

TOWN OF CALEDON  
PLANNING  
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# Hydrogeological Investigation – 12148 Albion Vaughan Road, Town of Caledon, Ontario

***Palmer Project #***  
1604602

***Prepared For***  
12148 Albion Vaughn Inc.

December 23, 2020

December 23, 2020

12148 Albion Vaughan Inc.  
Mike Liburdi  
27 Fenton Way  
Brampton, ON  
L6P 0P4

Dear Mike:

**Re: Hydrogeological Investigation – 12148 Albion Vaughan Road, Town of Caledon, Ontario**  
**Project #: 1604602**

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Palmer is pleased to submit the following report describing the results of our Hydrogeological Investigation for the property at 12148 Albion Vaughan Road, Town of Caledon, Ontario.

It is understood that the proposed development will consist of two 6-storey condominium units with 2-levels of underground parking. This report summarizes the results of the hydrogeological assessment, including a characterization of site geology, hydrostratigraphy, and groundwater conditions (i.e. groundwater levels, hydraulic gradient, and hydraulic conductivity). We have completed an effects assessment based on the site conditions and provided a series of hydrogeological development considerations.

Please let us know if you have question or comments on this submission. Thank you for the opportunity to work with your team on this project.

Yours truly,  
Palmer



Jason Cole, M.Sc., P. Geo.  
Principal, Senior Hydrogeologist

*December 23, 2020*

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# 1. Introduction

Palmer was retained by 12148 Albion Vaughan Inc. to complete a Hydrogeological Assessment for a proposed residential development at 12148 Albion-Vaughan Road, Town of Caledon, Ontario. Currently, the site is occupied by an abandoned residential building, a small storage building, driveway, and open space. The proposed development will consist of two 6-storey condominium units with 2-levels of underground parking. The conceptual draft plan for the development is presented in **Appendix A**, provided by Fausto Cortese Architects. The site is located approximately 370 m northwest of the intersection between Albion Vaughan Road and Highway 50 (**Figure 1**).

This report provides site information, including a characterization of site geology and hydrostratigraphy, groundwater conditions (i.e. groundwater levels and hydraulic conductivity), nearby water wells and Source Water Protection. Palmer has also completed an effects assessment based on the site conditions and provided a series of hydrogeological development considerations.

For construction dewatering in excess of 50,000 L/day a registration under the MECP Environmental and Sector Registry (EASR) is required. If dewatering exceeds 400,000 L/day a Permit to Take Water (PTTW) is required.

## 1.1 Scope of Work

Palmer's Hydrogeological Investigation was completed and includes the following main tasks:

- Obtain and review applicable background information including surficial geology maps, Ministry of the Environment, Conservation and Parks (MECP) water well records, and other applicable hydrogeology reports;
- Review site background data and borehole logs from Soil Engineers Ltd.'s Geotechnical Investigation in 2017;
- Characterize the hydrogeology of the site based on secondary source data and the results of Palmer's 2020 drilling program;
- Drill three (3) boreholes and install three (3) groundwater monitoring wells;
- Collect two (2) rounds of groundwater level measurements;
- Complete single well response testing (i.e., slug tests) to determine the hydraulic conductivity of the geological material;
- Conduct two (2) grain size analysis to provide a hydraulic conductivity estimate;
- Complete a Section 59 Source Water Protection Screening with York Region to confirm Source Protection requirements;
- Assessment groundwater/ surface water interactions for the on-site drainage feature;
- Assess potential impacts from site development and provide a series of hydrogeological development considerations; and
- Produce a Preliminary Hydrogeological Assessment Report to support a submission to the Town and Conservation Authority as part of site development approvals.

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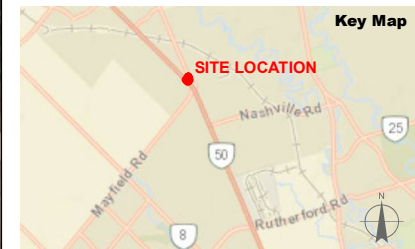
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## LEGEND:

- Monitoring Well
- Watercourse
- Subject Property

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PROJECT NO.	1604602	REVISION:	1-1
DATE:	Sep 16, 2020	SCALE:	1:1500
DRAWN:	CV	DATUM:	NAD 1983
CHECKED:	AL	PROJECTION:	UTM zone 17

CLIENT:  
**Aztec  
Restoration**

PREPARED BY:  
**Palmer™**

PROJECT:  
**12148 Albion Vaughan Rd - Res Dev**

TITLE:  
**Site  
Location**

**Figure 1**



## 2. Regional Conditions

### 2.1 Surficial Geology and Physiography

A review of available online surficial geology mapping by the Ontario Geological Survey (OGS) was used to identify the overburden materials of the site (**Figure 2**). Underlying the site is the Halton Till deposit which consists of clay to silt textured till, which is derived from glaciolacustrine deposits or shale. Fine textured glaciolacustrine deposits, consisting of silt and clay, minor sand and gravel, can be found to the east of the site.

The site is situated within the Peel Plain physiographic region as seen in **Figure 3** (Chapman and Putnam, 1984). The general elevation for this region ranges from 150 to 230 meters above sea level (masl) and there is a gradual and fairly uniform slope toward Lake Ontario. The underlying geological material of the Peel Plain consists of dense, limestone and shale imbued till that is often covered by a shallow layer of clay sediment.

### 2.2 Bedrock Geology

The bedrock underlying the study area consists of the Georgian Bay Formation (**Figure 4**) (Armstrong and Dodge, 2007). This formation consists of shale and limestone. According to nearby water well records, bedrock is found at approximately 38 metres below ground surface (mbgs).

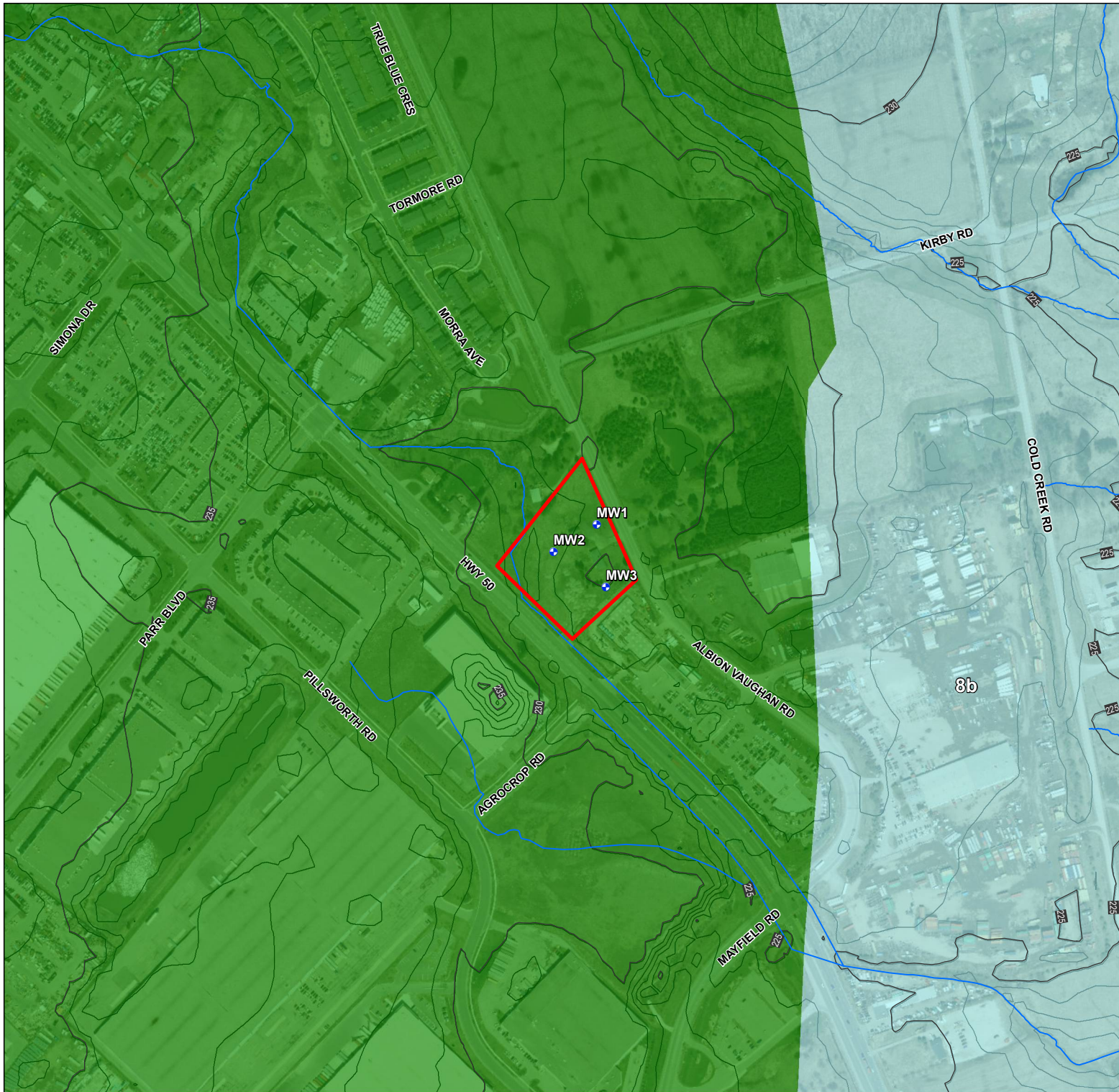
### 2.3 Drainage and Natural Features

The site is situated in the Humber River Subwatershed, which encompasses 911 km<sup>2</sup> and is the largest in the Toronto and Region Conservation Authority's (TRCA) jurisdiction. Water from the Niagara Escarpment and the Oak Ridges Moraine flows down the Humber River into Lake Ontario. The main branch of the river flows 126 km. The site is found near the multiple tributaries where water eventually flows back to the Humber River.

A small tributary intersects the west corner of the property (**Figure 1**). This channel has been historically realigned and appears to be perched on the till deposits.

### 2.4 MECP Water Wells

Based on a review of the MECP water well record database, 42 water wells are situated within a 500 m radius of the project boundary (**Figure 5**). Of the water wells, 16 are for domestic use, 1 is for livestock and domestic, 1 is for industrial and domestic, 10 are for monitoring, 3 are for monitoring or test holes, 5 are not used, 1 is for other, and 5 are unknown. The depth of wells ranged from 4.6 to 62.8 mbgs, with an average depth of 31.3 mbgs. The static water level depth ranged from 2.4 to 33.0 mbgs, with an average of 23.4 mbgs. The well yield ranged from 3.8 to 37.9 L/min, with an average yield of 19.5 L/min. Additional details on each water well can be seen below in **Table 1**.



LEGEND:

- Monitoring Well
- Watercourse
- Surface Elevation Contour (1m)
- Subject Property

**Surficial Geology<sup>1</sup>**  
PHANEROZOIC

CENOZOIC  
QUATERNARY  
PLEISTOCENE

**8** Fine-textured glaciolacustrine deposits: silt and clay, minor sand and gravel  
8b Interbedded silt and clay and gritty, pebbly flow till and rainout deposits

**5d** Till: Silty sand to sand-textured till on Precambrian terrain  
5d Clay to silt-textured till (derived from glaciolacustrine deposits or shale)

1. Ontario Geological Survey 2010 (Mapped at 1:50,000), Surficial geology of southern Ontario; Ontario Geological Survey, Miscellaneous Release- Data 128 - Revised

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CLIENT: Aztec Restoration

PREPARED BY: **Palmer™**

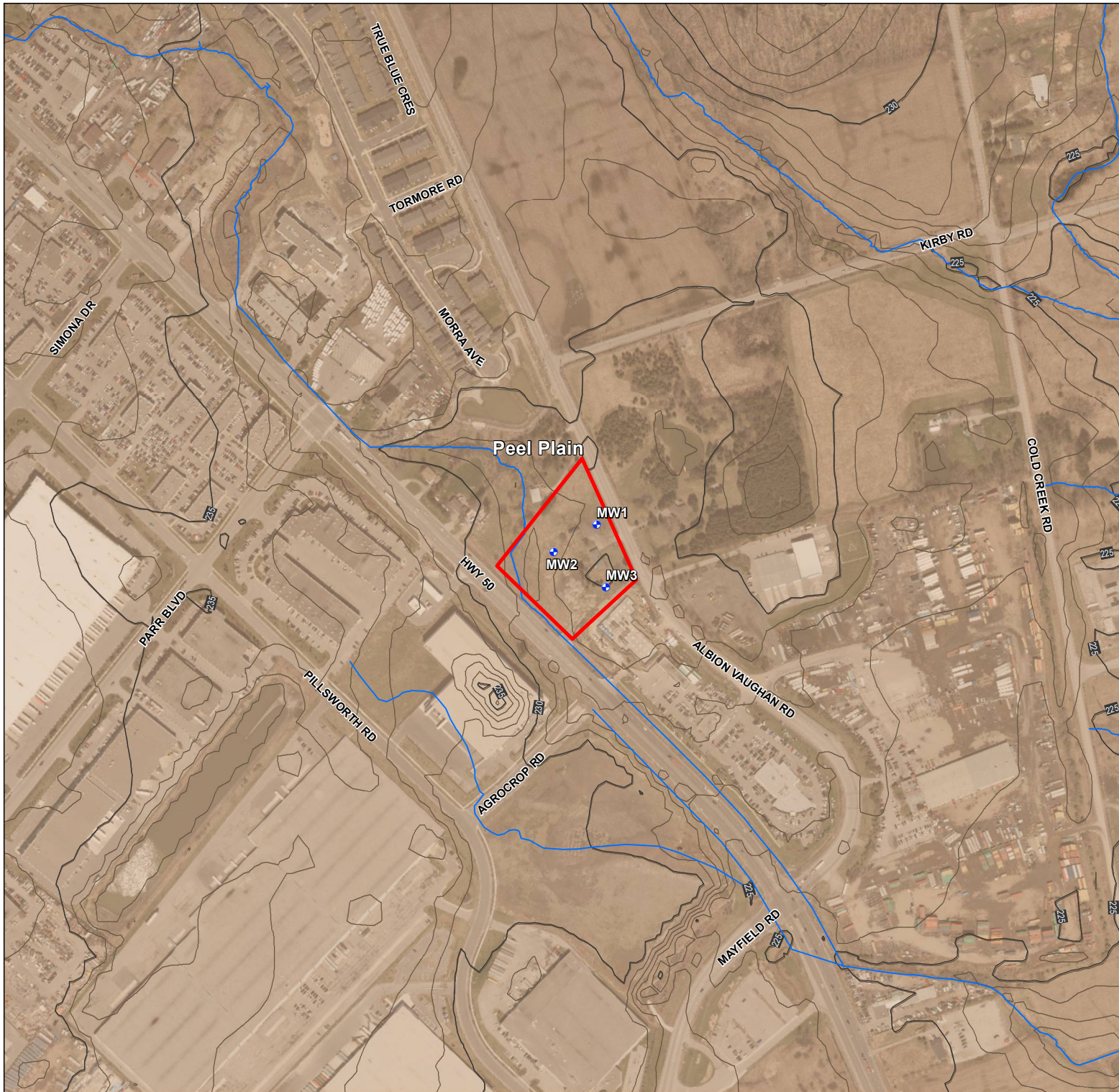
PROJECT: 12148 Albion Vaughan Rd - Res Dev

TITLE: **Surficial Geology**

**Figure 2**

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**LEGEND:**

- Monitoring Well
- Watercourse
- Surface Elevation Contour (1m)
- Subject Property

**Physiographic Region<sup>1</sup>**

- 33. Peel Plain

1. Chapman, L.J. and Putnam, D.F. 2007. Physiography of southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 228

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CLIENT: Aztec Restoration

PREPARED BY: **Palmer™**

PROJECT: 12148 Albion Vaughan Rd - Res Dev

TITLE: **Physiographic Region**

**Figure 3**

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LEGEND:

- Monitoring Well
- Watercourse
- Surface Elevation Contour (1m)
- Subject Property
- Paleozoic Bedrock Geology<sup>1</sup>**
  - Upper Ordovician*
    - 14** Georgian Bay Formation: shale and limestone

1. Armstrong, D.K. and Dodge, J.E.P. Paleozoic Geology Map of Southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 219.

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CLIENT: Aztec Restoration

PREPARED BY: **Palmer™**

PROJECT: 12148 Albion Vaughan Rd - Res Dev

TITLE: **Bedrock Geology**

**Figure 4**

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**LEGEND:**

- MECP Water Well within 500m w/ Well ID
- Monitoring Well
- Watercourse
- Subject Property
- Subject Property 500m Radius

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**DRAWN:** CV **DATUM:** NAD 1983  
**CHECKED:** AL **PROJECTION:** UTM zone 17

**CLIENT:** Aztec Restoration **PREPARED BY:** **Palmer™**

**PROJECT:** 12148 Albion Vaughan Rd - Res Dev

**TITLE:** **MECP Water Wells within 500m**

**Figure 5**

Document Path: G:\Shared drives\Projects 2016\16046 - Aztec Restoration\1604602 - 12148 Albion Vaughan Rd - Res Dev\Mapping\Figures\5 - MECP Water Wells.mxd



**Table 1. Water Well Records**

<b>Well ID</b>	<b>Date Completed</b>	<b>Depth (mbgs)</b>	<b>Static Water Level (mbgs)</b>	<b>Well Yield (L/min)</b>	<b>Well Use</b>
4900361	1953-11-25	13.7	-	-	-
4900362	1954-08-07	47.9	32.3	15.16	Domestic
4903208	1969-03-28	54.9	-	-	-
4903257	1969-06-13	61.0	24.4	15.16	Domestic
4903323	1969-09-03	51.8	14.3	22.74	Domestic
4903570	1970-09-29	54.3	-	-	Not Used
4903571	1970-10-06	47.5	29.0	7.58	Livestock and Domestic
4903711	1971-08-25	62.8	2.4	3.79	Domestic
4903812	1972-04-25	50.3	28.0	22.74	Domestic
4904179	1973-07-18	51.2	20.7	15.16	Domestic
4904182	1973-02-15	53.6	18.3	7.58	Industrial and Domestic
4904567	1974-10-15	47.9	18.9	37.9	Domestic
4904931	1976-05-13	53.9	29.3	11.37	Domestic
4905070	1977-03-15	55.5	32.0	7.58	Domestic
6907218	1964-07-16	22.9	-	-	-
6907219	1964-08-31	42.1	27.4	37.9	Domestic
6914986	1978-10-10	55.5	32.9	37.9	Domestic
6918791	1987-02-05	55.8	29.0	11.37	Domestic
6921422	1981-03-02	23.2	15.5	37.9	Domestic
7110588	2008-07-31	18.3	-	15.16	Domestic
7110588	2008-07-31	18.3	-	-	Domestic
7110588	2008-07-31	18.3	-	-	Domestic
7132481	2009-09-14	7.5	-	-	Monitoring
7132481	2009-09-14	-	-	-	Monitoring
7132481	2009-09-15	-	-	-	Monitoring
7177345	2011-12-28	-	33	-	Other
7212225	2013-10-18	-	-	-	-
7212292	2013-06-12	7.6	-	-	Monitoring
7212293	2013-06-12	7.6	-	-	Monitoring
7212297	2013-06-12	9.0	-	-	Monitoring
7212298	2013-06-12	6.0	-	-	Monitoring
7231571	2014-10-16	6.1	-	-	Monitoring and Test Hole
7231572	2014-10-16	5.2	-	-	Monitoring and Test Hole
7231573	2014-10-16	6.1	-	-	Monitoring and Test Hole
7235624	2014-11-03	-	30.5	-	Not Used
7235626	2014-11-03	-	-	-	Not Used
7236035	2014-10-14	-	-	-	Not Used
7236037	2014-10-14	-	-	-	Not Used
7245314	2015-07-16	4.6	-	-	Monitoring



Well ID	Date Completed	Depth (mbgs)	Static Water Level (mbgs)	Well Yield (L/min)	Well Use
7245315	2015-07-16	6.1	-	-	Monitoring
7245316	2015-07-16	6.1	-	-	Monitoring
7288339	2014-12-09	-	3.4	-	-

## 2.5 Source Water Protection

The site located in the Credit Valley, Toronto and Region and Central Lake Ontario (CTC) Source Protection Area. The Source Water Protection Plan identifies three main regulatory factors under the *Clean Water Act (2006)* relating to local hydrogeology to consider for site development: Significant Groundwater Recharge Areas (SGRAs), Highly Vulnerable Aquifers (HVAs), and Wellhead Protection Areas (WHPAs). Also, the Region of Peel requires a Section 59 Permit under the Clean Water Act (2006) when a proposed land development or change in activity is within a designated vulnerable area. The Section 59 permit designates whether the development or change in activity is prohibited by the Source Water Protection Plan or whether additional risk management plans are required.

Based on input from Peel Region staff, on November 19, 2020, and available MECP Source Protection information mapping (**Figure 6**), the site is not situated within Source Water Protection regulatory zones (HVA, SGRA, etc.) and will not require a Section 59 Permit. It was also confirmed that the site is not located within a WHPA-Q1/Q2 (recharge management) and is not subject to the recharge management policies under the Source Protection Plan.

## 3. Site Conditions

### 3.1 Drilling and Installation of Monitoring Wells

As part of Palmer's hydrogeological investigation, three (3) boreholes (BH20-1 to BH20-3) were drilled on August 17, 2020. The boreholes were drilled using hollow stem augers, to depths ranging from 6.4 to 6.7 mbgs. All three (3) boreholes were completed as monitoring wells in accordance with Ontario Regulation 903. The monitoring wells are made of 5.1 cm (2 inch) diameter schedule 40 polyvinyl chloride (PVC) pipe, with a 3.0 m (10 foot) screened interval. Borehole and monitoring well locations are shown on **Figure 1**. Additionally, according to Soil Engineers Ltd.'s Geotechnical Investigation (2017), 10 boreholes were drilled from October 11 to 12, 2016, with depths ranging from 5.0 to 8.1 m. No monitoring wells were installed, and boreholes were backfilled upon completion. **Table 2** provides a summary of borehole and monitoring well details and borehole logs are provided in **Appendix B**.

**Table 2. Borehole and Monitoring Well Installation Details**

Borehole/ Monitoring Well		Depth (mbgs)	Approx. Screened Interval (mbgs)	Geology
Palmer	BH20-1	6.7	3.6 - 6.7	Clayey Silt Till
	BH20-2	6.4	3.3 - 6.4	Clayey Silt Till
	BH20-3	6.7	3.6 - 6.7	Clayey Silt Till





LEGEND:

- Monitoring Well
- Watercourse
- Subject Property
- Highly Vulnerable Aquifer

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CLIENT: Aztec Restoration

PREPARED BY: **Palmer™**

PROJECT: 12148 Albion Vaughan Rd - Res Dev

TITLE: **Source Water Protection**

**Figure 6**



Borehole/ Monitoring Well		Depth (mbgs)	Approx. Screened Interval (mbgs)	Screened Geology
Soil Engineers Ltd.	BH1	6.6	-	Clayey Silt Till
	BH2	6.6	-	Clayey Silt Till
	BH3	6.6	-	Clayey Silt Till
	BH4	8.1	-	Clayey Silt Till
	BH5	5.0	-	Clayey Silt Till
	BH6	5.0	-	Clayey Silt Till
	BH7	5.0	-	Clayey Silt Till
	BH8	5.0	-	Clayey Silt Till
	BH9	8.1	-	Clayey Silt Till
	BH10	5.0	-	Clayey Silt Till

### 3.2 Hydrostratigraphy

Hydrostratigraphic units can be subdivided into two distinct groups based on their ability to allow groundwater movement. An aquifer is classically defined as a layer of soil that is permeable enough to permit a usable supply of water to be extracted. An aquitard is a layer of soil that inhibits groundwater movement due to its low permeability. Shallow groundwater flow at the site is primarily influenced by the Halton Till hydrostratigraphic unit.

The Halton Till at the site consists of a clayey silt till that acts as an aquitard unit restricting groundwater flow. The clayey silt till aquitard can be found underlying the layer of fill in all boreholes (BH20-1 to B20-3) and was terminated in this deposit. In BH20-2, a thick silty clay layer was found at a depth of 4.7 mbgs and is found to be 1.5 m thick. This unit contains some silty sand and sand layers, allowing minimal groundwater to flow through. The hydraulic conductivity is estimated to range from  $10^{-6}$  to  $10^{-9}$  m/s.

### 3.3 Groundwater Level and Flow

Three (3) 50 mm diameter monitoring wells were installed to monitor stabilized groundwater levels. Stabilized groundwater levels were measured on August 26, 2020 (one week after borehole drilling) and on November 20, 2020. All wells were found to be dry. From the soil samples, it is observed the soil starts to turn grey at approximately 4.2 mbgs, and this can be interpreted as the water level during seasonal highs. **Table 3** shows the water levels in each monitoring well.

**Table 3. Groundwater Levels**

Borehole/ Monitoring Well	Stick Up (m)	Groundwater Level (mbgs)	
		August 26, 2020	November 20, 2020
BH20-1	0.77	Dry @ 6.7 mbgs	Dry @ 6.7 mbgs
BH20-2	0.81	Dry @ 6.4 mbgs	Dry @ 6.4 mbgs
BH20-4	0.83	Dry @ 6.7 mbgs	Dry @ 6.7 mbgs

The borehole logs from Soil Engineers Ltd.'s Geotechnical Investigation confirmed the absence of groundwater at the proposed footing depth of the underground parking, which is estimated to be approximately 7 mbgs. Their boreholes (**Appendix B**) had depths ranging from 5.0 to 8.1 mbgs and were all found to be dry upon completion of the drilling. All the boreholes were terminated in either a silty clay or silty clay till unit. It should be noted that groundwater levels can vary and are subject to seasonal fluctuations in response to weather events.

Most water is not expected to infiltrate into the ground from precipitation or snow melt, but instead become surface runoff due to the low permeability Halton Till aquitard at the surface. The runoff is expected to flow towards either the tributary on the west side of the property or into the drainage ditches surrounding the property. Based on the water level results, it is clear that the groundwater table is well below the depth of the on-site drainage feature. This feature is therefore interpreted to not be hydraulically connected to the water table nor groundwater supported.

### 3.4 Hydraulic Conductivity

As all three (3) monitoring wells were dry during the monitoring events, single well response tests could not be completed. To obtain hydraulic conductivity estimates for the soils, Palmer personnel submitted two (2) soil samples, Sample 7 in BH20-1 and Sample 6B in BH20-2, to Terrapex for grain size analyses (**Appendix C**).

Hydraulic conductivity estimates were calculated using Puckett's Method (Puckett, 1990) on the grain size analyses results. This method is typically used for calculating the hydraulic conductivity of low permeability silt and clay soils from grain size data by utilizing the percentage of clay in the soil.

Based on the Puckett's method, the geometric mean hydraulic conductivity of the Halton Till is approximately  $1.1 \times 10^{-8}$  m/sec and is found to be  $1.2 \times 10^{-7}$  m/s and  $1.0 \times 10^{-9}$  m/s for BH1 and BH2, respectively. The variability of the K values within the site are a result of the heterogeneity of the soils, where sand seams and clay layers can be found. The Halton Till layer is found to have a low hydraulic conductivity and will inhibit the flow of groundwater. **Table 4** provides a summary of the hydraulic conductivity values.

*Table 4. Hydraulic Conductivity Summary*

Borehole	Sample #	Depth (mbgs)	Solution	Hydraulic Conductivity (m/sec)
BH20-1	7	6.1	Puckett	$1.2 \times 10^{-7}$
BH20-2	6B	4.7	Puckett	$1.0 \times 10^{-9}$
Geomean	-	-	-	$1.1 \times 10^{-8}$

## 4. Development Considerations and Potential Effects

### 4.1 Environmental Impacts

Based on the hydrogeological study, construction or site development will not cause an adverse effect to nearby natural features. Based on borehole logs and groundwater level monitoring, no groundwater was found on site to a depth of 6.7 mbgs. Only limited precipitation is expected to infiltrate from precipitation or snow melt, and the water balance is instead dominated by surface runoff due to the low permeability Halton Till aquitard found throughout the site. The runoff is expected to flow towards either the tributary on the west side of the property or into the drainage ditches surrounding the property along the road right of ways.

Based on the water level results, it is clear that the groundwater table is well below the depth of the on-site drainage feature. This feature is therefore interpreted to not be hydraulically connected to the water table nor groundwater supported and will not be affected by construction or site development.

### 4.2 Source Water Protection

Based on input from Peel Region staff and available MECP Source Protection information mapping (**Figure 6**), the site is not situated within any Source Water Protection regulatory zones and therefore, does not require a Section 59 Permit. No significant threat is expected which would require stormwater management and/or water balance restrictions.

It is confirmed that the site is not located within a WHPA-Q1/Q2 (recharge management) only has a limited recharge function. From a hydrogeological perspective, no infiltration based mitigation is recommended.

### 4.3 Dewatering

The proposed site development consists of two 6-storey condominium units with 2-levels of underground parking, founded at approximately 7 mbgs (**Appendix A**). During site monitoring, no groundwater was observed in the wells, and the water table is therefore found to be below the depth of investigation at 6.7 mbgs.

However, from the soil samples, it is observed the soil starts to turn grey at approximately 4.2 mbgs, which can be interpreted as the water level during seasonal highs. A dewatering rate estimate was conservatively calculated by using this as the anticipated seasonal high water level from the grey to brown soil transition as no actual groundwater was found on site. Dewatering estimates assume a 100 m by 100 m excavation for the two (2) underground levels. The geometric mean hydraulic conductivity value of  $1.1 \times 10^{-8}$  m/s was used.

Dewatering rate estimates (Q) for the proposed building was calculated using the following equation from Powers et. al (2007) for an unconfined aquifer:

$$Q = \frac{\pi K (H^2 - h^2)}{\ln \left( \frac{R_0 + r_e}{r_e} \right)} + 2 \left[ \frac{x K (H^2 - h^2)}{2L} \right] \quad m^3/s$$

Where  $K$  = hydraulic conductivity (m/s)  
 $H$  = saturated thickness (m)  
 $h$  = saturated thickness after dewatering (m)  
 $R_0$  = radius of influence estimated using the Sichardt equation:  
 $R_0 = 3000 * (H-h) * \sqrt{K}$  (m)  
 $r_e$  = equivalent radius estimated by:  
 $r_e = \sqrt{\frac{a * a}{\pi}}$  (m)  
 Where  $a$  = trench width (m)  
 $x$  = excavation length  
 $L$  = line source distance (m) which is the greater of  $R_0/2$  or 10 m

Based on the above equation, it is estimated that up to 1,585 L/day of groundwater will be required to be discharged if groundwater is found 4.2 mbgs and is lowered to 7 mbgs. As a contingency and to account for variability in the soil, dewatering up to 10,000 L/day should be expected during construction. Dewatering at these rates is expected to be managed effectively using sump pumps at the base of the excavation and can be discharged in the surrounding drainage ditches on site following mitigation for sediment. No significant long-term dewatering is expected to be required.

For construction dewatering in excess of 50,000 L/day a registration under the MECP Environmental and Sector Registry (EASR) is required. If dewatering exceeds 400,000 L/day a Permit to Take Water (PTTW) is required. As the anticipated dewatering rates are estimated to be less than 50,000 L/day, a PTTW or EASR is not expected to be required for this project.

## 5. Conclusions and Recommendations

The following summarizes the results our Hydrogeological Investigation to support development at the property at 12148 Albion-Vaughan Road, Town of Caledon, Ontario:

- Underlying the site is the Halton Till Aquitard, which consists of clay to silt textured till, which is derived from glaciolacustrine deposits or shale.
- A small tributary to the Humber River intersects the west corner of the property. This channel has been historically realigned and appears to be perched on the till deposits.
- Based on a review of the MECP water well record database, 42 water wells are situated within a 500 m radius of the project boundary. Of the water wells, 16 are for domestic use, 1 is for livestock and domestic, 1 is for industrial and domestic, 10 are for monitoring, 3 are for monitoring or test holes, 5 are not used, 1 is for other, and 5 are unknown.
- Over the entire the site, the water levels in the well were determined to be dry at depths of 6.4 to 6.7 mbgs. Based on boreholes drilled by Soil Engineers Ltd., boreholes were found to be dry upon completion at depths ranging from 5.0 to 8.1 mbgs. From the soil samples, it is observed the soil starts to turn grey at approximately 4.2 mbgs, and this can be interpreted as the water level during seasonal highs.
- Based on the grain size analyses, the geometric mean hydraulic conductivity of the site is approximately  $1.1 \times 10^{-8}$  m/s and is found to be  $1.2 \times 10^{-7}$  m/s and  $1.0 \times 10^{-9}$  m/s for BH1 and BH2, respectively
- The site is not situated within Source Water Protection regulatory zones (HVA, SGRA, etc.) and will not require a Section 59 Permit. It was also confirmed that the site is not located within a WHPA-Q1/Q2 (recharge management) and is not subject to the recharge management policies under the Source Protection Plan.
- No significant threat is expected which would require stormwater management and/or water balance restrictions. It is not expected that construction will cause adverse effect to nearby natural features.
- Construction dewatering rate are expected to be very low to negligible for this project. A contingency rate of 10,000 L/day should be assumed as a contingency to account for variability in the soil. Dewatering at this rate will be manageable with the use of sump pumps, which can be discharged in the surrounding drainage ditches on site following mitigation for sediment. No long-term dewatering is expected to be required.
- A Permit To Take Water (PTTW) or a registration on the Environmental and Sector Registry (EASR) from the MECP are not expected to be required for this project.

## 6. Statement of Limitations

The extent of this study was limited to the specific scope of work for which we were retained and that is described in this report. Palmer has assumed that the information provided by the client or any secondary sources of information are factual and accurate. Palmer accepts no responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of omissions, misinterpretations or negligent acts from relied upon data. Judgment has been used by Palmer in the interpretation of the information provided but subsurface physical and chemical characteristics may differ from regional scale geology mapping and vary between or beyond well/borehole locations given the inherent variability in geological conditions.

Palmer is not a guarantor of the geological or groundwater conditions at the subject site, but warrants only that its work was undertaken and its report prepared in a manner consistent with the level of skill and diligence normally exercised by competent geoscience professionals practicing in the Province of Ontario. Our findings, conclusions and recommendations should be evaluated in light of the limited scope of our work.

The information and opinions expressed in the Report are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT PALMER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS PALMER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belongs to Palmer. Any use which a third party makes of the Report is the sole responsibility of such third party. Palmer accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Palmer's express written permission. Should the project design change following issuance of the Report, Palmer must be provided the opportunity to review and revise the Report in light of such alteration or variation.



## 7. Closure

This report was prepared and reviewed by the undersigned:

**Prepared By:**



Adrian Lo, B.Sc., G.I.T.  
Environmental Scientist (Hydrogeology)

**Reviewed By:**



Jason Cole, M.Sc., P.Geo.  
Principal, Senior Hydrogeologist

## 8. References

- Armstrong, D.K., and Dodge, J.E.P. 2007. Paleozoic Geology Map of Southern Ontario. Ontario Geological Survey, Miscellaneous Release – Data 219.
- Chapman, L.J. and D.F. Putnam. 1984. Physiography of Southern Ontario. Ontario Geological Survey, Special Volume 2: 270 p.
- Chapman, L.J., and Putnam, D.F. 2007. The Physiography of Southern Ontario. Ontario Geological Survey, Miscellaneous Release – Data 228.
- Puckett, W. E., Dane, J. H., and Hajek, B. F., Soil Science Society of America Journal, Vol. 49, 1985, pp. 831-836 Groundwater and Vadose Zone Monitoring, ASTM, STP, 1053, 1990
- Ministry of the Environment and Energy (MOEE), 1995. Technical Information Requirements of Land Development Applications.
- Mulligan, R.P. 2013. Quaternary Landform and Sediment Analysis of the Alliston Area (Southern Simcoe County) Ontario, Canada. M.Sc. Thesis. McMaster University.
- Sun, B. and Hassan, A. 2017. A Geotechnical Investigation for Proposed Residential Development at 12148 Albion Vaughan Road, Town of Caledon, Reference No. 1609-S145. Soil Engineers Ltd.
- The Ontario Geological Survey. 2003. Surficial Geology of Southern Ontario
- Thornthwaite, C.W. and J.R. Mather, 1957:  
Instructions and tables for computing potential evapotranspiration and water balance. Drexel Institute of Technology, Laboratory of Climatology. Publications in Climatology, Volume X. No. 3, 311p.
- TRC/CVC, 2010:  
Low Impact Development Stormwater Management Planning and Design Guide, Version 1.0 – Appendix C.

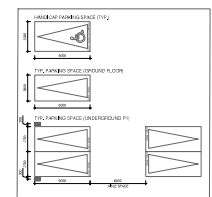
# **Appendix A**

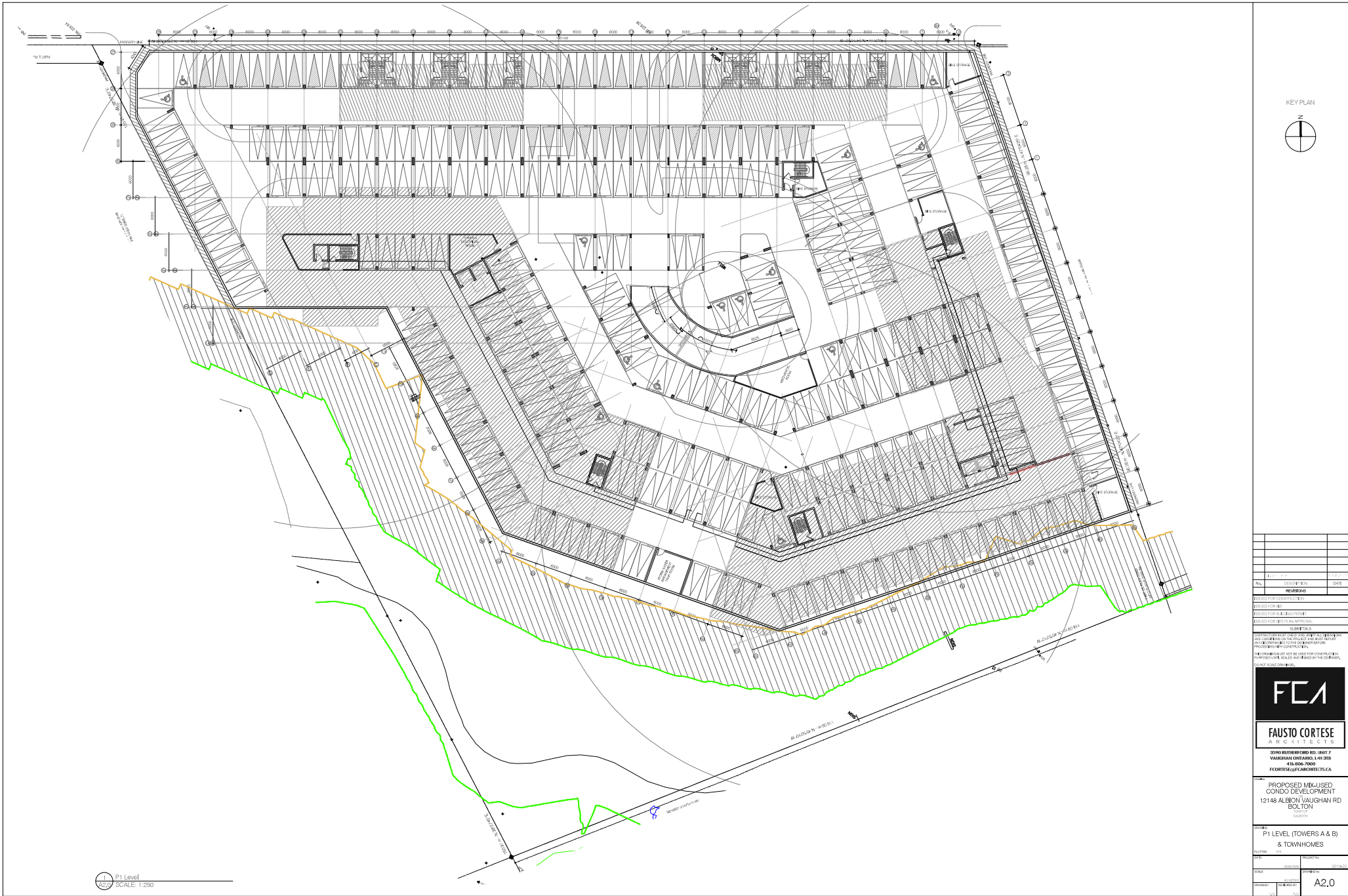
## **Conceptual Draft Plan**

Fausto Cortese Architects (2020)

[illegible]

PARKING				
BY LAW - PARKING REQUIREMENTS				
CONCRETE PAVED SURFACE	1.0000	1.0000	200	
PAVEMENT	1.0000	1.0000	20	
AREA WITHIN LOT	1.0000	1.0000	3	
SPILL-OVER PARKING	1.0000	1.0000	300	
SHOULDER TOTAL	1.0000	1.0000		203 spaces req'd
TOTAL SPENDING PERMITTED	REQUIREMENT (HANDICAP)	REQUIREMENT (SPOTS)	TOTAL	
IN TOTAL	15	20		
GRAND TOTAL	2	13		
SHOULDER TOTAL	17	304		321 spaces req'd

[illegible]



KEY PLAN



NO.	DESCRIPTION	DATE
1	REVISIONS	

DESIGNED BY	PROJECT NO.
DRAWN BY	DATE

FOR REVIEW AND APPROVAL  
FOR REVIEW AND APPROVAL  
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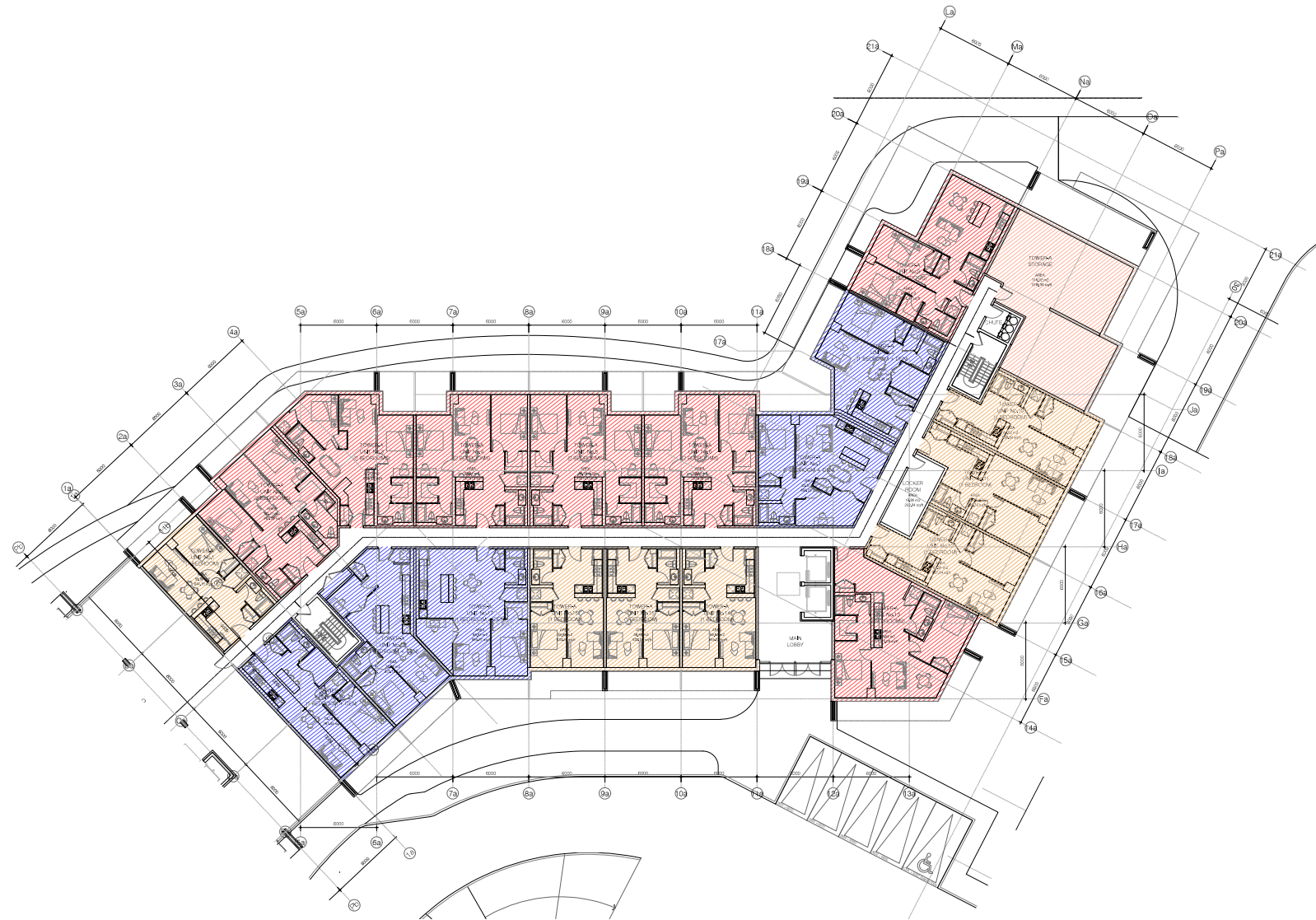
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CONDO DEVELOPMENT  
12148 ALBION VAUGHAN RD  
BOLTON  
ONTARIO

PROJECT  
P1 LEVEL (TOWERS A & B)  
& TOWNHOMES

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MAIN FLOOR PLAN TOWER A  
SCALE: 1:150

KEY PLAN



No.	DESCRIPTION	DATE
1	REVISIONS	

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DESIGNED FOR B.L. APPROVAL  
DESIGNED FOR P.E. APPROVAL

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PROPOSED MIXED-USE  
CONDO DEVELOPMENT  
12148 ALBION VAUGHAN RD.  
BOLTON  
ONTARIO

DATE: 2023-01-10  
DRAWN: MAIN FLOOR PLAN  
TOWER A

SCALE: 1:150  
SHEET: A2.0a



1 MAIN FLOOR PLAN TOWER B  
SCALE: 1:150



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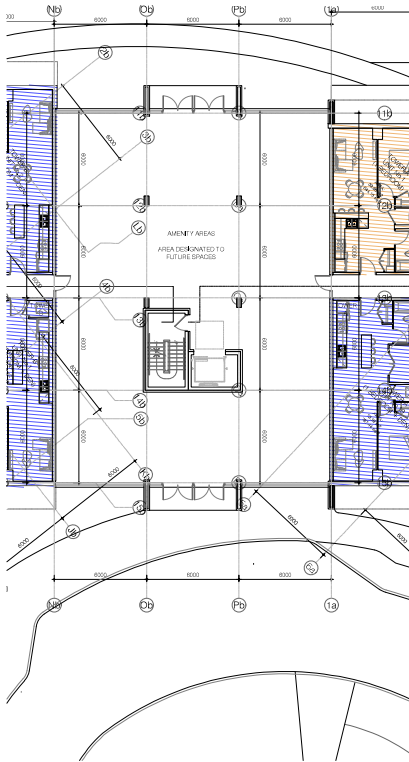
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CONDO DEVELOPMENT  
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BOLTON  
ONTARIO

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TOWER B

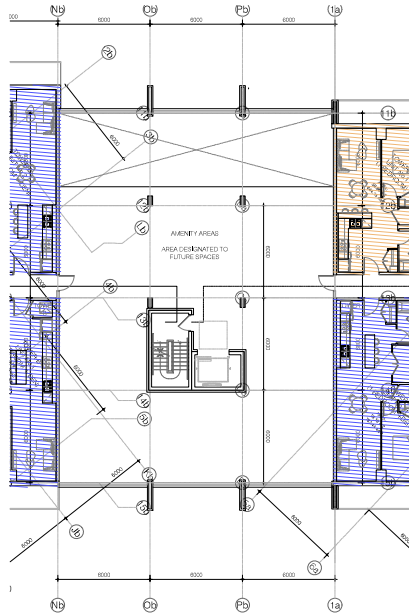
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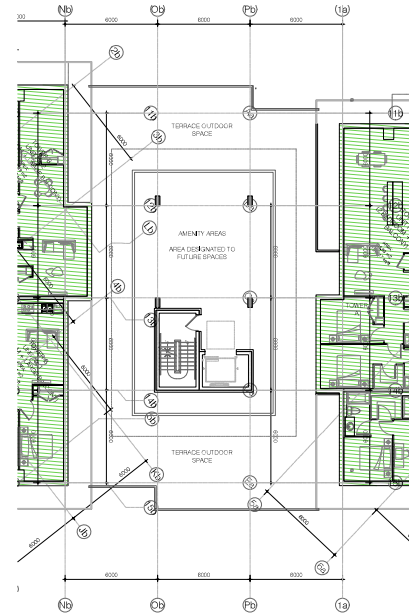
KEY PLAN



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SCALE: 1:150



3 3RD FLOOR PLAN - AMENITIES  
SCALE: 1:150

No.	DESCRIPTION	DATE
1	REVISIONS	

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PROJECT  
PROPOSED MIX-USED  
CONDO DEVELOPMENT  
12148 ALBION VAUGHAN RD  
BOLTON  
ONTARIO

DATE  
FLOOR PLANS BLOCKS  
AND UNITS - TOWNHOMES

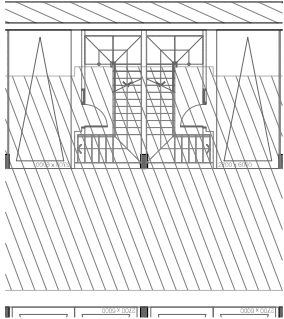
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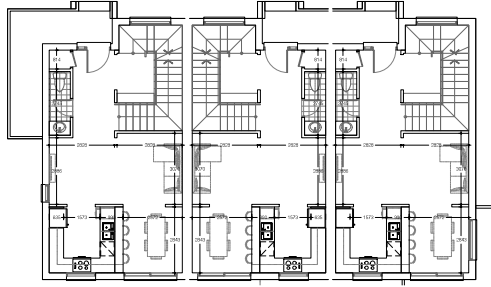
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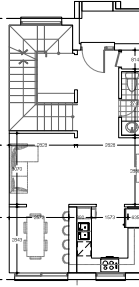
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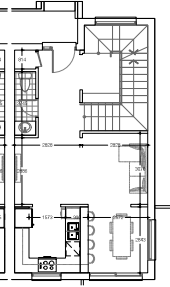
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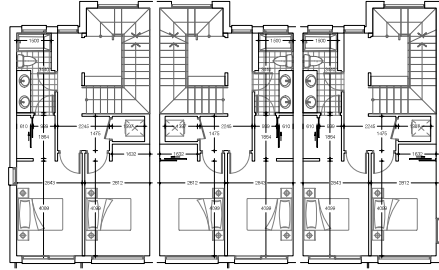
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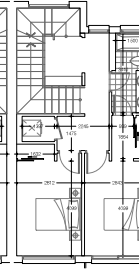
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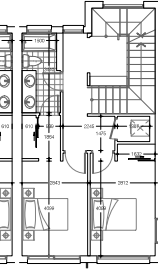
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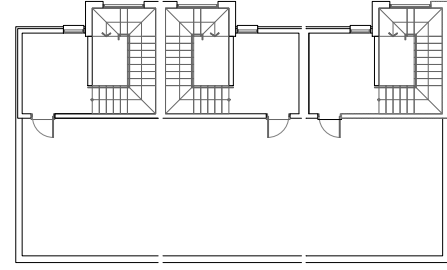
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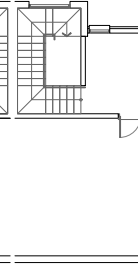
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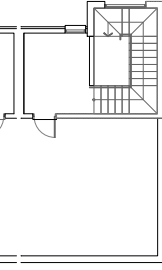
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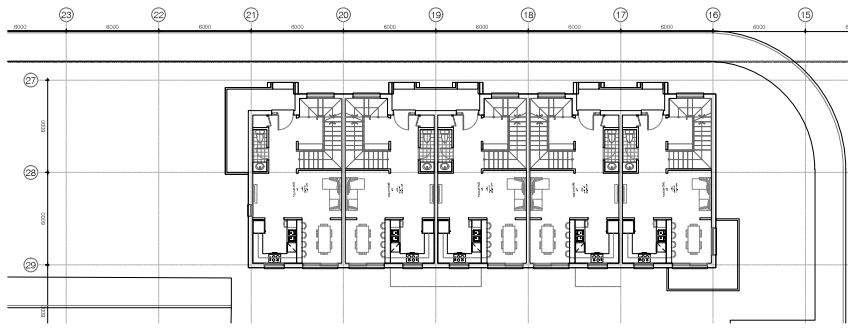
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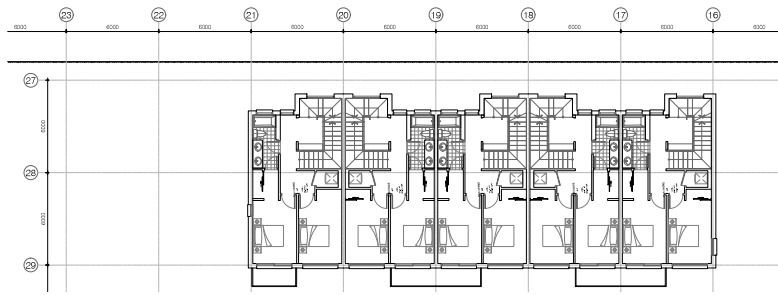
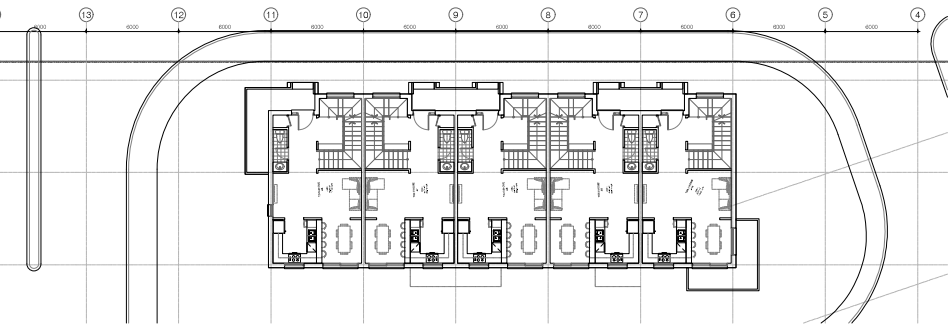
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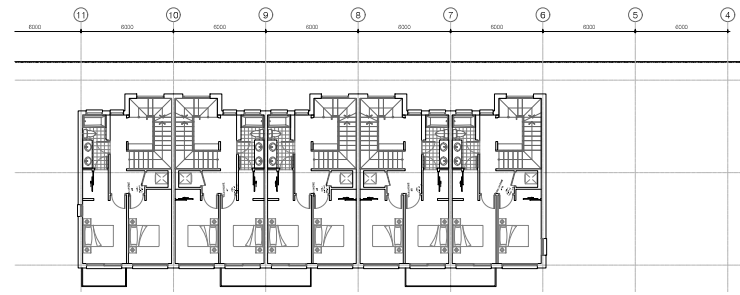
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2 2ND FLOOR PLAN - TOWNHOMES  
SCALE: 1:150



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1	REVISIONS	

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DATE: [REDACTED]

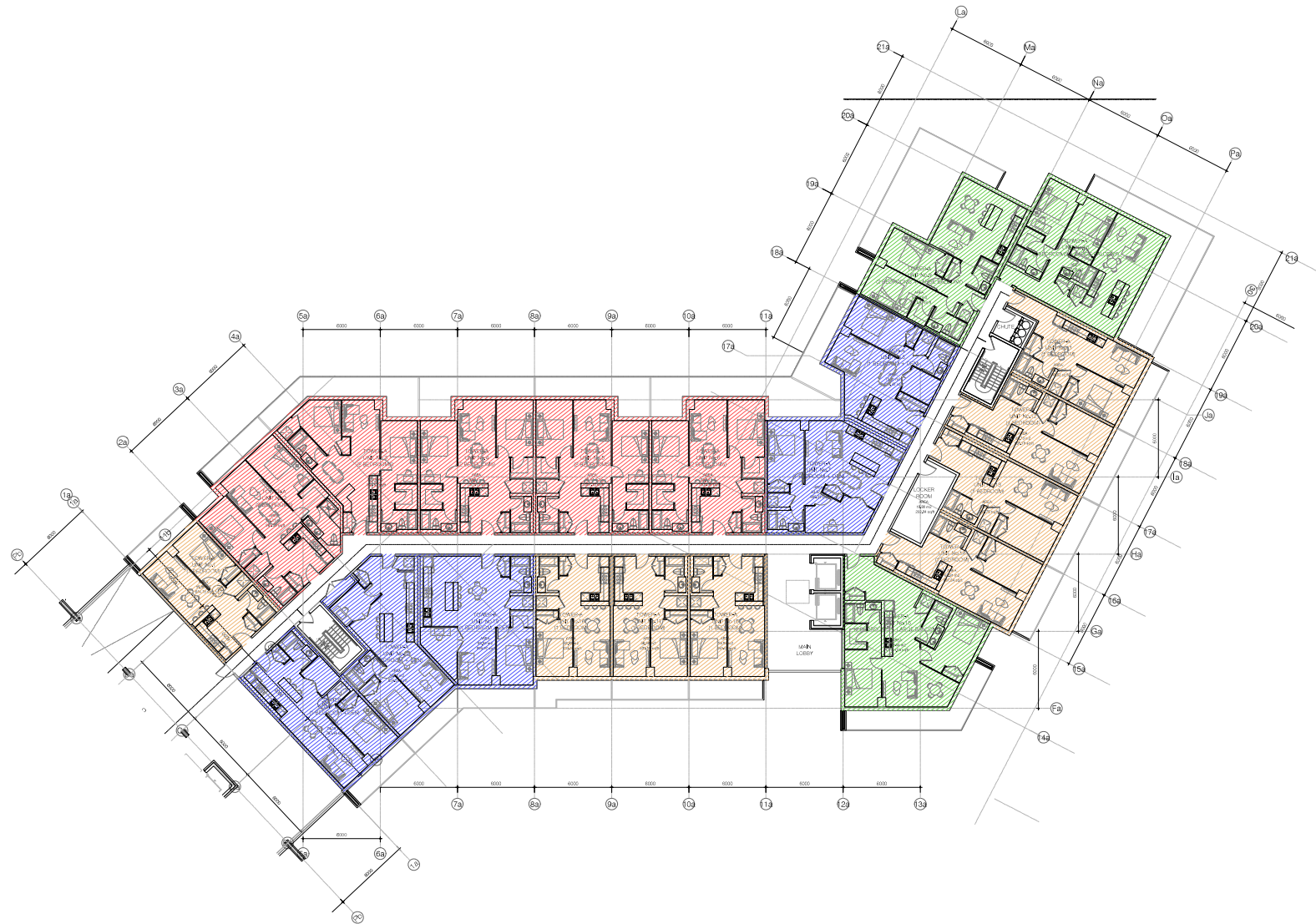
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CONDO DEVELOPMENT  
12148 ALBION VAUGHAN RD.  
BOLTON  
ONTARIO

FLOOR PLANS BLOCKS  
AND UNITS - TOWNHOMES

SCALE: 1:150  
DATE: [REDACTED]  
DRAWN BY: [REDACTED]  
CHECKED BY: [REDACTED]  
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2ND FLOOR PLAN - TOWER A  
SCALE: 1:150

KEY PLAN



NO.	DESCRIPTION	DATE
1	REVISIONS	

DESIGNED FOR CONSTRUCTION  
DESIGNED FOR BUILDING PERMIT  
DESIGNED FOR MECHANICAL PERMIT

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PROPOSED MIXED-USE  
CONDO DEVELOPMENT  
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ONTARIO

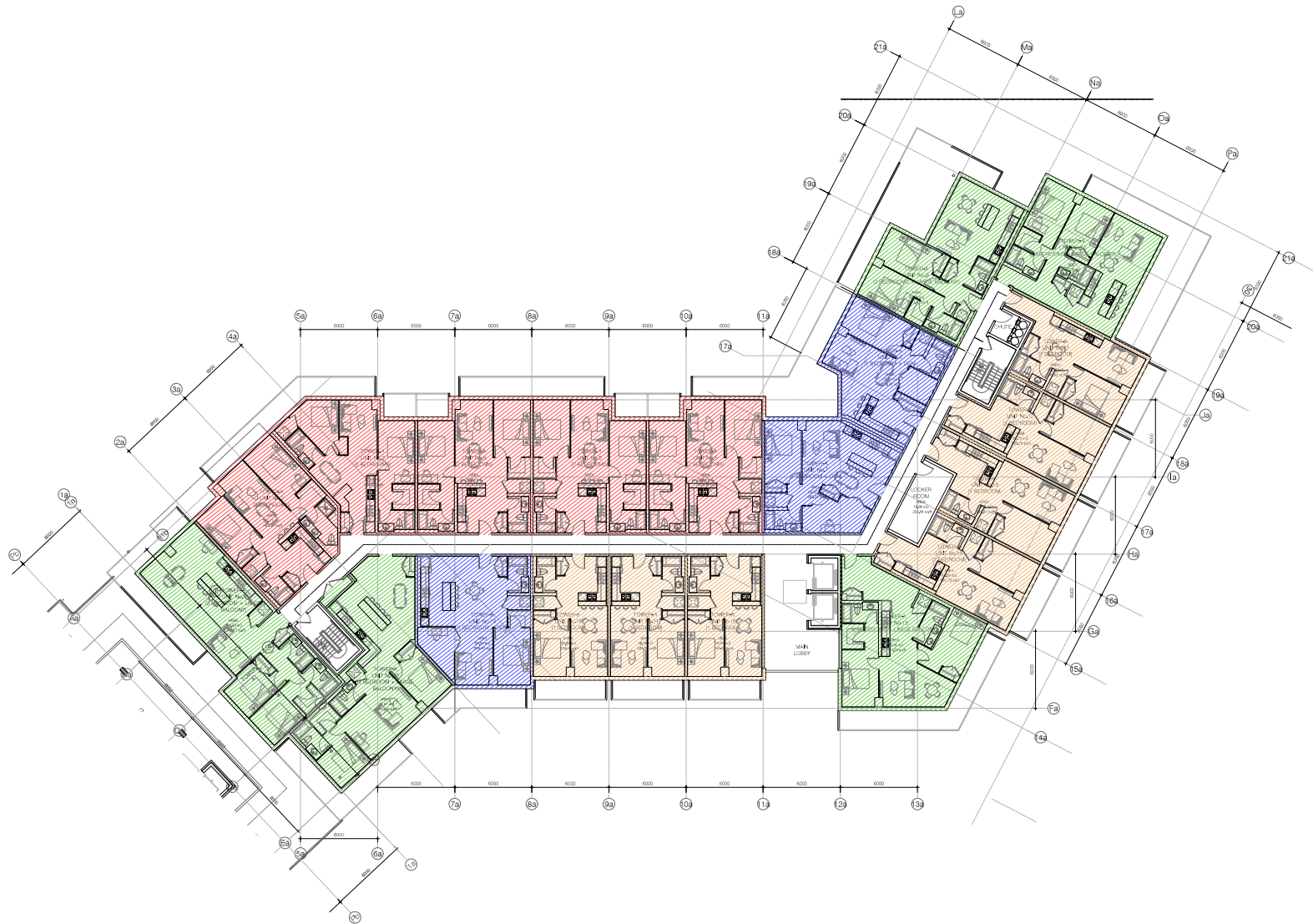
2ND FLOOR PLAN  
TOWER A

SCALE: 1:150  
DATE: 11/11/2020  
DRAWN BY: J. LEE  
CHECKED BY: J. LEE

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KEY PLAN



NO.	DESCRIPTION	DATE
1	REVISIONS	

DESIGNED BY	FAUSTO CORTESI
CHECKED BY	FAUSTO CORTESI
DATE	2023-07-10

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PROPOSED MIXED-USE  
CONDO DEVELOPMENT  
12148 ALBION VAUGHAN RD  
BOLTON  
ONTARIO

3RD TO 6TH FLOOR PLAN  
TOWER A

SCALE	1:150
DATE	2023-07-10
BY	FAUSTO CORTESI

A2.2a

3RD TO 6TH FLOOR PLAN - TOWER A  
SCALE: 1:150



3RD TO 6TH FLOOR PLAN - TOWER B  
SCALE: 1:150



No.	DESCRIPTION	DATE
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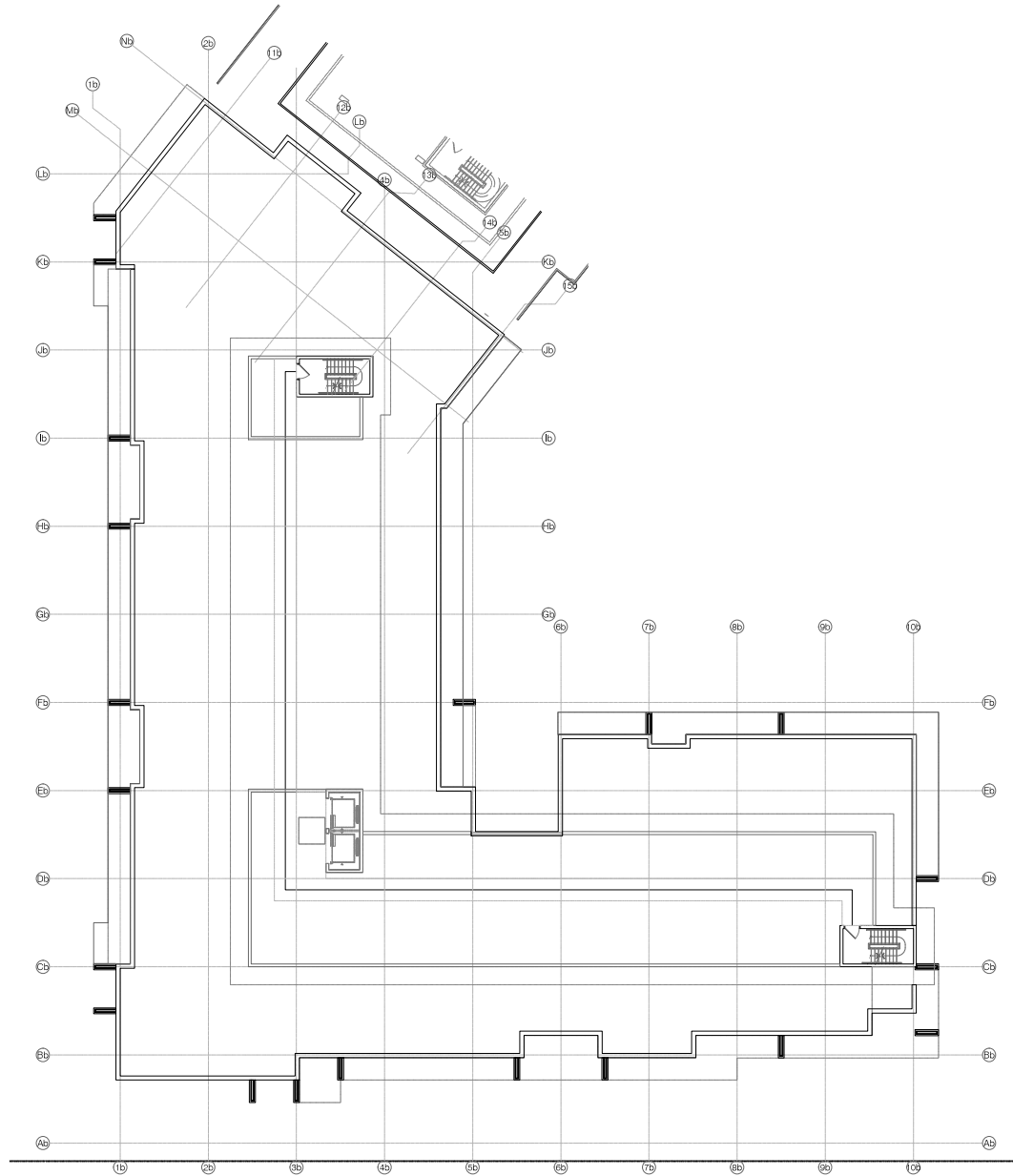
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VAUGHAN ONTARIO L4H 3B3  
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FCORTESE@FCAARCHITECTS.CA

PROPOSED MIX-USED  
CONDO DEVELOPMENT  
12148 ALBION VAUGHAN RD  
BOLTON  
ONTARIO

DATE	3RD TO 6TH FLOOR PLAN TOWER B
DATE	3RD TO 6TH FLOOR PLAN TOWER B
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1 PENTHOUSE - TOWER B  
SCALE: 1:150

KEY PLAN



No.	DESCRIPTION	DATE
1	REVISION	

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FOR REVIEW FOR BUILDING PERMIT  
FOR REVIEW FOR FINAL APPROVAL

CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.

**FAUSTO CORTESE**  
 ARCHITECTS  
 3500 RUTHERFORD RD. UNIT 7  
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 416-908-7000  
 FCORTESE@FCAARCHITECTS.CA

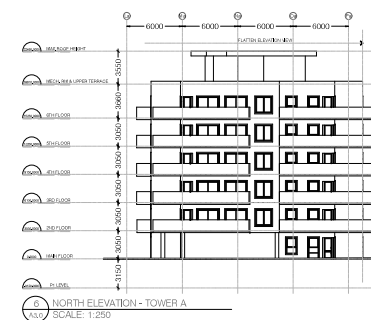
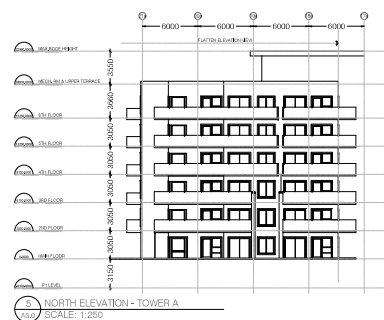
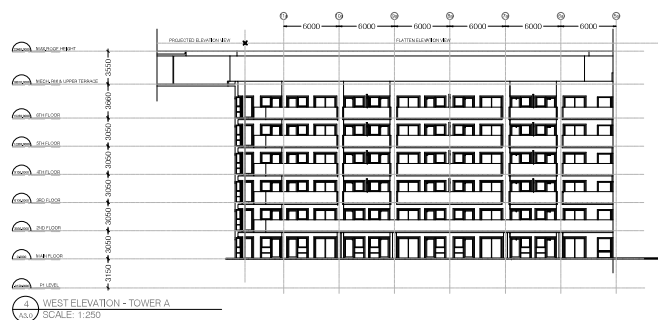
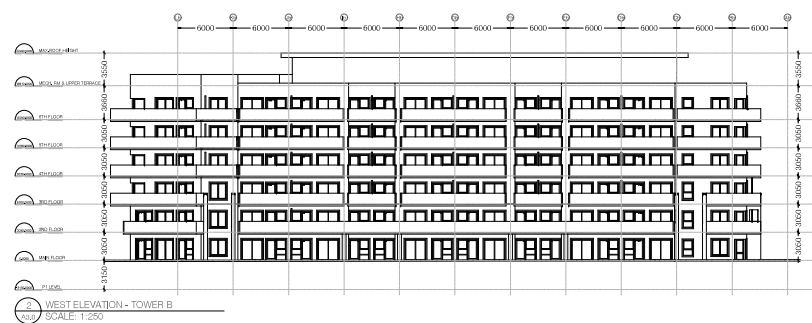
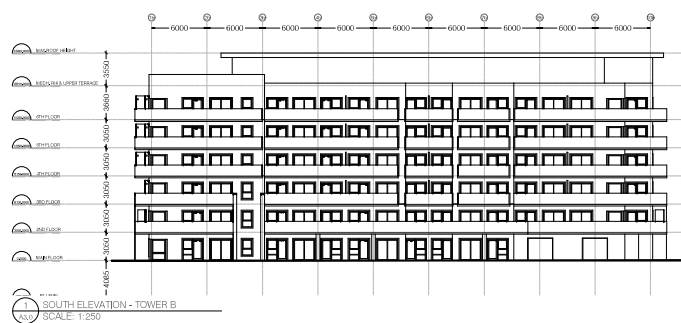
PROPOSED MIX-USED  
CONDO DEVELOPMENT  
12148 ALBION VAUGHAN RD  
BOLTON  
ONTARIO

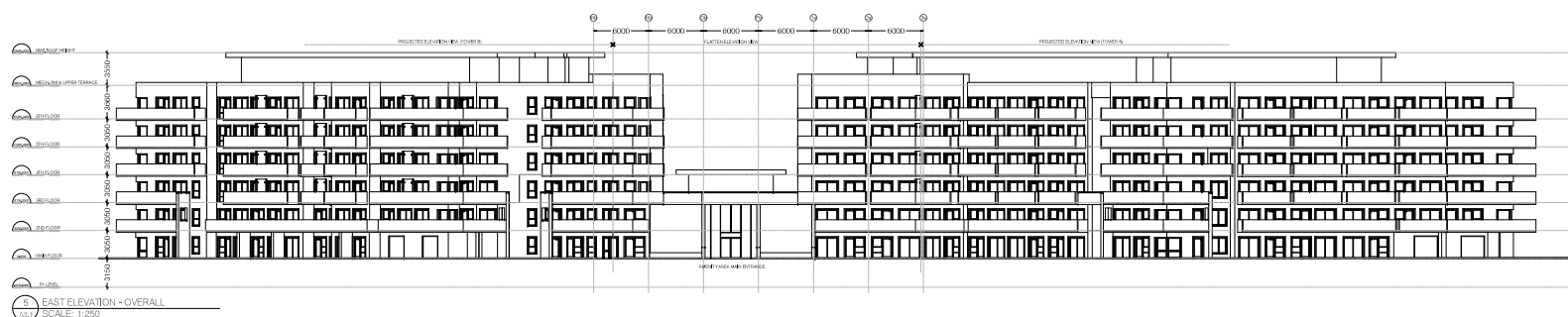
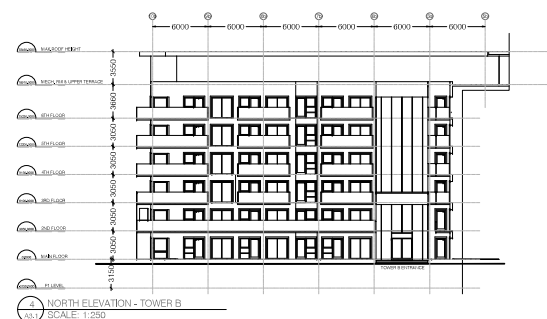
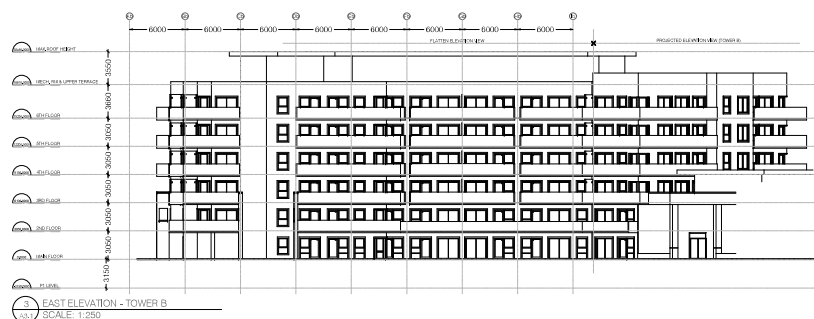
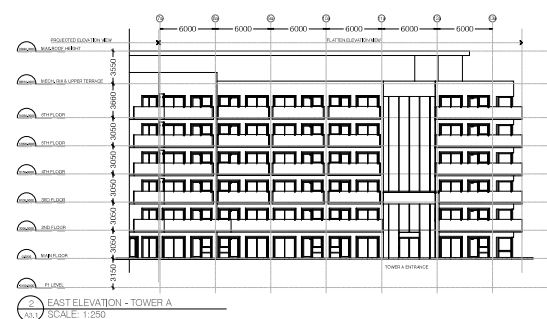
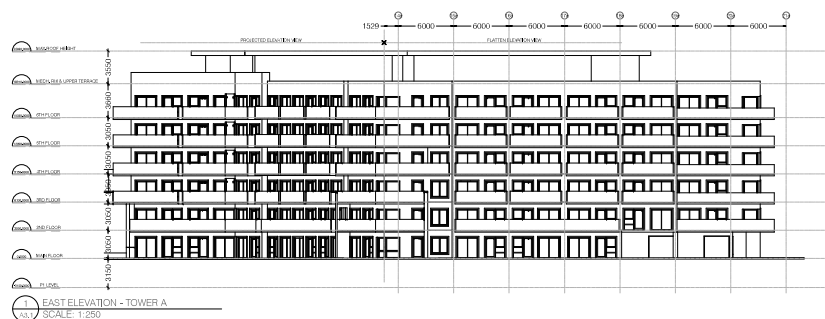
UNIT: B  
PENTHOUSE  
TOWER B

SCALE: 1:150  
DATE: 11/11/2023  
DRAWN BY: J. LEE  
CHECKED BY: J. LEE

A2.3b



[illegible]



No.	DESCRIPTION	DATE
	revisions	
ISSUED FOR CONSTRUCTION		
ISSUED FOR BID		
ISSUED FOR BUILDING PERMIT		
ISSUED FOR SET IN AS APPROVAL		

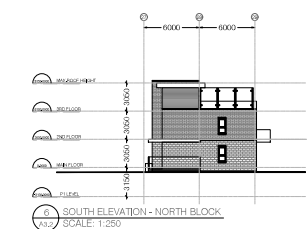
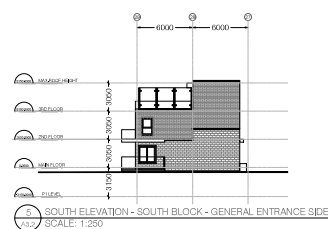
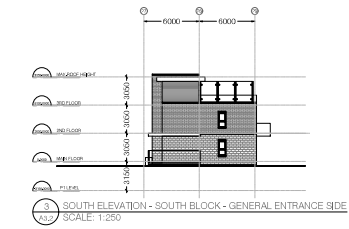
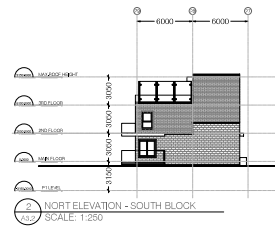
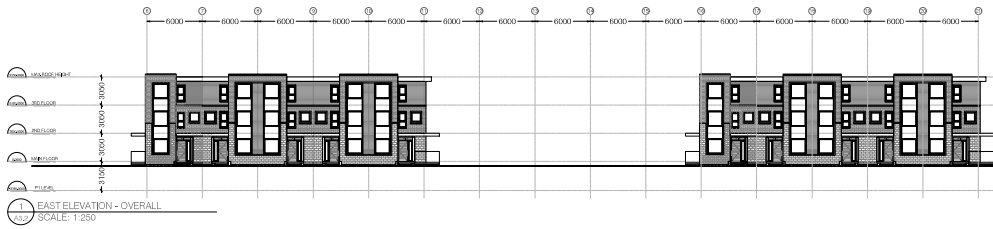
**SUBMITTALS**  
CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND MUST REPORT ANY DISCREPANCIES TO THE DESIGNER BEFORE PROCEEDING WITH CONSTRUCTION.  
  
THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION PURPOSES UNTIL SEALED AND SIGNED BY THE DESIGNER.  
  
DO NOT SCALE DRAWING



PROPOSED MIX-USED  
CONDO DEVELOPMENT  
12148 ALBION VAUGHAN RD  
BOLTON

ELEVATIONS  
PLAN No.2

DATE: 05/06/2020		2019
SCALE:		DRAWING No.
AS NOTED		A3.1
DATE: 05/06/2020	SCALE:	



No.	DESCRIPTION	DATE
	REVISIONS	
APPROVED FOR CONSTRUCTION		
APPROVED FOR BUILDING PERMIT		
APPROVED FOR CITY/COUNTY APPROVAL		

CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.

**FCA**

**FAUSTO CORTESE**  
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VAUGHAN, ONTARIO L4H 3B8  
416-306-7000  
FCORTESE@FCAARCHITECTS.CA

PROJECT PROPOSED MIXED-USE CONDO DEVELOPMENT 12148 ALBION VAUGHAN RD BOLTON ONTARIO	
DRAWING ELEVATIONS TOWNHOMES	
DATE 2024	REVISION 001/001
SCALE 1:250	DATE 2024
OWNER FCA	SCALE A3.2



PRIMARY	SECONDARY	A4.0
1/2	1/2	

1 BUILDING SECTION  
A4.0 SCALE: 1:150

# **Appendix B**

## **Borehole Logs**

Palmer (2020)

Soil Engineers Ltd. (2017)

W.P. \_\_\_\_\_ LOCATION \_\_\_\_\_ See Borehole Location Plan (UTM 17T) \_\_\_\_\_ ORIGINATED BY AL

DIST \_\_\_\_\_ HWY \_\_\_\_\_ BOREHOLE TYPE Hollow Stem Auger \_\_\_\_\_ COMPILED BY AL

DATUM Geodetic \_\_\_\_\_ DATE Aug-17-2020 to Aug-17-2020 \_\_\_\_\_ CHECKED BY \_\_\_\_\_

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	POCKET PEN. (G <sub>u</sub> ) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa										
								20 40 60 80 100										
0.0	Ground Surface																	
0.2	TOPSOIL:																	
	FILL: brown silty sand, some gravel, contains rootlets		1	SS	16													
0.7	Clayey Silt Till: some sand, trace gravel, occ. cobbles and boulders, contains sand and silt seams		2	SS	17													
			3	SS	19													
			4	SS	26													
			5	SS	28													
	turns from brown to grey		6	SS	19													
			7	SS	17													
6.7	END OF BOREHOLE Notes: Upon completion of drilling, a 50mm diameter monitoring well was installed in the borehole. The well was completed with a stick up casing.  Well Installation Details: Bentonite: 0.0-2.4 m Sand: 3.0 - 6.7 m Screen: 3.6 - 6.7 m																	

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

+ 3, × 3: Numbers refer to Sensitivity

○ = 3% Strain at Failure

1604602



W.P. \_\_\_\_\_ LOCATION \_\_\_\_\_ See Borehole Location Plan (UTM 17T) \_\_\_\_\_ ORIGINATED BY AL \_\_\_\_\_

DIST \_\_\_\_\_ HWY \_\_\_\_\_ BOREHOLE TYPE Hollow Stem Auger \_\_\_\_\_ COMPILED BY AL \_\_\_\_\_

DATUM Geodetic \_\_\_\_\_ DATE Aug-17-2020 to Aug-17-2020 \_\_\_\_\_ CHECKED BY \_\_\_\_\_

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	POCKET PEN. (G <sub>u</sub> ) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa										
								UNCONFINED		FIELD VANE		QUICK TRIAXIAL						
	Ground Surface																	
0.0	TOPSOIL:																	
0.2	FILL: brown and grey silty sand, some gravel, contains rootlets		1	SS	5													
1			2	SS	5													
1.5	Clayey Silt Till: some sand, trace gravel, occ. cobbles and boulders, contains sand and silt seams		3	SS	6													
	disturbed till																	
			4	SS	26													
			5	SS	38													
	turns from brown to grey																	
4.7	Silty Clay: grey, trace silt, moist		6	SS	16													
6.2	Clayey Silt Till: some sand, trace gravel, occ. cobbles and boulders, contains sand and silt seams		7	SS	72/0.18 m													
6.4	END OF BOREHOLE Notes: Upon completion of drilling, a 50mm diameter monitoring well was installed in the borehole. The well was completed with a stick up casing.  Well Installation Details: Bentonite: 0.0-2.4 m Sand: 2.7 - 6.7 m Screen: 3.3 - 6.4 m																	

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

+ 3, × 3: Numbers refer to Sensitivity ○ = 3% Strain at Failure

1604602

W.P. \_\_\_\_\_ LOCATION \_\_\_\_\_ See Borehole Location Plan (UTM 17T) \_\_\_\_\_ ORIGINATED BY AL

DIST \_\_\_\_\_ HWY \_\_\_\_\_ BOREHOLE TYPE Hollow Stem Auger \_\_\_\_\_ COMPILED BY AL

DATUM Geodetic \_\_\_\_\_ DATE Aug-17-2020 to Aug-17-2020 \_\_\_\_\_ CHECKED BY \_\_\_\_\_

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	POCKET PEN. (G <sub>u</sub> ) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa										
								20 40 60 80 100										
0.0	Ground Surface																	
0.1	<b>TOPSOIL:</b> FILL: brown silty sand, some gravel, contains rootlets		1	SS	5													
0.7	<b>Clayey Silt Till:</b> some sand, trace gravel, occ. cobbles and boulders, contains sand and silt seams		2	SS	24													
			3	SS	22													
			4	SS	33													
			5	SS	44													
	turns from brown to grey		6	SS	15													
			7	SS	27													
6.7	<b>END OF BOREHOLE</b> Notes: Upon completion of drilling, a 50mm diameter monitoring well was installed in the borehole. The well was completed with a stick up casing.  Well Installation Details: Bentonite: 0.0-2.4 m Sand: 3.0 - 6.7 m Screen: 3.6 - 6.7 m																	

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

+ 3, X 3: Numbers refer to Sensitivity

○ = 3% Strain at Failure

1604602

# LOG OF BOREHOLE NO.: 1

Figure No.: 1

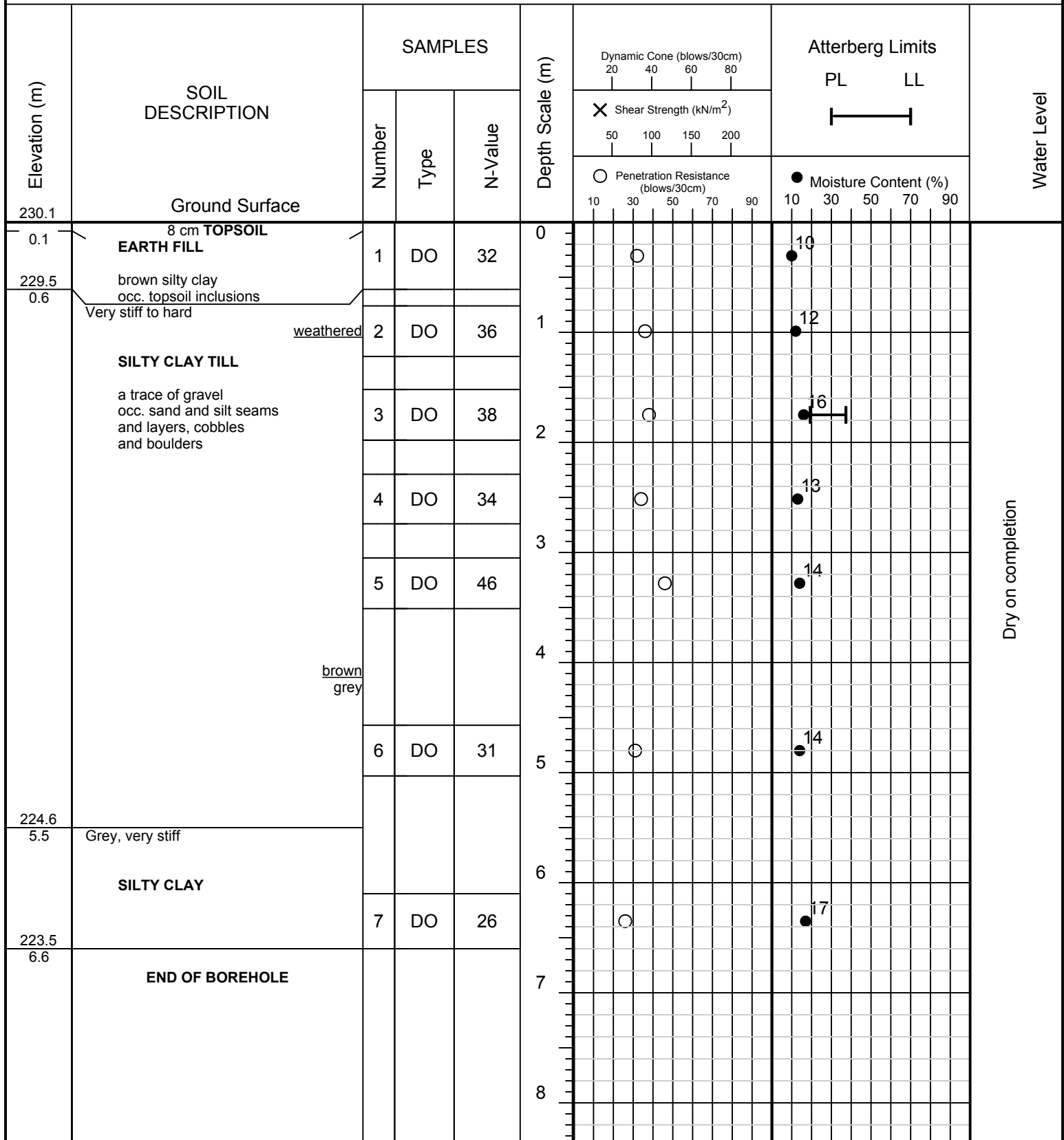
**Job Number:** 1609-S145

**Project Description:** Proposed Residential Development

**Job Location:** 12148 Albion-Vaughan Road  
Town of Caledon

**Method of Boring:** Flight-Auger

**Drilling Date:** October 12, 2016



**SOIL ENGINEERS LTD.**



# LOG OF BOREHOLE NO.: 2

Figure No.: 2

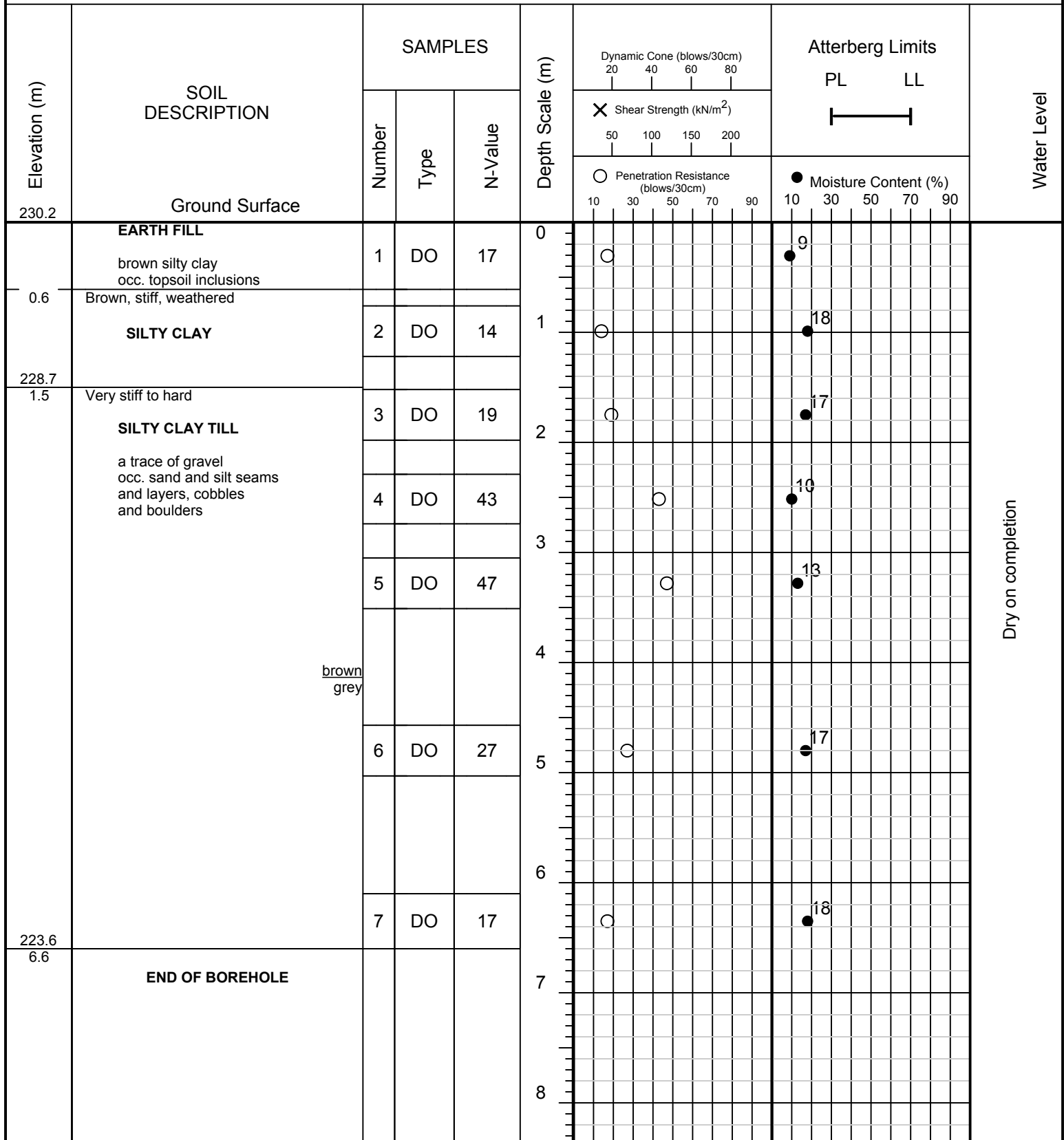
**Job Number:** 1609-S145

**Project Description:** Proposed Residential Development

**Job Location:** 12148 Albion-Vaughan Road  
Town of Caledon

**Method of Boring:** Flight-Auger

**Drilling Date:** October 12, 2016



**SOIL ENGINEERS LTD.**

# LOG OF BOREHOLE NO.: 3

Figure No.: 3

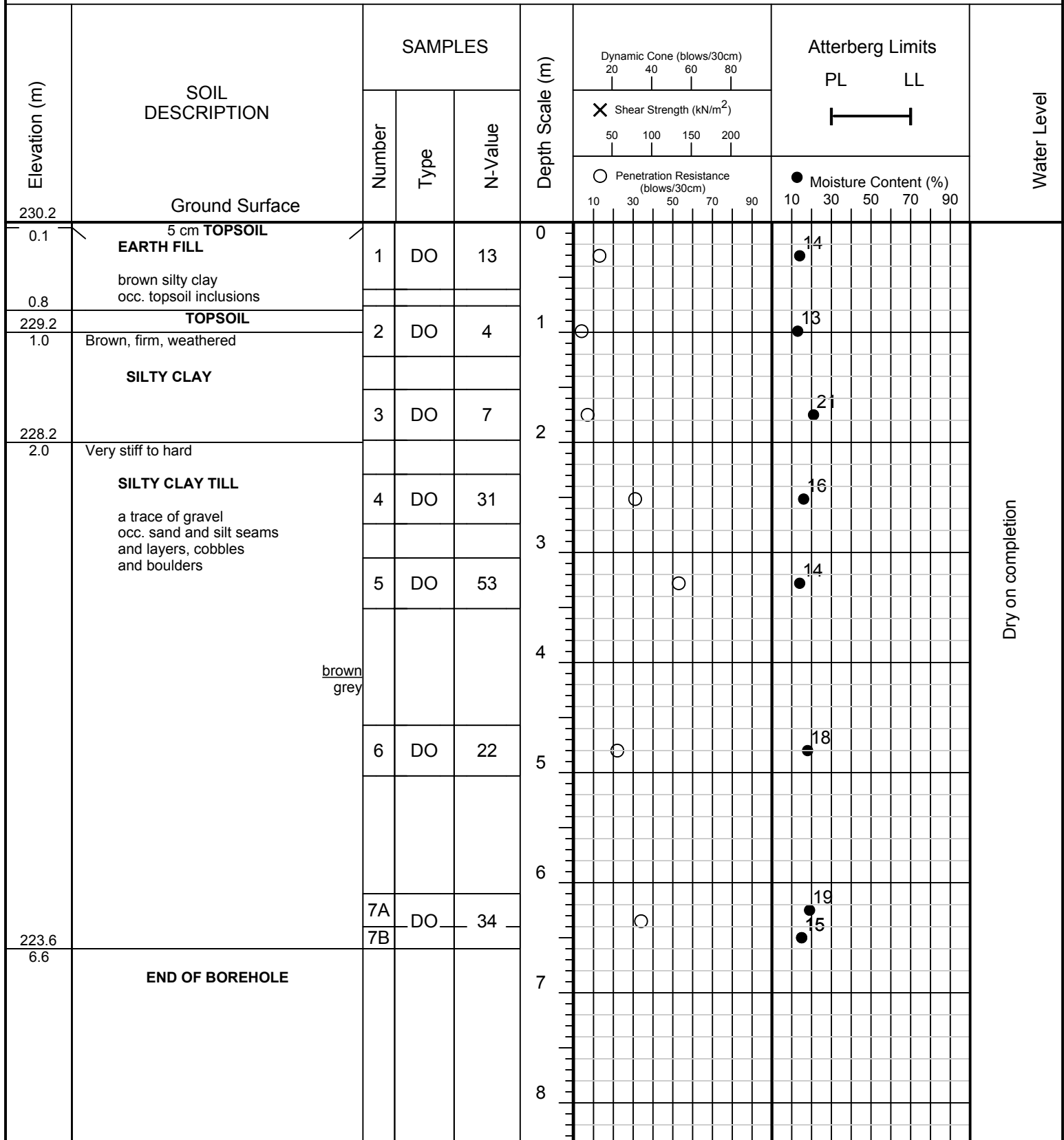
**Job Number:** 1609-S145

**Project Description:** Proposed Residential Development

**Job Location:** 12148 Albion-Vaughan Road  
Town of Caledon

**Method of Boring:** Flight-Auger

**Drilling Date:** October 11, 2016



**SOIL ENGINEERS LTD.**

# LOG OF BOREHOLE NO.: 4

Figure No.: 4

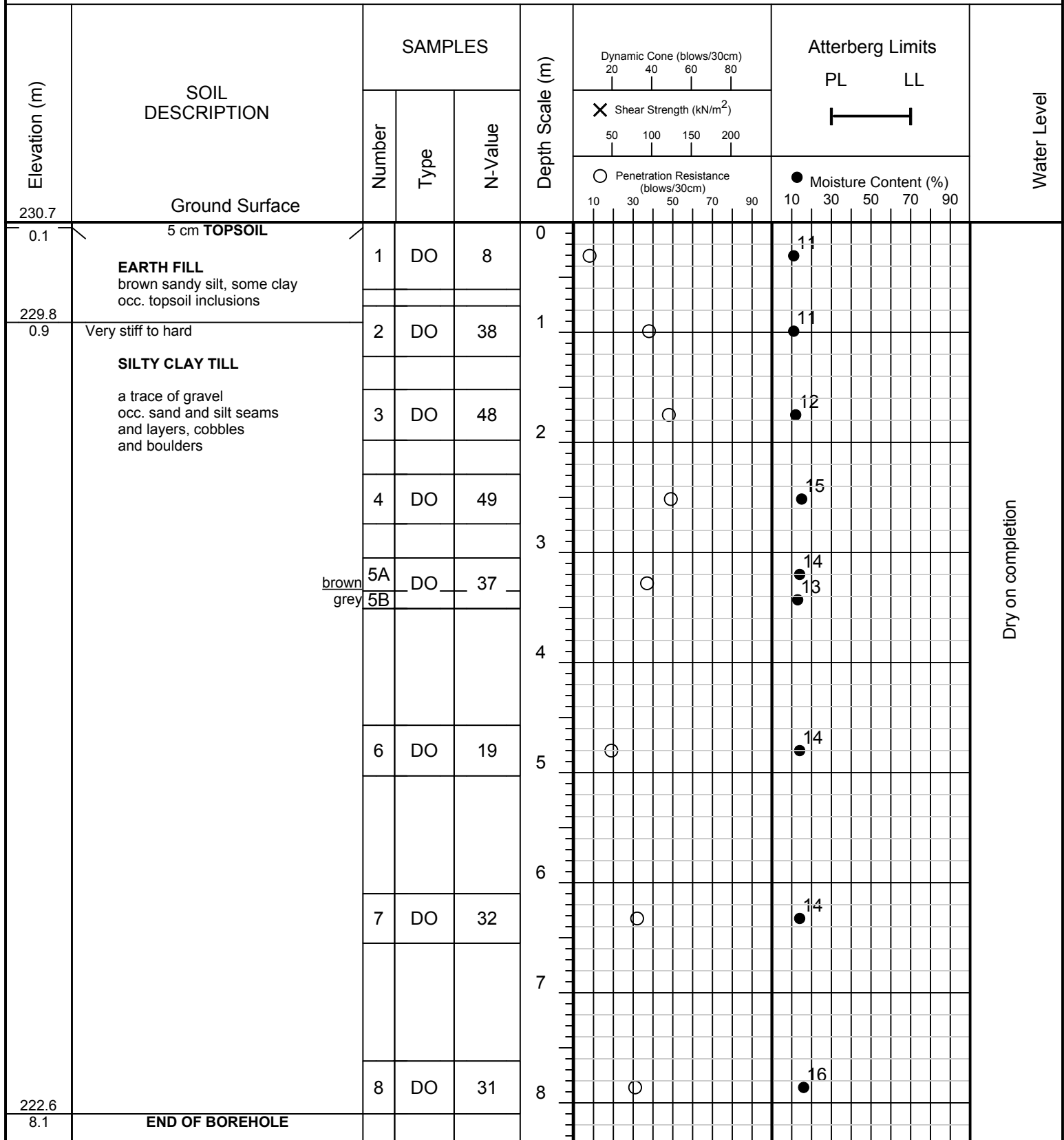
**Job Number:** 1609-S145

**Project Description:** Proposed Residential Development

**Job Location:** 12148 Albion-Vaughan Road  
Town of Caledon

**Method of Boring:** Flight-Auger

**Drilling Date:** October 11, 2016



**SOIL ENGINEERS LTD.**

# LOG OF BOREHOLE NO.: 5

Figure No.: 5

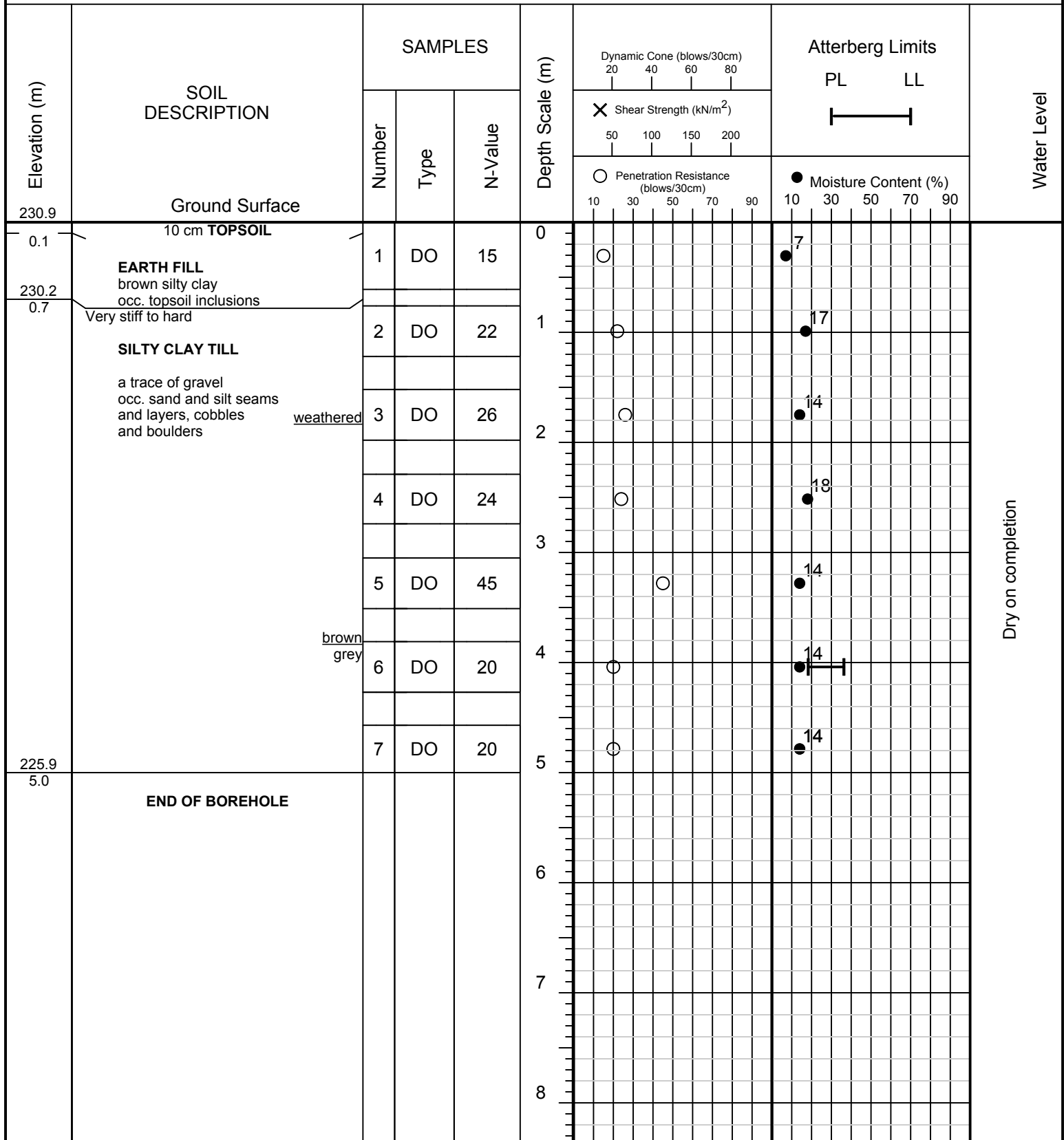
**Job Number:** 1609-S145

**Project Description:** Proposed Residential Development

**Job Location:** 12148 Albion-Vaughan Road  
Town of Caledon

**Method of Boring:** Flight-Auger

**Drilling Date:** October 11, 2016



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# LOG OF BOREHOLE NO.: 6

Figure No.: 6

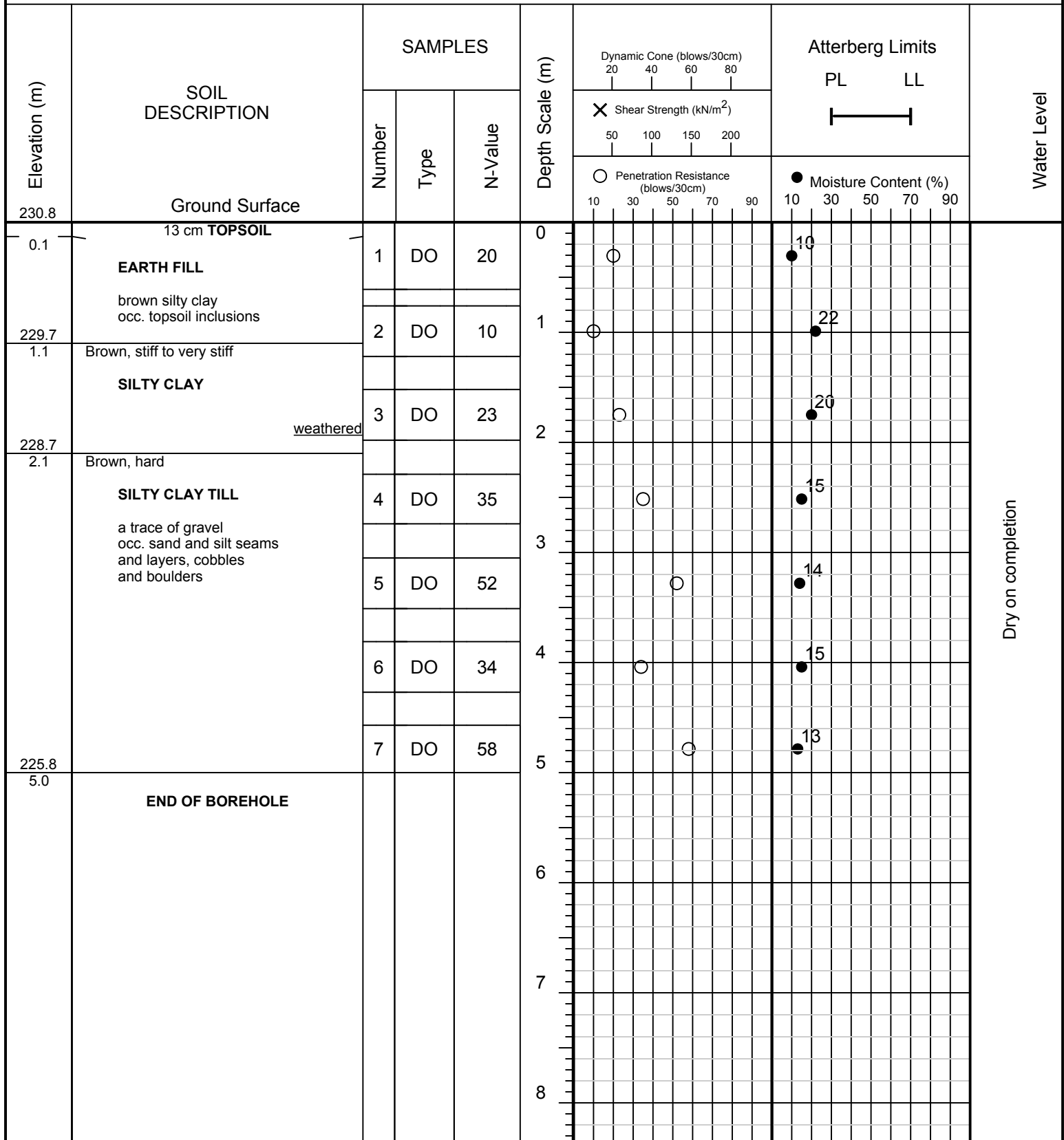
**Job Number:** 1609-S145

**Project Description:** Proposed Residential Development

**Job Location:** 12148 Albion-Vaughan Road  
Town of Caledon

**Method of Boring:** Flight-Auger

**Drilling Date:** October 11, 2016



**SOIL ENGINEERS LTD.**

# LOG OF BOREHOLE NO.: 7

Figure No.: 7

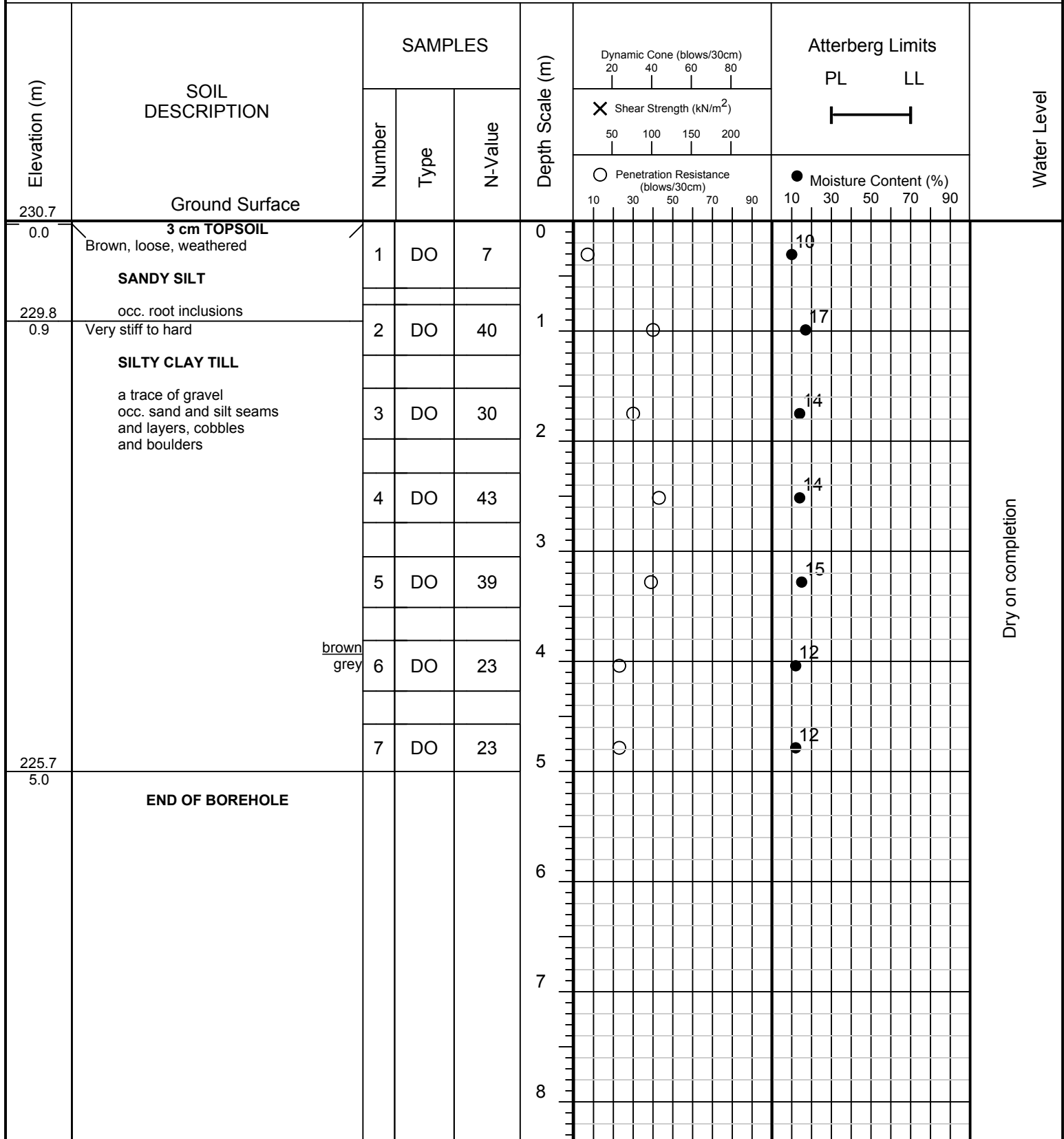
**Job Number:** 1609-S145

**Project Description:** Proposed Residential Development

**Job Location:** 12148 Albion-Vaughan Road  
Town of Caledon

**Method of Boring:** Flight-Auger

**Drilling Date:** October 11, 2016



**SOIL ENGINEERS LTD.**

# LOG OF BOREHOLE NO.: 8

Figure No.: 8

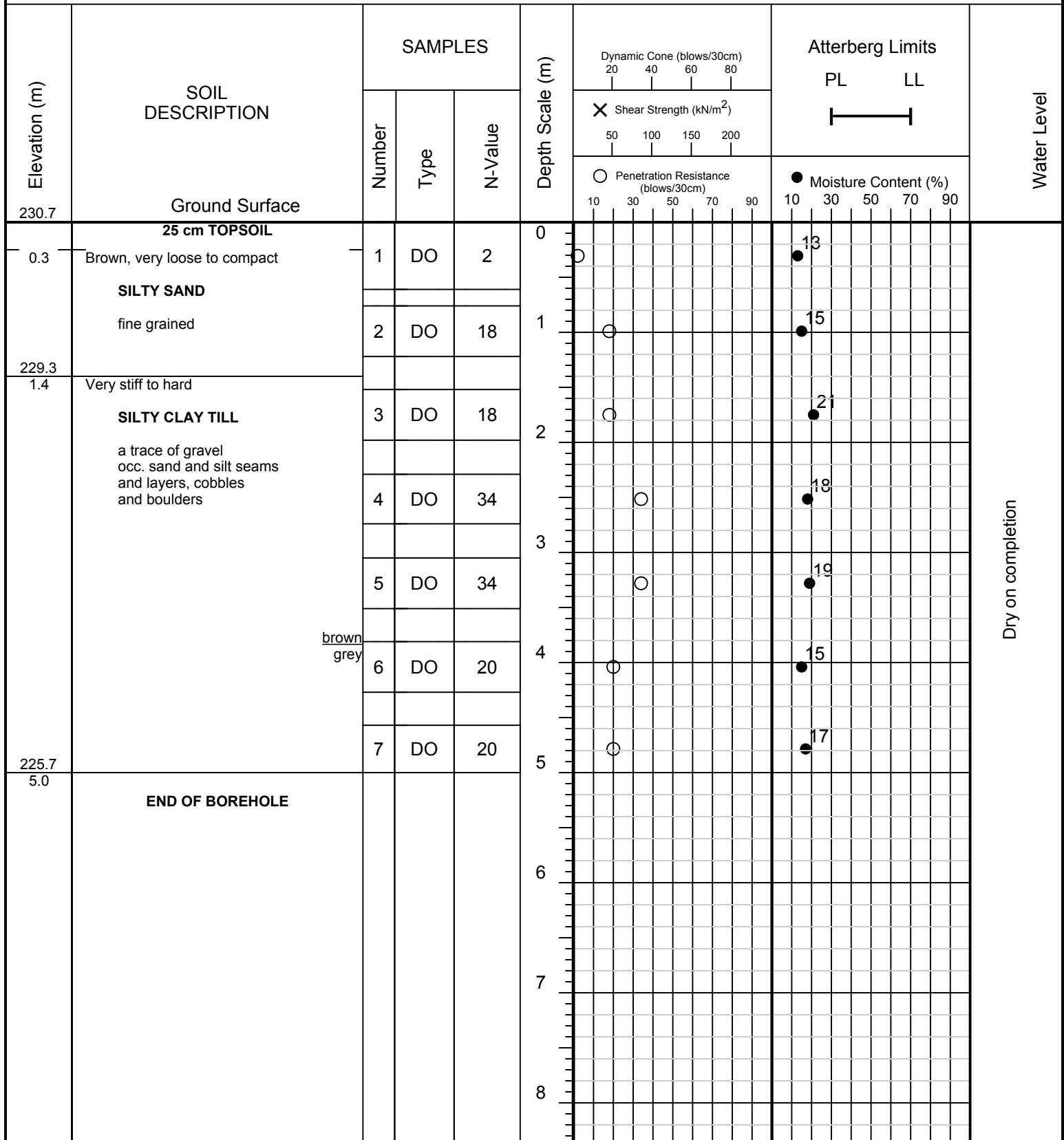
**Job Number:** 1609-S145

**Project Description:** Proposed Residential Development

**Job Location:** 12148 Albion-Vaughan Road  
Town of Caledon

**Method of Boring:** Flight-Auger

**Drilling Date:** October 12, 2016



**SOIL ENGINEERS LTD.**

# LOG OF BOREHOLE NO.: 9

Figure No.: 9

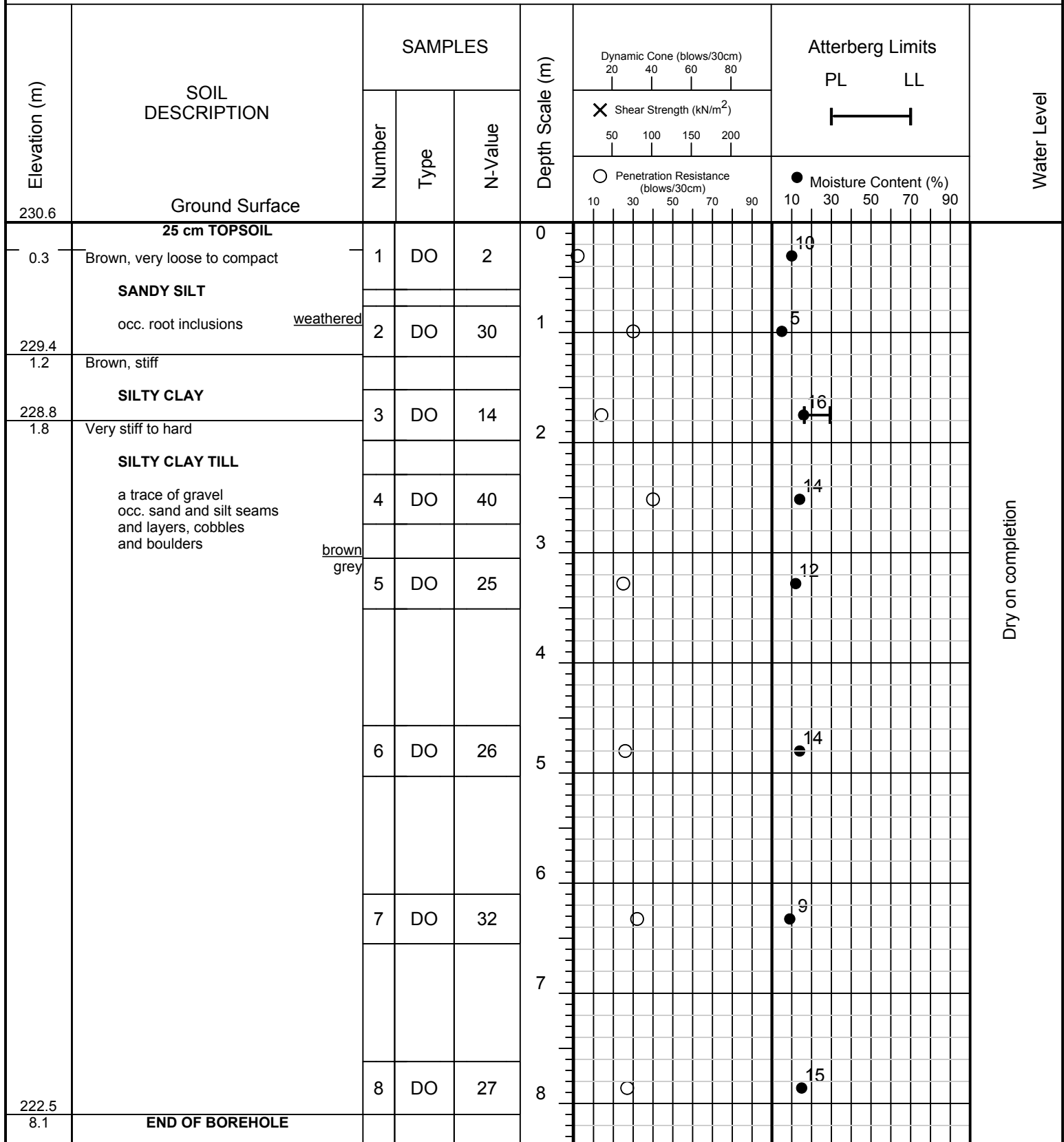
**Job Number:** 1609-S145

**Project Description:** Proposed Residential Development

**Job Location:** 12148 Albion-Vaughan Road  
Town of Caledon

**Method of Boring:** Flight-Auger

**Drilling Date:** October 12, 2016



**SOIL ENGINEERS LTD.**



# LOG OF BOREHOLE NO.: 10

Figure No.: 10

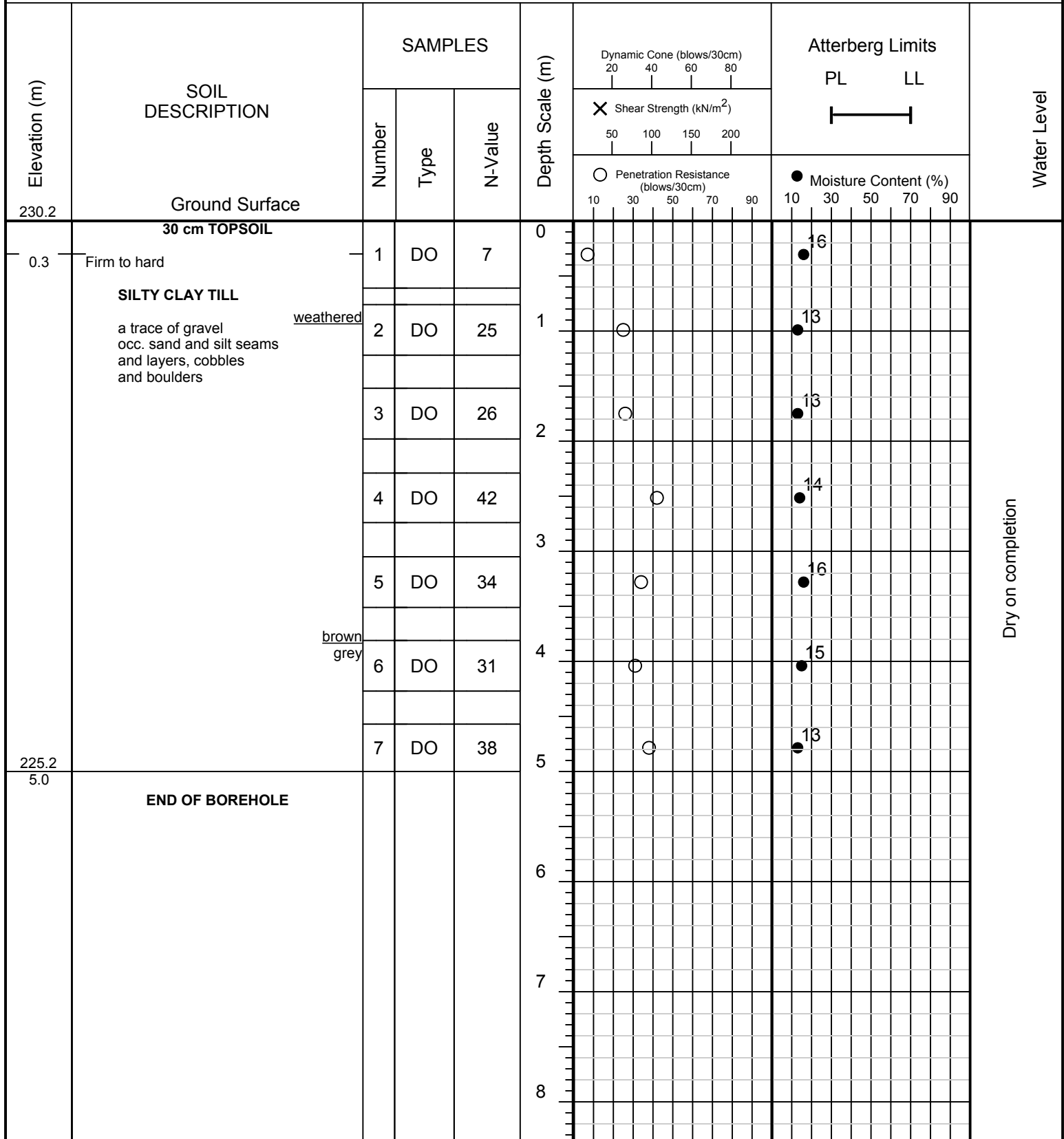
**Job Number:** 1609-S145

**Project Description:** Proposed Residential Development

**Job Location:** 12148 Albion-Vaughan Road  
Town of Caledon

**Method of Boring:** Flight-Auger

**Drilling Date:** October 12, 2016



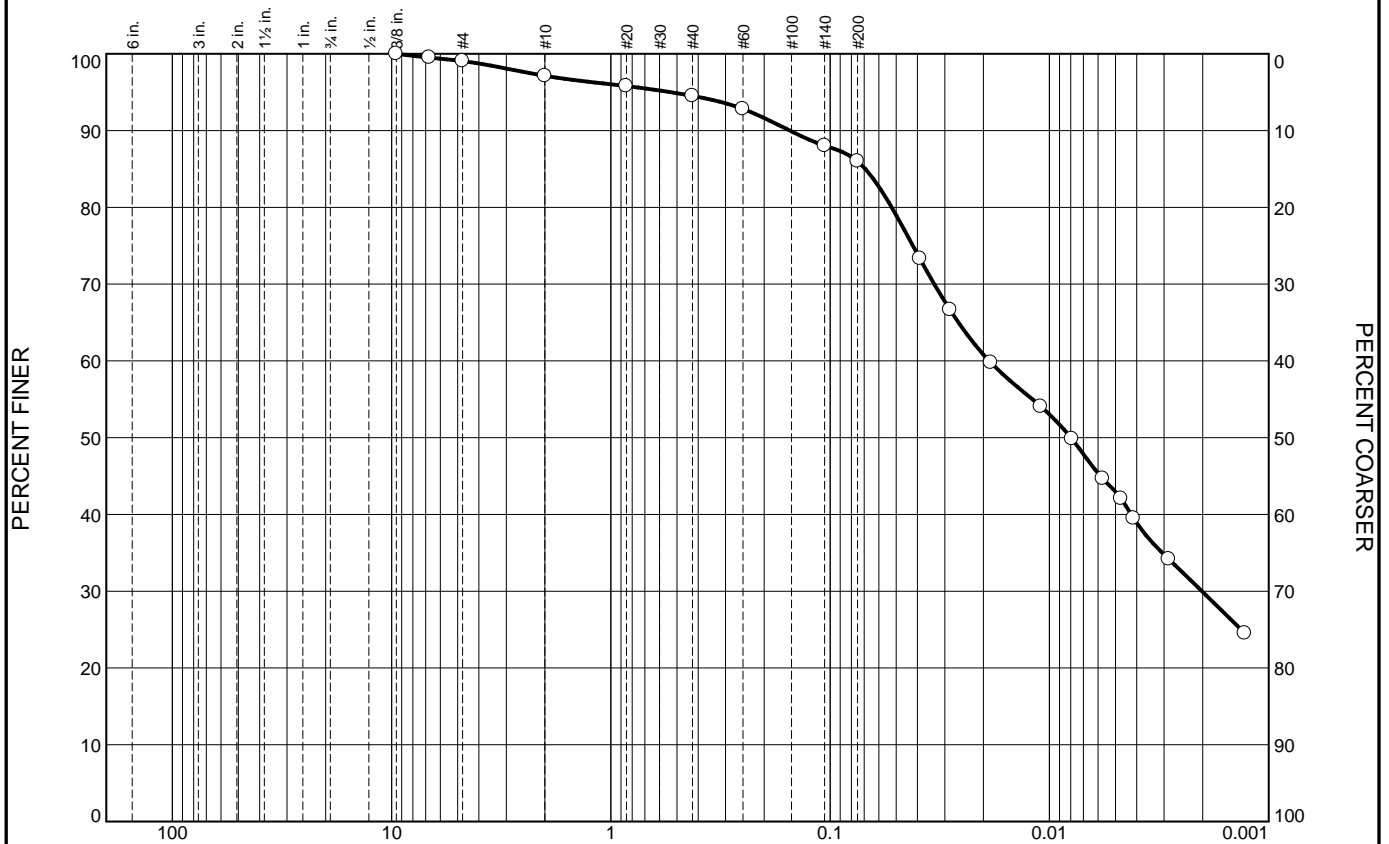
**SOIL ENGINEERS LTD.**

# **Appendix C**

## **Grainsize Analysis**

Terrapex (2020)

# Grain Size Distribution Report



GRAIN SIZE - mm.

	% +3"	% Gravel		% Sand		% Fines				
				Coarse	Fine	Silt		Clay		
<input type="radio"/>	0	3		2	9	56		30		
<input checked="" type="checkbox"/>	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
<input type="radio"/>			0.0691	0.0188	0.0080	0.0020				

Material Description

USCS

AASHTO

☐ CLAYEY SILT some sand trace gravel

Project No. 19009 Client: PECG

Project: Laboratory Testing

☐ Location: BH1 Sample Number: 7

Remarks:

**Terrapex**

Figure 2

Tested By: AM

The graph illustrates the relationship between sieve size and the percentage of material finer or coarser than that sieve. The x-axis represents sieve size in inches on a logarithmic scale, with major ticks at 6 in., 3 in., 2 in., 1½ in., 1 in., ¾ in., ½ in., and 0.001 in. The y-axis represents the percentage of material finer (left side, 0 to 100) and coarser (right side, 0 to 100). A curve is plotted with data points, showing that as the sieve size decreases, the percentage of material finer decreases and the percentage of material coarser increases.

Sieve Size (in.)	Sieve Number	Percent Finer (%)	Percent Coarser (%)
6 in.		100	0
3 in.		100	0
2 in.		100	0
1½ in.		100	0
1 in.		100	0
¾ in.		100	0
½ in.		100	0
0.1875 in.	#10	100	0
0.075 in.	#20	100	0
0.06 in.	#25	100	0
0.0475 in.	#30	100	0
0.0375 in.	#40	98	2
0.03 in.	#50	97	3
0.025 in.	#60	96	4
0.02 in.	#75	95	5
0.015 in.	#100	94	6
0.0125 in.	#120	93	7
0.0106 in.	#140	92	8
0.009 in.	#160	91	9
0.0075 in.	#200	85	15
0.006 in.		81	19
0.005 in.		76	24
0.00425 in.		72	28
0.00375 in.		68	32
0.003 in.		60	40
0.0025 in.		55	45
0.001875 in.		45	55

Material Description	USCS	AASHTO
○ CLAY AND SILT trace sand trace gravel		

Remarks:	

Figure 1

**Tested By:** AM