIENT: MacPherson Builders (Blue Mountains) Ltd.
 c/o Higgins Engineering Ltd.

FILE NO.: 3-11-7059
 LAB NO.: 442b
 SAMPLE DATE: May-31-11
 SAMPLED BY: B.H.

BOREHOLE NUMBER: 8 SAMPLE DEPTH: 10' to 11.5'
 SAMPLE NUMBER: 5
 SAMPLE LOCATION: as above
 SAMPLE DESCRIPTION: Sandy, gravelly silt, some clay

GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



MIT SYSTEM	GRAVEL		COARSE	MEDIUM	FINE	SILT	CLAY
			SAND				
UNIFIED SYSTEM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY	
	GRAVEL		SAND				



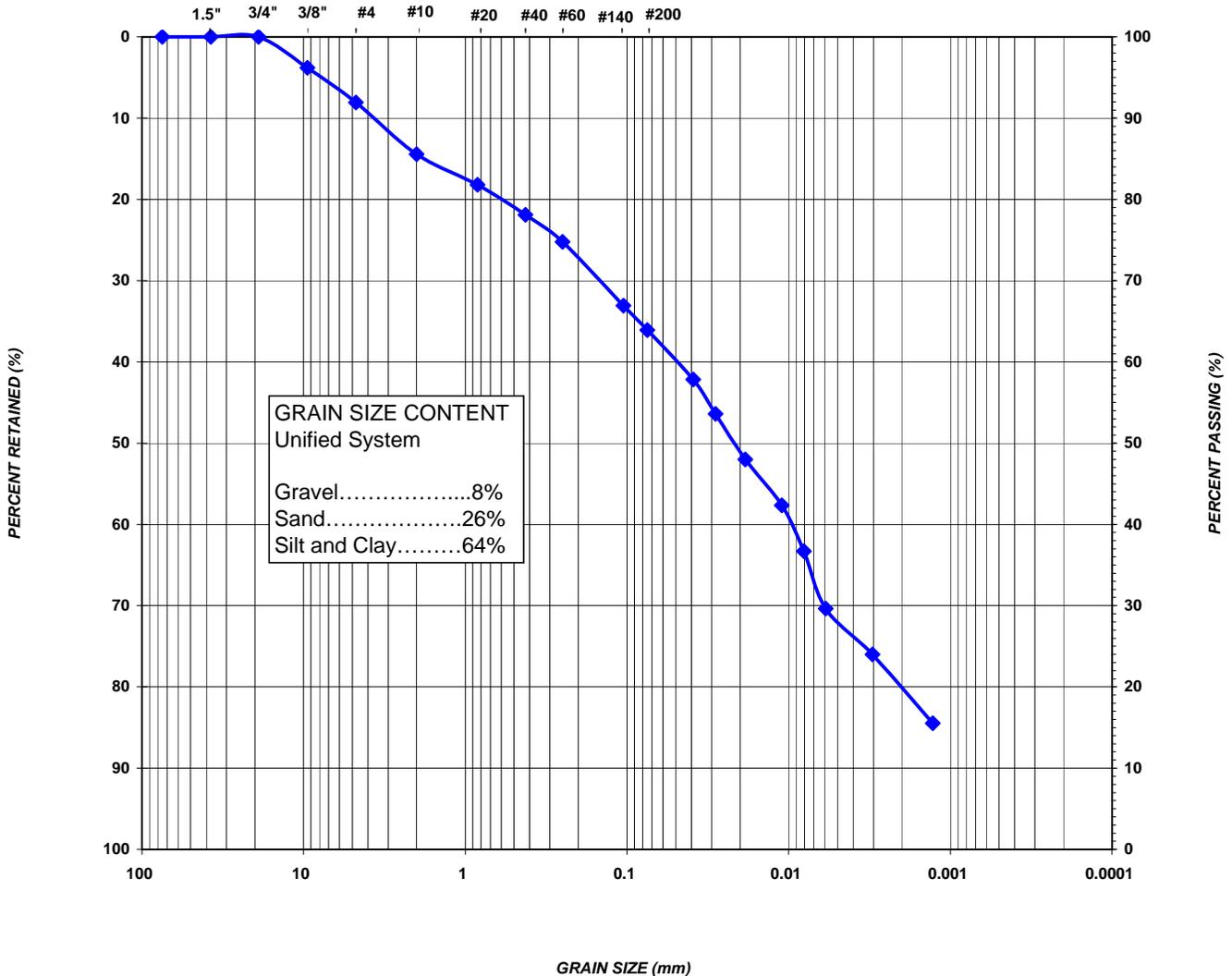
PROJECT: Home Farm Subdivision
 LOCATION: Town of the Blue Mountains, ON
 CLIENT: MacPherson Builders (Blue Mountains) Ltd.
 c/o Higgins Engineering Ltd.

FILE NO.: 3-11-7059
 LAB NO.: 442c
 SAMPLE DATE: May-31-11
 SAMPLED BY: B.H.

BOREHOLE NUMBER: 15 SAMPLE DEPTH: 2.5' to 4'
 SAMPLE NUMBER: 2
 SAMPLE LOCATION: as above
 SAMPLE DESCRIPTION: Sandy silt, some clay, trace gravel

GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



MIT SYSTEM	GRAVEL		COARSE	MEDIUM	FINE	SILT	CLAY
			SAND				
UNIFIED SYSTEM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY	
	GRAVEL		SAND				



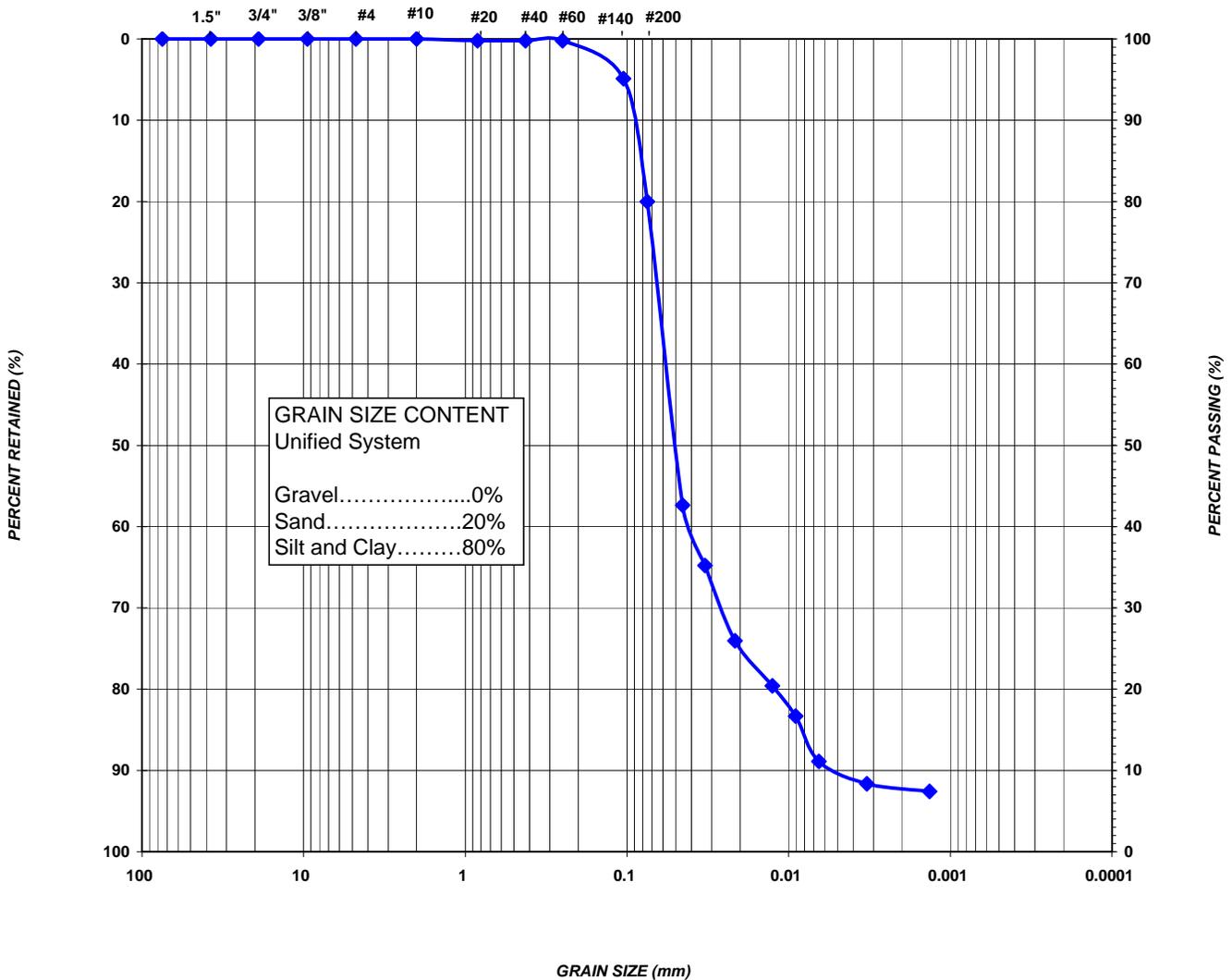
PROJECT: Home Farm Subdivision
 LOCATION: Town of the Blue Mountains, ON
 CLIENT: MacPherson Builders (Blue Mountains) Limited
 c/o Higgins Engineering Limited

FILE NO.: 3-11-7059
 LAB NO.: 494a
 SAMPLE DATE: June-08-11
 SAMPLED BY: B.H.

BOREHOLE NUMBER: 13 SAMPLE DEPTH: 7.5' to 9'
 SAMPLE NUMBER: 4
 SAMPLE LOCATION: as above
 SAMPLE DESCRIPTION: Silt, some sand, trace clay

GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



MIT SYSTEM	GRAVEL			COARSE	MEDIUM	FINE	SILT	CLAY
	SAND							
UNIFIED SYSTEM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY		
GRAVEL		SAND				SILT AND CLAY		



TEST REPORT

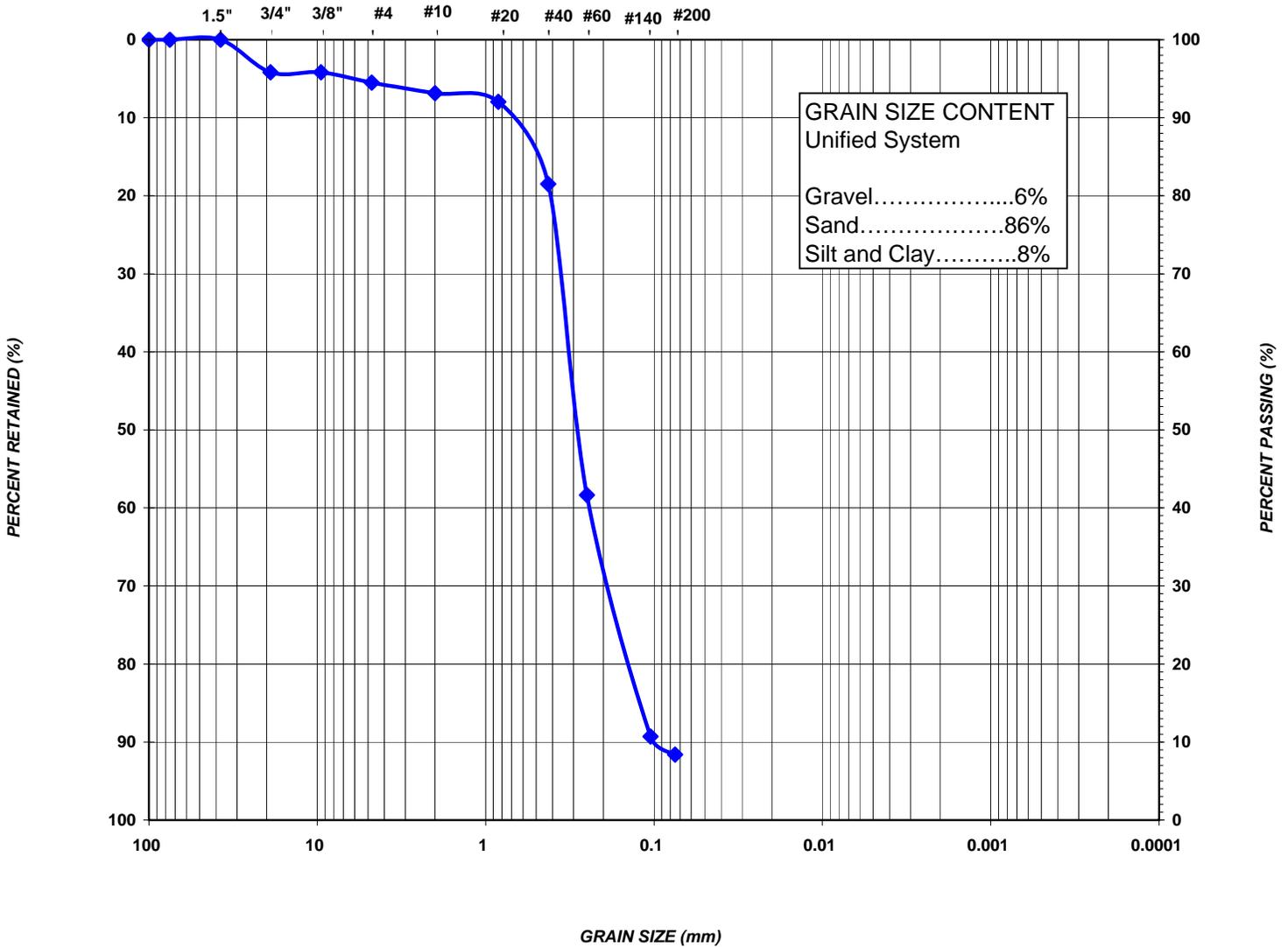
PROJECT: Home Farm Subdivision
 LOCATION: Town of the Blue Mountains, ON
 CLIENT: MacPherson Builders (Blue Mountains) Limited
 c/o Higgins Engineering Limited

FILE NO.: 3-11-7059
 LAB NO.: 494b
 SAMPLE DATE: June-08-11
 SAMPLED BY: B.H.

TEST HOLE NUMBER: 18 SAMPLE DEPTH: 5' to 6.5'
 SAMPLE NUMBER: 3
 SAMPLE LOCATION: as above
 SAMPLE DESCRIPTION: Sand, trace silt, trace gravel

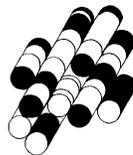
GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



MIT SYSTEM	GRAVEL			COARSE	MEDIUM	FINE	SILT	CLAY
	SAND							
UNIFIED SYSTEM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY		
	GRAVEL		SAND					

SITE PHOTOGRAPHS



Terraprobe Inc.



MAY 2014

SITE PHOTOGRAPHS

31-14-1013



MAY 2014

SITE PHOTOGRAPHS

31-14-1013



MAY 2014

SITE PHOTOGRAPHS

31-14-1013



MAY 2014

SITE PHOTOGRAPHS

31-14-1013



MAY 2014

SITE PHOTOGRAPHS

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MAY 2014

SITE PHOTOGRAPHS

31-14-1013



MAY 2014

SITE PHOTOGRAPHS

31-14-1013

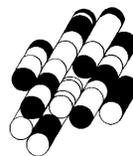


MAY 2014

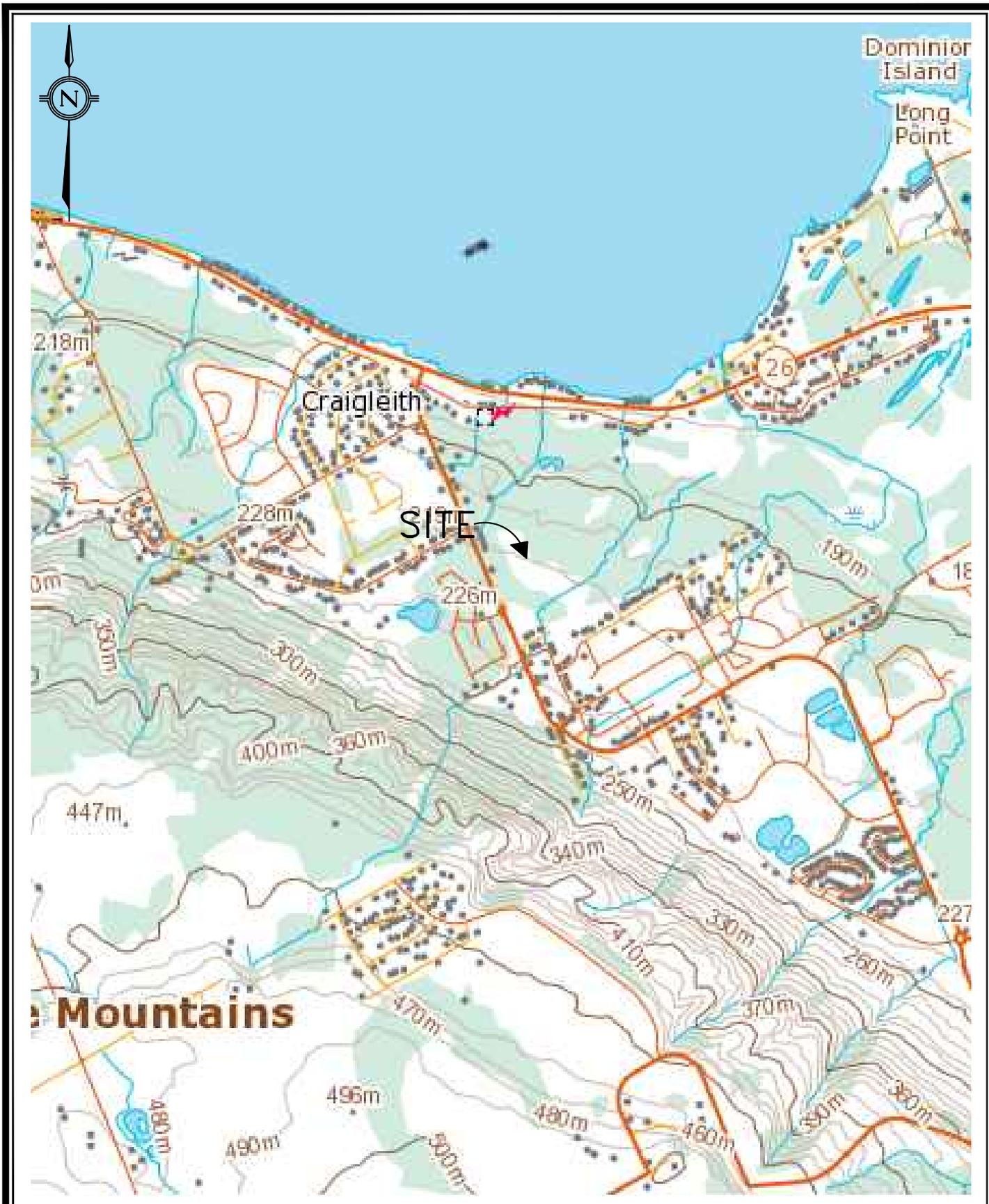
SITE PHOTOGRAPHS

31-14-1013

FIGURES



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APRIL 2014

SITE LOCATION PLAN

31-14-1013



FIGURE 1



NOT TO SCALE

APRIL 2014

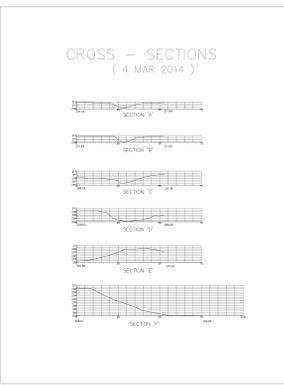
SITE LOCATION

31-14-1013



LOT/BLOCK	LAND USE ANALYSIS	# UNITS	AREA (HA.)
1 TO 137	SINGLE FAMILY (18.3m,12.19m)	23	-
	TOWNHOMES (7.62m)	84	5.8089
	SEMI-DETACHED (9.14m)	30	-
138 TO 283	SINGLE FAMILY (18.3m,12.19m)	64	-
	TOWNHOMES (7.62m)	48	8.3688
	SEMI-DETACHED (9.14m)	34	-
STREET	MUNICIPAL ROW	0	0.9748
284	HERITAGE SITE	0	4.7352
285	COMMON ELEMENTS (ROAD, PARKING)	0	1.3386
286	COMMON ELEMENTS (SWM, PARKING)	0	0.6168
287	COMMON ELEMENTS (OPEN SPACE, PARKING)	0	0.4105
288-293	COMMON ELEMENTS (LANEWAY)	0	0.5797
294	COMMON ELEMENTS (ROAD, PARKING)	0	2.3488
295	COMMON ELEMENTS (SWM, PARKING)	0	0.7181
296-297	MUNICIPAL ROW	0	0.0513
298	COMMON ELEMENTS (OPEN SPACE, PARKING)	0	1.1618
299-301	COMMON ELEMENTS (LANEWAY)	0	0.3124
302	COMMON ELEMENTS (COMMON AREA)	0	0.8820
303-307	OPEN SPACE, PARK, WATERCOURSE	0	8.1827
308	PUMP STATION	0	0.0786
309-311	OPEN SPACE	0	4.3616
312-313	TO BE RETAINED BY OWNER	-	19.2958
314	MUNICIPAL ROW	0	0.0701
TOTAL		283	60.2965

PARKING SPACES (PH 1 - 68, PH 2 - 87) 155



DRAFT PLAN
 OF PROPOSED SUBDIVISION
 LOTS 2, 3, 4, 5, 6 AND 7,
 REGISTERED PLAN 555 AND
 PART OF LOT 159
 REGISTERED PLAN 529 AND
 PART OF LOT 20
 CONCESSION 2
 PART 1, PLAN 16R-2536
 PART OF HELEN STREET ROW
 TOWN OF THE BLUE MOUNTAINS
 COUNTY OF GREY



OWNER'S AUTHORIZATION

I hereby authorize Higgin Engineering Limited, Consulting Engineers and Planners, to prepare and submit this proposed plan of subdivision

MACHERSON BUILDERS (BLUE MOUNTAINS) LIMITED/DATE
 RUSSELL HIGGINS (AUTHORIZED SIGNING OFFICER)

TOWN OF THE BLUE MOUNTAINS DATE
 ELLEN ANDERSON (MAYOR)

TOWN OF THE BLUE MOUNTAINS DATE
 CORRINA GILES (CLERK)

SURVEYOR'S CERTIFICATE
 I hereby certify that the boundary of the lands to be subdivided as shown on this plan and their relationship to the adjacent lands are accurately and correctly shown

ZURBEK, EMO AND PATTEN LTD. DATE

ADDITIONAL INFORMATION
 Required under Section 50(2) of the Planning Act
 (a) as shown (g) as shown
 (b) as shown (h) municipal / private water
 (c) as shown on key plan (i) fill over bedrock
 (d) residential / open space (j) as shown
 (e) as shown (k) municipal / private sewers
 (f) as shown (l) as shown

No.	REVISIONS	DATE	APPROVED

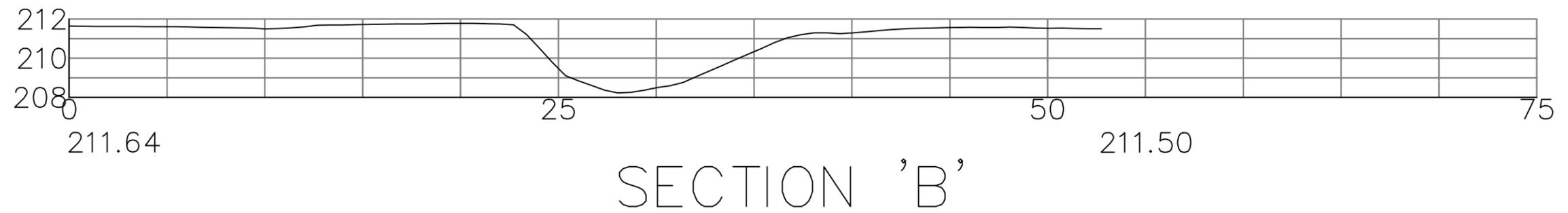
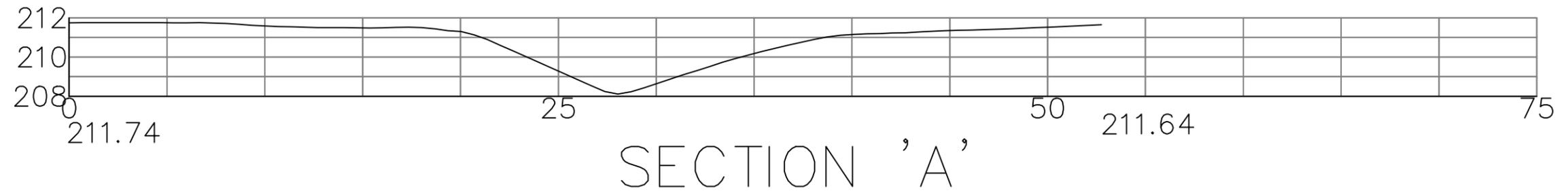
HIGGIN ENGINEERING LIMITED
 CONSULTING ENGINEERS AND PLANNERS
 416 MOORE AVENUE, SUITE 306, TORONTO, (416) 443-8001

TOWN OF THE BLUE MOUNTAINS
 PLANNING DEPARTMENT

CROSS - SECTIONS
 PART LOT 20, CONCESSION 2,
 TOWN OF THE BLUE MOUNTAINS
 COUNTY OF GREY

DESIGN	L.S.H.	SCALE	HOR.	1:1000	DRAWING No.
DRAWN	L.S.H.	REVIEWED			1410-208-S
DATE	12 NOV 2014	SHEET No.			

BOREHOLE & SECTION LOCATION PLAN
 APRIL 2014 31-14-1013
 FIGURE 4
 CROSS - SECTIONS
 BASED ON DRAFT PLAN Dwg# 1410-208-S



SCALE 1:250

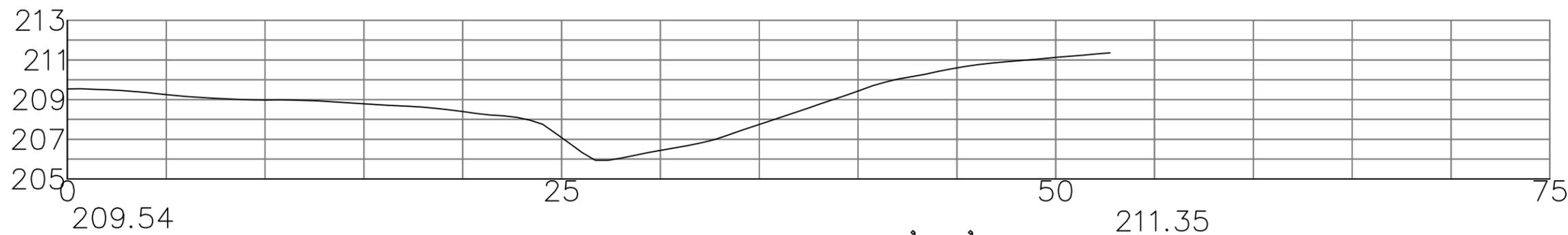
APRIL 2014

CROSS SECTIONS A & B

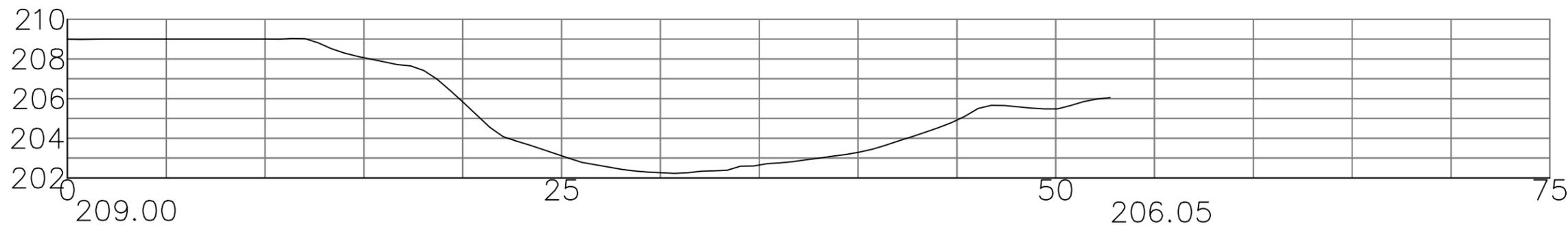
31-14-101



FIGURE 5



SECTION 'C'



SECTION 'D'

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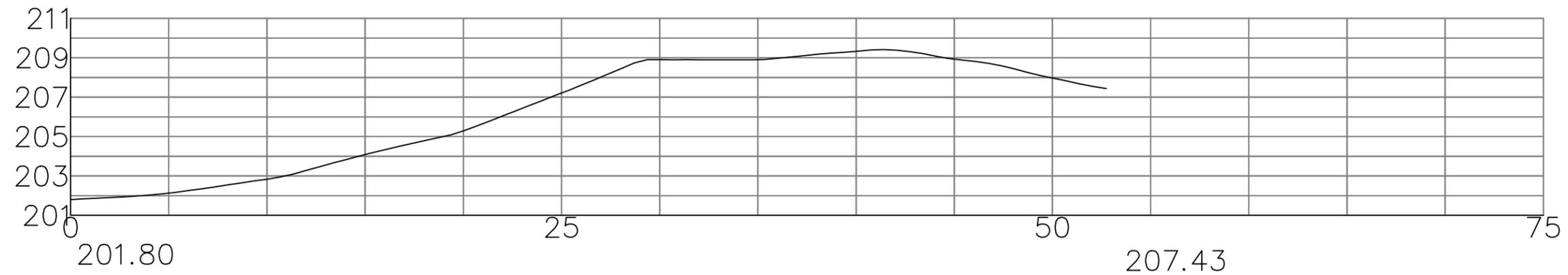
APRIL 2014

CROSS SECTIONS C & D

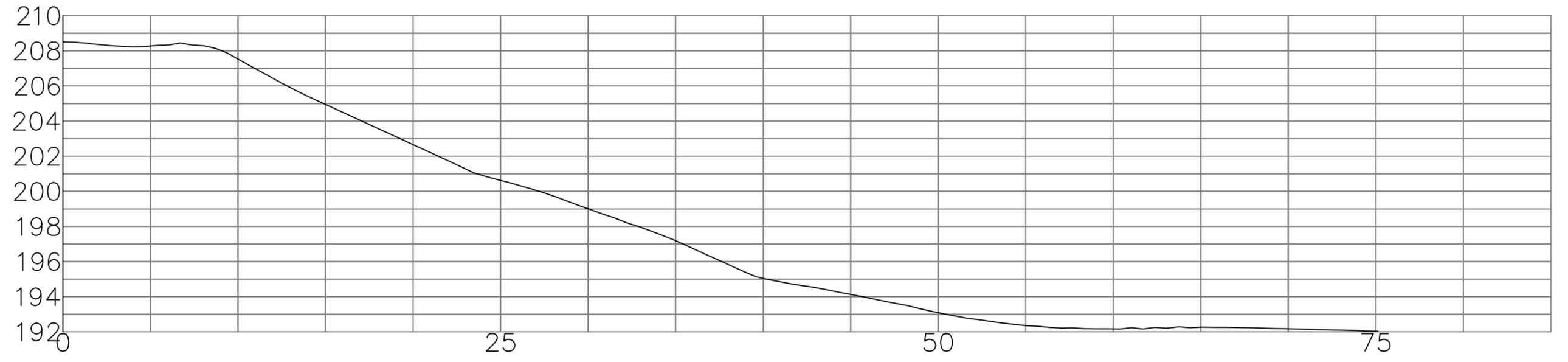
31-14-101



FIGURE 6



SECTION 'E'



SECTION 'F'

SCALE 1:250

APRIL 2014

CROSS SECTIONS E & F

31-14-101



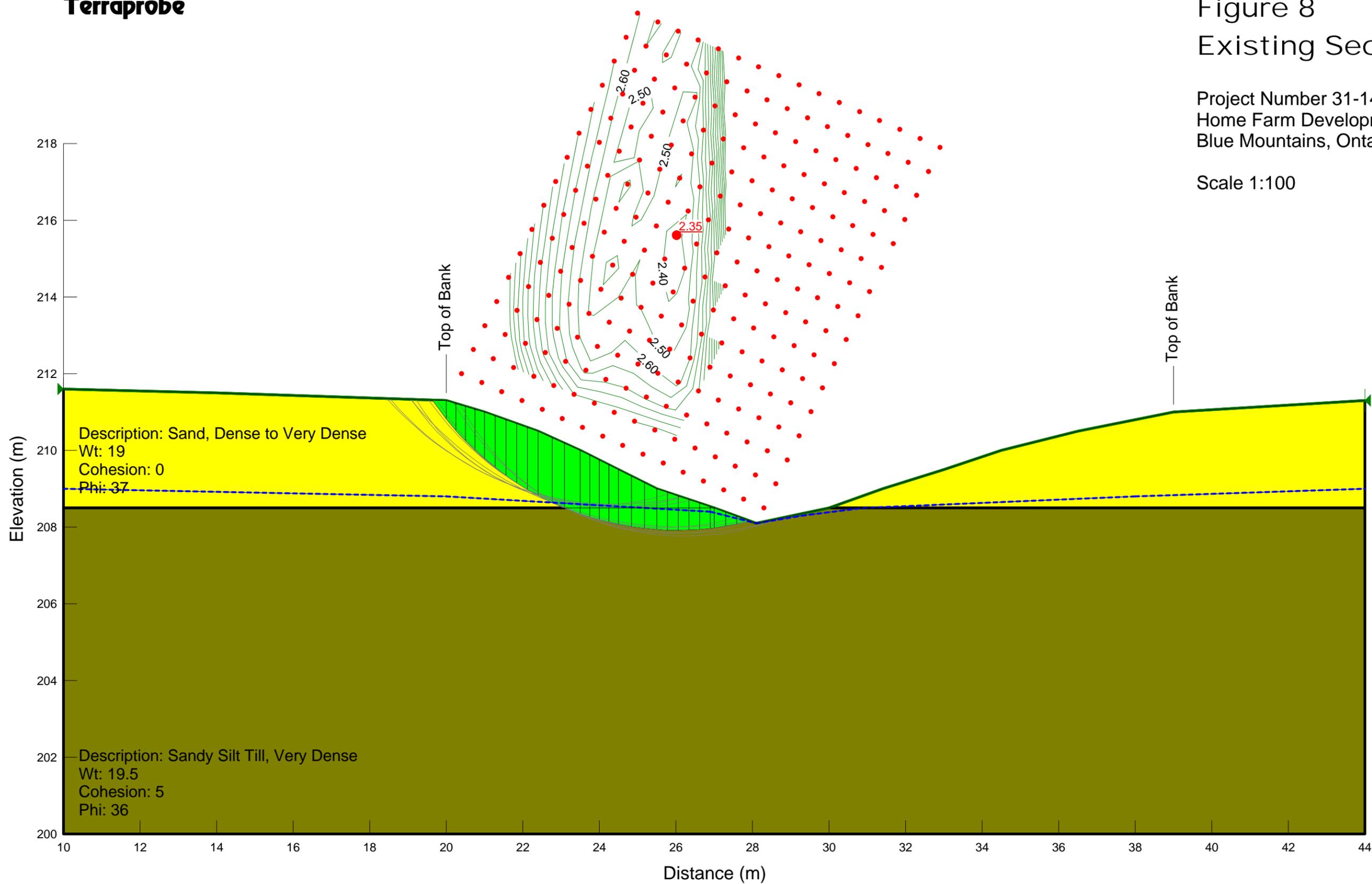
FIGURE 7

Terraprobe

Figure 8
Existing Section AA'

Project Number 31-14-1013
Home Farm Development
Blue Mountains, Ontario

Scale 1:100

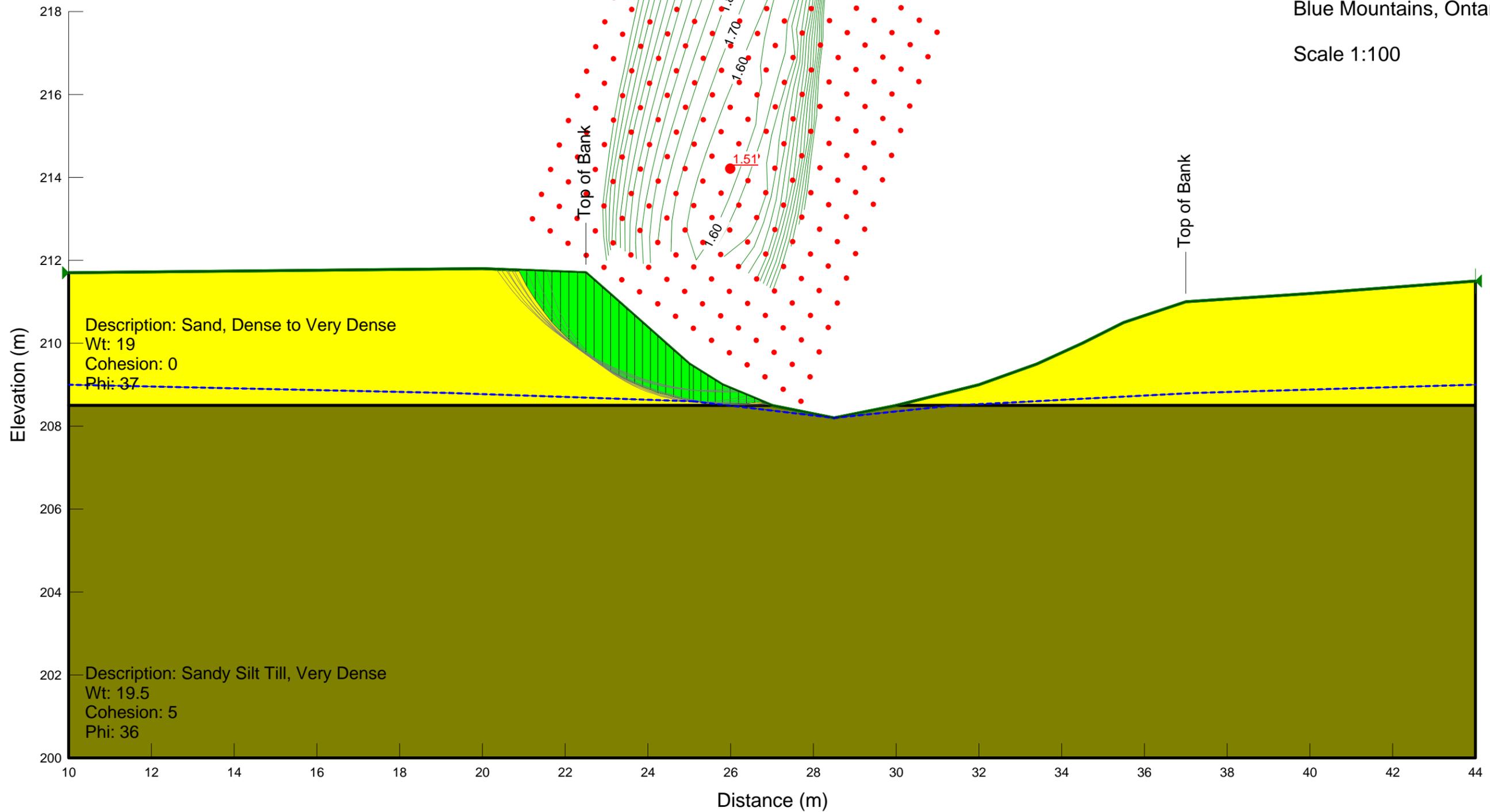


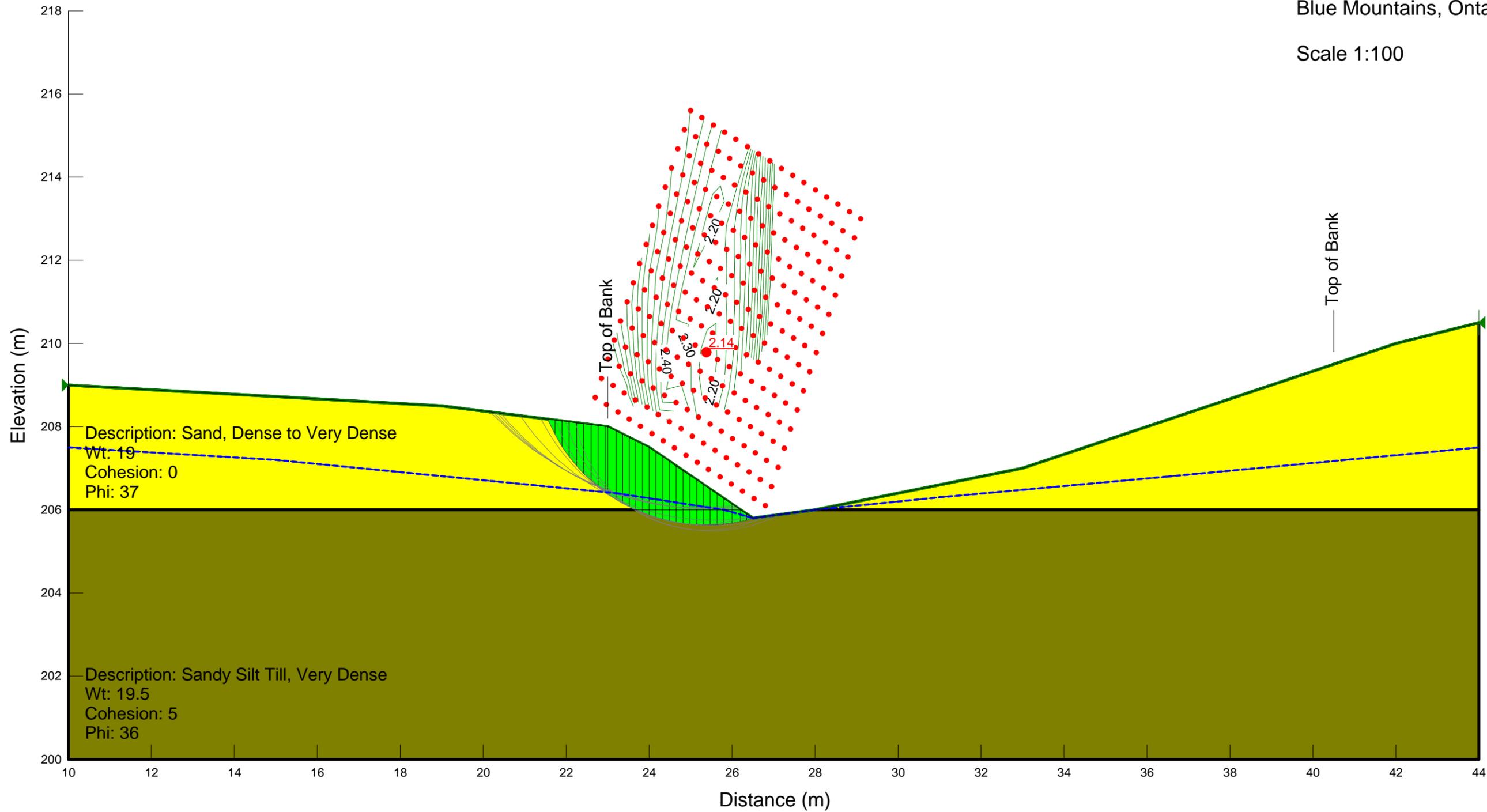
Terraprobe

Figure 9
Existing Section BB'

Project Number 31-14-1013
Home Farm Development
Blue Mountains, Ontario

Scale 1:100



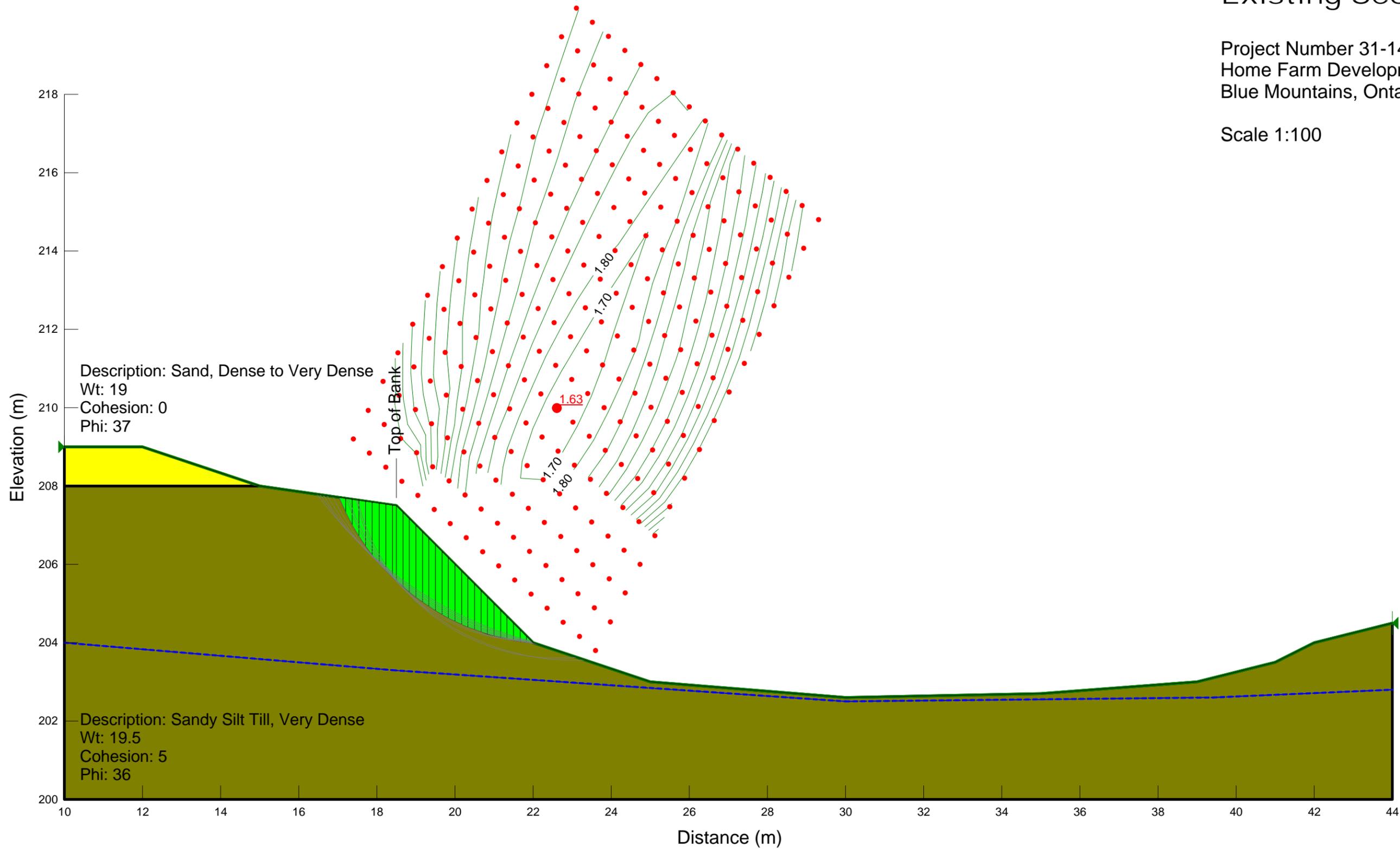


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Figure 11
Existing Section DD'

Project Number 31-14-1013
Home Farm Development
Blue Mountains, Ontario

Scale 1:100



Terraprobe

Figure 12
Existing Section EE'

Project Number 31-14-1013
Home Farm Development
Blue Mountains, Ontario

Scale 1:100

