Airport Road Improvements










APPENDICES ESR 1

Municipal Class Environmental Assessment
Airport Road
from 1.0km north of Mayfield Road to 0.6km north of King Street

October 2015

Region of Peel
Working for you

H HYDROGEOLOGY & GEOMORPHIC ASSESSMENT

Terraprobe
Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

HYDROGEOLOGIC INVESTIGATION
AIRPORT ROAD CLASS EA
NORTH OF MAYFIELD ROAD TO NORTH OF KING STREET
REGION OF PEEL, ONTARIO

Prepared For:

IBI Group
30 International Drive
Toronto, Ontario
M9W 5P3

Attention: Mr. Alan Ortlieb

File No. 13-12-2142
June 5, 2013

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FIGURES:

APPENDICES:

1.0 INTRODUCTION AND PROJECT DESCRIPTION

Terraprobe was retained by the IBI Group to conduct an investigation of groundwater resources in the vicinity of the proposed reconstruction of Airport Road.

The project entails the reconstruction of Airport Road from 0.6 km north of Mayfield Road to 1 km north of King Street. The reconstruction involves the upgrading of the existing two lane roadway to a four lane roadway.

The purpose of the hydrogeological study is to:

- Evaluate the existing ground water conditions in the area of the proposed project;
- Identify potential ground water impacts and mitigation measures related to the proposed construction measures;
- Examine the ground water control requirements and the type of Permit required;
- Carry out a door-to-door survey to assess the location of existing water supply wells that are in close proximity to the roadway corridor;
- Provide recommendations as to the susceptibility of local supply wells to the construction works, and provide recommendations for a well monitoring program, prior to and during construction.

2.0 SCOPE OF WORK

The following tasks were undertaken in order to address the requirements of the PTTW application:

- *Review of available background information*. A review of available geotechnical and hydrogeologic information for the site was conducted, including topographic mapping, geologic mapping, and results of previous subsurface investigations.

- *Review of Geotechnical Investigation*. A review of the subsurface investigation conducted for the project by Terraprobe in November 2012. The investigation consisted of the drilling of 37 boreholes to depths ranging from 1.1 m to 11.1 m below existing grades. Monitoring wells were installed at selected locations.

- *Completion of a Door-to-Door Well Survey.* A well survey was completed for all residences and businesses within 500 m of the project area. The well survey was completed to assess private well locations and construction details and operating history for wells within the study area.

- *Ground Water Level Monitoring.* Monitoring wells were installed along the existing alignment of Airport Road as part of the subsurface investigation completed by Terraprobe. Wells were installed to allow for the measurement of long term ground water levels.

- *Completion of Hydrogeologic Assessment.* A hydrogeologic assessment of the site was completed based on the observed site conditions. Hydraulic conductivity of the soils at the site and the hydrogeologic function of the site and surrounding area were assessed based on the observed site conditions and results of the subsurface investigation.

3.0 DESCRIPTION OF SITE CONDITIONS

3.1 Site Description and Location

The project area consists of a 6.5 km section of Airport Road extending from 0.6 km north of Mayfield Road to 1 km north of King Street in the Region of Peel. For the purposes of the hydrogeological investigation an area of 500 m surrounding the project area was considered, including a 500 m radius surrounding the intersections of Airport Road and King Street, and Airport Road and Old School Road and Healy Road as indicated on the attached Figure 2. The project area lies within the Town of Caledon. The Hamlet of Sandhill is at the intersection of Airport Road and King Street, and the Hamlet of Tullamore is at the intersection of Airport Road and Mayfield Road.

The area along Airport Road between Mayfield Road and King Street is currently rural, consisting predominately of detached homes and agricultural fields. Large commercial developments are found beyond the southern extent of the study area. These developments are serviced with municipal sewer and water services. It was reported by residents within the study area that properties along Airport Road to the north of Healey Road and Old School Road are serviced with municipal sewer and water services. Municipal servicing does not extend throughout the entire study area. Residences along the northern portions of the study area utilize private servicing (including wells and septic tanks).

Based on engineering drawings provided by the Region of Peel, a 300 mm diameter water main extends along Airport Road within the project area from Mayfield Road to approximately 1.5 km north of Old School Road (north of the residence at 13441 Airport Road). A 600 mm diameter trunk sewer main also extends along Airport Road from Mayfield Road to north of King Street.

In summary, the project involves widening of the existing two lane road to four lanes. Generally, the widening of the roadway will not involve significant excavations below the existing grade. Fill materials will be placed in some areas to in order to permit widening of the roadway or slightly alter the existing road grades.

Significant excavation will be conducted only in the vicinity of the Salt Creek, where culvert replacements are proposed. In particular, there are three culvert box cover replacements that are proposed in the vicinity of Stations 1+100, 3+060, and 3+460 as shown on the accompanying Figure 1. Details of the dimensions and elevations of the proposed culvert sections are described in greater detail in Section 3.6.1 to 3.6.3 of this report.

3.2 Topography and Drainage

The topography of the study area is gently rolling. Ground elevations across the study area vary from approximately 275 m across northern sections of the site to elevations at 230 m across the southern extent

of the site. Within the project area there are three culvert sections for the crossing of Salt Creek. Replacement of the three concrete culvert sections along Airport Road within the project area is proposed.

Surface water runoff and drainage is directed to several small creeks crossing the site. Salt Creek flows to the east towards the West Humber River located approximately 6 km east of the site.

3.3 Site Geology and Hydrogeology

The site is underlain primarily by Halton Till, an extensive glacial deposit of silt to silty clay with some sand, gravel, and boulders. The till deposits are underlain by shale bedrock of the Georgian Bay formation. The site is located about 3 km to the southeast of the Oak Ridges Moraine complex. Geologic mapping for the site and immediate vicinity is presented on the accompanying Figure 4.

Ground water flow through till deposits are expected to be limited as a result of the low permeability of these deposits. Due to low permeable soils present across the area it is expected that shallow ground water levels at the site will be within 1 to 2 m of ground surface. Shallow ground water flow will generally follow topography and be directed toward surface water creeks crossing the study area. Significant ground water flow and discharge from the till deposits is not expected.

Three cross-sections based on information contained with the MOE well records are attached showing subsurface geology along three segments of the study area. Figure 5 shows sub-surface geology along Airport Road from 0.6 km north of Mayfield to 1 km north of King Street, Figure 6 provides the sub-surface geology along King Street 500 m to the east and west of Airport Road and Figure 7 provides subsurface geology along Old School Road 500 m west of Airport Road and Healey Road 500 m east of Airport Road. Well locations are shown on the attached Figure 3.

An analysis of water well records obtained from the Ontario Ministry of the Environment (MOE) indicates that the thickness of till within the study area varies in depth from 10 m to 76 m (10 to 250 feet). A bedrock valley exists to the north of the study area approximately 1.2 km south of the intersection of Airport Road and King Street. The bedrock valley crosses over the northern section of the study area and King Street. Overburden deposits consist of clay till and isolated sand deposits. Coarse grained sediments also exist at the bedrock/overburden contact. Wells in the vicinity of the site are generally completed within coarse grained sediments or within the shale bedrock. MOE well records for wells within the study area are provided on the attached Appendix A.

A summary of the construction details of wells completed within the study area is provided in the table below:

Summary of Private Wells

Total Number of Wells	**63**
Wells Completed in Bedrock	47 (75%)
Wells Completed in Overburden	16 (25%)
Well Type	
Drilled Well	42 (67%)
Bored/Dug Well	20 (32%)
No Data	1 (1%)
Depth Ranges	
Less than 9 m (<30 ft)	4 (6%)
10 m to 15 m (30 to 50 ft)	22 (35%)
16 m to 21 m (50 to 70 ft)	17 (27%)
22 m to 27 m (70 to 90 ft)	8 (13%)
28 m to 33 m (90 to 110 ft)	3 (5%)
Greater than 33 m (>110 ft)	9 (14%)
Water Use	
Domestic/Stock	55 (88%)
Public Supply	2 (3%)
Commercial/Industrial	2 (3%)
Not Used	3 (5%)
Unknown	1 (1%)
Water Quality	
Fresh	32 (51%)
Salty	3 (5%)
Unknown	28 (44%)
Reported Pumping Rate	
Less than 19 Lpm (<5 GPM)	28 (44%)
19 Lpm to 38 Lpm (5 to 10 GPM)	19 (31%)
Greater than 38 Lpm (>10 GPM)	1 (1%)
Unknown	15 (24%)

In summary, wells within the overburden are generally large diameter bored wells completed to depths less than 70 feet. Drilled wells are generally completed to depths greater than 50 feet into shale bedrock. Water quality is noted as fresh water. Saline water was encountered within some bedrock wells. Wells are typically used for domestic purposes and generally have low yields of less than 38 Lpm (10 Gpm).

3.4 Subsurface Investigation

A subsurface investigation was completed by Terraprobe in November 2012. The subsurface investigation included the drilling of 37 boreholes along the existing alignment of Airport Road, Old

School Road, Healey Road and King Street. Boreholes were advanced through asphalt and granular road base sediments into the underlying soils to various depths from 1.1 m to 11.1 m. Boreholes were also advanced in the vicinity of Creek crossings with Airport Road to investigate soil conditions for foundation works for culvert and bridge crossings and to investigate shallow ground water levels in the vicinity of these crossings. Borehole locations are shown on the attached Figure 1. Borehole logs and results of laboratory grain size analysis are provided attached in Appendix C.

Boreholes completed within the roadway or gravel shoulder encountered granular base and sub-base followed by silty clay to clayey silt fill to depths between 0.3 to 1.7 m below grade followed by fill deposits. Fill depth was generally less than 3.1 m and comprised of a heterogeneous mixture of sandy silt, clayey silt and silty clay with a trace of sand and gravel.

Silty clay till was found in most boreholes underlying existing fill deposits and underneath the topsoil layer along the grassed ditches to the completed depths of boreholes. Silt and sandy silt deposits were encountered in boreholes DC1 and DC2 and SC1 and SC2, in proximity to the middle and northern culvert sections respectively. A shale and till complex was encountered in boreholes NB1 and NB2 in the vicinity of the southernmost culvert section along Airport Road at depths between 4.6 to 6.1 m below grade. Shale bedrock was not encountered in completed boreholes.

Boreholes completed along the alignment of King Street, Old School Road and Healey Road were observed to be dry and open upon completion. Boreholes completed along Airport Road in the vicinity of Creek crossings encountered ground water. Un-stabilized ground water within these completed boreholes was observed between 10.2 to 3.4 m below the existing ground surface. Monitoring wells were established at one borehole location in the vicinity of each of the three culvert sections to determine stabilized ground water conditions. The table below summarizes the observed water level elevations:

Summary of Monitoring Well Locations

Monitoring Well Location	Station	Ground Elevation (masl)	Elevation of Creek Bed (m)	Well Depth (m)	Ground Water Elevation (masl)	
					17-Dec-12	7-Jan-13
MW-NB2	1+100	240.5	236.4	11.0	236.8	236.8
MW-DC1	3+060	254.4	251.5	10.8	253.3	253.2
MW-SC1	3+460	257.4	254.1	10.8	255.3	255.0

Ground water levels in the vicinity of the culvert sections are expected at elevations similar, or slightly above, to the level of water within the creek.

3.5 Results of Door-to-Door Well Survey

A survey of local private wells was conducted in the area by Terraprobe staff in November 2012. Homes and businesses within the study area were visited and a questionnaire was completed with the well owner where possible. A total of 76 homes and businesses were visited, with questionnaires being completed for

9 local wells. At residences where no one was available to complete a questionnaire a letter was left informing the resident about the survey and provided contact information so the resident could participate in the survey. The well questionnaire and letter provided to residents and a summary of the results of the water well survey are provided in Appendix B.

In general wells were reported to have adequate quantity and quality for residential purposes. Residents reported that municipal water is supplied to residences within the project area from Mayfield Road to approximately 1.5 km north of Old School Road and along Healey Road immediately east of Airport Road. It was reported that some wells completed prior to municipal servicing were not decommissioned following connection to municipal servicing, but are no longer in use. It is estimated that approximately 40 of the residences included in the well survey are serviced with municipal servicing.

4.0 ASSESSMENT OF GROUND WATER CONTROL REQUIREMENTS

Based on the subsurface conditions observed in the geotechnical investigation, measured shallow ground water levels in the vicinity of culvert sections and a review of background information, the potential ground water control requirements for construction of culvert extensions for each of the three existing culvert sections within the project area has been assessed.

4.1 Summary of Site Conditions and Ground Water Features

In summary, the results of the site investigation and information review indicate the following:

- The site is generally underlain by low to permeability glacial till materials. Locally, the glacial till may contain isolated sand lenses or pockets of more pervious material.

- The stabilized ground water levels are generally within approximately 1 to 2 m of the ground surface.

- The site is situated in an area which is partially serviced with municipal piped water obtained from Lake Ontario. Based on a review of well records on file with the Ministry of the Environment private residential wells are present within 200 m of each of the three tributary crossings. Many wells within the project area were decommissioned following connection of residences to the municipal water main.

- With the exception of the culvert crossings, the proposed widening will not result in any significant affect to ground water conditions. This is because the work generally does not involve significant excavations (with the exception of the culvert crossings).

On the basis of the above, it is expected that excavations carried below the water table in the native soil materials will encounter only minor ground water seepage. Locally, zones of slightly greater seepage may be encountered within isolated zones or pockets of sandy material. Similarly, there may be ground water perched within the fill materials for the roadway as a result of the low permeability underlying native soils.

It is expected that significant excavations will be carried below the water table only in the vicinity of the proposed culvert crossings. As noted previously, the soil types encountered in the vicinity of the culvert crossings generally consist of low permeability silt to clayey silt materials.

A summary of the boreholes completed in the vicinity of the creek crossing is provided in the Table below:

Summary of Boreholes in Vicinity of Creek Crossings

Borehole Location	Station	Overburden Type	Depth (m)	Water Level (m)	Estimated Conductivity (m/s)
North Tributary					
BH SC-1	3+460	Sandy Silt	10.8	2.1	$1x10^{-6}$
BH SC-2	3+420	Sandy Silt	11.1	-	
Middle Tributary					
BH DC-1	3+060	Sandy Silt to Sand and Silt	10.8	1.1	$1x10^{-6}$
BH DC-2	3+020	Sandy Silt	10.7	-	
South Tributary					
BH NB-1	1+140	Silty Clay	9.2	-	$1x10^{-7}$
BH NB-2	1+100	Silty Clay	11.0	3.7	

4.2 Impact Analysis

The elevations of the proposed culvert excavations, and measured ground water levels are summarized below:

Culvert Section	Proposed Base of Excavation	Ground Water Elevations	Draw-Down Required
North Culvert Section	253.1 m	255.3 m	2.2 m
Culvert Section	250.2 m	253.3 m	3.1 m
South Section	235.2 m	236.8 m	1.6 m

Based on the above, the ground water elevation in the vicinity of the culvert must be lowered by approximately 1.6 to 3.1 m.

The radius of influence expected from the ground water control will be limited, as the results of the low permeability of the materials. The maximum radius of influence will be less than 10 m.

Similarly, ground water inflow to the excavations will be limited and is expected to be less than 50,000 L/Day. It is noted that there may be localized higher flow rates within zones of the excavation, however, flow rates are expected to diminish significantly as ground water is removed.

It is expected that the ground water control will generally be accomplished by pumping from filtered sumps in the base of the excavation. It will be necessary to divert surface flows from the excavation in order to prevent the accumulation of rainfall runoff and creek drainage.

4.3 Discharge of Ground Water

Total ground water flow discharged from excavations is expected to be relatively low. Ground water discharge may be directed to overland flow and drainage or to the creek channel. A plan should be developed to determine appropriate drainage pathways to prevent flooding and erosion. In the case that groundwater seepage into excavations is discharged to surface water, ground water discharge should be visually clear of sediment. Excavation sumps should be filtered to ensure that fines are not pumped in the ground water discharge system. The outlet should be checked frequently to ensure that the discharge water is not carrying fines. Appropriate methods to control transport of silt in discharge water, such as straw bales or filter bags, should be fitted to the outlet of the discharge.

4.4 Impact on Local Water Wells

The expected radius of influence is less than 10 m. Based on Regional servicing plans, a 300 mm diameter water main exists in the vicinity of each of the three culvert crossings along Airport Road. Many residences along the extent of the water main have generally connected to the municipal supply, and have either decommissioned private well(s) at their property or the well(s) are no longer in use. Wells along Airport Road, during the door-to-door well survey were reported to be completed to depths greater than 7.6 m (25 feet). The radius of influence of is not expected to exceed 10 m surrounding proposed construction sites. Residential water wells are not found within the anticipated radius of influence of dewatering works.

4.5 Geotechnical Considerations

Lowering of ground water levels during construction activities has the potential to create ground subsidence or settlement. The native glacial till overburden material at the site are generally non-plastic or of low plasticity. Soils are typically compact/hard in consistency. These materials are not subject to settlement as a result of lowering of ground water levels expected during the construction period.

On this basis, there will be no ground settlement caused as a result of lowering of ground water levels.

Ground water pumping activities have the potential to carry fines in the ground water discharge. Pumping of fines may cause loss of ground and impact on adjacent structures. It is imperative that all sumps or inlets be property filtered to prevent the pumping or movement of soil or fines into the ground water discharge. This must be inspected on a regular basis during any ground water pumping activities.

The results of the study indicate that the construction works will not result in an adverse impact to existing wells in the area. Nonetheless, it is recommended that a pre-construction survey of local wells be conducted. In addition, a number of independent monitoring wells should be established adjacent to the road alignment to allow for independent monitoring of ground water levels prior to and following

construction. This information can be used to assess potential claims for water loss which may be related to the road widening and culvert construction.

4.6 Requirements for Record Keeping

Based on the results of the hydrogeologic investigation, it is expected there will be no significant impacts created by the dewatering activities. Nonetheless, it is important to maintain records to ensure that any unforeseen impacts are properly identified and that appropriate contingency measures can be implemented. The following record keeping measures are recommended:

- The location and extent (depth and approximate dimensions) of all excavations on the site should be recorded on a daily basis.

- The requirements for ground water control including volumes and duration of pumping from each excavation should be recorded on a daily basis.

- Ground water discharge from ground water control systems should be inspected frequently to ensure they are not carrying fines. In the event that significant fines are noted in ground water discharge, then pumping should be stopped immediately, and proper control measures should be implemented to prevent movement of fines. An inspection should be conducted by a qualified geotechnical engineer to ensure that the movement of fines has not resulted in any potential impact to adjacent structures.

- The location of all discharge areas and overland discharge routes should be noted on a daily basis. The routes should be inspected frequently to ensure that there is no erosion or damage caused as a result of discharge of pumped ground water.

5.0 SUMMARY AND CONCLUSIONS

i. The proposed construction work will generally not involve significant excavation. Significant excavation is expected only in the vicinity of the three culvert crossings.

ii. The site is generally characterized by low permeability clayey to silty glacial till materials. The ground water table is typically encountered within 1-2 m of the ground surface.

iii. The ground water control requirements of the culvert excavations are expected to be less than 50,000 L/day. On this basis, a Permit to Take Water is not required for the construction works. This assumes that all surface drainage and runoff will be directed away from the construction excavations.

iv. The maximum zone of influence arising from the groundwater control activities will be less than 10 m. There are no water wells situated in close proximity to the construction works which could be affected by the groundwater control activities.

v. Residents from Mayfield Road to approximately 1.5 km north of Old School Road are generally provided with the municipal piped water. Along the remaining portion of the alignment, water supply is generally from private wells. The proposed construction will not result in any adverse impacts to existing private wells in the area.

vi. The proposed construction works will not result in an adverse impact to local ground water conditions or wells. Nonetheless, it is recommended that a pre-construction survey be conducted of existing wells in the area. In addition, several monitoring wells should be installed adjacent to the construction works to provide for independent monitoring of ground water levels. This information will be used to assess potential construction related claims for water loss.

We trust this report meets with your requirements. Should you have any questions regarding the information presented, please do not hesitate to contact our office.

Yours truly,
Terraprobe Inc.

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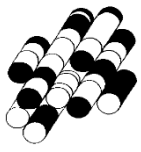
Principal

Brampton Office

FIGURES

Terraprobe Inc.



LEGEND

Borehole Location

SCALE

20 10 0 10 20 30 40m

Terraprobe
11 Indell Lane, Brampton, Ontario, L6T 3Y3
Tel: (905) 796-2650 Fax: (905) 796-2250

Title: **BOREHOLE LOCATION PLAN**

File No. 11-12-2096

FIGURE : 1

Terraprobe
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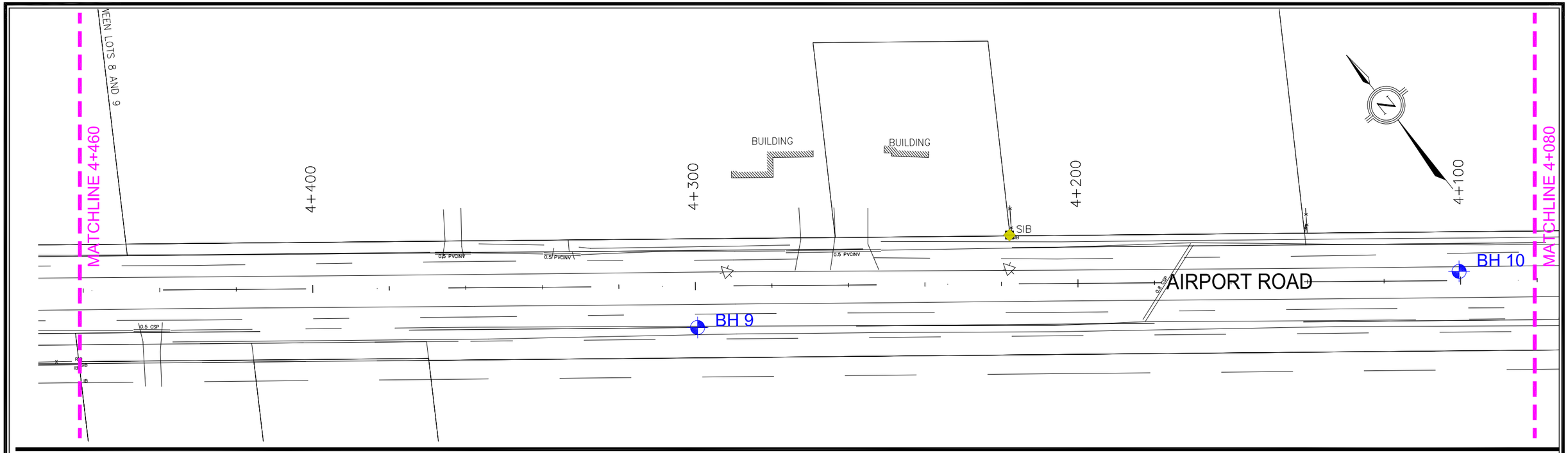
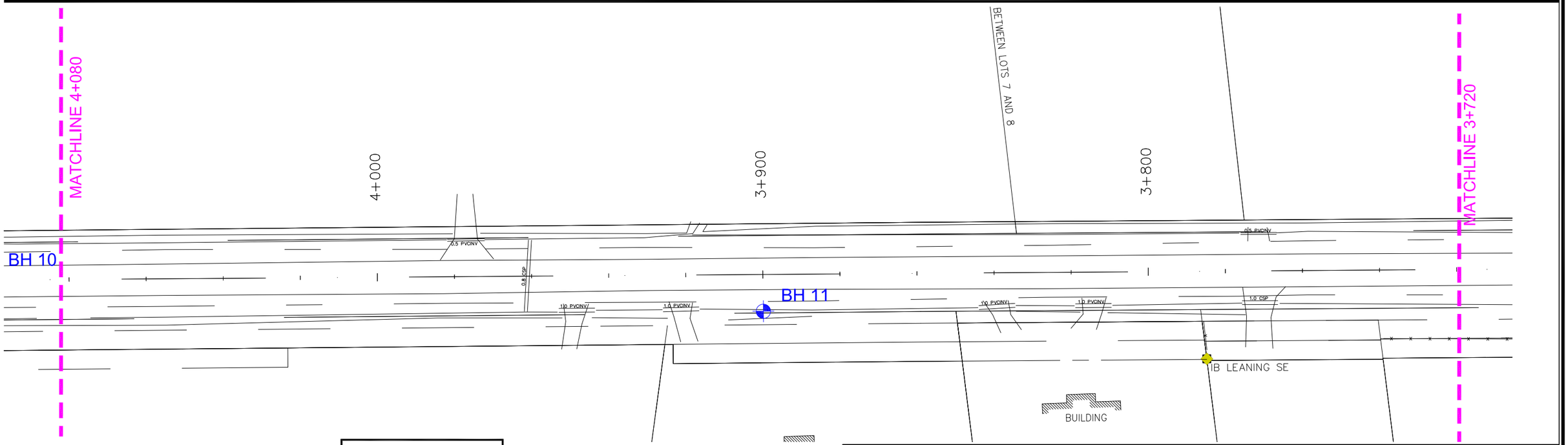
Tel: (905) 796-2650 Fax: (905) 796-2250

Title: **BOREHOLE LOCATION PLAN**

File No. 11-12-2096

FIGURE : 2





LEGEND

Borehole Location

SCALE

20 10 0 10 20 30 40m

Terraprobe
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Tel: (905) 796-2650 Fax: (905) 796-2250

Title: **BOREHOLE LOCATION PLAN**

File No. 11-12-2096

FIGURE : 3

MATCHLINE 3+720

3+700

BUILDING

BUILDING

3+600

BUILDING

BUILDING

BUILDING

3+500

BUILDING

3+400

BUILDIN

MATCHLINE 3+320

BH 12

AIRPORT ROAD

BH SC2

BH SC2A

BH SC1

BH SC1A

0.6 PVCINV

0.6 PVCINV

0.6 PVCINV

0.6 PVCINV

0.6 PVCINV

0.5 CSP

CULBOX

CULBOX

0.5 CSP

0.5 CSP

MATCHLINE 3+320

BUILDING

3+300

BUILDING

N LOTS 6 AND 7

3+200

3+100

3+000

MATCHLINE 2+940

BH 13

BH DC2

BH DC2A

BH DC1

BH DC1A

0.5 CSP

0.5 CSP

0.5 CSP

0.5 CSP

0.5 CSP

0.5 CSP

0.5 CSP

0.8 PVCINV

BUILDING

BUILDING

LEGEND

Borehole Location

SCALE

20 10 0 10 20 30 40m

Terraprobe

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Title:

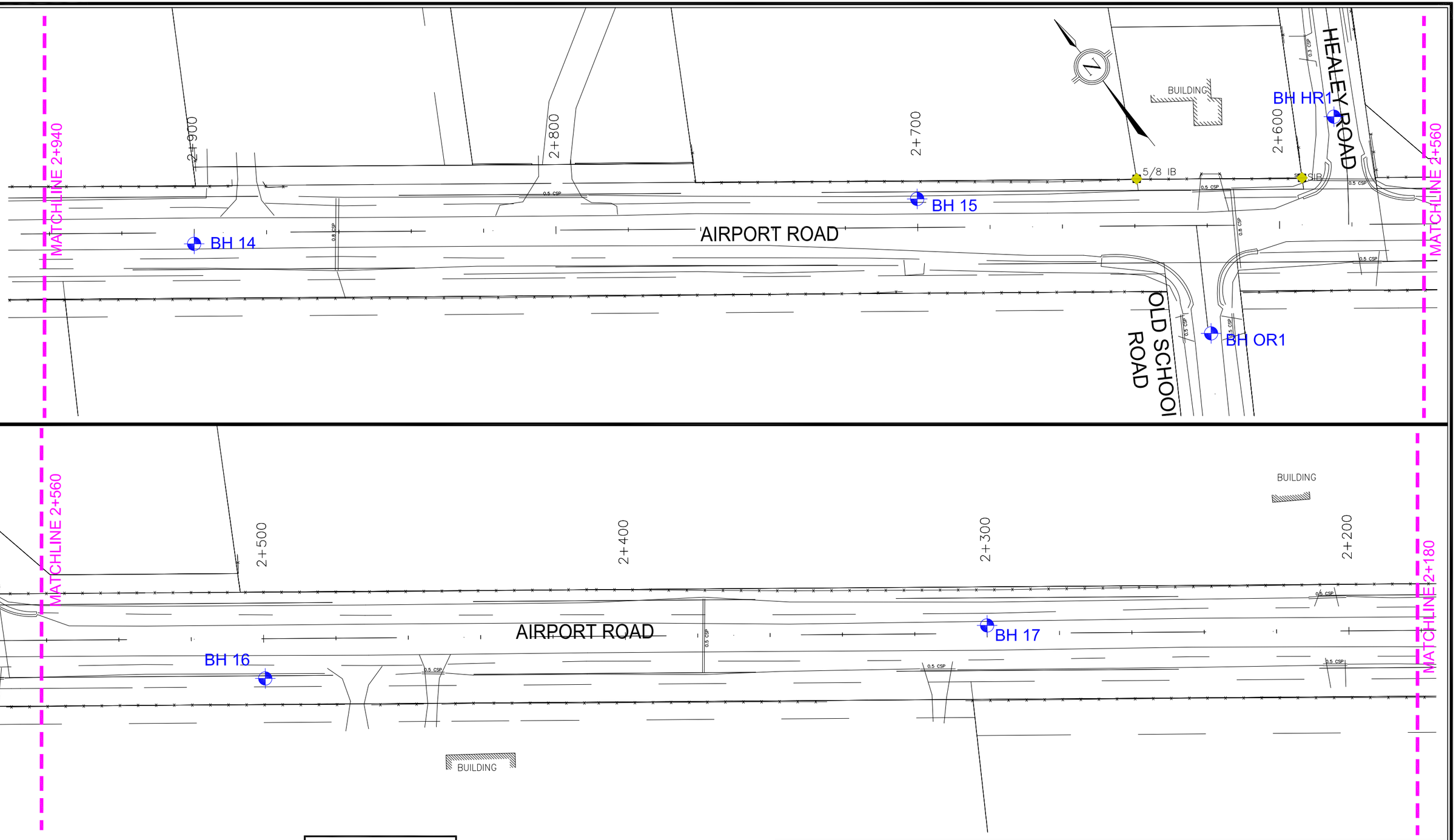
BOREHOLE LOCATION PLAN

File No.

11-12-2096

FIGURE :

4



LEGEND

Borehole Location

SCALE

20 10 0 10 20 30 40m

Terraprobe
11 Indell Lane, Brampton, Ontario, L6T 3Y3
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Title: **BOREHOLE LOCATION PLAN**

File No. 11-12-2096

FIGURE : 5

MATCHLINE 2+180

2+100

2+000

1+900

1+800

MATCHLINE 1+800

BH 18

BH 19

0.5 CSP

SIB

0.5 CSP

MATCHLINE 1+800

1+800

1+700

1+600

1+500

MATCHLINE 1+420

AIRPORT ROAD

BH 20

0.5 CSP

0.5 CSP

0.5 PVCINV

BH 21

0.8 CSP

SIB

0.5 CSP

BUILDING

LEGEND

Borehole Location

SCALE

20 10 0 10 20 30 40m

Terraprobe
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Tel: (905) 796-2650 Fax: (905) 796-2250

Title: **BOREHOLE LOCATION PLAN**

File No. 11-12-2096

FIGURE : 6

MATCHLINE 1+420

1+400

BUILDING

1+300

1+200

1+100

AIRPORT ROAD

BH 22

BH NB2

BH NB2A

BH NB1

BH NB1A

0.75 CSP

0.3 CSP

0.5 PVCINV

BUILDING

BUILDING

MATCHLINE 1+040

MATCHLINE 1+040

1+000

0+900

0+800

0+700

BUILDING

BUILDING

GV

GV

GV

3.05

SIB

IB

0.3 CSP

BH 24

BH 23

0.3 CSP

0.3 CSP

0.4 CSP

0.4 CSP

MATCHLINE 0+660

LEGEND

Borehole Location

SCALE

20 10 0 10 20 30 40m

Terraprobe

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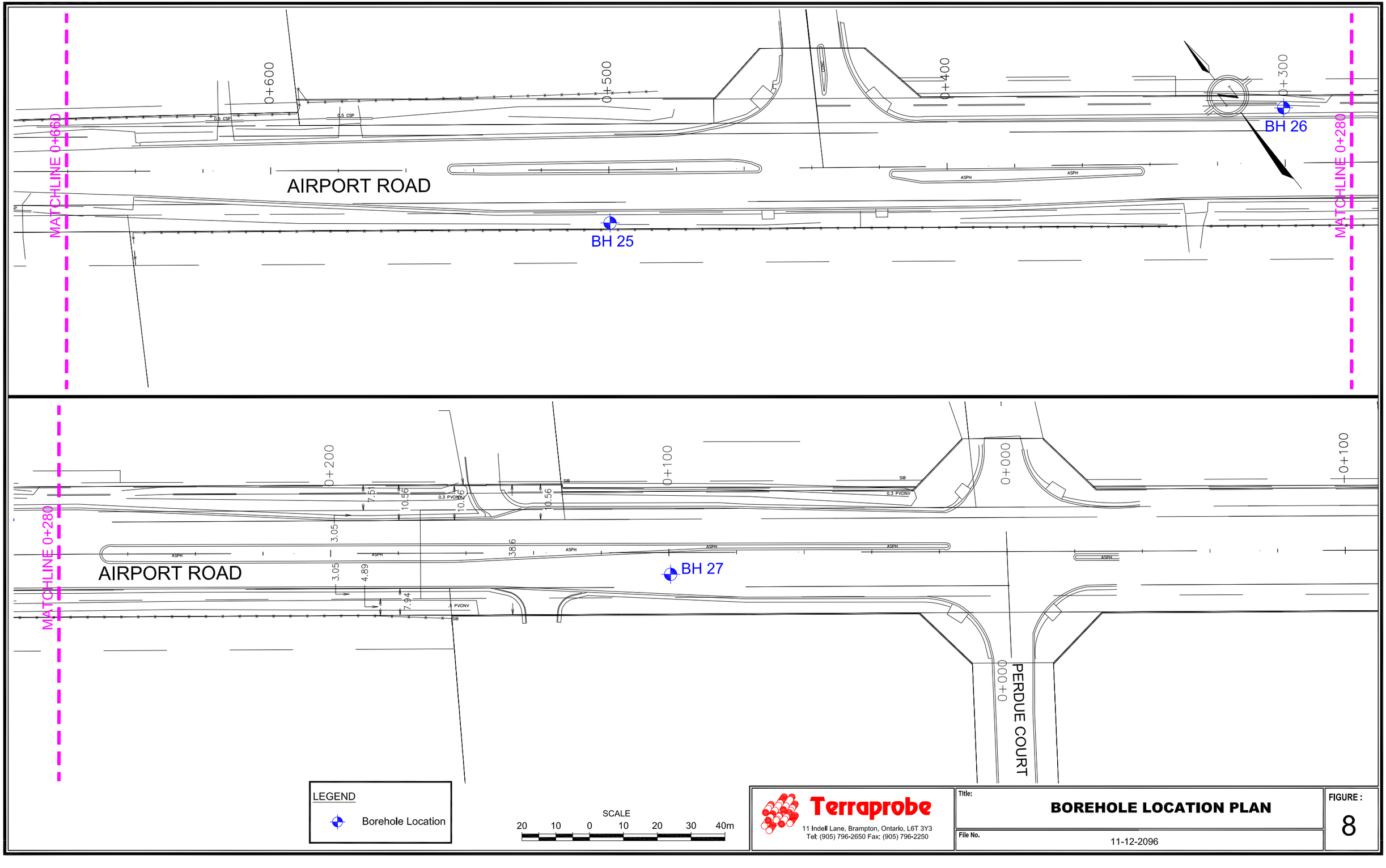
Title: **BOREHOLE LOCATION PLAN**

File No. 11-12-2096

FIGURE : 7



Terraprobe
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Tel: (905) 796-2650 Fax: (905) 796-2250

Title: **BOREHOLE LOCATION PLAN**

File No. 11-12-2096

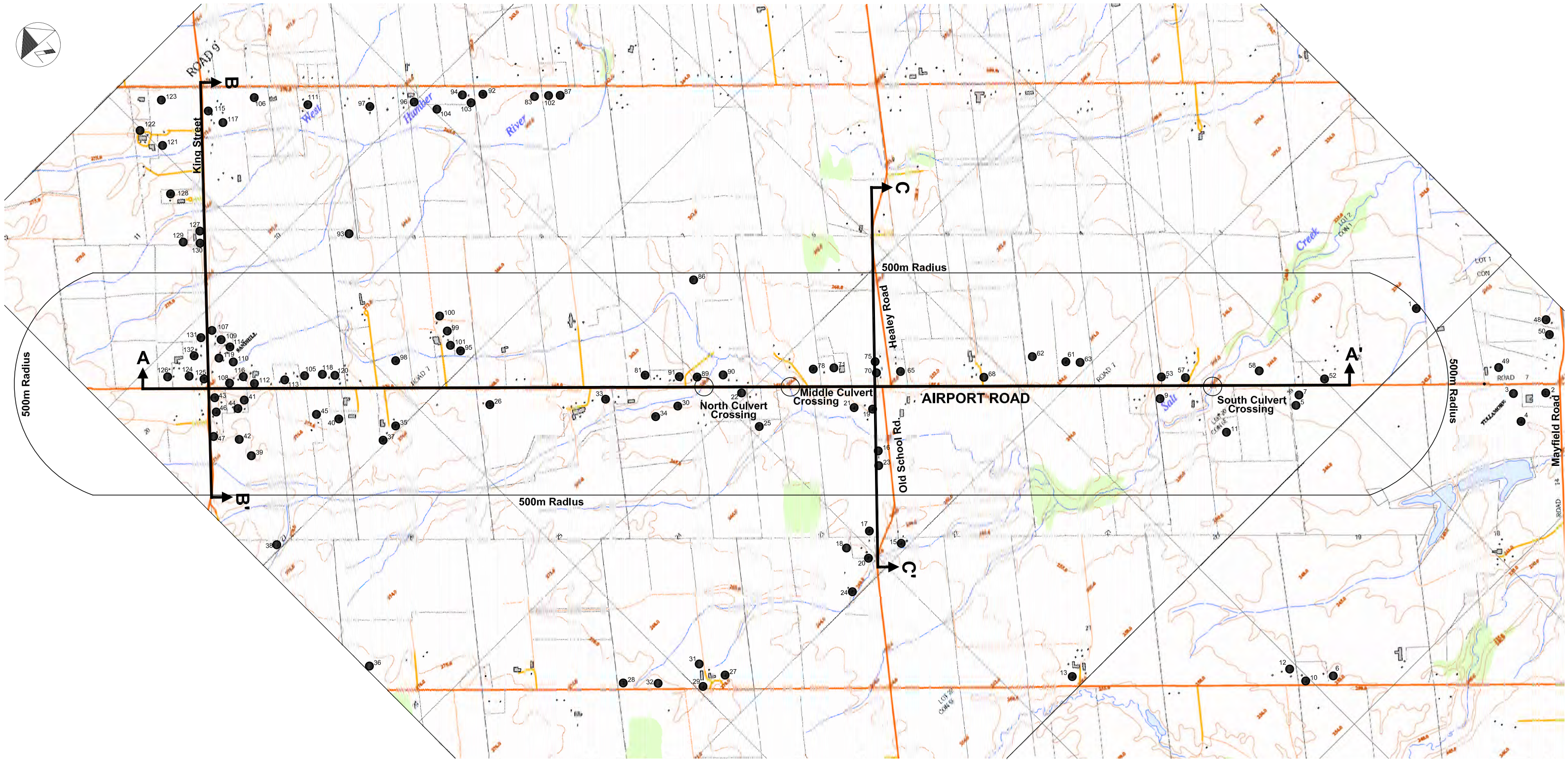
FIGURE : 8

Site Location Plan
Airport Road
Caledon, Ontario

Terraprobe
903 Barton Street, Unit 22
Stoney Creek, Ontario, L8E 5P5
(905) 643-7560 / Fax (905) 643-7559

Drawn By:	A.C.	Scale:	N.T.S.	Project No.:	13-12-2142
Checked By:	P.R.	Date:	March, 2013	Figure No.:	2

NOTES:
All locations and scales are approximate.



LEGEND:

68 location of well

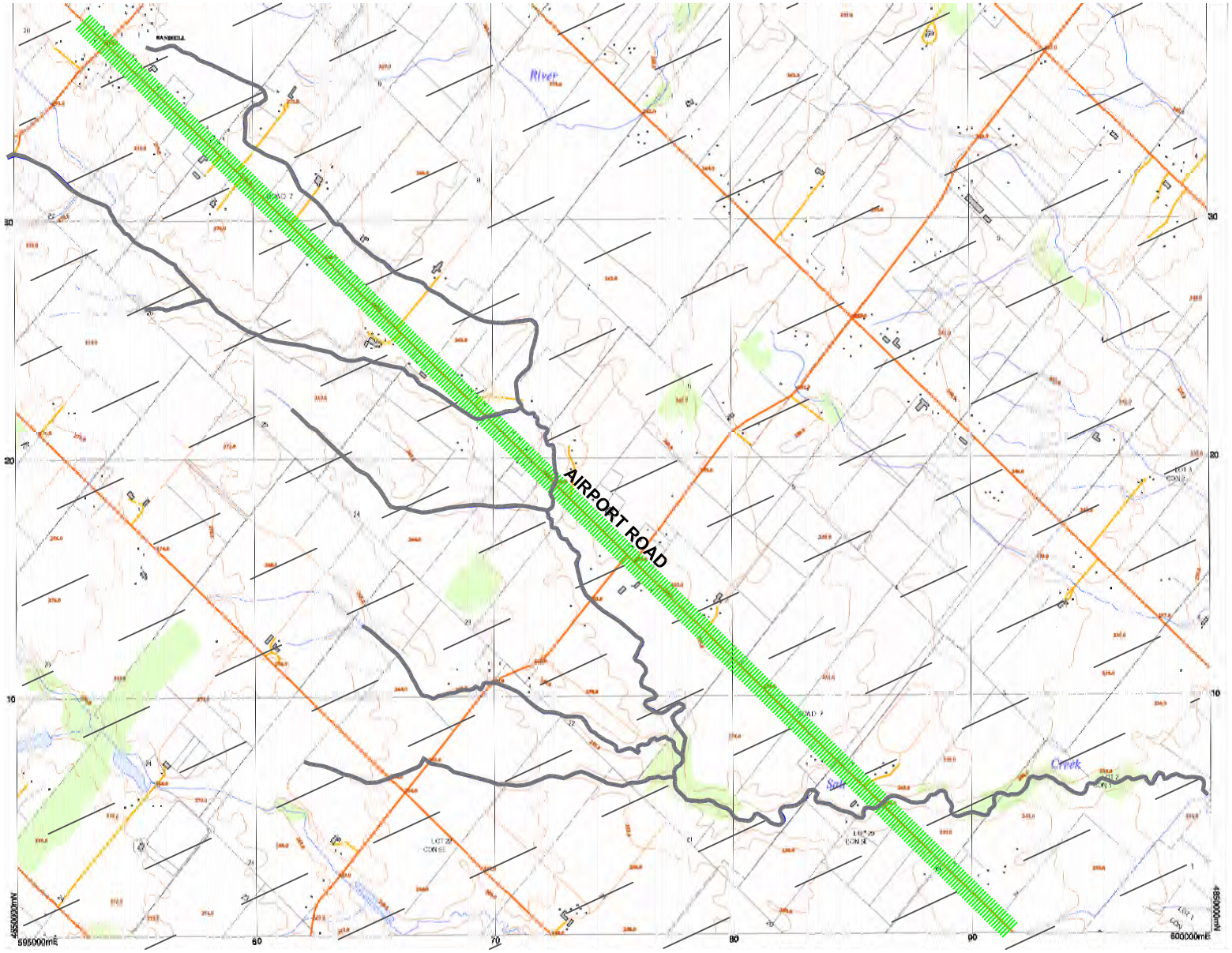
A A' Cross Section

NOTES:
All locations and scales are approximate.

Well Location Plan
Airport Road Class EA
Caledon, Ontario

Terraprobe
903 Barton Street, Unit 22
Stoney Creek, Ontario, L8E 5P5
(905) 643-7560 / Fax (905) 643-7559

Drawn By: A.C.	Scale: N.T.S.	Project No.: 13-12-2142
Checked By: P.R.	Date: March, 2013	Figure No.: 3



LEGEND:

Site Area

Modern River Deposits; sand, silt, minor gravel

Young Tills; Clayey silt till (Halton Till)

NOTES:
All locations and scales are approximate.

Source:
Quarternary Geology, Toronto and Surrounding Area, Ontario Geological Survey, Perliminary Map P.2204 Geological Series 1980

Site Geology
Airport Road Class EA
Caledon, Ontario

Terraprobe
903 Barton Street, Unit 22
Stoney Creek, Ontario, L8E 5P5
(905) 643-7560 / Fax (905) 643-7559

Drawn By:	A.C.	Scale:	N.T.S.	Project No.:	13-12-2142
Checked By:	P.R.	Date:	March, 2013	Figure No.:	4

NORTHWEST

SOUTHEAST

MW 126
MW 124
KING ST.
MW 125
MW 43
MW 108
MW 116
MW 44
MW 112
MW 41
MW 113
MW 105
MW 45
MW 118
MW 120
MW 40
MW 35
MW 26
MW 33
MW 34
MW 91
MW 30
MW 89
MW 90
MW 22
MW 78
MW 71
MW 21
MW 75
OLD SCHOOL RD.
MW 70
HEALEY RD.
MW 65
MW 68
MW 63
MW 9
MW 53
CREEK
MW 58
MW 5
MW 7
MW 52

Elevation (masl)

280
270
260
250
240
230
220
210
200
190

0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
5,500

Distance Along Baseline (m)

LITHOLOGY GRAPHIC LEGEND

- Clay
- Sand
- Queenston Formation
- Water Level
- Infered Water Level

NOTES:
All locations and scales are approximate.

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Stoney Creek, Ontario L8E 5P5
(905) 643-7560

Title:
CROSS-SECTION A-A'
ALONG AIRPORT ROAD

File No.: 13-12-2142

Figure: 5

SOUTHWEST

NORTHEAST

MW 115
MW 117

CREEK

MW 127
MW 130
MW 129

CREEK

MW 109
MW 107
MW 132
MW 119
MW 125

Airport Rd.

MW 43
MW 46
MW 47

CREEK

Elevation (masl)

280
270
260
250
240
230
220
210
200
190

0
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
1,400

Distance Along Baseline (m)

LITHOLOGY GRAPHIC LEGEND

- Clay
- Sand
- Queenston Formation
- Water Level
- Infered Water Level

NOTES:
All locations and scales are approximate.

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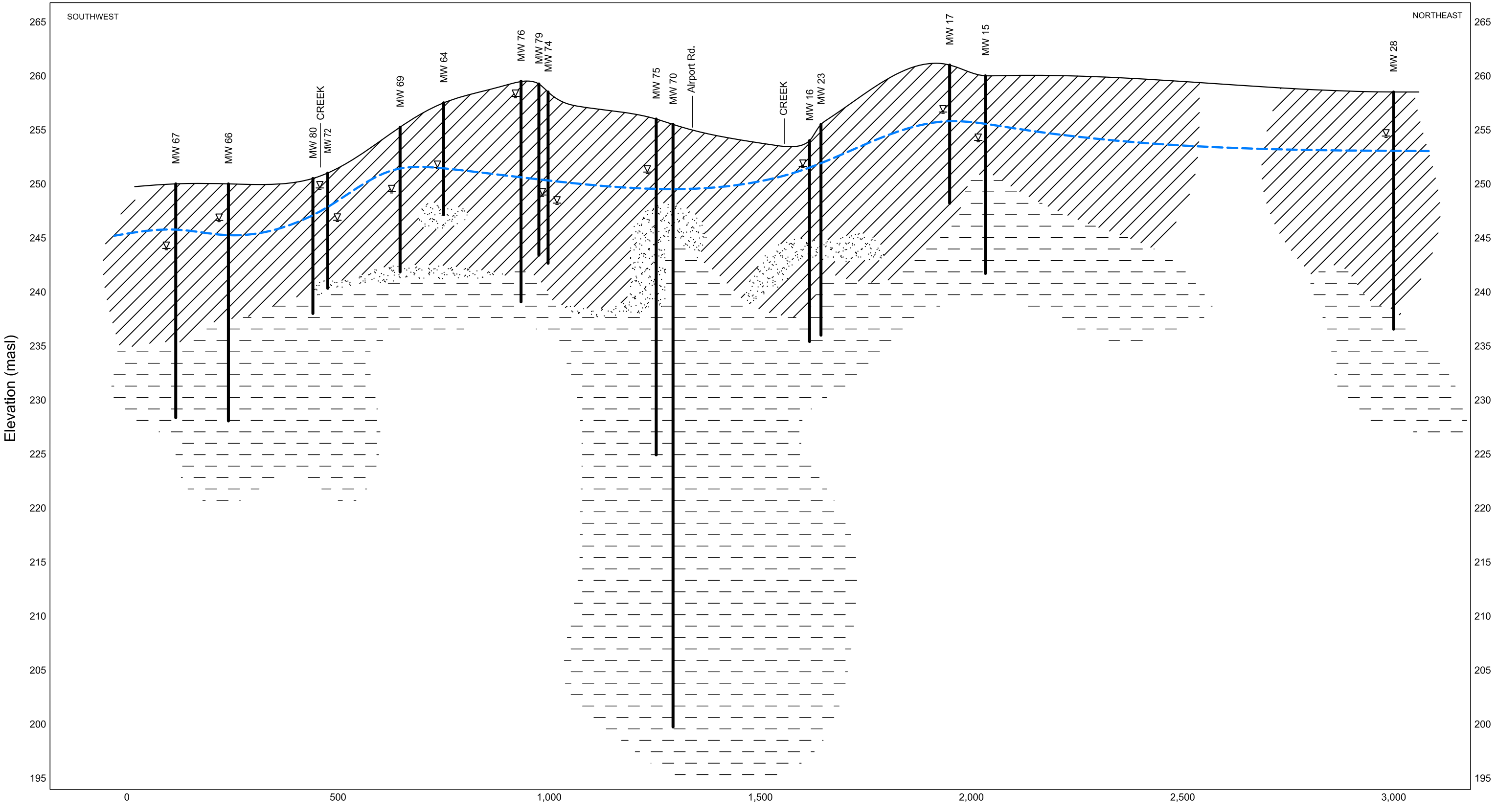
Title: CROSS-SECTION B-B'
ALONG KING STREET

File No.: 13-12-2142

Figure: 6



LITHOLOGY GRAPHIC LEGEND

- Clay
- Sand
- Queenston Formation
- Water Level
- Infered Water Level

NOTES:
All locations and scales are approximate.

Terraprobe
903 Barton Street, Unit 22
Stoney Creek, Ontario L8E 5P5
(905) 643-7560

Title: CROSS-SECTION C-C'
ALONG OLD SCHOOL ROAD

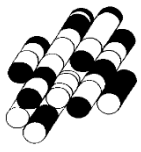
File No.: 13-12-2142

Figure: 7

MOE Well Records

APPENDIX A

Terraprobe Inc.



	TOWNSHIP CONCESSION (LOT)	UTM[1]	DATE[2] CNTR[3]	CASING DIA[4]	WATER[5,6] DETAIL	STAT LVL/PUMP LVL[7] RATE[8]/TIME HR:MIN	WATER USE[9]	SCREEN INFO[10]	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND[5,11]
	BRAMPTON CITY (CHING HS E 06(021)	17 599625 4848755[N]	2008/05 7090	30	FR 0074	005 / 010 004 / 1:30	DO	59 25	7117974 (Z86307) A058975 BLCK LOAM 0001 BRWN CLAY 0009 GREY CLAY 0058 RED SHLE 0074 GREY GRVL BLDR 0076 SHLE 0084
	BRAMPTON CITY (CHING 06(025)		2006/06 3108				NU		6930383 (Z30605) PRDG 0041 0013
	CALEDON TOWN (CHINGU CON 06(019)	17 589078 4836871[N]	2007/02 7143	06	0074	005 / 046 005 / 4:0	DO	16 60	7040930 (Z42494) A038053 BRWN CLAY SAND GRVL 0041 RED SHLE 0076
	CALEDON TOWN (CHINGU CON 06(029)	17 584771 4841408[N]	1990/08 3317	08 06	FR 0051	030 / 050 003 / 1:30	DO		4907448 (57456) RED CLAY STNS 0049 RED SHLE 0081
4	CALEDON TOWN (CHINGU HS E 06(018)	17 599507 4849413[N]	1975/07 1307	30	FR 0060	030 / 057 002 / 1:0	DO		4904710 () BRWN LOAM 0011 GREY CLAY 0058 GRVL 0060
3	CALEDON TOWN (CHINGU HS E 06(018)	17 599619 4849541[N]	1990/02 4919	30 30	UK 0040 UK 0058	040 / 058 010 / 1:0	DO		4907348 (62600) BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY SAND GRVL 0060
2	CALEDON TOWN (CHINGU HS E 06(018)	17 599669 4849455[N]	2004/09 6607	02	0016		NU	2 18	4909576 (Z19514) A015808 GREY SILT CLAY 0015 GREY CLAY SILT 0020
5	CALEDON TOWN (CHINGU HS E 06(018)	17 598849 4850234[N]	1992/03 4919	30 30	UK 0020 UK 0040	020 / 040 010 / 1:0	DO		4907705 (110913) BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY SAND LYRD 0060
1	CALEDON TOWN (CHINGU HS E 06(018)	17 599561 4850123[N]	1975/01 1307	30	FR 0050	030 / 048 002 / 1:0	DO		4904610 () BRWN LOAM 0012 GREY CLAY 0048 GRVL 0050
	CALEDON TOWN (CHINGU HS E 06(018)	17 599331 4848098[N]	1967/03 1325	30	FR 0041	028 / 040 001 / 0:30	DO		4901541 () LOAM 0002 BRWN CLAY 0012 BLUE CLAY BLDR 0022 HPAN 0040 MSND 0041 BLUE CLAY 0043
8	CALEDON TOWN (CHINGU HS E 06(019)	17 598410 4848873[N]	1971/09 1307	30	FR 0033	015 / 031 004 / 1:0	DO		4903693 () BRWN LOAM 0010 GREY CLAY 0033
6	CALEDON TOWN (CHINGU HS E 06(019)	17 598065 4849173[N]	1979/09 3132	06	FR 0039	011 / 037 002 / 1:30	NU		4905631 () BRWN CLAY SOFT 0015 BLUE CLAY STNS SOFT 0040 BLUE BLDR HARD 0049 BLUE SHLE SOFT 0088 BLUE SHLE HARD 0120 BLUE SHLE CLAY HARD 0129 BLUE SHLE HARD 0240
7	CALEDON TOWN (CHINGU HS E 06(019)	17 598865 4850223[N]	1980/05 4919	30 30	UK 0055	020 / 055 / 0:30	DO		4905745 () BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0055 GREY SAND LOOS 0058
11	CALEDON TOWN (CHINGU HS E 06(020)	17 598506 4850328[N]	1967/08 3514	07 07	FR 0065	030 / 070 002 / 2:0	DO		4901543 () BRWN CLAY 0018 GREY CLAY GRVL 0052 BLUE SHLE 0070

	TOWNSHIP CONCESSION (LOT)	UTM[1]	DATE[2] CNTR[3]	CASING DIA[4]	WATER[5,6] DETAIL	STAT LVL/PUMP LVL[7] RATE[8]/TIME HR:MIN	WATER USE[9]	SCREEN INFO[10]	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND[5,11]
(12)	CALEDON TOWN (CHINGU HS E 06(020)	17 597965 4859273[N]	1981/05 3637	30 36 24	FR 0032 FR 0022 FR 0035	017 / 010 / :0	DO		4905839 () BRWN LOAM 0001 BRWN CLAY STNS 0010 GREY CLAY STNS SAND 0029 GREY STNS CLAY 0035 GREY CLAY SHLE 0036 GREY SHLE VERY HARD 0038
(10)	CALEDON TOWN (CHINGU HS E 06(020)	17 597965 4849323[N]	1980/09 2224	30	FR 0026	006 / 020 006 / 0:30	DO		4905701 () GREY SAND 0015 GREY CLAY STNS 0025 GREY SAND GRVL 0027
(9)	CALEDON TOWN (CHINGU HS E 06(020)	17 598389 4850638[N]	1949/07 4620	06 06	FR 0023		DO		4901542 () LOAM CLAY 0002 CLAY STNS 0006 CLAY GRVL HPAN 0013 HPAN 0022 CLAY GRVL 0023 BLUE SHLE 0025
(13)	CALEDON TOWN (CHINGU HS E 06(021)	17 597251 4850025[N]	1966/08 1307	30	FR 0035	025 / 075 / :0	ST DO		4901544 () BRWN LOAM CLAY 0012 GREY CLAY 0033 GRVL 0035
(14)	CALEDON TOWN (CHINGU HS E 06(022)	17 597365 4851248[N]	1978/08 4919	30 30	UK 0020	008 / 030 / 0:30	DO		4905428 () BRWN LOAM HARD 0001 BRWN CLAY HARD 0010 GREY CLAY HARD 0020 GREY SAND GRVL PCKD 0033
(15)	CALEDON TOWN (CHINGU HS E 06(022)	17 597064 4951024[N]	1977/10 3561	07	FR 0058	020 / 055 005 / 2:0	DO		4905283 () LOAM 0002 STNS CLAY 0030 BLUE SHLE 0060
(16)	CALEDON TOWN (CHINGU HS E 06(023)	17 597348 4851392[N]	1998/11 3108	06 06	FR 0060	015 / 038 004 / 17:0	DO		4908388 (196122) BRWN CLAY SAND STNS 0017 BLUE CLAY 0034 GRVL 0054 BLCK CLAY 0056 BLCK SHLE SOFT 0061
(17)	CALEDON TOWN (CHINGU HS E 06(023)	17 597093 4851158[N]	1996/05 4919	30 30	UK 0040 UK 0030	015 / 040 010 / 1:0	DO		4908152 (161520) BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY SAND LYRD 0042
(18)	CALEDON TOWN (CHINGU HS E 06(023)	17 596960 4851209[N]	1984/08 4919	30 30	UK 0040 UK 0050	010 / 050 / :30	DO		4906285 () BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY STNS HARD 0057
	CALEDON TOWN (CHINGU HS E 06(023)	17 597441 4851575[N]	2009/01 4011	05		006 / / :0	NU		7118693 (Z89949)
(20)	CALEDON TOWN (CHINGU HS E 06(023)	17 596990 4851098[N]	1972/06 3612	30	UK 0028	018 / 032 002 / 1:0	DO		4903841 () BRWN LOAM 0002 BRWN CLAY STNS 0023 BLUE CLAY 0028 GREY CLAY SAND 0030 GREY SAND BLDR 0034
(21)	CALEDON TOWN (CHINGU HS E 06(023)	17 597471 4851576[N]	1989/09 4919	30 30	UK 0050	010 / 030 010 / 1:0	DO		4907173 (62527) BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0050 GREY SHLE HARD 0052
(22)	CALEDON TOWN (CHINGU HS E 06(023)	17 597078 4852011[N]	1989/04 4919	30 30	UK 0050	008 / 030 010 / 1:0	DO		4907131 (47161) BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0050 GREY SAND LOOS 0055
(23)	CALEDON TOWN (CHINGU HS E 06(023)	17 597332 4851363[N]	1995/11 3108	06	FR 0045 SA 0063		NU		4908073 (156489) LOAM 0002 CLAY GRVL 0035 SAND GRVL 0045 BLUE CLAY 0052 BLUE SHLE 0064

	TOWNSHIP CONCESSION (LOT)	UTM[1]	DATE[2] CNTR[3]	CASING DIA[4]	WATER[5,6] DETAIL	STAT LVL/PUMP LVL[7] RATE[8]/TIME HR:MIN	WATER USE[9]	SCREEN INFO[10]	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND[5,11]
24	CALEDON TOWN (CHINGU HS E 06(023)	17 596915 4851003[N]	1968/08 4813	06 06	FR 0046	008 / 045 005 / 3:0	DO		4903114 () BRWN CLAY 0014 BLUE CLAY 0037 GREY CLAY MSND 0042 BLUE SHLE 0051
25	CALEDON TOWN (CHINGU HS E 06(023)	17 597015 4851873[N]	1976/12 4919	30 30	UK 0021 UK 0040	020 / 045 / :0	DO		4905040 () BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY STNS HARD 0040 GREY GRVL CLAY LOOS 0047
26	CALEDON TOWN (CHINGU HS E 06(024)	17 596237 4852825[N]	1964/02 1325	30	FR 0051 FR 0080	041 / 060 001 / 1:0	DO		4901547 () BRWN CLAY BLDR 0014 BLUE CLAY MSND BLDR 0080 BLUE MSND 0081
27	CALEDON TOWN (CHINGU HS E 06(024)	17 596127 4851152[N]	1996/05 4919	30 30	UK 0060	010 / 038 010 / 1:0	DO		4908151 (161509) BRWN LOAM HARD 0001 BRWN CLAY HARD 0040 GREY CLAY SAND LOOS 0075
28	CALEDON TOWN (CHINGU HS E 06(024)	17 595775 4851463[N]	1971/06 1660	05	FR 0070	015 / 058 009 / 2:0	DO		4903779 () BRWN LOAM 0001 BRWN CLAY 0029 GREY CLAY GRVL 0068 RED SHLE 0072
29	CALEDON TOWN (CHINGU HS E 06(024)	17 596046 4851170[N]	1960/06 1307	30	FR 0050	/ 025 / :0	ST DO		4901546 () BRWN LOAM CLAY 0012 GREY CLAY STNS 0048 GRVL 0050
30	CALEDON TOWN (CHINGU HS E 06(024)	17 596827 4852212[N]	1949/07 4620	06	FR 0056	014 / / :0	NU		4901545 () LOAM CLAY 0003 CLAY GRVL 0009 CLAY 0056 GRVL MSND 0057 CLAY MSND 0060 CLAY 0065 CLAY HPAN 0073 BLUE SHLE 0075
31	CALEDON TOWN (CHINGU HS E 06(024)	17 595771 4851496[N]	1990/11 3132	06 06	FR 0085	/ / 2:0	DO		4907444 (65753) BRWN CLAY STNS SAND 0012 BLUE CLAY STNS 0037 GREY CLAY 0063 BLUE CLAY SILT 0067 BLUE QSND FSND 0078 BLUE CLAY STNS WBRG 0095
32	CALEDON TOWN (CHINGU HS E 06(024)	17 595919 4851337[N]	1986/07 4919	30 30	UK 0065	/ / :30	DO		4906564 () BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0065 GREY SAND LOOS 0075
33	CALEDON TOWN (CHINGU HS E 06(025)	17 596615 4852423[N]	1981/06 4919	30 30	UK 0040 UK 0060	010 / 070 / 0:30	DO		4905886 () BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0060 GREY SAND LYRD PCKD 0075
34	CALEDON TOWN (CHINGU HS E 06(025)	17 596215 4852723[N]	1981/06 4919	30	UK 0030 UK 0060	002 / 060 / 0:30	DO		4905885 () BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY SOFT 0062
35	CALEDON TOWN (CHINGU HS E 06(026)	17 595845 4853068[N]	1965/04 4813	07	FR 0238 FR 0022	/ 243 001 / 4:0	NU	236 4	4901548 () YLLW CLAY 0001 QSND 0022 SILT 0230 GRVL 0240 BLUE SHLE 0255
36	CALEDON TOWN (CHINGU HS E 06(026)	17 594984 4852304[N]	2000/07 2576	06	FR 0070	-003 / 030 / 1:30	DO	64 3	4908598 (219626) BRWN FILL 0006 GREY CLAY HARD 0022 GREY CLAY GRVL SILT 0057 GREY GRVL CSND SILT 0072 GREY SILT FGVL 0076
37	CALEDON TOWN (CHINGU HS E 06(026)	17 595871 4853040[N]	1989/11 4868	30 30	FR 0010	006 / 020 004 / 1:0	IN		4907192 (41652) BRWN LOAM 0001 BRWN CLAY STNS 0010 BRWN SAND GRVL 0015 GREY SAND LOOS 0021 GREY CLAY STNS 0032

	TOWNSHIP CONCESSION (LOT)	UTM[1]	DATE[2] CNTR[3]	CASING DIA[4]	WATER[5,6] DETAIL	STAT LVL/PUMP LVL[7] RATE[8]/TIME HR:MIN	WATER USE[9]	SCREEN INFO[10]	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND[5,11]
	CALEDON TOWN (CHINGU HS E 06(026)	17 594950 4852358[N]	1981/05 3637	30 32 24	FR 0058	/ 016 014 / 1:0	DO		4905838 () BRWN LOAM 0001 BRWN CLAY STNS 0010 GREY CLAY SAND PCKD 0028 GREY CLAY 0058 GREY SAND 0058
38	CALEDON TOWN (CHINGU HS E 06(027)	17 595121 4853036[L]	2002/10 3662	30 30	UK 0030	014 / 030 004 / 2:0	DO		4909063 (240647) BLCK LOAM 0001 BRWN CLAY 0009 BLUE CLAY 0025 GREY SAND 0026 BLUE CLAY 0030 GREY GRVL 0033
39	CALEDON TOWN (CHINGU HS E 06(027)	17 595318 4853354[N]	1974/12 4919	30	UK 0045	005 / 030 / 0:30	DO		4904626 () BRWN LOAM 0001 BRWN CLAY 0015 GREY CLAY 0045 GREY SAND 0049
40	CALEDON TOWN (CHINGU HS E 06(027)	17 595719 4853223[N]	2009/06 4645	06	FR 0040	003 / 010 010 / 3:0	IN CO	32 8	7124992 (Z099805) A075864 BLCK LOAM SOFT 0001 BRWN CLAY HARD 0009 GREY CLAY SILT LYRD 0029 GREY SAND LOOS 0040
41	CALEDON TOWN (CHINGU HS E 06(027)	17 595485 4853579[N]	1974/05 1307	30	FR 0030	008 / 028 006 / 1:0	DO		4904396 () BRWN LOAM 0008 GREY CLAY 0028 CSND 0030
42	CALEDON TOWN (CHINGU HS E 06(027)	17 595313 4853483[N]	1975/09 3612	30	UK 0046	005 / 047 006 / 1:0	DO		4904763 () BLCK LOAM 0002 BRWN CLAY 0015 BLUE CLAY STNS 0045 GREY SAND 0050
	CALEDON TOWN (CHINGU HS E 06(027)	17 594765 4853148[N]	1972/10 1307	30	FR 0025	/ 022 002 / 1:0	DO		4904002 () BRWN LOAM 0008 GREY CLAY 0024 GRVL 0025
43	CALEDON TOWN (CHINGU HS E 06(027)	17 595342 4853687[N]	1986/06 3612	30 24	UK 0027	003 / 027 005 / 2:0	DO		4906492 () BLCK LOAM 0003 BRWN CLAY SAND 0010 BLUE CLAY STNS 0027 GREY SAND 0029
44	CALEDON TOWN (CHINGU HS E 06(027)	17 595425 4853582[N]	1991/12 4919	30 30	UK 0059	010 / 030 010 / 1:0	DO		4907601 (77350) BRWN LOAM HARD 0001 BRWN SAND CLAY HARD 0059 GREY CLAY SAND LOOS 0060
45	CALEDON TOWN (CHINGU HS E 06(027)	17 595635 4853273[N]	1970/11 3612	36	FR 0006	006 / 011 005 / 1:0	DO		4903504 () BLCK LOAM 0001 BRWN CLAY 0006 GREY GRVL 0012
46	CALEDON TOWN (CHINGU HS E 06(027)	17 595346 4853681[N]	1988/10 3612	30 30	UK 0019	019 / 039 002 / 1:0	DO		4906922 (18659) BLCK LOAM 0002 BRWN CLAY STNS 0019 BRWN SAND STNS 0023 BLUE CLAY STNS 0041
	CALEDON TOWN (CHINGU HS E 06(028)	17 594618 4853006[N]	1961/05 1325	30	FR 0020	002 / / :0	DO		4901549 () BRWN CLAY MSND 0008 BLUE CLAY 0013 BLUE CLAY GRVL 0019 GRVL 0020
	CALEDON TOWN (CHINGU HS E 06(028)	17 594685 4853480[L]	2002/10 3662	36 30	UK 0020 UK 0011	011 / 022 003 / 5:0	DO		4909064 (240648) BLCK LOAM 0001 BRWN CLAY 0004 BRWN CLAY SAND 0010 BLUE CLAY SAND 0015 BLUE CLAY STNS 0017 BLUE CLAY GRVL 0020 GREY GRVL 0022
	CALEDON TOWN (CHINGU HS E 06(028)	17 594638 4853148[N]	1995/10 3662	30 30	UK 0006	017 / 015 006 / 2:0	DO		4908072 (168361) BLCK LOAM 0002 BRWN CLAY 0008 BLUE CLAY 0016 BRWN SAND GRVL 0017 BLUE CLAY 0018
	CALEDON TOWN (CHINGU HS E 06(028)	17 593928 4853300[N]	1994/09 3132	06	FR 0089	012 / 047 010 / 12:0	DO	99 4	4907954 (144308) BRWN CLAY STNS DNSE 0013 BLUE CLAY STNS DNSE 0086 BLUE CSND LOOS 0103

TOWNSHIP CONCESSION (LOT)	UTM[1]	DATE[2] CNTR[3]	CASING DIA[4]	WATER[5,6] DETAIL	STAT LVL/PUMP LVL[7] RATE[8]/TIME HR:MIN	WATER USE[9]	SCREEN INFO[10]	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND[5,11]
CALEDON TOWN (CHINGU HS E 06(028)	17 595265 4853623[N]	1980/08 3612	30 30	UK 0045	005 / 044 008 / 2:0	DO		4905759 () BRWN LOAM 0002 BRWN CLAY 0018 BLUE CLAY 0044 GREY SAND 0045 BLUE CLAY 0046
CALEDON TOWN (CHINGU HS E 06(029)	17 594533 4854486[N]	1985/06 3612	30 24 30	UK 0023 UK 0048	006 / 047 004 / 1:0	DO		4906344 () BLCK LOAM 0002 BRWN CLAY SAND 0023 BLUE CLAY STNS 0047 GREY CLAY SAND STNS 0048
CALEDON TOWN (CHINGU HS E 06(029)	17 593615 4853473[N]	1982/08 3612	30	UK 0008	007 / 015 003 / 2:0	DO		4906004 () BLCK LOAM 0002 BRWN CLAY 0005 BRWN CLAY SAND STNS 0008 BLUE CLAY 0018
CALEDON TOWN (CHINGU HS E 06(029)	17 593965 4853273[N]	1982/08 3662	30 30	UK 0019	011 / 024 003 / 1:0	DO		4906002 () BRWN LOAM 0001 BRWN CLAY 0005 BRWN SAND CLAY 0011 BRWN CLAY STNS 0016 BLUE CLAY STNS 0019 BRWN CSND 0021 BLUE CLAY STNS 0028
CALEDON TOWN (CHINGU HS E 06(029)	17 593632 4853556[N]	1967/06 3612	36	FR 0018 FR 0007	007 / 014 002 / :0	DO		4901550 () LOAM 0001 CSND 0007 MSND 0009 BLUE CLAY 0015 QSND 0018
CALEDON TOWN (CHINGU HS W 06(018)	17 590365 4837423[N]	1979/10 3637	30	FR 0047 FR 0037	015 / 014 / 1:0	DO		4905555 () BRWN LOAM 0001 BRWN CLAY PCKD 0014 GREY CLAY STNS SOFT 0023 GREY CLAY SAND 0037 RED SHLE 0049
CALEDON TOWN (CHINGU HS W 06(018)	17 590435 4837463[N]	1968/06 5001	27	FR 0034	005 / / :0	DO		4903082 () LOAM CLAY 0005 CLAY 0025 STNS 0035 MSND 0046
CALEDON TOWN (CHINGU HS W 06(018)	17 589600 4836740[N]	1964/04 4101	07 07	FR 0088 FR 0065	030 / 088 006 / 6:0	ST DO		4902102 () BRWN CLAY 0025 BLUE CLAY 0040 CLAY MSND 0048 RED SHLE 0092
CALEDON TOWN (CHINGU HS W 06(019)	17 589075 4837263[N]	1979/11 5206	08 08	FR 0020 FR 0075	011 / 080 004 / 2:0	DO		4905575 () BRWN CLAY 0006 RED CLAY 0012 RED SHLE LYRD 0081
CALEDON TOWN (CHINGU HS W 06(019)	17 590015 4837903[N]	1981/05 3637	30 32	FR 0023 FR 0013 FR 0035	010 / 022 008 / 1:0	DO		4905840 () BRWN FILL 0001 BLCK LOAM 0002 BRWN CLAY 0011 GREY SILT CLAY SOFT 0019 BLCK CSND MSND CLAY 0023 RED CLAY STNS SNDY 0028 GREY CLAY SILT STNS 0036
CALEDON TOWN (CHINGU HS W 06(019)	17 589077 4837344[N]	1962/07 3514	07 07	FR 0072	018 / 018 010 / 4:0	ST DO		4902104 () BRWN CLAY 0021 RED SHLE 0075
CALEDON TOWN (CHINGU HS W 06(019)	17 589025 4837218[N]	1989/03 4868	30	FR 0018	010 / 018 004 / 1:0	ST		4907075 (41628) BRWN LOAM 0001 BRWN CLAY PCKD 0006 RED CLAY STNS BLDR 0016 RED SHLE LMSN HARD 0028
CALEDON TOWN (CHINGU HS W 06(020)	17 588434 4837543[N]	1971/11 3637	30	FR 0025	012 / 033 / :0	DO		4903808 () BRWN LOAM 0001 BRWN CLAY STNS 0006 BRWN CLAY MSND 0010 GREY CLAY 0011 GREY MSND 0013 GREY CLAY MSND 0019 BRWN CLAY 0025 RED MSND 0026 BRWN CLAY 0035

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	TOWNSHIP CONCESSION (LOT)	UTM[1]	DATE[2] CNTR[3]	CASING DIA[4]	WATER[5,6] DETAIL	STAT LVL/PUMP LVL[7] RATE[8]/TIME HR:MIN	WATER USE[9]	SCREEN INFO[10]	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND[5,11]
	CALEDON TOWN (ALBION CON 01(001)	17 600461 4850254[N]	1962/06 1307	30	FR 0018	010 / 002 / :0	DO		4900001 () BRWN LOAM 0009 GREY SHLE 0018
	CALEDON TOWN (ALBION CON 01(001)	17 600501 4850295[N]	1964/03 1308	30	FR 0014	012 / 018 001 / 1:0	DO		4900002 () BRWN CLAY MSND 0009 STNS SHLE 0018
48	CALEDON TOWN (ALBION CON 01(001)	17 600065 4849748[N]	1972/10 1307	30	FR 0036	010 / 034 004 / 1:0	DO		4904001 () BRWN OBDN 0030 GREY SHLE 0036
49	CALEDON TOWN (ALBION CON 01(001)	17 599565 4849623[N]	1972/11 1307	30	FR 0052	018 / 050 002 / 1:0	DO		4903999 () BRWN OBDN 0010 GREY CLAY 0051 GRVL 0052
50	CALEDON TOWN (ALBION CON 01(001)	17 599915 4849623[N]	1969/03 1307	30	FR 0041	030 / / :0	DO		4903239 () BRWN LOAM 0006 GREY CLAY STNS 0040 GREY SHLE 0041
51	CALEDON TOWN (ALBION CON 01(002)	17 599915 4851023[N]	1975/06 5206	07	FR 0020	020 / 038 006 / 8:0	DO		4905010 () PRDG 0019 BLUE SHLE 0040
52	CALEDON TOWN (ALBION CON 01(002)	17 598965 4850173[N]	1970/10 1307	30	FR 0035	010 / 033 002 / 1:0	DO		4903516 () BRWN LOAM 0012 GREY CLAY 0034 MSND 0035
53	CALEDON TOWN (ALBION CON 01(003)	17 598469 4850699[N]	1963/04 1307	30	FR 0040	020 / 001 / :0	DO		4900006 () BRWN LOAM 0010 GREY CLAY 0035 GREY SHLE 0040
54	CALEDON TOWN (ALBION CON 01(003)	17 599515 4851523[N]	1976/10 1307	30	FR 0028	018 / 026 002 / 1:0	DO		4904960 () BRWN LOAM 0009 GREY CLAY 0019 GREY SHLE 0028
55	CALEDON TOWN (ALBION CON 01(003)	17 599715 4851073[N]	1958/05 1612	04 04	FR 0103	012 / 102 004 / 2:0	DO		4900003 () LOAM 0002 BRWN CLAY 0018 BLUE CLAY 0033 BLUE SHLE 0104
56	CALEDON TOWN (ALBION CON 01(003)	17 599415 4851423[N]	1960/10 1612	04 04	FR 0077	020 / 035 003 / 0:30	DO		4900004 () PRDG 0022 BLUE SHLE 0078
	CALEDON TOWN (ALBION CON 01(003)	17 598566 4850653[N]	2005/06 4011	00		002 / / :0			4909812 (Z30252)
58	CALEDON TOWN (ALBION CON 01(003)	17 598807 4850410[N]	1962/08 1307	30	FR 0037	016 / 001 / :0	DO		4900005 () BRWN LOAM 0012 GREY CLAY STNS 0030 GREY SHLE 0037
59	CALEDON TOWN (ALBION CON 01(003)	17 599618 4851443[N]	1989/06 4919	30	UK 0080	010 / 020 010 / 1:0	DO		4907193 (62441) BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0080 GREY SAND LOOS 0085
60	CALEDON TOWN (ALBION CON 01(003)	17 599515 4851473[N]	1976/09 1307	30	FR 0030	012 / 028 001 / 1:0	DO		4904959 () BRWN LOAM 0010 GREY CLAY 0024 GREY SHLE 0030
	CALEDON TOWN (ALBION CON 01(004)	17 598170 4851072[N]	2005/09 4011	29		005 / / :0			4909900 (Z30270)
	CALEDON TOWN (ALBION CON 01(004)	17 598119 4851175[N]	2005/09 4011	30		007 / / :0			4909902 (Z30269)

	TOWNSHIP CONCESSION (LOT)	UTM[1]	DATE[2] CNTR[3]	CASING DIA[4]	WATER[5,6] DETAIL	STAT LVL/PUMP LVL[7] RATE[8]/TIME HR:MIN	WATER USE[9]	SCREEN INFO[10]	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND[5,11]
63	CALEDON TOWN (ALBION CON 01(004)	17 598215 4851023N	1972/05 1307	30	FR 0044	020 / 042 / 1:0	DO		4903822 () BRWN LOAM 0012 GREY CLAY 0036 SAND GRVL 0044
	CALEDON TOWN (ALBION CON 01(004)	17 598444 4851174N	2005/09 4011	05		008 / / :0			4909901 (Z30268)
64	CALEDON TOWN (ALBION CON 01(005)	17 598011 4852009N	1964/07 1307	30	FR 0034	018 / 001 / :0	DO		4900008 () BRWN LOAM 0012 GREY CLAY 0032 GREY MSND 0034
65	CALEDON TOWN (ALBION CON 01(005)	17 597673 4851583N	1975/09 1307	30	FR 0042	015 / 040 002 / 1:0	DO		4904739 () BRWN LOAM 0010 GREY CLAY 0040 UNKN 0042
66	CALEDON TOWN (ALBION CON 01(005)	17 598425 4852323N	1968/06 2613	06 06	FR 0063	010 / 069 002 / 3:0	DO		4903041 () BRWN CLAY 0010 BLUE CLAY 0041 BLUE SHLE 0072
67	CALEDON TOWN (ALBION CON 01(005)	17 598515 4852423N	1968/06 2613	05 05	SA 0050	018 / 068 002 / 2:0	DO		4903040 () BRWN CLAY 0015 HPAN 0048 BLUE SHLE 0071
68	CALEDON TOWN (ALBION CON 01(005)	17 597930 4851292N	1966/08 3512	07 07	SA 0125	051 / 120 002 / 2:0	DO ST		4900009 () LOAM 0001 YLLW CLAY 0003 BLUE CLAY 0040 BLUE CLAY GRVL 0052 BLUE SHLE 0135
69	CALEDON TOWN (ALBION CON 01(005)	17 598121 4852019N	1964/07 1307	30	FR 0044	020 / 001 / :0	DO		4900007 () BRWN LOAM 0012 GREY CLAY 0042 GREY MSND 0044
70	CALEDON TOWN (ALBION CON 01(006)	17 597595 4851623N	1968/05 3406	04 04	FR 0183	038 / 163 004 / 4:0	DO		4903033 () PRDG 0032 MSND 0035 GRVL SHLE 0061 LMSN 0064 RED SHLE 0142 RED SHLE 0183
	CALEDON TOWN (ALBION CON 01(006)	17 593215 4846281N	2008/11 1663	02	0012	001 / / :0		16 10	7118903 (Z94054) A075113 BRWN SAND GRVL FILL 0006 BRWN FSND GRVL 0007 BRWN LOAM 0008 BRWN FSND GRVL 0012 GREY FSND SILT 0019 GREY FSND CLAY GRVL 0028
71	CALEDON TOWN (ALBION CON 01(006)	17 597465 4851793N	1971/07 4919	30	FR 0042	007 / 040 / 1:0	DO		4903640 () BRWN LOAM 0001 GREY CLAY 0025 GREY STNS 0026 GREY CLAY 0042
72	CALEDON TOWN (ALBION CON 01(006)	17 598215 4852283N	1969/06 1307	30	FR 0035	015 / / :0	DO		4903240 () BRWN LOAM 0008 GREY CLAY 0033 GREY MSND 0035
73	CALEDON TOWN (ALBION CON 01(006)	17 598111 4852050N	1974/09 1307	30	FR 0052	030 / 050 001 / 0:10	DO		4904515 () BRWN LOAM 0008 GREY CLAY 0050 GREY SHLE 0052
74	CALEDON TOWN (ALBION CON 01(006)	17 597829 4851818N	1973/05 4919	30	UK 0043	035 / 051 001 / 1:0	DO		4904226 () BRWN LOAM 0001 BRWN CLAY 0010 GREY CLAY STNS GRVL 0052
75	CALEDON TOWN (ALBION CON 01(006)	17 597615 4851673N	1968/06 4610	05 05	FR 0060 FR 0100	018 / 060 005 / 3:0	DO		4903045 () PRDG 0045 BLUE CLAY BLDR 0056 HPAN 0057 BLUE SHLE 0102
76	CALEDON TOWN (ALBION CON 01(006)	17 597815 4851993N	1969/09 4919	36 30	FR 0058	002 / 002 001 / :0	DO		4903332 () BRWN LOAM 0003 GREY CLAY 0058 GREY MSND STNS 0067

	TOWNSHIP CONCESSION (LOT)	UTM[1]	DATE[2] CNTR[3]	CASING DIA[4]	WATER[5,6] DETAIL	STAT LVL/PUMP LVL[7] RATE[8]/TIME HR:MIN	WATER USE[9]	SCREEN INFO[10]	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND[5,11]
77	CALEDON TOWN (ALBION CON 01(006)	17 598237 4852816N	1987/08 1660	06 06	FR 0078	015 / 082 003 / 1:0	DO		4906706 (15849) BRWN LOAM 0001 CLAY STNS 0022 BLUE CLAY 0058 GRVL HARD PCKD 0078 GREY SHLE ROCK 0087
78	CALEDON TOWN (ALBION CON 01(006)	17 597415 4851863N	1970/03 3512	07	SA 0084	010 / 075 002 / 1:0	DO		4903469 () LOAM 0001 BRWN CLAY 0003 BLUE CLAY 0065 BLUE SHLE 0088
79	CALEDON TOWN (ALBION CON 01(006)	17 597830 4851866N	1973/06 4919	30	UK 0040	035 / / :0	DO		4904120 () BRWN LOAM 0001 BRWN CLAY 0010 GREY SAND CLAY BLDR 0052
80	CALEDON TOWN (ALBION CON 01(006)	17 598222 4852283N	1984/06 3108	06	FR 0039	003 / 038 005 / 2:0	DO		4906181 () LOAM 0001 BRWN CLAY SNDY STNS 0014 BLUE CLAY 0029 GREY CLAY HARD GVLY 0036 BLUE SHLE 0041
	CALEDON TOWN (ALBION CON 01(007)	17 596840 4852350N	2010/04 4011			013 / / :0			7145562 (Z103941)
82	CALEDON TOWN (ALBION CON 01(007)	17 597919 4853126N	1985/12 4919	30	UK 0020 UK 0040	010 / 058 / 0:30	DO		4906463 () BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0060
83	CALEDON TOWN (ALBION CON 01(007)	17 597418 4853673N	1987/06 4919	30 30	UK 0050	005 / 040 / 1:0	DO		4906697 (05022) BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0050 GREY SAND LOOS 0056
84	CALEDON TOWN (ALBION CON 01(007)	17 598215 4852785N	2008/06 2576	06 06	FR 0082 SA 0128	023 / 001 / :0			7110141 (Z89654) A073250 LOAM 0001 BRWN CLAY SILT STNS 0022 GREY CLAY SILT 0043 GREY GRVL SLTY 0059 GREY CLAY GRVL 0074 GREY SHLE 0138
85	CALEDON TOWN (ALBION CON 01(007)	17 598251 4852807N	2008/07 2576	06 05	FR 0054	023 / 002 / 48:0	DO	20 70	7110140 (Z89647) A073238 LOAM 0001 BRWN CLAY SLTY GRVL 0021 GREY CLAY SLTY 0048 GREY SILT GRVL FSND 0059 GREY CLAY SLTY GRVL 0073 CMTD GREY SHLE 0090
86	CALEDON TOWN (ALBION CON 01(007)	17 597264 4852605N	2004/07 1663						4909502 (Z13094) BRWN CLAY GRVL 0014 GREY CLAY GRVL 0030 GREY GRVL SAND CLAY 0043 BLUE CLAY GRVL SAND 0085 GREY SHLE CLAY LYRD 0093 GREY SHLE 0129
87	CALEDON TOWN (ALBION CON 01(007)	17 597398 4853706N	1987/10 4919	30 30	UK 0040	010 / 040 / 1:0	DO		4906734 (17877) BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0040 GREY SAND LOOS 0058
88	CALEDON TOWN (ALBION CON 01(007)	17 597986 4852944N	1974/10 1307	30	FR 0047	015 / 047 002 / 1:0	DO		4904530 () BRWN LOAM 0012 GREY CLAY 0045 GREY SAND 0047
89	CALEDON TOWN (ALBION CON 01(007)	17 597015 4852223N	1982/07 3108	06	FR 0085	007 / 094 001 / 2:0	DO		4905948 () LOAM 0002 BRWN CLAY GVLY 0014 BLUE CLAY 0067 GRVL DRTY 0069 BLUE CLAY SHLE 0075 RED SHLE 0077 BLUE SHLE 0096

	TOWNSHIP CONCESSION (LOT)	UTM[1]	DATE[2] CNTR[3]	CASING DIA[4]	WATER[5,6] DETAIL	STAT LVL/PUMP LVL[7] RATE[8]/TIME HR:MIN	WATER USE[9]	SCREEN INFO[10]	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND[5,11]
90	CALEDON TOWN (ALBION CON 01(007)	17 597065 4852173[N]	1981/10 4919	30 30	UK 0050	002 / 050 / 0:30	DO		4905893 () BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0050 GREY GRVL SAND 0053
91	CALEDON TOWN (ALBION CON 01(007)	17 596841 4852317[N]	1964/08 3512	07	FR 0045	008 / 030 004 / 5:0	DO	46 4	4900010 () LOAM 0001 YLLW CLAY 0012 BLUE CLAY 0045 GRVL MSND 0050
92	CALEDON TOWN (ALBION CON 01(008)	17 597208 4853828[N]	1998/08 3108	06 05 05	SA 0148 FR 0129	005 / 113 005 / 1:50	DO	123 6	4908360 (196105) BRWN CLAY 0020 BLUE CLAY BLDR 0050 BLUE CLAY SOFT 0112 BLUE CLAY STNS HARD 0123 SAND GRVL SILT 0129 BLUE SHLE 0149
93	CALEDON TOWN (ALBION CON 01(008)	17 596342 4852810[N]	1960/05 3512	07	FR 0089	/ 002 002 / :0	DO		4900011 () YLLW CLAY 0021 BLUE CLAY 0088 GRVL 0090
94	CALEDON TOWN (ALBION CON 01(008)	17 597169 4853883[N]	1990/07 3108	06	FR 0104	/ 112 010 / 2:0	DO	109 3	4907339 (65393) BRWN CLAY 0012 BLUE CLAY GRVL 0047 BLUE CLAY SILT 0062 BLUE CLAY GRVL 0104 SAND GRVL 0112
95	CALEDON TOWN (ALBION CON 01(009)	17 596301 4853056[N]	1963/12 1307	30	FR 0050	020 / 002 / :0	DO		4900013 () BRWN LOAM 0010 GREY CLAY 0048 GREY MSND 0050
96	CALEDON TOWN (ALBION CON 01(009)	17 596965 4854023[N]	1971/11 1815	07	FR 0055	/ 028 003 / 4:0	DO		4903736 () BRWN LOAM 0001 BRWN CLAY 0008 BLUE CLAY BLDR 0045 SAND 0046 SILT 0058
97	CALEDON TOWN (ALBION CON 01(009)	17 596821 4854136[N]	1967/11 1307	30	FR 0055	/ 010 / :0	DO		4900014 () BRWN LOAM 0012 GREY CLAY 0053 MSND 0055
98	CALEDON TOWN (ALBION CON 01(009)	17 596113 4853273[N]	2004/11 3662	36 36	FR 0024 FR 0045	005 / 045 004 / 4:0	DO		4909622 (Z01837) A001749 BLCK LOAM 0001 BRWN CLAY STNS 0014 BLUE CLAY STNS 0023 GREY SAND FSND 0024 BLUE CLAY STNS 0025 BLUE STNS CLAY 0043 GREY SAND FSND 0045 0046
99	CALEDON TOWN (ALBION CON 01(009)	17 596371 4853127[N]	1990/03 4919	30	UK 0090	010 / 020 010 / 1:0	DO		4907351 (77172) BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0060 GREY SAND LOOS 0093
100	CALEDON TOWN (ALBION CON 01(009)	17 596415 4853173[N]	1977/06 3662	30	UK 0054	003 / 020 004 / 1:0	ST		4905140 () BRWN LOAM 0001 BRWN CLAY 0020 BLUE CLAY STNS 0025 BRWN SAND 0026 BLUE CLAY STNS 0054 BRWN SAND 0058
101	CALEDON TOWN (ALBION CON 01(009)	17 596358 4853144[N]	1988/09 4919	30	UK 0040 UK 0050	005 / 030 010 / 1:0	DO		4906931 (35124) BRWN LOAM HARD 0001 BRWN CLAY 0030 GREY CLAY SAND LYRD 0064
102	CALEDON TOWN (ALBION CON 01(009)	17 597464 4853606[N]	1996/07 4919	30	UK 0060	010 / 030 010 / 1:0	DO		4908146 (161526) BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0060 GREY GRVL SAND LOOS 0070
103	CALEDON TOWN (ALBION CON 01(009)	17 597165 4853823[N]	1978/07 4919	30	UK 0030	010 / 040 / 0:30	DO		4905427 () BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0030 GREY SAND SOFT 0043

	TOWNSHIP CONCESSION (LOT)	UTM[1]	DATE[2] CNTR[3]	CASING DIA[4]	WATER[5,6] DETAIL	STAT LVL/PUMP LVL[7] RATE[8]/TIME HR:MIN	WATER USE[9]	SCREEN INFO[10]	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND[5,11]
104	CALEDON TOWN (ALBION CON 01(009)	17 596992 4853947[N]	1960/11 1307	30	FR 0040	/ 002 / :0	DO		4900012 () BRWN LOAM 0012 GREY CLAY STNS 0039 CLAY MSND 0040
105	CALEDON TOWN (ALBION CON 01(010)	17 595726 4853440[N]	1987/08 3612	30 30	UK 0045	003 / 032 005 / 2:0	DO		4906671 (18639) BRWN LOAM 0002 BRWN CLAY STNS 0030 BLUE CLAY STNS 0045 GREY SAND 0048
106	CALEDON TOWN (ALBION CON 01(010)	17 596440 4854533[N]	1972/06 3612	30	FR 0033	/ 034 006 / 2:0	DO		4903839 () BLCK LOAM 0002 BLUE CLAY STNS 0030 GREY GRVL 0033 BLUE CLAY STNS 0037
107	CALEDON TOWN (ALBION CON 01(010)	17 595556 4853937[N]	1985/09 4778	06	FR 0182	/ 008 010 / 3:0	DO		4906484 () BRWN CLAY 0009 BLUE CLAY STNS 0045 BLUE CLAY 0160 BLUE CLAY SILT 0174 BLUE SAND SILT GRVL 0182 GRVL DRTY 0187
108	CALEDON TOWN (ALBION CON 01(010)	17 595464 4853700[N]	1988/05 4005	06	UK 0162	004 / 152 006 / 4:0	ST		4906833 (18136) BRWN CLAY SAND LOOS 0008 GREY CLAY LOOS 0023 GREY CLAY SAND PCKD 0045 GREY CLAY LOOS 0090 GREY CLAY SAND PCKD 0155 GREY CLAY GRVL LOOS 0160 GREY LMSN HARD 0162 GREY GRVL SAND PCKD 0164
109	CALEDON TOWN (ALBION CON 01(010)	17 595629 4853934[N]	1958/04 3512	03	FR 0250	/ / :0	DO		4900015 () YLLW CLAY 0012 BLUE CLAY 0061 MSND CLAY 0084 HPAN 0200 FSND 0211 HPAN 0248 GRVL 0251
110	CALEDON TOWN (ALBION CON 01(010)	17 595565 4853773[N]	1976/09 3612	30 30	UK 0048	007 / 008 / 1:0	DO		4904946 () BLCK LOAM 0002 BRWN CLAY 0015 BLUE CLAY STNS 0048 GREY FSND 0050
111	CALEDON TOWN (ALBION CON 01(010)	17 596614 4854325[N]	1966/12 1307	30	FR 0042		DO		4900018 () BRWN LOAM 0018 GREY CLAY 0040 GREY MSND 0042
112	CALEDON TOWN (ALBION CON 01(010)	17 595545 4853623[N]	1968/11 1307	30	FR 0046		DO		4903001 () BRWN LOAM 0010 GREY CLAY 0044 MSND 0046
113	CALEDON TOWN (ALBION CON 01(010)	17 595655 4853523[N]	1970/06 1307	30	FR 0047	006 / 045 002 / 1:0	PS		4903477 () BRWN LOAM 0008 GREY CLAY 0046 GREY MSND 0047
114	CALEDON TOWN (ALBION CON 01(010)	17 595565 4853823[N]	1968/06 3612	30	FR 0025	/ 018 007 / :0	DO		4903028 () LOAM 0002 BRWN CLAY STNS 0023 CSND 0025
115	CALEDON TOWN (ALBION CON 01(010)	17 596239 4854644[N]	1986/05 3612	30 30	UK 0030	002 / 025 005 / 2:30	DO		4906499 () BLCK LOAM 0002 BRWN CLAY 0016 BLUE CLAY 0027 BRWN FSND 0030
116	CALEDON TOWN (ALBION CON 01(010)	17 595460 4853695[N]	1988/08 4005	06	UK 0239	002 / 208 001 / 3:0	DO		4906881 (31184) GREY SAND LOOS 0172 GREY CLAY SAND LOOS 0190 GREY SILT LOOS 0238 GREY SAND GRVL LOOS 0240 GREY CLAY HARD 0250
117	CALEDON TOWN (ALBION CON 01(010)	17 596287 4854589[N]	1957/05 1307	36	FR 0027	/ 003 / :0	DO		4900016 () BRWN LOAM 0012 GREY CLAY STNS 0025 GRVL 0027

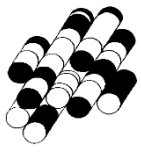
	TOWNSHIP CONCESSION (LOT)	UTM[1]	DATE[2] CNTR[3]	CASING DIA[4]	WATER[5,6] DETAIL	STAT LVL/PUMP LVL[7] RATE[8]/TIME HR:MIN	WATER USE[9]	SCREEN INFO[10]	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND[5,11]
118	CALEDON TOWN (ALBION CON 01(010)	17 595769 4853405[N]	1985/08 3612	30 30	UK 0047 UK 0018	018 / 048 003 / 1:0	DO		4906315 () BLCK LOAM 0002 BRWN CLAY STNS 0015 BRWN SAND GRVL 0018 GREY CLAY STNS 0047 GREY SAND CLAY 0050
119	CALEDON TOWN (ALBION CON 01(010)	17 595475 4853787[N]	1961/10 1307	30	FR 0030	/ 001 / :0	DO		4900017 () BRWN LOAM 0012 GREY CLAY 0028 CSND 0030
120	CALEDON TOWN (ALBION CON 01(010)	17 595770 4853426[N]	1973/08 4919	30	UK 0035	010 / 038 002 / 1:0	DO		4904246 () BRWN LOAM 0001 BRWN CLAY 0020 GREY CLAY STNS 0035 GREY SAND 0038 GREY CLAY STNS 0040
121	CALEDON TOWN (ALBION CON 01(011)	17 596036 4854668[N]	1967/05 1308	30	FR 0011	001 / 016 / 0:30	DO		4900024 () LOAM 0002 BRWN CLAY 0011 BLUE MSND 0018
122	CALEDON TOWN (ALBION CON 01(011)	17 595997 4854794[N]	1989/09 3662	30 30	UK 0019	/ 026 005 / 2:0	DO		4907211 (70153) BRWN LOAM 0001 BRWN CLAY 0012 BLUE CLAY STNS 0019 BRWN GRVL SAND STNS 0020 BLUE CLAY 0027 GREY SAND STNS 0029
123	CALEDON TOWN (ALBION CON 01(011)	17 596145 4854849[N]	1967/06 3612	36	FR 0016	/ 015 003 / 1:0	DO		4900022 () LOAM 0002 BRWN CLAY BLDR 0010 BLUE CLAY BLDR 0016 MSND 0018
124	CALEDON TOWN (ALBION CON 01(011)	17 595365 4853873[N]	1968/07 4102	30	FR 0027	/ 004 / :0	DO		4903020 () BRWN CLAY 0005 BLUE CLAY STNS 0027 CLAY MSND 0033
125	CALEDON TOWN (ALBION CON 01(011)	17 595415 4853823[N]	1977/06 3612	30	UK 0038	007 / 004 / :0	DO		4905178 () BLCK LOAM 0002 BRWN CLAY 0014 BLUE CLAY 0038 BRWN SAND GRVL 0040
126	CALEDON TOWN (ALBION CON 01(011)	17 595342 4853880[N]	1994/11 4919	30	UK 0060	010 / 030 010 / 1:0	DO		4907930 (152427) BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0060 GREY SAND LOOS 0070
127	CALEDON TOWN (ALBION CON 01(011)	17 595868 4854266[N]	1990/08 3132	06 06	FR 0105	003 / 098 / 2:0	DO		4907366 (78110) BRWN CLAY STNS DNSE 0003 GREY CLAY STNS DNSE 0014 BLUE CLAY STNS DNSE 0048 BLUE SILT FSND LOOS 0052 BLUE CLAY STNS DNSE 0105 BLUE LMSN HARD 0106
128	CALEDON TOWN (ALBION CON 01(011)	17 595897 4854481[N]	1967/05 1308	30	FR 0014	001 / 017 001 / :0	DO		4900023 () LOAM 0002 BRWN CLAY 0014 MSND 0019
129	CALEDON TOWN (ALBION CON 01(011)	17 595788 4854295[N]	1965/01 1308	30	FR 0025	017 / 020 / :0	DO		4900021 () LOAM 0001 BLUE CLAY 0025 MSND 0026
130	CALEDON TOWN (ALBION CON 01(011)	17 595863 4854241[N]	1949/08 4620	06	FR 0052 FR 0085	004 / / :0	NU		4900019 () LOAM CLAY 0001 CLAY 0018 HPAN 0025 CLAY GRVL 0032 HPAN 0036 CLAY 0040 CLAY FSND 0043 MSND CLAY 0052 FSND 0058 MSND CLAY 0092 CLAY FSND 0094 SHLE 0171

	TOWNSHIP CONCESSION (LOT)	UTM[1]	DATE[2] CNTR[3]	CASING DIA[4]	WATER[5,6] DETAIL	STAT LVL/PUMP LVL[7] RATE[8]/TIME HR:MIN	WATER USE[9]	SCREEN INFO[10]	WELL # (AUDIT#) WELL TAG # DEPTHS TO WHICH FORMATIONS EXTEND[5,11]
131	CALEDON TOWN (ALBION CON 01(011)	17 595506 4853948[N]	1985/08 4778	06	FR 0182	/ 070 015 / 2:30	DO PS	182 4	4906486 () BRWN CLAY 0010 BLUE CLAY STNS 0048 BLUE CLAY 0160 BLUE CLAY SILT 0175 BLUE CLAY SAND SILT 0182 GRVL 0186
132	CALEDON TOWN (ALBION CON 01(011)	17 595474 4853858[N]	1956/11 3512	05	FR 0021	005 / 036 002 / :0	DO		4900020 () YLLW CLAY 0005 BLUE CLAY 0021 GRVL MSND 0036
	CALEDON TOWN (ALBION CON 01(012)	17 594852 4854338[N]	1974/03 4919	30	UK 0070	010 / 015 / 1:0	DO		4904353 () BRWN LOAM 0001 BRWN CLAY 0020 GREY CLAY BLDR 0070 GREY GRVL 0072
133	CALEDON TOWN (ALBION CON 01(012)	17 595561 4854972[N]	1975/09 3612	30	UK 0011	010 / 023 003 / 1:0	ST		4904779 () BLCK LOAM 0002 BRWN CLAY SAND 0009 BRWN SAND CLAY 0015 GREY SAND STNS 0018 BLUE CLAY 0025
	CALEDON TOWN (ALBION CON 01(012)	17 595676 4855297[N]	1965/07 3612	36	FR 0011	011 / 004 / 1:0	DO		4900025 () LOAM 0002 BRWN CLAY STNS 0012 GRVL 0015

Private Well Survey

APPENDIX B

Terraprobe Inc.



Terraprobe
Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

October 24, 2012

File No. 13-12-2142
Brampton Office

RE: PRIVATE WELL INVENTORY
ROAD WIDENING – AIRPORT ROAD
FROM MAYFIELD ROAD TO NORTH OF KING STREET
TOWN OF CALEDON, ONTARIO

Dear Resident/Property Owner:

Terraprobe was retained by IBI Group to undertake a private well survey along Airport Road from Mayfield Road to King Street. The well survey is to be completed as part of the background investigation to be completed for the widening of Airport Road from two lanes to four lanes from 1.0 km north of Mayfield road to 0.6 km north of King Street, including the hamlet of Sandhill. The well survey is being conducted to identify residences and businesses utilizing private wells for water supply within 500 m of the project area.

This letter has been left since there was no one available at the time of our visit. The purpose of our visit is to conduct interviews with local residents and land owners in regards to water supply wells in operation along Airport Road between Mayfield Road and King Street. The information we hope to obtain will include:

1. The location of well(s) and septic bed, if known;
2. The depth, diameter and construction details of the well(s);
3. The pump type and depth, and any water treatment systems in use;
4. Information regarding the past performance of the well(s) (i.e. water quality and yield).

Although no one was available at the time of our visit, if you are interested in participating in the well survey and there is a particular time which suits your schedule, please contact Paul Raepple of Terraprobe at (905) 643-7560, or by email at praepple@terraprobe.ca. Any questions you may have regarding the well survey can be answered at that time. When calling please reverse the long distance charges and indicate to the receptionist you are calling in regards to the Airport Road well survey. We will be available to call during business hours from Monday to Friday 8:30 am to 5:00 pm.

A copy of the completed questionnaire will be provided to you upon your request. We anticipate that the well survey questions can be answered in a few minutes. A well inspection can also be scheduled in which our technician will measure the depth and water level.

We understand that your participation in this survey is voluntary; however your co-operation is greatly appreciated. Thank you for your consideration of our private well inventory.

Yours truly,
Terraprobe Inc.

Paul Raepple, B.Sc.

APPENDIX B: SUMMARY OF DOOR-TO-DOOR WELL SURVEY
AIRPORT ROAD CLASS EA
PEEL REGION, ONTARIO

Address	Name	Well Type	Depth	Treatment Systems	Well Use	Well Demand	Comments
KING STREET							
6046 King Street							No Response.
6051 King Street							No Response.
6065 King Street							No Response.
6071 King Street							No Response.
5964 King Street							No Response.
5968 King Street							No Response.
5961 King Street							No Response.
5958 King Street							No Response.
5945 King Street	Roberto Laterti	Drilled	Unknown	UV filter, Softener	Residential	Two Residents	Resident reports good water quality and quantity.
5937 King Street							No Response.
OLD SCHOOL ROAD							
5962 Old School Road							No Response.
5893 Old School Road	Stanley Fir	Dug	7.6 m	UV Filter, Softener	Residential	Three Residents	Resident reported good water quality and quantity. Water is reported to have high hardness.
5894 Old School Road	Roxanne Perruzza	Drilled	Unknown	Softener, Iron Filters	Residential	Four Residents	Resident states good water quality and quantity. Resident does not drink water due to softener and odour. An old dug well is reported on the property no longer in use.
HEALEY ROAD							
6094 Healey Road	Joe Serwerynek	Bored	15.2 m	None used	Lawn/car		Resident is supplied with municipal water. Uses
6055 Healey Road							No Response.
6040 Healey Road							No Response.
6028 Healey Road							No Response.
6035 Healey Road							No Response.
6045 Healey Road							No Response.
AIRPORT ROAD							
14210 Airport Road							No Response.
14198 Airport Road							No Response.
14057 Airport Road							No Response.
14045 Airport Road							No Response.
14001 Airport Road							No Response.

APPENDIX B: SUMMARY OF DOOR-TO-DOOR WELL SURVEY
AIRPORT ROAD CLASS EA
PEEL REGION, ONTARIO

Address	Name	Well Type	Depth	Treatment Systems	Well Use	Well Demand	Comments
13972 Airport Road	Dino DiPucchio	Drilled	24.4 m	UV Filter, Softener	Residential	Five Residents	Resident reported a second bored well 11.6 m in depth at the property used as a cistern. Drilled well is pumped into the bored well, which is pumped to the house. Resident had 61 m well completed at property that did not encounter ground water. Resident reports high iron and hardness.
13958 Airport Road							No Response.
13949 Airport Road							No Response.
13941 Airport Road							No Response.
13940 Airport Road							No Response.
13879 Airport Road							No Response.
13869 Airport Road							No Response.
13857 Airport Road							No Response.
13845 Airport Road							No Response.
13839 Airport Road							No Response.
13819 Airport Road							No Response.
13789 Airport Road							No Response.
13759 Airport Road							No Response.
13755 Airport Road							No Response.
13726 Airport Road							No Response.
13660 Airport Road							No Response.
13598 Airport Road	Marty Perrin	Bored	18.3 m	None used	Residental	Two Residents	Resident report good water quality and quantity.
13571 Airport Road	Tricia Snell	Bored	27.4 m	UV filter	Residential	Four + Residents	Well supplies two residences, one rented by the owner. A second 6 m dug well is also reported at the property not currently in use.
13541 Airport Road							
13531 Airport Road							No Response.
13441 Airport Road							Municipal Water main extends to residnces to the south. No Response.
13440 Airport Road							No Response.
13432 Airport Road							No Response.
13392 Airport Road							No Response.
13380 Airport Road							No Response.
13341 Airport Road	Marion Brittan	Bored	Shallow	None used	Not Used		Resident is connected to municipal services. Well was decommissioned by the Region.

APPENDIX B: SUMMARY OF DOOR-TO-DOOR WELL SURVEY
AIRPORT ROAD CLASS EA
PEEL REGION, ONTARIO

Address	Name	Well Type	Depth	Treatment Systems	Well Use	Well Demand	Comments
13329 Airport Road	David Little	Bored	7.6 m	None used	Not Used		Resident is connected to municipal water. Bored well on property is not in use.
13319 Airport Road							No Response.
13309 Airport Road							No Response.
13292 Airport Road							No Response.
13291 Airport Road							No Response.
13221 Airport Road							No Response.
13213 Airport Road							No Response.
13210 Airport Road							No Response.
13198 Airport Road							No Response.
13186 Airport Road							No Response.
13123 Airport Road							No Response.
13095 Airport Road							No Response.
13013 Airport Road							No Response.
12958 Airport Road							No Response.
12926 Airport Road							No Response.
12863 Airport Road							No Response.
12620 Airport Road							No Response.
12577 Airport Road							No Response.
12542 Airport Road							No Response.
12541 Airport Road							No Response.
12484 Airport Road							No Response.
12451 Airport Road							No Response.
12439 Airport Road							No Response.
12404 Airport Road							No Response.
12394 Airport Road							No Response.
12389 Airport Road							No Response.
12366 Airport Road							No Response.

Terraprobe

Private Well Survey

PROJECT No.

I.D. No. _____

OWNER Roxanne Perruzza ORIGINAL OWNER _____

ADDRESS 5894 Old School Road

LOT/CONC./TWP. _____ PHONE _____

DATE

WELL DETAILS

TYPE Drilled DIAMETER 6 inch

CASING Steel SCREEN _____

PUMP TYPE & DEPTH Submersable.

WATER TREATMENT Softener, iron filters.

DATE CONSTRUCTED Older than 12 yrs.

DEPTH Unknown. Meas/Stated

WATER LEVEL _____ b.m.p.

STICK-UP _____ a.g.l.

INSPECTION NOTES :

Old well on property not used
Dug well.

WELL USE

WELL USE Residential

No. OF RESIDENTS Four Residents

WATER QUALITY Good.

WATER QUANTITY Good

EVER BOUGHT WATER? Use bottled water.

WHEN? WHY? _____

PREVIOUS PROBLEMS WITH WELL (WHEN?)

COMMENTS:
Once supplied 7 people without problem.

Doesnot drink due to odour, sitterns.

WELL CONSTRUCTION

WELL LOCATION / SEPTIC

NOTES:

GEODeTIC ELEVATION: _____

MOE WELL No.: _____

OWNER: _____

ENGINEER: _____

PERMISSION TO SURVEY WELL: _____

Terraprobe

Private Well Survey

PROJECT No. 13-12-2142.

I.D. No. _____

OWNER Joe Serwerynek. ORIGINAL OWNER _____

ADDRESS 6094 Healey Road.

LOT/CONC./TWP. _____ PHONE (905)857-3156

DATE

Nov 20-2012.

WELL DETAILS

TYPE Bored well. DIAMETER 30 inch

CASING Concrete SCREEN _____

PUMP TYPE & DEPTH Submersable.

WATER TREATMENT -Not used now past hardness softener.

DATE CONSTRUCTED 40yrs.

DEPTH 50ft. Meas/Stated

WATER LEVEL _____ b.m.p.

STICK-UP _____ a.g.l.

INSPECTION NOTES :

Municipal Hook up

Well used for

WELL USE

WELL USE Lawn / Car Washing.

No. OF RESIDENTS _____

WATER QUALITY Good.

WATER QUANTITY Good.

EVER BOUGHT WATER? _____

WHEN? WHY? _____

PREVIOUS PROBLEMS WITH WELL (WHEN?)

Residential use in summer was conservative

COMMENTS:

WELL CONSTRUCTION

WELL LOCATION / SEPTIC

NOTES:

GEODeTIC ELEVATION: _____

MOE WELL No.: _____

OWNER: _____

ENGINEER: _____

PERMISSION TO SURVEY WELL: _____

Terraprobe

Private Well Survey

PROJECT No. 13-12-2142

I.D. No. _____

OWNER Tricia ~~Watts~~ Snell. ORIGINAL OWNER _____

ADDRESS 13571 Airport Road / 13541 Airport Road.

LOT/CONC./TWP. _____ PHONE Snell, David 416-578-2488.

DATE

Nov 12, 2012.

WELL DETAILS

TYPE Bored DIAMETER _____

CASING Concrete. SCREEN _____

PUMP TYPE & DEPTH Jet Pump.

WATER TREATMENT UV filter.

DATE CONSTRUCTED 1990.

DEPTH 90ft. old 20ft well. Meas/Stated

WATER LEVEL _____ b.m.p.

STICK-UP _____ a.g.l.

INSPECTION NOTES :

Two wells side by side

Supply two residential homes.

WELL USE

WELL USE Residential

No. OF RESIDENTS Two houses 4+

WATER QUALITY Good.

WATER QUANTITY Water used for Drinking

EVER BOUGHT WATER? _____

WHEN? WHY? _____

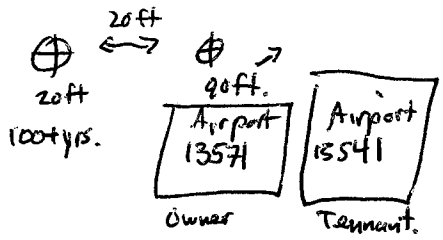
PREVIOUS PROBLEMS WITH WELL (WHEN?)

Over use - water left on over night

20ftwell.

COMMENTS:

WELL CONSTRUCTION



WELL LOCATION / SEPTIC

NOTES: Left Message with Son David Snell Regarding Well Survey - Nov 12, 2012.

GEODeTIC ELEVATION: _____

MOE WELL No.: _____

OWNER: _____

ENGINEER: _____

PERMISSION TO SURVEY WELL: Call prior to monitoring

Terraprobe

Private Well Survey

PROJECT No. 13-12-2142

I.D. No. _____ DATE

OWNER Marty Perrin ORIGINAL OWNER _____

ADDRESS 13598 Airport Road.

LOT/CONC./TWP. _____ PHONE 905-584-2185.

WELL DETAILS

TYPE Bored DIAMETER _____

CASING Concrete. SCREEN _____

PUMP TYPE & DEPTH S-bmersable.

WATER TREATMENT None.

DATE CONSTRUCTED 30+years

DEPTH 60ft. Meas/Stated

WATER LEVEL _____ b.m.p.

STICK-UP _____ a.g.l.

INSPECTION NOTES :

WELL USE

WELL USE Residential.

No. OF RESIDENTS 2 people.

WATER QUALITY Good Quality

WATER QUANTITY Good Quantity.

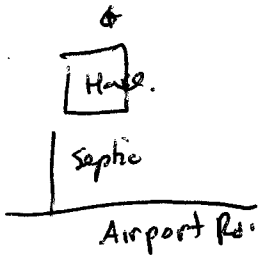
EVER BOUGHT WATER? Drinking.

WHEN? WHY? _____

PREVIOUS PROBLEMS WITH WELL (WHEN?)

COMMENTS:

WELL CONSTRUCTION



WELL LOCATION / SEPTIC

NOTES:

GEODeTIC ELEVATION: _____

MOE WELL No.: _____

OWNER: _____

ENGINEER: _____

PERMISSION TO SURVEY WELL: Call prior to monitoring.

Terraprobe

Private Well Survey

PROJECT No. 13-12-2142

I.D. No. _____

OWNER Roberto. Latreti. ORIGINAL OWNER _____

ADDRESS 5945 King Street Corner of house.

LOT/CONC./TWP. _____ PHONE 905-584-2171.

DATE

Nov 12, 2012

WELL DETAILS

TYPE Drilled DIAMETER _____

CASING Metal SCREEN _____

PUMP TYPE & DEPTH Submersable.

WATER TREATMENT Filter UV Softner.

DATE CONSTRUCTED 30+ years.

DEPTH Unknown. Meas/Stated

WATER LEVEL _____ b.m.p.

STICK-UP _____ a.g.l.

INSPECTION NOTES :

WELL USE

WELL USE Residential -

No. OF RESIDENTS 2.

WATER QUALITY Filtered.

WATER QUANTITY always Good.

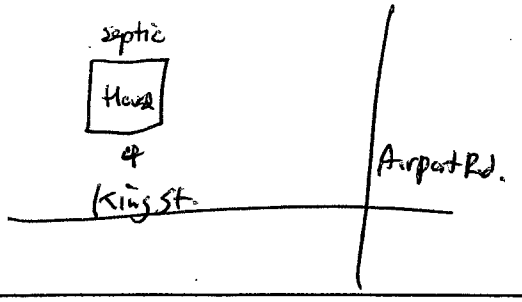
EVER BOUGHT WATER? Drinking.

WHEN? WHY? _____

PREVIOUS PROBLEMS WITH WELL (WHEN?)

COMMENTS:

WELL CONSTRUCTION



WELL LOCATION / SEPTIC

NOTES:

GEODeTIC ELEVATION: _____

MOE WELL No.: _____

OWNER: _____

ENGINEER: _____

PERMISSION TO SURVEY WELL: Call Prior to Monitoring.

Terraprobe

Private Well Survey

PROJECT No. 13-12-2142

I.D. No. _____

OWNER Dino DiPucchio ORIGINAL OWNER _____

ADDRESS 13972 Airport Rd SW Corner King/Airport

LOT/CONC./TWP. _____ PHONE 905-584-2186.

DATE

November 7, 2012.

WELL DETAILS

TYPE _____ DIAMETER _____

CASING _____ SCREEN _____

PUMP TYPE & DEPTH Submersible.

WATER TREATMENT Softner, UV,

DATE CONSTRUCTED _____

DEPTH _____ Meas/Stated

WATER LEVEL _____ b.m.p.

STICK-UP _____ a.g.l.

INSPECTION NOTES :

- Problems with sewer main
- 10-12 years prior.

Bored / Drilled

38ft. 200ft. → water at 80ft.

Bored well used as cistern.

WELL USE

WELL USE Residential

No. OF RESIDENTS Five residents

WATER QUALITY _____

WATER QUANTITY Iron, Hardness.

EVER BOUGHT WATER? Drinking

WHEN? WHY? _____

PREVIOUS PROBLEMS WITH WELL (WHEN?)

Two drilled wells installed one to 80ft one to 200ft. 200ft well did not encounter water

COMMENTS:

80ft Drilled well is pumped into Bored well.

Submersible wells equipped in Both wells.

* CALL PRIOR TO TAKING WATER LEVELS.

WELL CONSTRUCTION

WELL LOCATION / SEPTIC

NOTES:

GEODeTIC ELEVATION: _____

MOE WELL No.: _____

OWNER: _____

ENGINEER: Paul Rapple

PERMISSION TO SURVEY WELL: Yes.

Terraprobe

Private Well Survey

PROJECT No. 13-12-242.

I.D. No. _____

OWNER David Little ORIGINAL OWNER _____

ADDRESS 13329 Airport Half Betweent Healy and King.

LOT/CONC./TWP. _____ PHONE _____

DATE

November 8, 2012.

WELL DETAILS

TYPE Bored well. DIAMETER _____

CASING _____ SCREEN _____

PUMP TYPE & DEPTH Jet Pump Disconnected.

WATER TREATMENT _____

DATE CONSTRUCTED _____

DEPTH 25ft. Meas/Stated

WATER LEVEL _____ b.m.p.

STICK-UP _____ a.g.l.

INSPECTION NOTES :

well in front not in use
connected to Municipal

2-3 years connected to municipal.
- main ends ¼ north of ~~Mayfield~~ Resident.
½ way between King/Healy - Dean's Farm.

WELL USE

WELL USE _____

No. OF RESIDENTS _____

WATER QUALITY _____

WATER QUANTITY _____

EVER BOUGHT WATER? _____

WHEN? WHY? _____

PREVIOUS PROBLEMS WITH WELL (WHEN?)

~~Seasonal water shortage.~~
- over use

COMMENTS:

well in front lot free to monitor.
well not in use.

WELL CONSTRUCTION

WELL LOCATION / SEPTIC

NOTES:

GEODeTIC ELEVATION: _____

MOE WELL No.: _____

OWNER: _____

ENGINEER: _____

PERMISSION TO SURVEY WELL: _____

Terraprobe

Private Well Survey

PROJECT No. 13-12-2142.

I.D. No. _____

OWNER Marion Brittain ORIGINAL OWNER _____

ADDRESS 13341 Airport Road. King / Airport

LOT/CONC./TWP. _____ PHONE _____

DATE

Nov 12, 2012.

WELL DETAILS

TYPE Bored / Dug. DIAMETER _____

CASING _____ SCREEN _____

PUMP TYPE & DEPTH Filters

WATER TREATMENT _____

DATE CONSTRUCTED _____

DEPTH Shallow - Meas/Stated

WATER LEVEL _____ b.m.p.

STICK-UP _____ a.g.l.

INSPECTION NOTES :

1998 / 1999 - water / sewer municipal

- well decommissied by peel Region.

WELL USE

WELL USE Residential - Not Drinking.

No. OF RESIDENTS Three

WATER QUALITY _____

WATER QUANTITY Seasonally Dry

EVER BOUGHT WATER? Bought Drinking water.

WHEN? WHY? _____

PREVIOUS PROBLEMS WITH WELL (WHEN?)

Artesian well on property prior

cistern

- septic bed - towards rear

- well at side

COMMENTS:

Brownish. water

Dry - due to overuse / seasonal.

WELL CONSTRUCTION

WELL LOCATION / SEPTIC

NOTES:

GEODeTIC ELEVATION: _____

MOE WELL No.: _____

OWNER: _____

ENGINEER: _____

PERMISSION TO SURVEY WELL: _____

Terraprobe

PRIVATE WELL SURVEY

13-12-2142
PROJECT No.

I.D. No. _____

OWNER Stanley Fir ORIG. OWNER _____

ADDRESS 5893 Old School Rd.

LOT / CONC. / TWP. _____ PHONE _____

DATE Nov 8. 2012

WELL DETAILS

TYPE Dug DIAMETER 3ft.

CASING _____ SCREEN _____

PUMP TYPE & DEPTH 3ft dug → pipe down.

WATER TREATMENT Softener, light.

DATE CONSTRUCTED 2011.

DEPTH 25ft Meas/Stated

WATER LEVEL — b.m.p.

STICK-UP — a.g.l.

INSPECTION NOTES:
- Not able to see the well.

WELL USE

WELL USE everything (sink, laundry etc)

No. OF RESIDENTS 3

WATER QUALITY hard.

WATER QUANTITY Never gone dry

EVER BOUGHT WATER? No.

WHEN? WHY? _____

PREVIOUS PROBLEMS WITH WELL (WHEN?)
—

COMMENTS: Owner stated the well was on an underground river.

WELL CONSTRUCTION

WELL LOCATION / SEPTIC

NOTES:

Nice people, we weren't able to inspect the well - owner not comfortable with that. Well was not visible in front, so it's likely in the backyard.

OWNER: _____

GEODETIC ELEVATION: _____ ENGINEER: _____

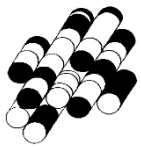
MOE WELL No. _____ PERMISSION TO SURVEY WELL: _____

Borehole Logs and

Grain Size Analysis

APPENDIX C

Terraprobe Inc.



Terraprobe

BOREHOLE LOG 1

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 26, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : CME 75

Drilling Method : Solid stem augers

Station : 6+000

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0		**GROUND SURFACE**				
		190mm **ASPHALTIC CONCRETE**				
	0.2	710mm **GRANULAR BASE / SUBBASE**		1	SS	62
				2	SS	50 / 150mm
1	0.9	**FILL**, silty clay, trace organics, very stiff, dark brown, wet		3	SS	16
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
Unconfined + Field Vane
Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

43

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG 2

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : December 3, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : PIONJAR

Station : 5+800

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0		**GROUND SURFACE**				
		150mm **TOPSOIL**				
	0.2	(WEATHERED/DISTURBED)		1A	SS	
	0.8	**SILTY CLAY**, some sand, trace gravel, very stiff to hard, brown, moist (GLACIAL TILL)		1B		
1				2	SS	
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG 3

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : December 3, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : PIONJAR

Station : 5+500

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
		GROUND SURFACE				
0		150mm **TOPSOIL**				
	0.2	**FILL**, clayey silt, some sand, trace gravel, trace organics, stiff, dark brown, moist		1	SS	
1	1.1	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
Unconfined, Pocket Penetrometer, Field Vane, Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit, Natural Water Content, Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG 4

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 26, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : CME 75

Drilling Method : Solid stem augers

Station : 5+300

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
		GROUND SURFACE				
0		190mm **ASPHALTIC CONCRETE**				
	0.2	710mm **GRANULAR BASE / SUBBASE**		1	SS	50 / 100mm
				2	SS	50 / 150mm
1	0.9	**FILL**, clayey silt, some sand, trace gravel, stiff, greyish brown, moist		3A	SS	13
	1.5	**SILTY CLAY**, some gravel, trace sand, stiff, brown, moist (GLACIAL TILL)		3B		
	1.8					

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

Terraprobe

BOREHOLE LOG 5

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : December 3, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : PIONJAR

Station : 5+100

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0		**GROUND SURFACE**				
		150mm **TOPSOIL**				
	0.2	(WEATHERED/DISTURBED)		1A	SS	
	0.6	**SILTY CLAY**, some sand, trace gravel, trace rootlets, hard, brown, moist (GLACIAL TILL)		1B	SS	
1				2	SS	
	1.4	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
Unconfined + Field Vane
Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL
0 16 48 36

Terraprobe

BOREHOLE LOG 6

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : December 3, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : PIONJAR

Station : 4+900

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
		GROUND SURFACE				
0		150mm **TOPSOIL**				
	0.2	(WEATHERED/DISTURBED)		1	SS	
1	0.9	**SILTY CLAY**, trace gravel, trace sand, very stiff, brown, moist (GLACIAL TILL)		2	SS	
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG 7

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 26, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : CME 75

Drilling Method : Solid stem augers

Station : 4+700

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
		GROUND SURFACE				
0		230mm **ASPHALTIC CONCRETE**				
	0.2	270mm **GRANULAR BASE / SUBBASE**		1	SS	74
	0.5	**FILL**, sand, some silt, trace gravel, dense, brown, wet		2	SS	36
1	1.3	**SILTY CLAY**, trace gravel, trace sand, hard, brown, moist (GLACIAL TILL)		3	SS	31
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40
Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG 8

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : December 3, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : PIONJAR

Station : 4+500

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
		GROUND SURFACE				
0		150mm **TOPSOIL**				
	0.2	**FILL**, silty clay, some sand, trace gravel, soft, dark brown, wet		1	SS	
1	0.9	**SILTY CLAY**, trace gravel, trace sand, very stiff, brown, moist (GLACIAL TILL)		2	SS	
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

library: library - terraprobe gint.glb report: terraprobe soil log file: 11-12-2096 bh logs.gpj

Terraprobe

BOREHOLE LOG 9

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : December 3, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : PIONJAR

Station : 4+300

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
		GROUND SURFACE				
0		150mm **TOPSOIL**				
	0.2	**FILL**, clayey silt, some sand, trace gravel, soft to firm, dark brown, moist to wet		1	SS	
1				2A	SS	
	1.4	**SILTY CLAY**, some sand, trace gravel, very stiff, brown, moist (GLACIAL TILL)		2B		
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
Unconfined Field Vane
Pocket Penetrometer Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG 10

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 26, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : CME 75

Drilling Method : Solid stem augers

Station : 4+100

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
		GROUND SURFACE				
0		200mm **ASPHALTIC CONCRETE**				
	0.2 / 0.4	200mm **GRANULAR BASE / SUBBASE**		1	SS	50 / 125mm
		FILL, sandy silt, some clay, trace gravel, compact, greyish brown, moist		2	SS	15
1	1.2	**SILTY CLAY**, some sand, trace gravel, very stiff, brown, moist (GLACIAL TILL)		3	SS	19
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
Unconfined, Pocket Penetrometer, Field Vane, Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit, Natural Water Content, Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)

GR	SA	SI	CL
1	17	43	39

Terraprobe

BOREHOLE LOG 11

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : December 3, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : PIONJAR

Station : 3+900

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
		GROUND SURFACE				
0		150mm **TOPSOIL**				
	0.2	**FILL**, silty clay, trace gravel, trace sand, trace rootlets, soft, brown, moist		1	SS	
1				2A	SS	
	1.5	**SILTY CLAY**, trace gravel, trace sand, hard, brown, moist (GLACIAL TILL)		2B		
	1.8					

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

Terraprobe

BOREHOLE LOG 12

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : December 3, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : PIONJAR

Station : 3+700

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
		GROUND SURFACE				
0		150mm **TOPSOIL**				
	0.2	**FILL**, silty clay, some sand, trace gravel, firm, dark brown, moist		1	SS	
1	0.9	**SILTY CLAY**, trace gravel, trace sand, hard, brown, moist (GLACIAL TILL)		2	SS	
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG 13

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 26, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : CME 75

Drilling Method : Solid stem augers

Station : 3+200

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0		**GROUND SURFACE**				
		220mm **ASPHALTIC CONCRETE**				
	0.2	240mm **GRANULAR BASE / SUBBASE**		1	SS	50 / 100mm
	0.5	**FILL**, sand, some silt, trace gravel, compact, brown, moist to wet		2	SS	27
1				3A	SS	17
	1.5	**CLAYEY SILT**, sandy, trace gravel, very stiff, brown, moist (GLACIAL TILL)		3B		
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
Unconfined, Pocket Penetrometer, Field Vane, Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit, Natural Water Content, Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)

GR	SA	SI	CL
2	27	48	23

Terraprobe

BOREHOLE LOG 14

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 27, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : CME 75

Drilling Method : Solid stem augers

Station : 2+900

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0		**GROUND SURFACE**				
		150mm **ASPHALTIC CONCRETE**				
	0.2	550mm **GRANULAR BASE / SUBBASE**		1	SS	66
				2A		
	0.8	**FILL**, clayey silt, trace sand, trace gravel, stiff, dark brown, moist		2B	SS	15
1	1.2	**SILTY CLAY**, trace gravel, trace sand, very stiff, brown, moist (GLACIAL TILL)		3	SS	21
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG 15

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : December 3, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : PIONJAR

Station : 2+700

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0		**GROUND SURFACE**				
		150mm **TOPSOIL**				
	0.2	(WEATHERED/DISTURBED)				
	0.5	**SILTY CLAY**, trace gravel, trace sand, very stiff, brown, moist (GLACIAL TILL)		1	SS	
1				2	SS	
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG 16

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : December 3, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : PIONJAR

Station : 2+500

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
		GROUND SURFACE				
0		150mm **TOPSOIL**				
	0.2	(WEATHERED/DISTURBED)		1	SS	
1	0.9	**SILTY CLAY**, trace gravel, trace sand, very stiff, brown, moist (GLACIAL TILL)		2	SS	
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
Unconfined + Field Vane
Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG 17

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 26, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : CME 75

Drilling Method : Solid stem augers

Station : 2+300

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
		GROUND SURFACE				
0		245mm **ASPHALTIC CONCRETE**				
	0.2	515mm **GRANULAR BASE / SUBBASE**		1	SS	50 / 100mm
	0.8	**SILTY CLAY**, trace sand, stiff to very stiff, brown, moist (GLACIAL TILL)		2A 2B	SS	9
1				3	SS	27
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30
LL=51

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL
0 4 30 66

Terraprobe

BOREHOLE LOG 18

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : December 3, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : PIONJAR

Station : 2+100

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0		**GROUND SURFACE**				
		150mm **TOPSOIL**				
	0.2	(WEATHERED/DISTURBED)		1A	SS	
	0.6	**SILTY CLAY**, trace gravel, trace sand, very stiff, brown, moist (GLACIAL TILL)		1B	SS	
1				2	SS	
	1.4	**END OF BOREHOLE**				

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Borehole was dry and open upon completion of drilling.

Terraprobe

BOREHOLE LOG 19

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 26, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : CME 75

Drilling Method : Solid stem augers

Station : 1+900

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
		GROUND SURFACE				
0		220mm **ASPHALTIC CONCRETE**				
	0.2 / 0.4	380mm **GRANULAR BASE / SUBBASE**		1	SS	31
1		**SILTY CLAY**, trace gravel, trace sand, stiff to very stiff, brown, moist (GLACIAL TILL)		2	SS	13
				3	SS	28
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG 20

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : December 3, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : PIONJAR

Station : 1+700

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
		GROUND SURFACE				
0		150mm **TOPSOIL**				
	0.2	(WEATHERED/DISTURBED)		1	SS	
1	0.9	**SILTY CLAY**, trace gravel, trace sand, very stiff, brown, moist (GLACIAL TILL)		2	SS	
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40
Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG 21

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 26, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : CME 75

Drilling Method : Solid stem augers

Station : 1+500

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0		**GROUND SURFACE**				
		200mm **ASPHALTIC CONCRETE**				
	0.2	560mm **GRANULAR BASE / SUBBASE**		1	SS	54
				2A		
1	0.8	**FILL**, clayey silt, some sand, trace gravel, stiff, dark brown, moist to wet		2B	SS	10
				3A		
	1.4	**SILTY CLAY**, trace gravel, trace sand, stiff, brown, wet (GLACIAL TILL)		3B	SS	13
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG 22

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 27, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : CME 75

Drilling Method : Solid stem augers

Station : 1+300

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
		GROUND SURFACE				
0		35mm **ASPHALTIC CONCRETE**		1A		
	0.3	235mm **GRANULAR BASE / SUBBASE**		1B	SS	12
		FILL, clayey silt, some sand, trace gravel, stiff, dark brown, moist				
1	0.8	**SILTY CLAY**, trace gravel, trace sand, firm, brown, moist (GLACIAL TILL)		2	SS	8
		...at 1.5 m, becoming very stiff		3	SS	26
2				4	SS	29
3				5	SS	23
4						
5				6	SS	19
6				7	SS	23
	6.6	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Penetration Test Values (Blows / 0.3m)
Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
Unconfined, Pocket Penetrometer, Field Vane, Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit, Natural Water Content, Liquid Limit
PL MC LL
10 20 30

LL=51

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)

GR	SA	SI	CL
0	3	29	68

library: library - terraprobe gint.glb report: terraprobe soil log file: 11-12-2096 bh logs.gpj

Terraprobe

BOREHOLE LOG 23

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : December 3, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : PIONJAR

Station : 0+920

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
		GROUND SURFACE				
0		150mm **TOPSOIL**				
	0.2	(WEATHERED/DISTURBED)		1	SS	
1	0.9	**SILTY CLAY**, trace gravel, trace sand, very stiff, brown, moist (GLACIAL TILL)		2	SS	
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG 24

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 26, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : CME 75

Drilling Method : Solid stem augers

Station : 0+700

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0		**GROUND SURFACE**				
		165mm **ASPHALTIC CONCRETE**				
	0.2	595mm **GRANULAR BASE / SUBBASE**		1	SS	67
				2A		
1	0.8	**SILTY CLAY**, trace gravel, trace sand, stiff, brown, moist (GLACIAL TILL)		2B	SS	12
				3	SS	15
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
Unconfined + Field Vane
Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG 25

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : December 3, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : PIONJAR

Station : 0+500

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
		GROUND SURFACE				
0		150mm **TOPSOIL**				
	0.2	**FILL**, clayey silt, some sand, trace gravel, soft, brown, moist		1	SS	
1				2	SS	
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40
Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

library: library - terraprobe gint.glb report: terraprobe soil log file: 11-12-2096 bh logs.gpj

Terraprobe

BOREHOLE LOG 26

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : December 3, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : PIONJAR

Station : 0+300

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
		GROUND SURFACE				
0		150mm **TOPSOIL**				
	0.2	**FILL**, clayey silt, some sand, trace gravel, firm, brown to greyish brown, moist		1	SS	
1				2	SS	
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG 27

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 27, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : CME 75

Drilling Method : Solid stem augers

Station : 0+100

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0		**GROUND SURFACE**				
		215mm **ASPHALTIC CONCRETE**				
	0.2	485mm **GRANULAR BASE / SUBBASE**		1	SS	54
1	0.7	**FILL**, sand, some silt, trace gravel, compact, brown, moist		2	SS	21
	1.2	**SILTY CLAY**, trace sand, very stiff, brown, moist (GLACIAL TILL)		3	SS	21
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
Unconfined + Field Vane
Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30
LL=51

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL
0 3 31 66

Terraprobe

BOREHOLE LOG DC1

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 30, 2012

Sheet No. : 1 of 2

Position :

Elevation Datum : Local

Rig type : track-mounted

Drilling Method : Solid stem augers

Station : 3+060

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	98.5	**GROUND SURFACE**				
		100mm **TOPSOIL**				
		(WEATHERED/DISTURBED)		1	SS	4
	97.9					
	0.6	**SANDY SILT**, trace to some gravel, some clay, compact to dense, brown, moist (GLACIAL TILL)		2	SS	21
1						
				3	SS	41
2						
				4	SS	39
3	95.5					
	3.1	**SILT**, trace to some clay, trace sand, trace gravel, very dense, grey, moist		5	SS	78 / 275mm
4						
				6	SS	50 / 125mm
5						
				7	SS	50 / 150mm
6						
7						
				8	SS	50 / 75mm
8						
9	89.4					
	9.1	**SAND AND SILT**, some clay, some gravel, very dense, grey, moist (GLACIAL TILL)		9	SS	50 / 150mm

Elevation Scale (m): 98, 97, 96, 95, 94, 93, 92, 91, 90, 89

Penetration Test Values (Blows / 0.3m)
Dynamic Cone: 10 20 30 40
Undrained Shear Strength (kPa)
Unconfined, Pocket Penetrometer, Field Vane, Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)

GR	SA	SI	CL
	14	32	41	13
	1	3	81	15

(continued next page)

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BOREHOLE LOG DC1

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 30, 2012

Sheet No. : 2 of 2

Position :

Elevation Datum : Local

Rig type : track-mounted

Drilling Method : Solid stem augers

Station : 3+060

Depth Scale (m)	Elev Depth (m)	Description (continued)	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour	Instrument Details	Unstabilized Water Level	Lab Data and Comments
10								Dynamic Cone 10 20 30 40; Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160	Plastic Limit, Natural Water Content, Liquid Limit PL MC LL 10 20 30				GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
	87.7	**SAND AND SILT**, some clay, some gravel, very dense, grey, moist (GLACIAL TILL) *(continued)*		10	SS	50 / 150mm	88						11 41 37 11
	10.8												

END OF BOREHOLE

Unstabilized water level measured at 10.2m below grade; borehole caved to 10.3m below grade upon completion of drilling.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Dec 17, 2012	1.1	97.4
Jan 7, 2013	1.2	97.3

Terraprobe

BOREHOLE LOG DC2

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 28, 2012

Sheet No. : 1 of 2

Position :

Elevation Datum : Local

Rig type : CME 75

Drilling Method : Solid stem augers

Station : 3+020

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
	100.1	**GROUND SURFACE**				
0	99.9	180mm **ASPHALTIC CONCRETE**				
	0.2	1000mm **GRANULAR BASE / SUBBASE**		1	SS	34
1				2	SS	24
	98.9					
	1.2	**FILL**, clayey silt, trace gravel, trace sand, stiff, greyish brown, moist		3	SS	9
2				4A	SS	14
	97.5					
	2.6	**SANDY SILT**, some clay, trace gravel, compact to dense, brown, moist (GLACIAL TILL)		4B		
3				5	SS	35
4						
5				6	SS	32
	94.0					
6	6.1	**SILT**, trace to some clay, very dense, grey, moist		7	SS	50 / 150mm
7						
				8	SS	50 / 125mm
8						
				9	SS	94
9						

Elevation Scale (m): 100, 99, 98, 97, 96, 95, 94, 93, 92, 91

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

(continued next page)

Terraprobe

BOREHOLE LOG DC2

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 28, 2012

Sheet No. : 2 of 2

Position :

Elevation Datum : Local

Rig type : CME 75

Drilling Method : Solid stem augers

Station : 3+020

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour	Instrument Details	Unstabilized Water Level	Lab Data and Comments
10		*(continued)*					90	Dynamic Cone 10 20 30 40; Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160	Plastic Limit, Natural Water Content, Liquid Limit PL MC LL 10 20 30				GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
		SILT, trace to some clay, very dense, grey, moist *(continued)*											
	89.4												
	89.4 10.7	**SANDY SILT**, trace gravel, trace clay, very dense, grey, moist (GLACIAL TILL)		10	SS	50 / 75mm							

END OF BOREHOLE

Unstabilized water level measured at 8.8m below grade; borehole caved to 10.7m below grade upon completion of drilling.

Terraprobe

BOREHOLE LOG HR1

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 27, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : CME 75

Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0		**GROUND SURFACE**				
		55mm **ASPHALTIC CONCRETE**				
		395mm **GRANULAR BASE / SUBBASE**		1	SS	34
	0.5	**SILTY CLAY**, trace gravel, trace sand, very stiff, brown, moist (GLACIAL TILL)		2	SS	16
1				3	SS	27
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG KS1

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 26, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : CME 75

Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0		**GROUND SURFACE**				
		220mm **ASPHALTIC CONCRETE**				
	0.2	480mm **GRANULAR BASE / SUBBASE**		1	SS	31
				2A		
1	0.8	**FILL**, clayey silt, trace to some sand, trace gravel, stiff, dark brown, moist to wet		2B	SS	10
				3A		
	1.5	**SILTY CLAY**, trace gravel, trace sand, stiff, brown, moist (GLACIAL TILL)		3B	SS	15
	1.8					

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

Terraprobe

BOREHOLE LOG KS2

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 27, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : CME 75

Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
		GROUND SURFACE				
0		240mm **ASPHALTIC CONCRETE**				
	0.2	660mm **GRANULAR BASE / SUBBASE**		1	SS	50 / 125mm
				2A	SS	29
1	0.9	**FILL**, clayey silt, some sand, trace gravel, stiff, dark brown, moist		2B		
				3	SS	9
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
Unconfined + Field Vane
Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG NB1

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 29, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : CME 75

Drilling Method : Solid stem augers

Station : 1+140

Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
240.4	**GROUND SURFACE**				
240.2	180mm **ASPHALTIC CONCRETE**				
0.2	1500mm **GRANULAR BASE / SUBBASE**		1	SS	101
			2	SS	73
238.7			3A	SS	9
1.7	**FILL**, clayey silt, trace gravel, trace sand, trace organics, stiff, brown to dark brown, moist		3B		
			4	SS	12
			5	SS	8
236.6					
3.8	**SILTY CLAY**, some sand, trace gravel, very stiff, grey, moist (GLACIAL TILL)		6	SS	24
235.8					
4.6	Shale & till complex (georgian bay formation)		7	SS	100 / 150mm
			8	SS	100 / 150mm
			9	SS	100 / 75mm
231.2			10	SS	100 / 25mm
9.2	**END OF BOREHOLE**				

Unstabilized water level measured at 3.4m below grade; borehole caved to 5.8m below grade upon completion of drilling.

Penetration Test Values (Blows / 0.3m)
Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
Unconfined, Pocket Penetrometer, Field Vane, Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit, Natural Water Content, Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL
7 14 49 30

Depth Scale (m): 0 1 2 3 4 5 6 7 8 9

Elevation Scale (m): 240 239 238 237 236 235 234 233 232

library: library - terraprobe gint.glb report: terraprobe soil log file: 11-12-2096 bh logs.gpj

Terraprobe

BOREHOLE LOG NB2

Client : IBI Group
Project : Airport Road Class EA
Location : Peel Region, Ontario

Project No.: 11-12-2096
Date started : November 30, 2012
Sheet No. : 1 of 2

Position :
Rig type : track-mounted

Elevation Datum : Geodetic (NAD83)
Drilling Method : Solid stem augers

Station : 1+100

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0	240.5	**GROUND SURFACE**				
		120mm **TOPSOIL**				
		FILL, clayey silt, trace to some sand, trace gravel, firm to stiff, brown, moist		1	SS	7
1				2	SS	10
				3	SS	10
2						
				4	SS	11
3				5	SS	6
	236.7					
	3.8	**SILTY CLAY**, some sand, trace gravel, hard, brown, moist (GLACIAL TILL)		6	SS	58
4						
				7	SS	59
5						
6	234.4					
	6.1	Shale & till complex (georgian bay formation)		8	SS	100 / 150mm
7						
				9	SS	100 / 75mm
8						
				10	SS	100 / 25mm
9						

Elevation Scale (m): 240, 239, 238, 237, 236, 235, 234, 233, 232, 231

Penetration Test Values (Blows / 0.3m)
Dynamic Cone: 10 20 30 40
Undrained Shear Strength (kPa)
Unconfined, Pocket Penetrometer, Field Vane, Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments
GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

(continued next page)

Terraprobe

BOREHOLE LOG NB2

Client : IBI Group
Project : Airport Road Class EA
Location : Peel Region, Ontario

Project No.: 11-12-2096
Date started : November 30, 2012
Sheet No. : 2 of 2

Position :
Elevation Datum : Geodetic (NAD83)
Rig type : track-mounted
Drilling Method : Solid stem augers
Station : 1+100

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour	Instrument Details	Unstabilized Water Level	Lab Data and Comments
10		*(continued)*						Dynamic Cone 10 20 30 40; Unconfined, Field Vane, Pocket Penetrometer, Lab Vane 40 80 120 160	Plastic Limit, Natural Water Content, Liquid Limit PL MC LL 10 20 30				GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
		Shale & till complex (georgian bay formation) *(continued)*					230						
	229.5			11	SS	100 / 125mm							
	11.0			12	SS	100 / 25mm							

END OF BOREHOLE

Unstabilized water level measured at 5.5m below grade; borehole caved to 8.2m below grade upon completion of drilling.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 7, 2013	3.7	236.8
Dec 17, 2013	3.7	236.8

Terraprobe

BOREHOLE LOG OS1

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 27, 2012

Sheet No. : 1 of 1

Position :

Elevation Datum : Geodetic (NAD83)

Rig type : CME 75

Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0		**GROUND SURFACE**				
		35mm **ASPHALTIC CONCRETE**		1	SS	50 / 125mm
		565mm **GRANULAR BASE / SUBBASE**				
	0.6	**SILTY CLAY**, trace gravel, trace sand, stiff to very stiff, brown, moist (GLACIAL TILL)		2	SS	11
1				3	SS	24
	1.8	**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m)

Penetration Test Values (Blows / 0.3m)
Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
Unconfined + Field Vane
Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Terraprobe

BOREHOLE LOG SC1

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 28, 2012

Sheet No. : 1 of 2

Position :

Elevation Datum : Local

Rig type : CME 75

Drilling Method : Solid stem augers

Station : 3+460

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
	100.5	**GROUND SURFACE**				
0	100.3	150mm **ASPHALTIC CONCRETE**				
	0.2					
	100.0	300mm **GRANULAR BASE / SUBBASE**		1	SS	25
	0.5	**FILL**, sand, some silt, trace gravel, loose to compact, brown, moist		2	SS	13
1				3	SS	7
2				4	SS	4
	97.5					
3	3.1	**SANDY SILT**, some clay, trace gravel, compact, brown, moist (GLACIAL TILL)		5	SS	17
4						
	95.9					
	4.6	**SILT**, trace to some clay, very dense, grey, moist		6	SS	90 / 225mm
5						
6				7	SS	50 / 150mm
7						
				8	SS	95 / 275mm
8						
				9	SS	50 / 150mm
9						

Elevation Scale (m): 100, 99, 98, 97, 96, 95, 94, 93, 92, 91

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

(continued next page)

Terraprobe

BOREHOLE LOG SC1

Client : IBI Group
Project : Airport Road Class EA
Location : Peel Region, Ontario

Project No.: 11-12-2096
Date started : November 28, 2012
Sheet No. : 2 of 2

Position :
Elevation Datum : Local
Rig type : CME 75
Drilling Method : Solid stem augers
Station : 3+460

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour	Instrument Details	Unstabilized Water Level	Lab Data and Comments
10		*(continued)*											
	89.7	**SILT**, trace to some clay, very dense, grey, moist *(continued)*		10	SS	50 / 150mm	90						
	10.8	**END OF BOREHOLE**											

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40
Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160
Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit — PL MC LL — 10 20 30
Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Borehole was dry and caved to 2.5m below grade upon completion of drilling.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Dec 17, 2012	2.1	98.4
Jan 7, 2013	2.4	98.1

Terraprobe

BOREHOLE LOG SC2

Client : IBI Group
Project : Airport Road Class EA
Location : Peel Region, Ontario

Project No.: 11-12-2096
Date started : November 29, 2012
Sheet No. : 1 of 2

Position :
Elevation Datum : Local
Rig type : CME 75
Drilling Method : Solid stem augers
Station : 3+420

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	100.6	**GROUND SURFACE**				
		400mm **GRAVEL SHOULDER**				
	100.2			1	SS	19
	0.4	**FILL**, clayey silt, some sand, trace gravel, firm to stiff, greyish brown, moist				
1				2	SS	15
				3	SS	5
2				4	SS	11
3	97.6					
	3.1	**SANDY SILT**, some clay, trace to some gravel, compact to very dense, brown, moist (GLACIAL TILL)		5	SS	29
4						
				6	SS	85 / 250mm
5						
	94.5					
6	6.1	**SILT**, trace to some clay, very dense, grey, moist		7	SS	50 / 150mm
7						
				8	SS	50 / 125mm
8						
				9	SS	88 / 275mm
9						

Elevation Scale (m): 100, 99, 98, 97, 96, 95, 94, 93, 92, 91

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

12 27 45 16

(continued next page)

Terraprobe

BOREHOLE LOG SC2

Client : IBI Group

Project : Airport Road Class EA

Location : Peel Region, Ontario

Project No.: 11-12-2096

Date started : November 29, 2012

Sheet No. : 2 of 2

Position :

Elevation Datum : Local

Rig type : CME 75

Drilling Method : Solid stem augers

Station : 3+420

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour	Instrument Details	Unstabilized Water Level	Lab Data and Comments
10		*(continued)*											
		SILT, trace to some clay, very dense, grey, moist *(continued)*											
							90						
11	89.5			10	SS	86							
	11.1												

Penetration Test Values (Blows / 0.3m): × Dynamic Cone (10 20 30 40)

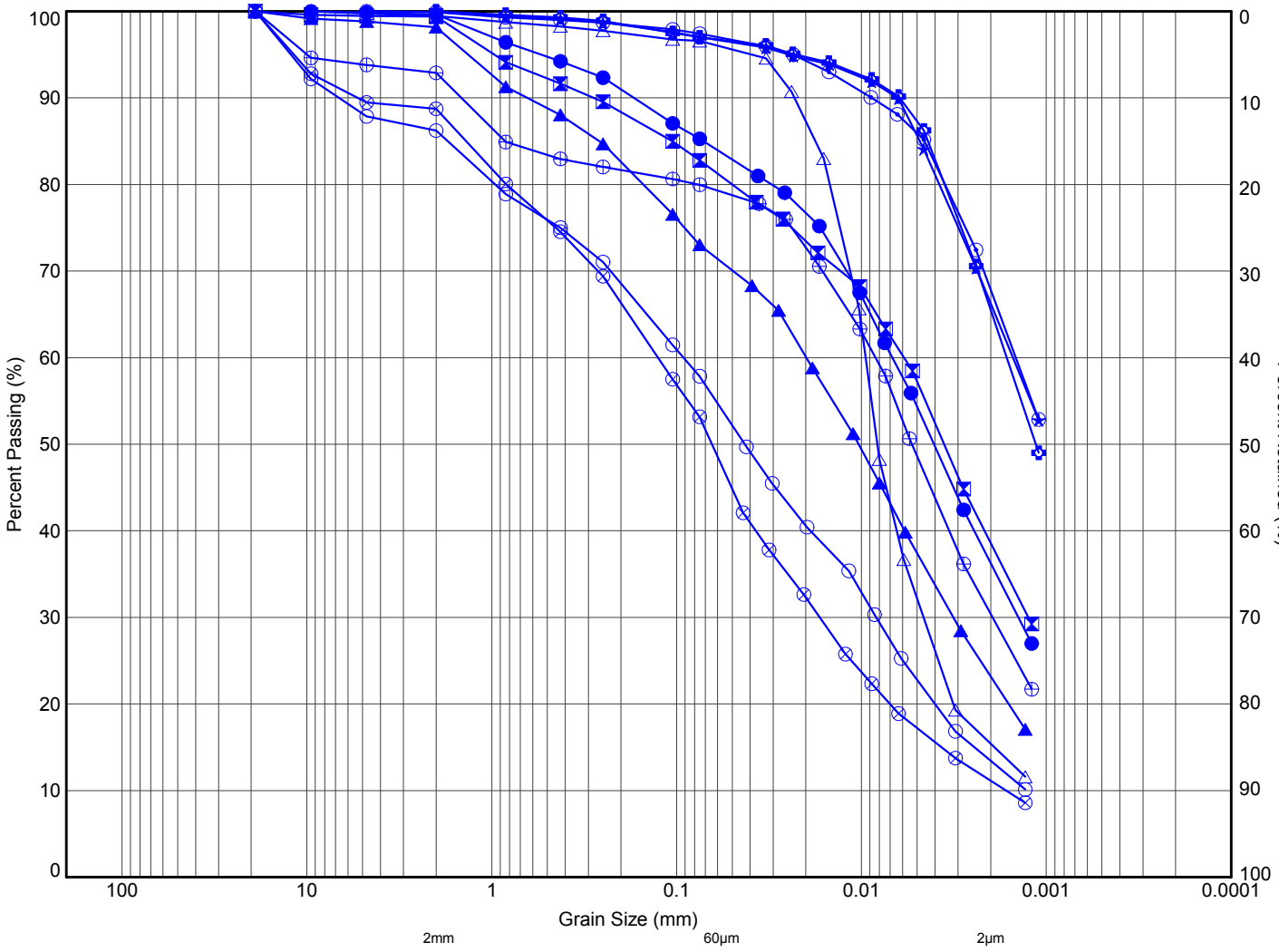
Undrained Shear Strength (kPa): ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane (40 80 120 160)

Moisture / Plasticity: Plastic Limit (PL) 10 — Natural Water Content (MC) 20 — Liquid Limit (LL) 30

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

END OF BOREHOLE

Borehole was dry and caved to 10.1m below grade upon completion of drilling.



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

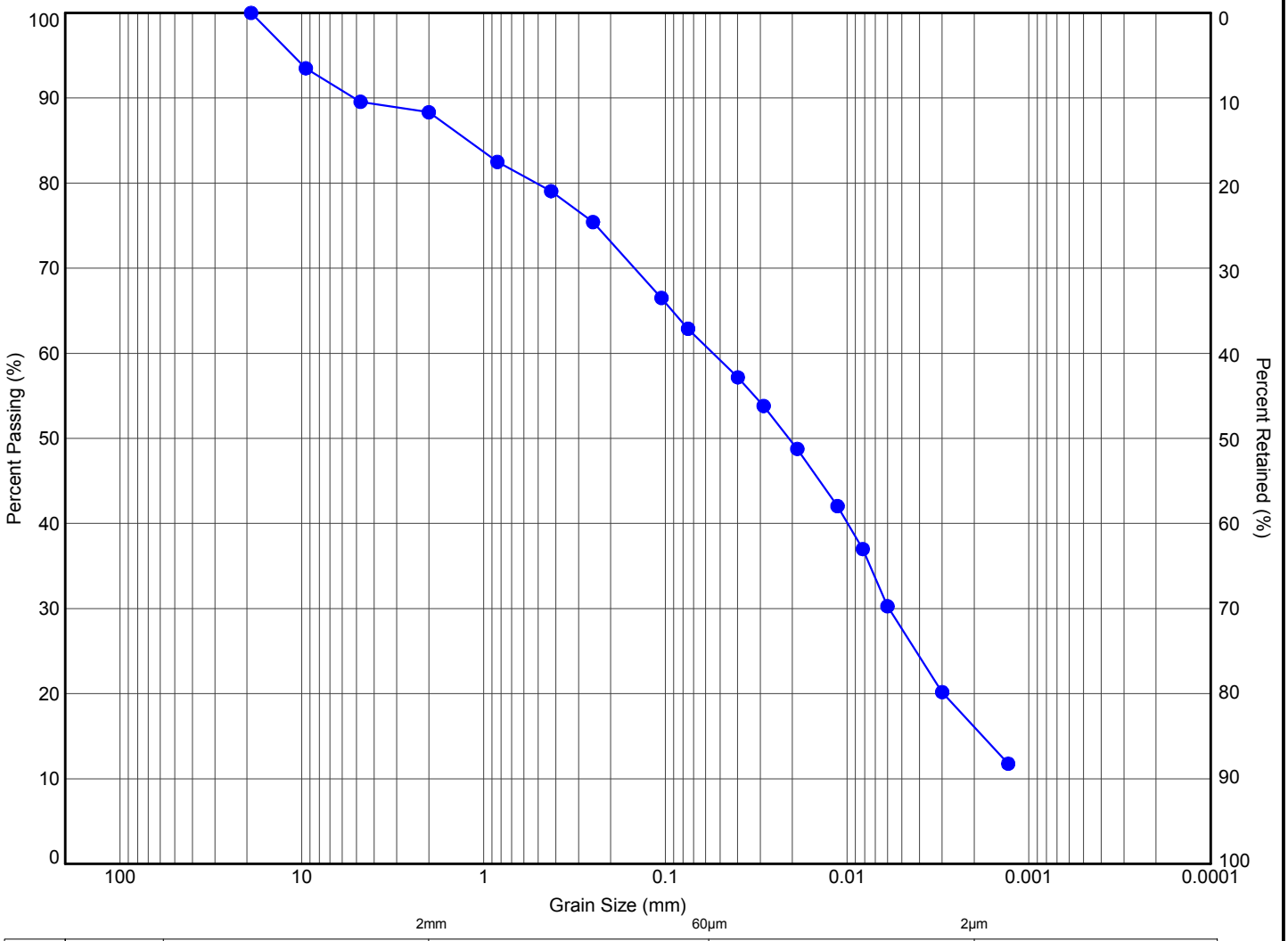
MIT SYSTEM

	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**5**	SS2	1.1		0	16	48	36	
⊠	**10**	SS3	1.5		1	17	43	39	
▲	**13**	3B	1.7		2	27	48	23	
★	**17**	SS3	1.5		0	4	30	66	
⊙	**22**	SS6	4.8		0	3	29	68	
✿	**27**	SS3	1.5		0	3	31	66	
○	**DC1**	SS4	2.5		14	32	41	13	
△	**DC1**	SS8	7.7		1	3	81	15	
⊗	**DC1**	SS10	10.7		11	41	37	11	
⊕	**NB1**	SS6	4.0	236.3	7	14	49	30	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title: **GRAIN SIZE DISTRIBUTION**

File No.: **11-12-2096**



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

MIT SYSTEM

	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**SC2**	SS5	3.3		12	27	45	16	

Terraprobe

11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title: **GRAIN SIZE DISTRIBUTION**

File No.: **11-12-2096**

Engineering Plans

Airport Road Culvert Sections

APPENDIX D

Terraprobe Inc.

AIRPORT ROAD

REFER TO DWG. No. 21983-D

REFER TO DWG. No. 21981-D

MATCHLINE STA. 1+720

MATCHLINE STA. 1+440

SEDIMENT CONTROL FENCE (SEE DETAIL)

24m-525mm STEEL LINER

PROP. 2-45° BEND (HOR & VERT)

PROP. 2-45° BENDS (VERT)

2-45° BENDS (VERT&HOR)

6m EASEMENT

PROP. HYD&V

PROP. 300mm V&B

PROP. 2-22.5° BENDS (HOR & VERT)

BORE PIT

150 SAN SERVICE

SALT CREEK - TRIBUTARY OF ARGO HUMBER RIVER

MIXED TREE SPECIES AND UNDERBRUSH

MIXED CON & DEC TREES

DEC TREE-ROW - APPROX. 7 TREES

ENCASEMENT

PROP. 300mm WATERMAIN

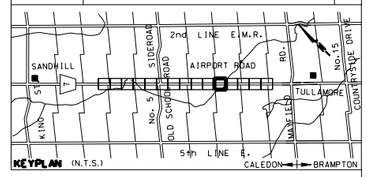
FOR NOTES AND DETAILS SEE DWG. No. 21978-D

SERVICE DATA

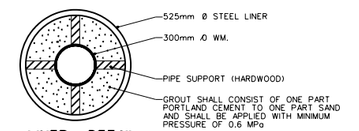
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS	AUG/19/95	J.P.
STORM SEWERS			BELL U/G CABLE	OCT/12/95	J.P.
WATERMAINS			HYDRO U/G CABLE	SEPT/18/95	J.P.
			CTV	NOV/2/95	J.P.

REVISIONS

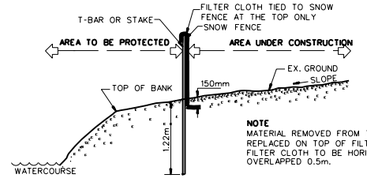
DATE	DETAILS	INIT.
NOV. 1997	AS CONSTRUCTED	J.P.



KEYPLAN (N.T.S.)



LINER DETAIL
N.T.S.



SEDIMENT CONTROL FENCE
N.T.S.

NOTES FOR CREEK CROSSING

1. FINISHED GROUND ELEVATION WITHIN BORE PIT AREAS TO MATCH EXISTING.
2. WATER PUMPED FROM BORING AND RECEIVING PITS TO BE DISCHARGED INTO A FILTER BAG FOR REMOVAL OF PARTICULATE, TO THE SATISFACTION OF M.T.R.C.A.
3. ALL DISTURBED AREAS AT VICINITY OF CREEK TO BE REINSTATED WITH 50mm NURSERY GRADE TOPSOIL AND SEEDED AS SOON AS POSSIBLE AFTER CONSTRUCTION.

243.20	242.20	241.15	240.25	239.35	237.85	236.05	234.87	233.38	233.29	236.40	236.95	237.90	238.90	239.90	BOT.EL.OF WM.
1+720	1+700	1+680	1+660	1+640	1+620	1+600	1+580	1+560	1+540	1+520	1+500	1+480	1+460	1+440	CHAINAGE

General Notes

- ALL DRIVEWAYS ASPHALT UNLESS OTHERWISE NOTED.
- ALL SERVICE LOCATIONS ARE APPROXIMATE AND MUST BE LOCATED ACCURATELY IN THE FIELD
- DENOTES BUILDING - NOT LOCATED
- DENOTES BUILDING LOCATED
- TYPE 'B' BEDDING UNLESS OTHERWISE NOTED (SAN)

B.M. NO. ELEV.

THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL EXISTING UTILITIES PRIOR TO AND DURING CONSTRUCTION LOCATION OF EXISTING UTILITIES APPROXIMATE ONLY. TO BE VERIFIED IN FIELD BY CONTRACTOR.

DESIGNED BY | CHKD. | APPROVED BY

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMMENCING WORK NOTIFY THE FOLLOWING
THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL TELEPHONE COMPANY
CONSUMERS GAS COMPANY
MINISTRY OF TRANSPORTATION
MINISTRY OF ENVIRONMENT
HYDRO ELECTRIC POWER COMM. OF ONTARIO
HYDRO ELECTRIC COMM. CITY OF MISSISSAUGA
HYDRO ELECTRIC COMM. CITY OF BRAMPTON
HYDRO ELECTRIC COMM. TOWN OF CALEDON
CABLE TELEVISION

10m 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

Region of Peel
Public Works

AIRPORT ROAD

(FROM N. OF MAYFIELD RD. TO N. OF OLD SCHOOL RD.)

PROP. 300mm WATERMAIN

Sta. 1+440 To Sta. 1+720

LOTS	AREA C-4	PROJECT NO.	95-1010
CHECKED BY	DRAWN BY CAD/J.P.	PLAN NO.	21982-D
DATE SEPT. 1995	SHEET 5 OF 15		

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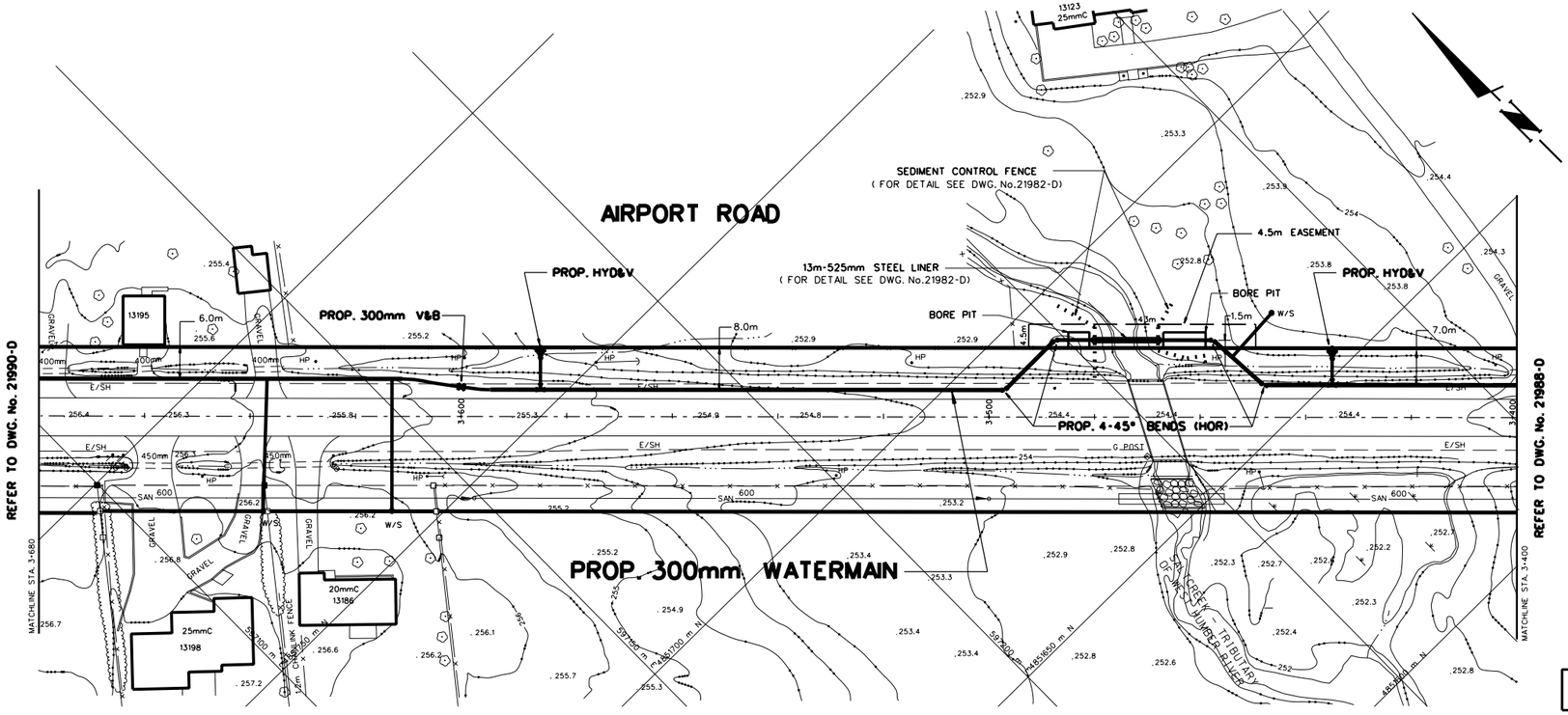
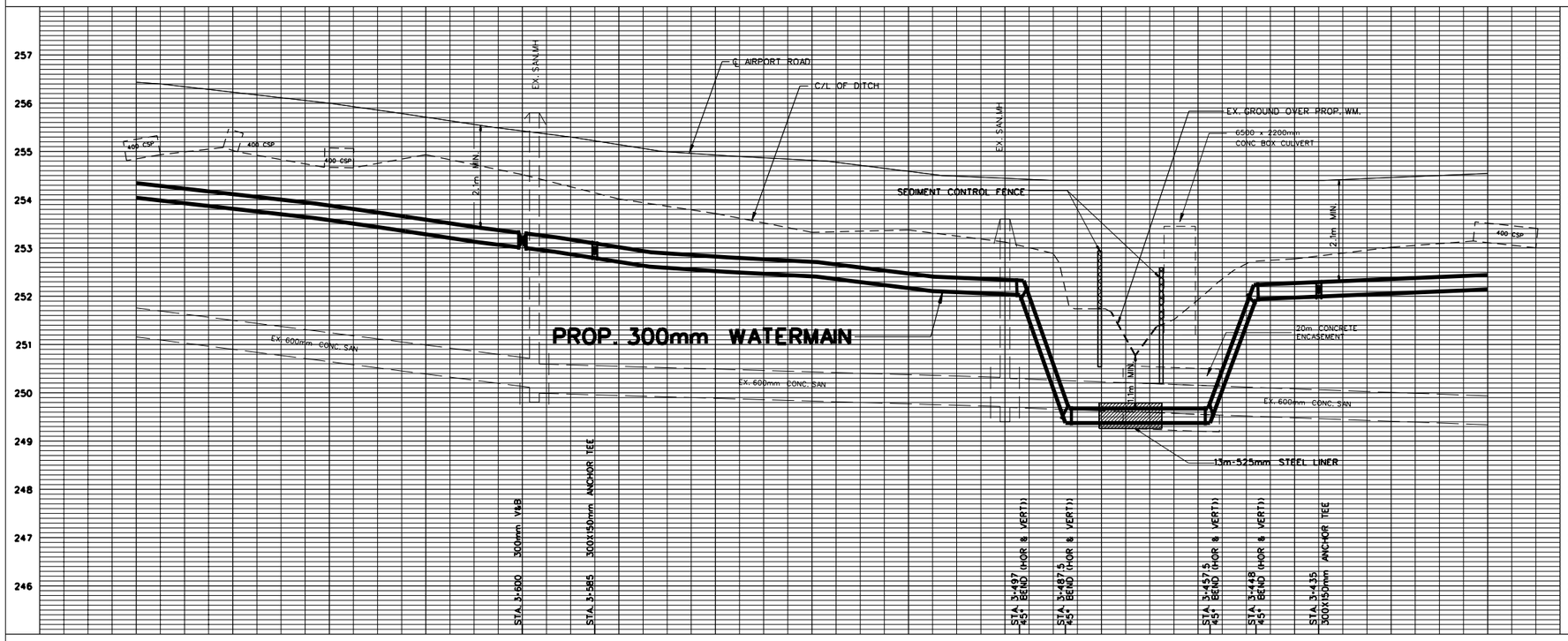
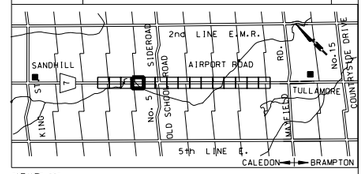




SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS	AUG/19/95	J.P.
STORM SEWERS			BELL U/G CABLE	OCT/12/95	J.P.
WATERMAINS			HYDRO U/G CABLE	SEPT/18/95	J.P.
			CTV	NOV/2/95	J.P.

REVISIONS		
DATE	DETAILS	INIT.
NOV. 1997	AS CONSTRUCTED	J.P.



KEYPLAN
(N.T.S.)

General Notes

- ALL DRIVEWAYS ASPHALT UNLESS OTHERWISE NOTED.
- ALL SERVICE LOCATIONS ARE APPROXIMATE AND MUST BE LOCATED ACCURATELY IN THE FIELD
- DENOTES BUILDING - NOT LOCATED
- DENOTES BUILDING LOCATED TYPE 'B' BEDDING UNLESS OTHERWISE NOTED (SAN)

B.M. NO. ELEV.

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DESIGNED BY — APPROVED BY

CHKD.

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING
THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
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CONSUMERS GAS COMPANY
MINISTRY OF TRANSPORTATION
MINISTRY OF ENVIRONMENT
HYDRO ELECTRIC POWER COMM. OF ONTARIO
HYDRO ELECTRIC COMM. CITY OF MISSISSAUGA
HYDRO ELECTRIC COMM. CITY OF BRAMPTON
HYDRO ELECTRIC COMM. TOWN OF CALEDON
CABLE TELEVISION

10m 0 10 20 30m — HORIZONTAL SCALE
1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
Public Works

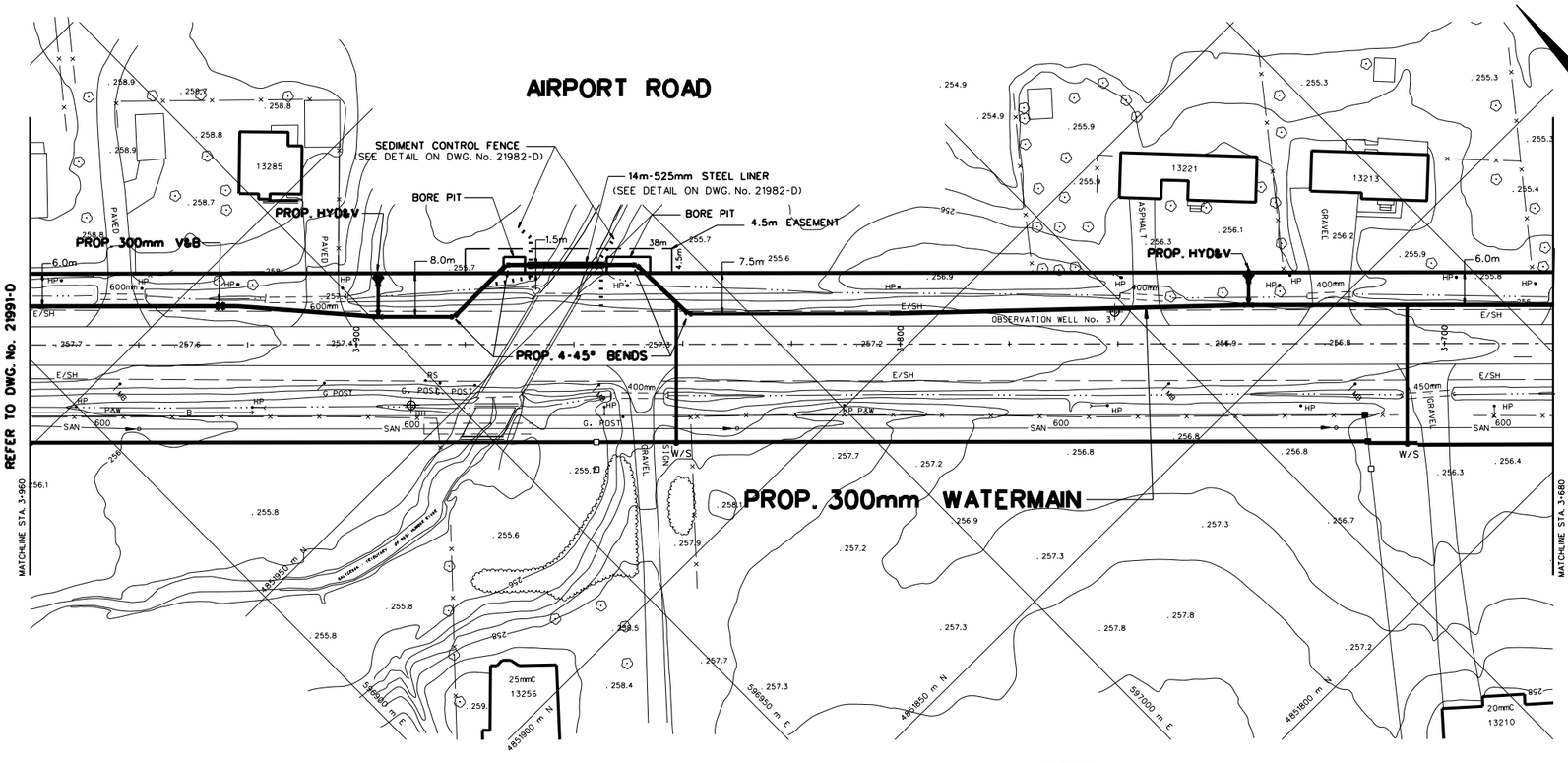
AIRPORT ROAD

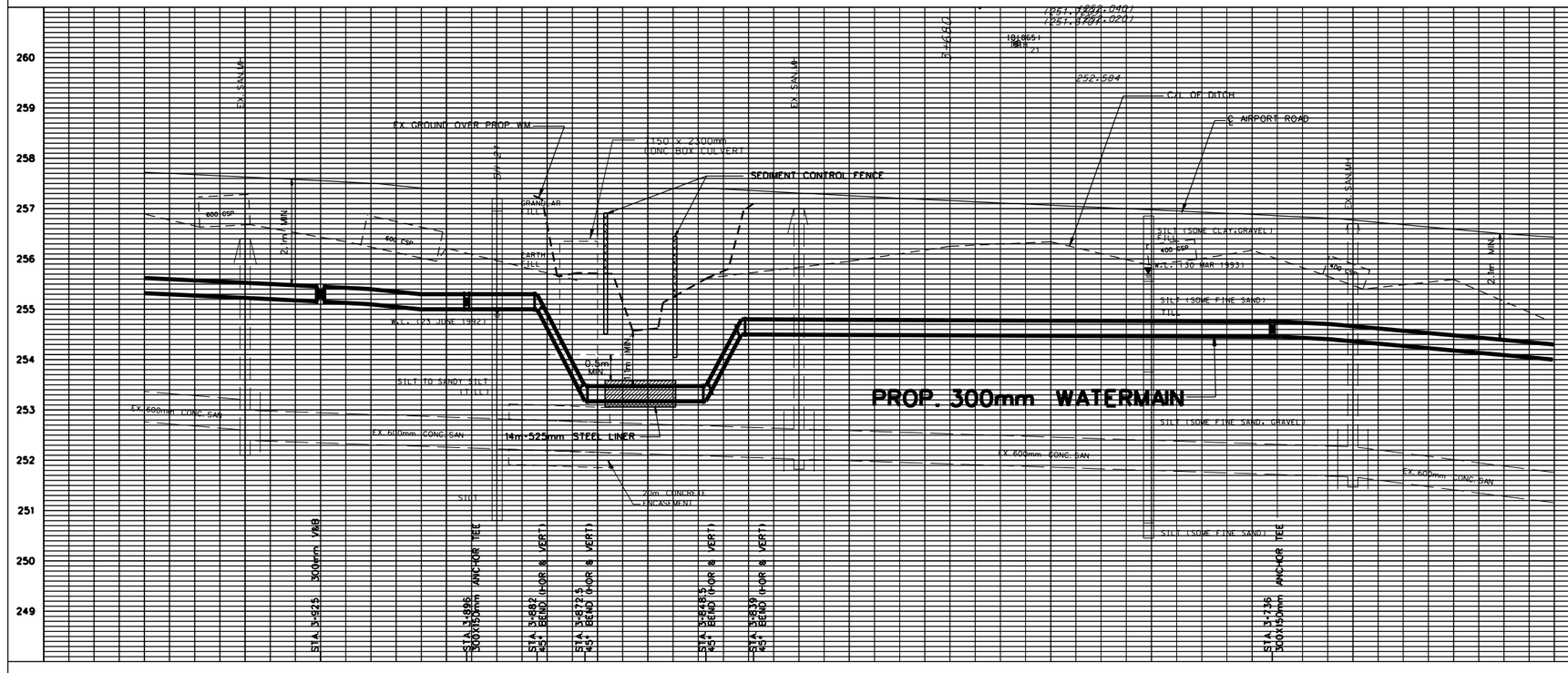
(FROM N. OF MAYFIELD RD. TO N. OF OLD SCHOOL RD.)

PROP. 300mm WATERMAIN

Sta. 3+400 To Sta. 3+680

LOTS	AREA C-4	PROJECT NO.	95-1010
CHECKED BY	DRAWN BY CAD/J.P.	PLAN NO.	21989-D
DATE SEPT. 1995	SHEET 12 OF 15		





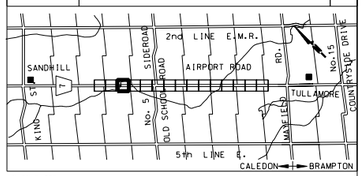
255.30	255.25	255.15	255.00	254.60	253.15	254.50	254.50	254.50	254.45	254.45	254.45	254.35	254.20	254.00	BOT. EL. OF WM.
3+960	3+940	3+920	3+900	3+880	3+860	3+840	3+820	3+800	3+780	3+760	3+740	3+720	3+700	3+680	CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS	AUG/19/95	J.P.
STORM SEWERS			BELL U/G CABLE	OCT/12/95	J.P.
WATERMAINS			HYDRO U/G CABLE	SEPT/18/95	J.P.
			CTV	NOV/2/95	J.P.

REVISIONS

DATE	DETAILS	INIT.
NOV. 1997	AS CONSTRUCTED	J.P.



KEYPLAN
(N.T.S.)

FOR NOTES AND DETAILS SEE DWG. No. 21978-D

FOR NOTES ON CREEK CROSSING SEE DWG. No. 21982-D

General Notes

- ALL DRIVEWAYS ASPHALT UNLESS OTHERWISE NOTED.
- ALL SERVICE LOCATIONS ARE APPROXIMATE AND MUST BE LOCATED ACCURATELY IN THE FIELD
- DENOTES BUILDING - NOT LOCATED
- DENOTES BUILDING LOCATED
- TYPE 'B' BEDDING UNLESS OTHERWISE NOTED (SAN)

B.M. NO. ELEV.

THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL EXISTING UTILITIES PRIOR TO AND DURING CONSTRUCTION LOCATION OF EXISTING UTILITIES APPROXIMATE ONLY. TO BE VERIFIED IN FIELD BY CONTRACTOR.

DESIGNED BY | APPROVED BY

CHKD.

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMMENCING WORK NOTIFY THE FOLLOWING
THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
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HYDRO ELECTRIC POWER COMM. OF ONTARIO
HYDRO ELECTRIC COMM. CITY OF MISSISSAUGA
HYDRO ELECTRIC COMM. CITY OF BRAMPTON
HYDRO ELECTRIC COMM. TOWN OF CALEDON
CABLE TELEVISION

10m 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

Region of Peel
Public Works

AIRPORT ROAD

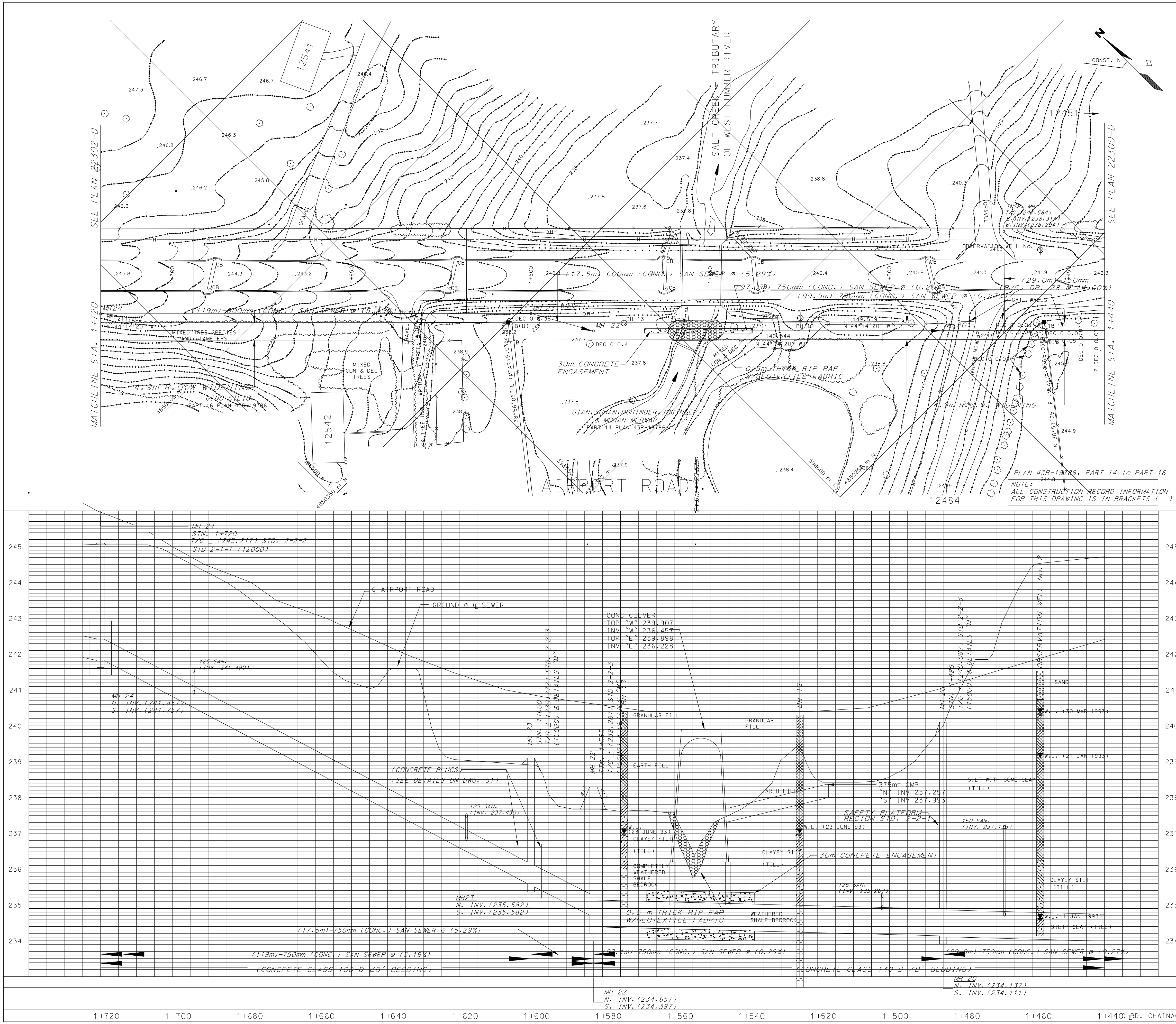
(FROM N. OF MAYFIELD RD. TO N. OF OLD SCHOOL RD.)

PROP. 300mm WATERMAIN

Sta. 3+680 To Sta. 3+960

LOTS	AREA C-4	Project No.	95-1010
CHECKED BY	DRAWN BY CAD/J.P.	Plan No.	21990-D
DATE SEPT. 1995	SHEET 13 OF 15		

21990_d.dgn 12/05/04 8:50:55 AM

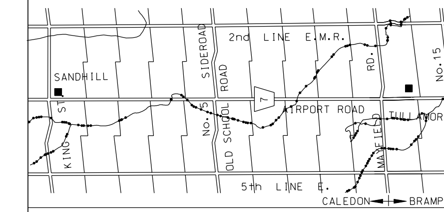


SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELLU/G CABLE		
WATERMAINS			HYDROU/G CABLE		

REVISIONS

DATE	DETAILS	INIT.
2 DEC 1993	MNR COMMENTS RIP-RAP NOTES	G.G.
7 FEB 1995	CONSTRUCTION RECORD	R.V.



KEYPLAN SCALE : 1:10 000

GENERAL NOTES:

1. ALL WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REGION OF PEEL STANDARDS.
2. ALL EXISTING INFORMATION HAS BEEN SHOWN IN ACCORDANCE WITH THE BEST AVAILABLE RECORDS. THE CONTRACTOR SHALL VERIFY LOCATION OF EXISTING UTILITIES IN THE FIELD PRIOR TO COMMENCING OF ANY WORK.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PROTECTION AND TEMPORARY RELOCATION OF UNDERGROUND AND ABOVE GROUND UTILITIES PRIOR TO AND DURING CONSTRUCTION.
4. CONTRACTOR SHALL NOT REMOVE OR DAMAGE ANY TREES UNLESS THEY ARE INDICATED AS REMOVAL ITEMS ON THE DRAWINGS.
5. CONTRACTOR SHALL MAINTAIN FLOW IN ALL EXISTING WATER SERVICES DURING CONSTRUCTION.
6. ALL BACKFILL ON TRAVELLED PORTION OF THE RIGHT-OF-WAY TO BE GRANULAR "B" BACKFILL AND BE COMPACTED TO MIN. 100% STANDARD PROCTOR DENSITY.
7. MINIMUM PAVED ROAD RESTORATION SHALL BE 40mm HL3, 50mm HL8, 150mm GRANULAR "A" AND 450mm GRANULAR "B" TYPE II
8. ALL DRIVEWAYS DISTURBED SHALL BE RESTORED WITH 300mm GRANULAR "A" FOR GRAVEL SURFACE AND 300mm "A" PLUS 50mm HL3 FOR PAVED SURFACE.
9. ALL GRAVEL SHOULDER DISTURBED SHALL BE RESTORED WITH 450mm GRANULAR "B" TYPE II AND 300mm GRANULAR ∠A'.
10. ALL AREAS DAMAGED OR DISTURBED BY THE CONTRACTOR SHALL BE RESTORED TO THE RESTORATION REQUIREMENTS AS SPECIFIED OR OTHERWISE TO THE ORIGINAL CONDITION.
11. CONTRACTOR SHALL INSTALL CLAY PLUGS THROUGH THE GRANULAR BEDDING IMMEDIATELY UP-GRADIENT AND DOWN GRADIENT OF ALL MANHOLES SITUATED BELOW THE WATER TABLE AS SHOWN IN DRAWINGS.
12. THE CONTRACTOR SHALL SUPPLY AND INSTALL ALL EROSION AND SEDIMENT CONTROLS AS PER CONTRACT SPECIFICATIONS AND AT LOCATIONS AS DIRECTED BY THE ENGINEER.
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CABLE TELEVISION

Region of Peel
Department of Public Works

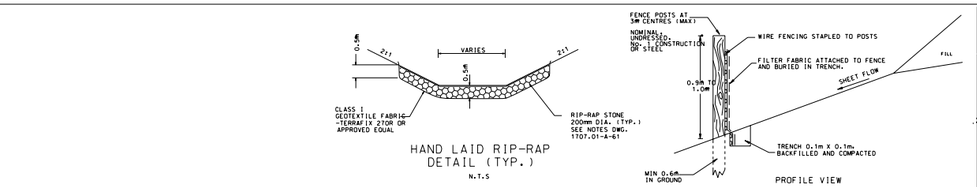
AIRPORT ROAD

SANITARY TRUNK SEWER

Sta. 1+440 To Sta. 1+720

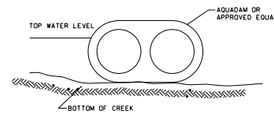
Lots	Ref. No.1707.01-A-21	Project No94-2133
Scale Hor. 1:500 Ver. 1:50	Drawn byJ.B.	Checked byHW, RV
Date 23 FEB 1994	Sheet 11 OF 54	Plan No. 22301-D

22301-D

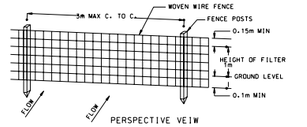


HAND LAID RIP-RAP DETAIL (TYP.)
N.T.S

PROFILE VIEW

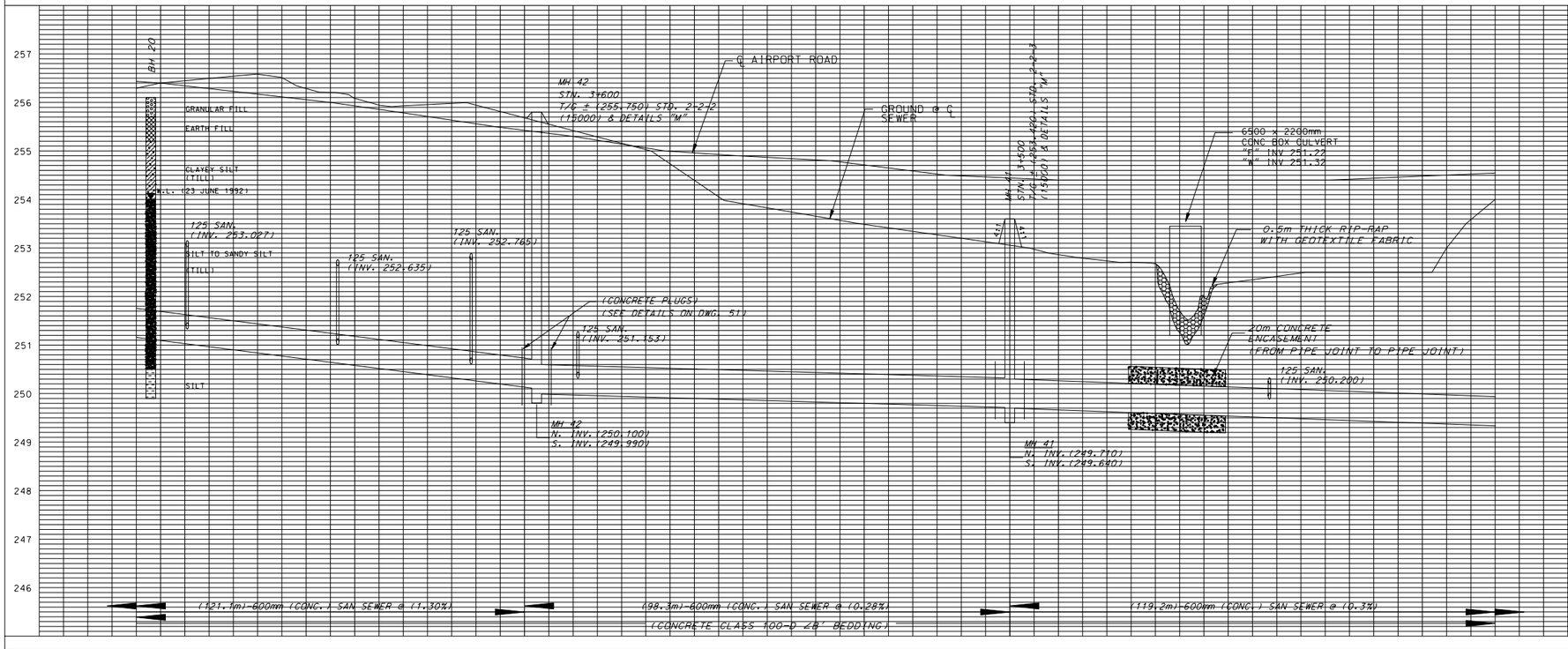


TEMPORARY WATER DIVERSION DAM DETAIL



PERSPECTIVE VEIW

TYPICAL SILT FENCE BARRIER



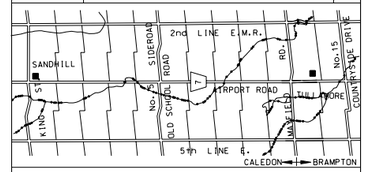
22308-D

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		

REVISIONS

DATE	DETAILS	INIT.



KEYPLAN SCALE : 1:10 000

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Region of Peel

Department of Public Works

AIRPORT ROAD

SANITARY TRUNK SEWER

Sta. 3+400 To Sta. 3+680

Lots	Ref. No. 1707.01-A-28	Project No 94-2133
Scale Hor. 1:500 Ver. 1:50	Drawn by J.B.	Checked by HW. RV
Date 23 FEB 1994	Sheet 18 OF 54	Plan No. 22308-D

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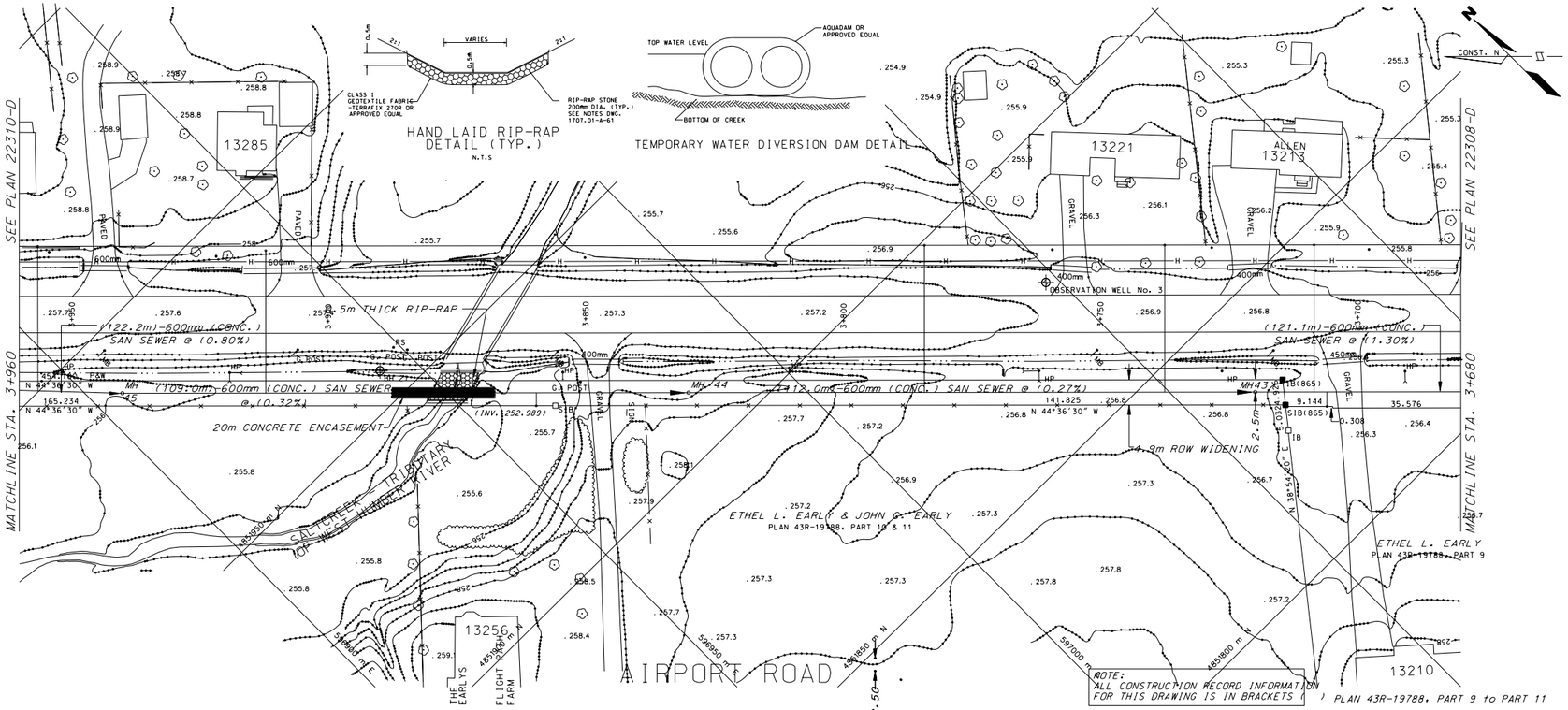

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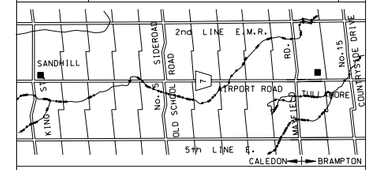
DATE	DETAILS	INIT.
2 DEC 1993	MNR COMMENTS RIP-RAP NOTES	G.G.
15 DEC 1993	COORDINATED WITH REALTY DEPARTMENT AND PROPERTY ACQUISITION	G.G.
7 FEB 1995	CONSTRUCTION RECORD	R.V.



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Lots	Ref. No. 1707.01-A-29	Project No 94-2133
Scale Hor. 1:500 Ver. 1:50	Drawn by J.B.	Checked by HW, RV
Date 23 FEB 1994	Sheet 19 OF 54	Plan No. 22309-D

22309-D

FINAL REPORT

Airport Road Class EA – Geomorphic Assessment

Date: DECEMBER 2014

Ref: 01-12-67

PARISH geomorphic

PARISH geomorphic

2500, Meadowpine Blvd. Suite 200 Address
Mississauga, Ontario, L5N 6C4
Canada
(905) 877-9531 Telephone
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www.parishgeomorphic.com Internet

Document Title:	Airport Road Class EA – Geomorphic Assessment
Status:	Report
Version:	01
Date:	December 2014
Project name:	Airport Road Class EA
Project number:	01-12-67
Client:	IBI Group
Reference:	01-12-67/01
Drafted by:	Jeff Winzenried
Checked by:	
Date checked:	
Approved by:	
Date of approval:	

Contents

1. Introduction

The Region of Peel has initiated a Schedule C Class Environmental Assessment in regards to proposed improvements along Airport road, extending from 1.0km north of Mayfield Road to 0.6km north of King Street within the Town of Caledon. In support of the EA Study for these road works, a geomorphic assessment of associated watercourse crossings was undertaken. Three watercourse crossings were investigated within the study corridor and include a low-order tributary of the West Humber River and the main branch of Salt Creek, which traverses Airport Road twice.

PARISH Geomorphic Ltd. has been retained by IBI Group to provide geomorphic support regarding the watercourse crossings. This report includes a desktop review of the subject crossings and a field investigation of the current geomorphic conditions. In order to determine whether a proposed crossing structure is suitable from a geomorphic perspective, watercourse crossings are typically evaluated according to a risk-based approach. This approach collectively reviews geomorphic conditions within vicinity of a crossing and identifies risks associated with the selected placement, sizing, and structure type. In order to achieve this, the following tasks were undertaken:

- Collect and review any pertinent background information, such as topographic mapping, historic aerial photographs, and any previous reports that would pertain to the channel/road crossing.
- Use available mapping to confirm channel reach boundaries.
- Where possible, complete channel migration analyses in order to determine 25-year erosion rates.
- Delineate the meander belt on a reach basis in the vicinity of the subject development using available mapping and air photos.
- Complete field reconnaissance to confirm existing geomorphic conditions, document any evidence of active erosion, and confirm appropriateness of the desktop results.
- Assess risk of proposed crossings related to channel migration, flooding, and other factors.

Study Area

The three crossings assessed include the most significant watercourses that traverse Airport Road. Additional minor culverts were identified; however these crossings were associated with insignificant drainage features with undefined channel dimensions. The existing structures that accommodate Salt Creek and the West Humber Tributary, include from north to south: Salt Creek Culvert, Deans Culvert, and Norris Bridge. Salt Creek Culvert and Deans Culvert are north of Mayfield road, approximately 820m and 420m, respectively. Norris Bridge is further south and is located 1600m north of Old School/Healy Road. Land use surrounding both watercourses is predominantly agricultural/scrub meadow. The culvert locations are displayed in **Figure 1.1**.

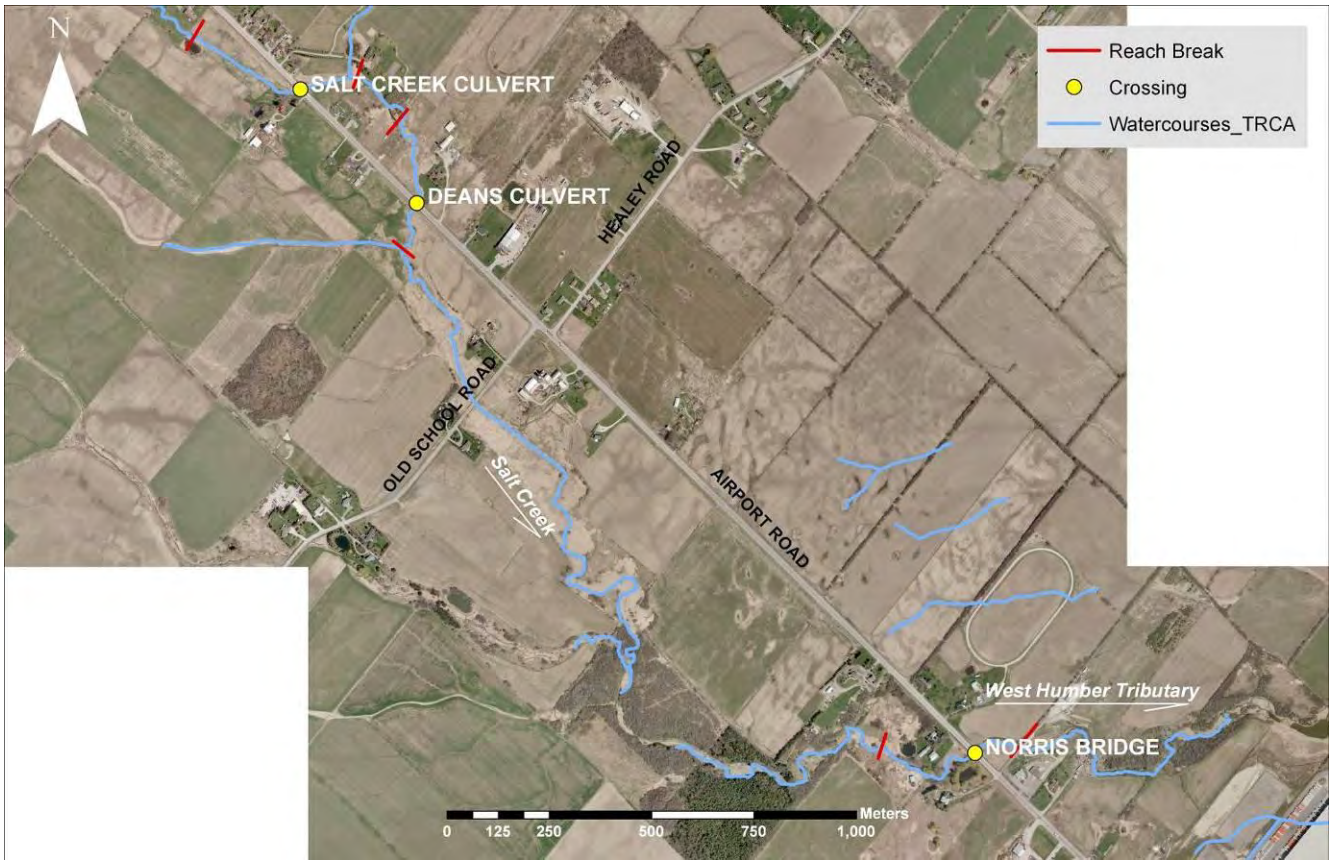

Figure 1.1: Study area and location of proposed pedestrian crossings and overlook structures

2. Background Review

A background review was undertaken to gather information regarding Salt Creek, the West Humber Tributary and the surrounding study area. Reviewed data included previous reports and mapping resources, including information concerning physiography and surficial geology. A general understanding of the underlying geology provides insight into channel form. Geology influences channel geometry, rates of migration, and defines the quantity and type of channel sediments.

The entire study area is covered by a single physiographic region, while the surficial geology is comprised of two material types. This physiographic region is identified as the South Slope, which consists of shallow shale and till plains which slope gently in a southeast direction towards Lake Ontario. It generally displays moderate topography comprised of low-relief drumlins and moraines (Chapman & Putnam, 1984). Surficial geology includes both till and modern alluvial deposits, the latter of which is associated with the major watercourses in the study area (Ontario Geological Survey). These alluvial deposits generally consist of clay, silt, sand, gravel and organics. These surficial geology regions within the study area can be viewed in **Figure 2**.

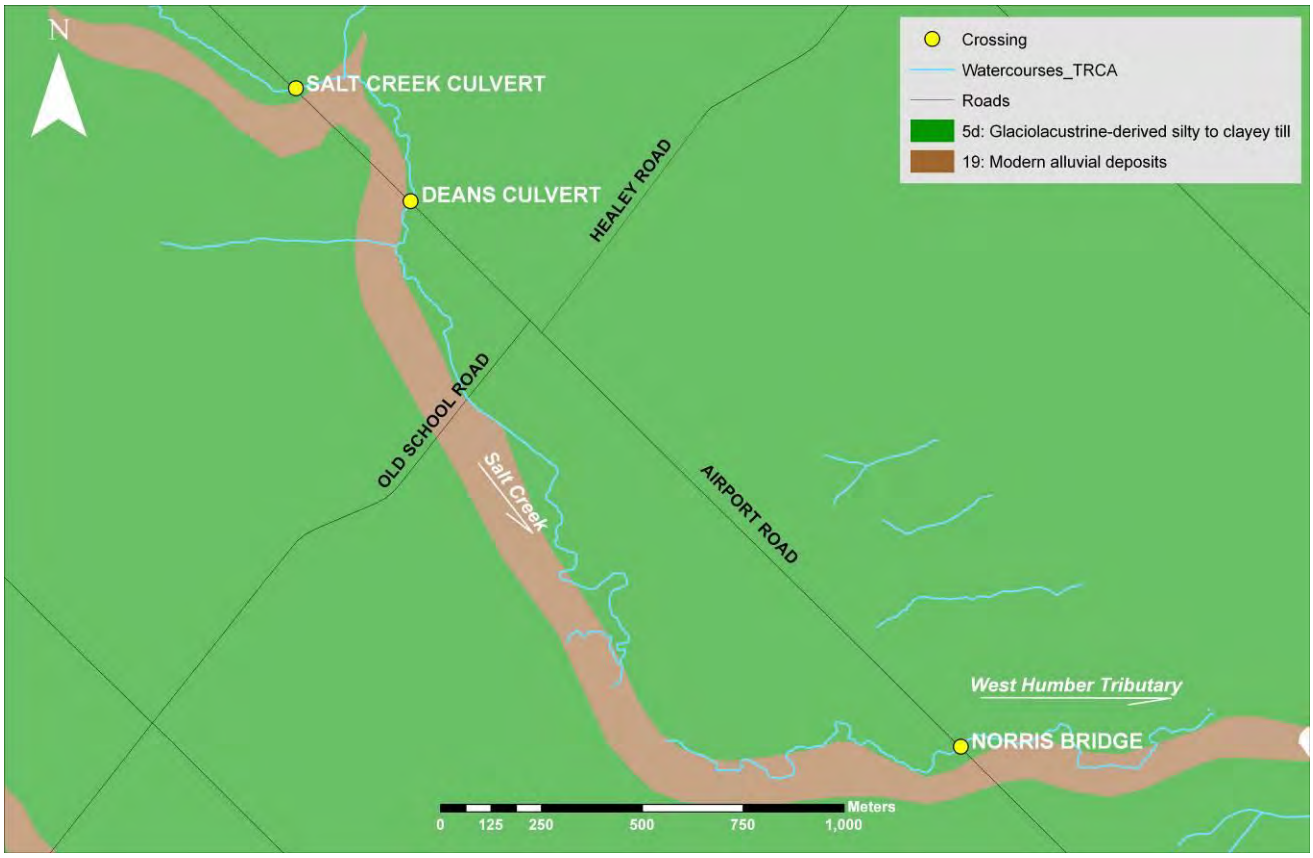

Figure 2: Surficial geology regions within the study area (Ontario Geological Survey)

3. Reach Delineation

The characteristics of the flow or channel materials can change along a creek or stream. In order to account for these changes, channels are separated into reaches – normally several hundred meters to several kilometers in length. A reach displays similarity with respect to its physical characteristics, such as channel form, function, and valley setting. Delineation of a reach considers sinuosity, gradient, hydrology, local geology, degree of valley confinement, and vegetative control using methods outlined in PARISH Geomorphic Ltd. (2001).

A total of three reaches relevant to the crossings were delineated for the study area. As geologic influences were consistent throughout, they were delimited primarily based on land-use and hydrologic controls. Salt Creek was divided into two reaches, with Reach SC-2 covering the Salt Creek Culvert and Reach SC-1 covering Deans Culvert. Reach SC-2 extends approximately 445m and was delineated based on riparian vegetation and degree of channel alteration. Just downstream, SC-1 was based on drainage inputs at both the upstream and downstream limits. Reach WH-3 of the West Humber Tributary passes the Norris Bridge. Reach WH-3 was also influenced by channel alterations; a change in planform governs the upstream limit, while the downstream limit coincides with a backwatered agricultural lane crossing (**Figure 3**).

Figure 3: Reach delineation for Salt Creek and the West Humber Tributary at the three major watercourse crossings along Airport Road.

4. Historical Assessment

A review of past conditions is typically carried out in order to document changes in land use and channel form over time. Historic aerial images from 1954 and 1978 were reviewed and compared to more recent imagery for both Salt Creek and the West Humber Tributary (**Figures 4.1 and 4.2**). A historic planform overlay for both watercourse revealed that most major changes were due to alterations through realignment and channelization likely related to the surrounding agricultural practices. Most changes are apparent between 1954 and 1978, where both channels display a high degree of straightening and Salt Creek accommodates a series of on-line ponds. Following 1978, changes in channel form appear minimal. In terms of land use, changes were also limited throughout the reviewed record. Surrounding land use has remained agricultural and construction/development is fairly insignificant.

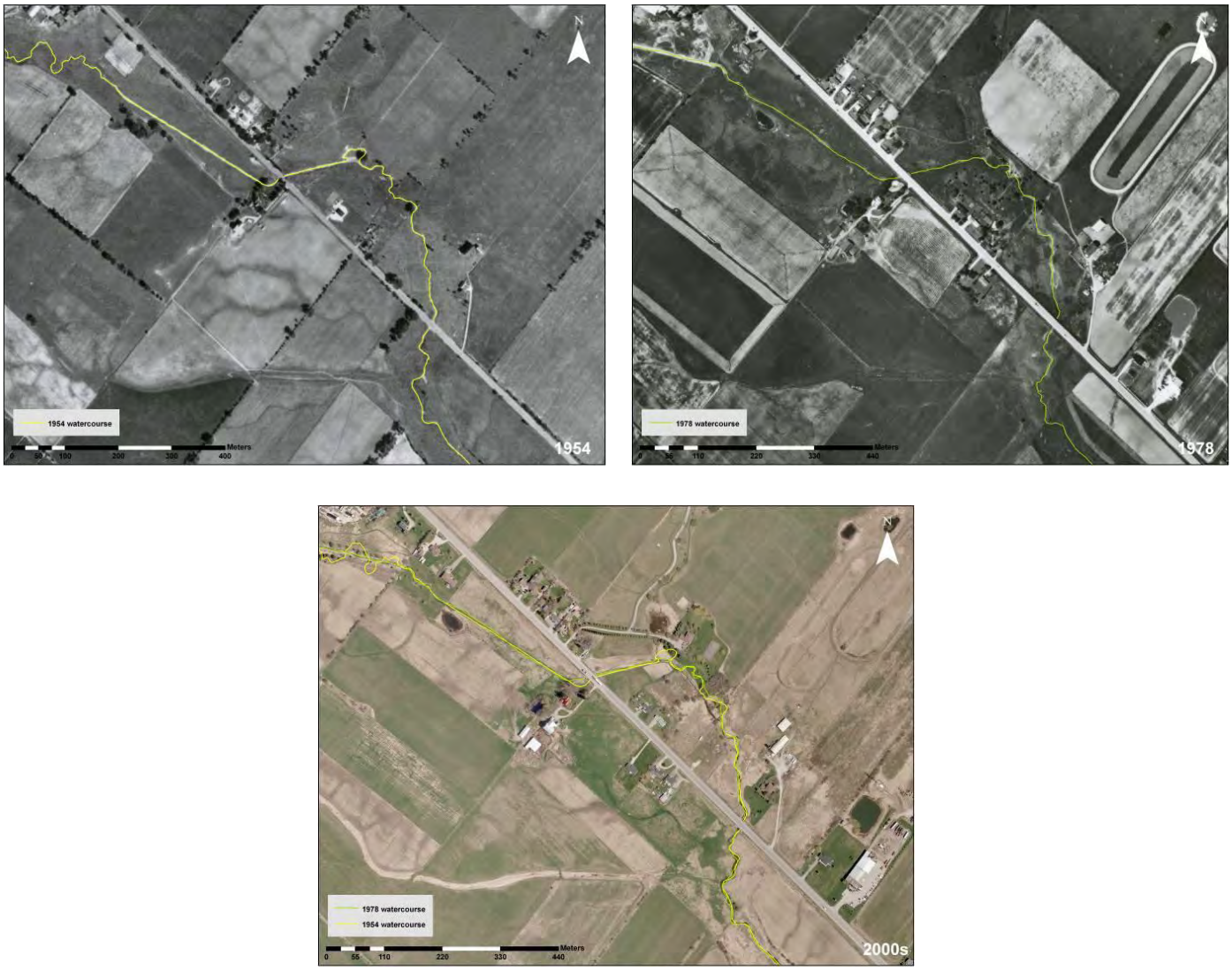

Figure 4.1: Historical planform overlay for study section of Salt Creek.

Figure 4.2: Historical planform overlay for study section of West Humber Tributary.

5. Existing Conditions

In order to confirm existing geomorphic conditions, document any evidence of active erosion and enable verification of meander belt width delineation, a field investigation of the delineated reaches on Salt Creek and the West Humber Tributary was carried out. Reaches SC-2, SC-1, and WH-3 were investigated on June 19, 2013. A photographic record of existing conditions during each site investigation is provided in **Appendix A**.

Rapid Geomorphic Assessment

The Rapid Geomorphic Assessment (RGA) was designed by the Ontario Ministry of Environment (1999) to assess reaches in rural and urban channels. This qualitative technique documents indicators of channel instability. Observations are quantified using an index that identifies channel sensitivity based on the presence or absence of evidence of aggradation, degradation, channel widening, and planimetric adjustment. Examples of these include the presence of bar forms, exposed infrastructure, head cutting due to knick point migration, fallen or leaning trees and exposed tree roots, channel scour along the bank toe, transition of the channel from single thread to multiple thread, and cut-off channels. Overall, the index produces values that indicate whether the channel is stable/in regime (score ≤0.20), stressed/transitional (score 0.21-0.40), or adjusting (score ≥0.40) (**Table 5.1**).

Table 5.1: RGA Classification

Factor Value	*Classification*	*Interpretation*
≤0.20	In Regime or Stable (Least Sensitive)	The channel morphology is within a range of variance for streams of similar hydrographic characteristics – evidence of instability is isolated or associated with normal river meander propagation processes
0.21-0.40	Transitional or Stressed (Moderately Sensitive)	Channel morphology is within the range of variance for streams of similar hydrographic characteristics but the evidence of instability is frequent
≥0.41	In Adjustment (Most Sensitive)	Channel morphology is not within the range of variance and evidence of instability is wide spread

Rapid Stream Assessment Technique

The Rapid Stream Assessment Technique (RSAT) was developed by John Galli at the Metropolitan Washington Council of Governments (Galli, 1996). The RSAT provides a more qualitative and broader assessment of the overall health and functions of a reach. This system integrates visual estimates of channel conditions and numerical scoring of stream parameters using six categories: channel stability, erosion and deposition, in-stream habitat, water quality, riparian conditions, and biological indicators.

Once a condition has been assigned a score, these scores are totaled to produce an overall rating that is based on a 50 point scoring system, divided into three classes: low (<20), moderate (20-35), and high (>35).

While the RSAT does score streams from a more biological and water quality perspective than the RGA, this information is also of relevance within a geomorphic context. This is based on the fundamental notion that, in general, the types of physical features that generate good fish habitat tend to represent good geomorphology

as well (i.e., fish prefer a variety of physical conditions – pools provide resting areas while riffles provide feeding areas and contribute oxygen to the water – good riparian conditions provide shade and food – woody debris and overhanging banks provide shade). Additionally, the RSAT approach includes semi-quantitative measures of bankfull dimensions, type of substrate, vegetative cover, and channel disturbance.

5.1.1 Reach SC-2

Reach SC-2 extends approximately 445m through agricultural lands and displays an altered planform. The channelized watercourse has limited sinuosity and receives additional roadside drainage prior to crossing Airport Road. Channel dimensions were variable due to dense channel vegetation which was primarily comprised of stands of Kentucky Blue Joint grass with some cattails. The channel was generally small, with bankfull widths ranging from 1.0 to 2.0m and a bankfull depth of 0.4m (**Table 5.2**). The reach displayed a moderate gradient with undefined pool-riffle sequencing. Bed material was comprised of a mix of silt clay and sands. Within vicinity of the crossing, the channel bed was lined with riverstone/rip rap measuring 5 to 10cm. Armoring of the channel bed continued within the crossing structure, which was lined with larger rip rap measuring 10 to 30cm.

The RGA resulted in a low-transitional score of 0.22, while the RSAT suggested a moderate degree of ecological health (**Tables 5.3 and 5.4**). The dominant geomorphic processes included widening and planimetric adjustment due to observed indicators that are characteristic of channels that are low-order, semi-confined and heavily vegetated. Widening was observed through steep angles through most of the reach and an extensive length of basal scour, while planimetric adjustment was evidenced by means of chute formation and a transition from a single thread to multiple channels.

5.1.2 Reach SC-1

Rapid assessment results for Reach SC-1 indicated that bankfull widths ranged from 1.5-2.0m in width and 0.6-0.8m in depth (**Table 5.2**). The channel was fairly confined and remained heavily vegetated, primarily by tall grasses. Conditions were similar to upstream reach SC-2, with the exception of exposed clay till observed along sections of the channel bed and various sections of localized widening or on-line ponds. Gradient was again moderate and the channel displayed some defined pool-riffle sequencing. Substrate at pools generally consisted of exposed clay till, while riffle features were comprised of gravel and sands with small cobbles measuring 5-10cm. The channel became considerably wider and deeper upstream of the crossing and regained some form just downstream of Airport Road, where it continued to flow through on-line, linear ponds.

RGA results identified the channel as being transitional (stability index of 0.272), while the RSAT resulted in a moderate degree of ecological health (**Tables 5.3 and 5.4**). Widening was observed as the predominant geomorphic process; however some evidence of degradation and planimetric adjustment were also noted. Indicators of widening included occurrence of large organic debris, steep bank angles, and an extensive length of basal scour.

5.1.3 Reach WH-3

Reach WH-3 was also likely altered due to agricultural purposes and displays some distorted bankfull dimensions. The upstream portion of the reach is considerably wide and transitions to a grassed channel with

bankfull widths and depths of approximately 2.0 and 1.0m, respectively (**Table 5.2**). Downstream of Airport Road, the watercourse becomes confined and transitions to a multiple thread channel. Riffle and pool features were generally unpronounced but did display differences in sediment composition. Fine gravel was observed at pool features and gravel with sands and small cobbles (5-10cm) at riffles. Substrate within the culvert was constructed and measured 20-40cm. The reach ended at a double CSP agricultural lane crossing, which coincided with a significant increase in channel width.

The RGA results suggest the channel is in a transitional state, with a score of 0.300. Planimetric form adjustment emerged as the primary geomorphic process and was observed through formation of chutes, multiple thread channel, and island formation. Overall, the reach displayed a moderate degree of ecological health (**Tables 5.3 and 5.4**).

Table 5.2: Summary of observed channel conditions along Silver Creek and Tributaries within Hungry Hollow.

Reach	Bankfull Dimensions (m)		Gradient	Substrate	
	Width	Depth		Pool	Riffle
SC-2	1.0-2.0	0.4	Moderate	cl - ms	cl - ms
SC-1	1.5-2.0	0.6-0.8	Moderate	clay till	gravel w/ sands, 5-10cm
WH-3	2.0-6.0	0.7-1.2	Low - moderate	fine gravel	gravel w/ sands, 5-10cm

Table 5.3: Summary of RGA scores for Silver Creek and Tributaries within Hungry Hollow.

RGA SUMMARY						
Reach	Factor Value				Stability Index	Condition
	Aggradation	Degradation	Widening	Planimetric Adjustment		
SC-2	0.143	0.167	0.286	0.286	0.220	Transitional
SC-1	0.143	0.286	0.375	0.286	0.272	Transitional
WH-3	0.111	0.286	0.375	0.429	0.300	Transitional

Table 5.4: Summary of RSAT results for Silver Creek and Tributaries within Hungry Hollow.

Reach	Factor Value						Overall Score	Condition
	Channel stability	Scour / deposition	Instream Habitat	Water Quality	Riparian Condition	Biological Indicators		
Max. Score	**11**	**8**	**8**	**8**	**7**	**8**	**50**	
SC-2	5	4	5	5	5	5	29	Moderate
SC-1	5	5	4	4	4	5	27	Moderate
WH-3	5	4	4	5	5	5	28	Moderate

6. Meander Belt Width Delineation

Streams and rivers are dynamic features that change their configuration and position within a floodplain by means of meander evolution, development, and migration processes. When meanders change shape and position, the associated erosion and deposition that enable these changes to occur can cause loss or damage to private property and infrastructure. For this reason, when development or other activities are contemplated near a watercourse, it is desirable to designate a corridor that is intended to contain all of the natural meander and migration tendencies of the channel. Outside of this corridor, it is assumed that private property and structures will be safe from the erosion potential of the watercourse. The space that a meandering watercourse occupies on its floodplain, within which all associated natural channel processes occur, is commonly referred to as the meander belt.

The Belt Width Delineation Procedure is applicable to a range of systems and follows a process-based methodology for determining the meander belt width based on background information, historic data (including aerial photography), degree of valley confinement and channel planform (Parish Geomorphic Ltd., 2004).

Preliminary Meander Belt Width

Based on available mapping and digital aerial images, preliminary belt widths were delineated for each study reach. A meander belt width is typically identified by drawing lines parallel to the governing outermost meanders of the existing channel planform and following the meander axis, which was applied to reaches SC-1 and WH-3. Due to the altered planform of reach SC-2, the preliminary width for reach SC-1 was used as a surrogate. Reach SC-1 displayed a more natural meandering planform and is located just downstream. The preliminary widths for reaches SC-1 and WH-3 were governed by meander amplitude and measure 32.0 and 34.0m, respectively. The preliminary width of 32.0m was then applied to reach SC-2. Prelminary widths can be viewed in **Figures 6.1, 6.2** and **6.3** and are summarized in **Table 6.1**.

Factor of Safety

From a geomorphic perspective, the 25 or 100-year migration rate typically represents the factor of safety to be applied to either side of the meander belt width in order to account for bank erosion and channel migration over time. However, due to the scale of the tributaries, high degree of vegetative cover, and high degree of channel alteration, migration rates representative of each reach could not be accurately quantified. In lieu of applying the erosion rate, a setback representing 10% of the preliminary meander belt width was applied to either side of the channel for each reach. The setback for reaches SC-2 and SC-1 measures 3.2m, while that of reach WH-3 measures 3.4m and is applied to either side of the channel. Setbacks and final meander belt widths for each reach can be viewed in **Figures 6.1, 6.2** and **6.3** and are summarized within **Table 6.1**.

Table 6.1: Meander Belt Widths for Silver Creek and Tributaries within Hungry Hollow.

Meander Belt Width Delineation			
Reach	SC-2	SC-1	WH-3
Preliminary Belt Width (m)	32.0	32.0	34.0

Erosion Setback (m)	3.2	3.2	3.4
Final Belt Width (m)	38.4	38.4	40.8

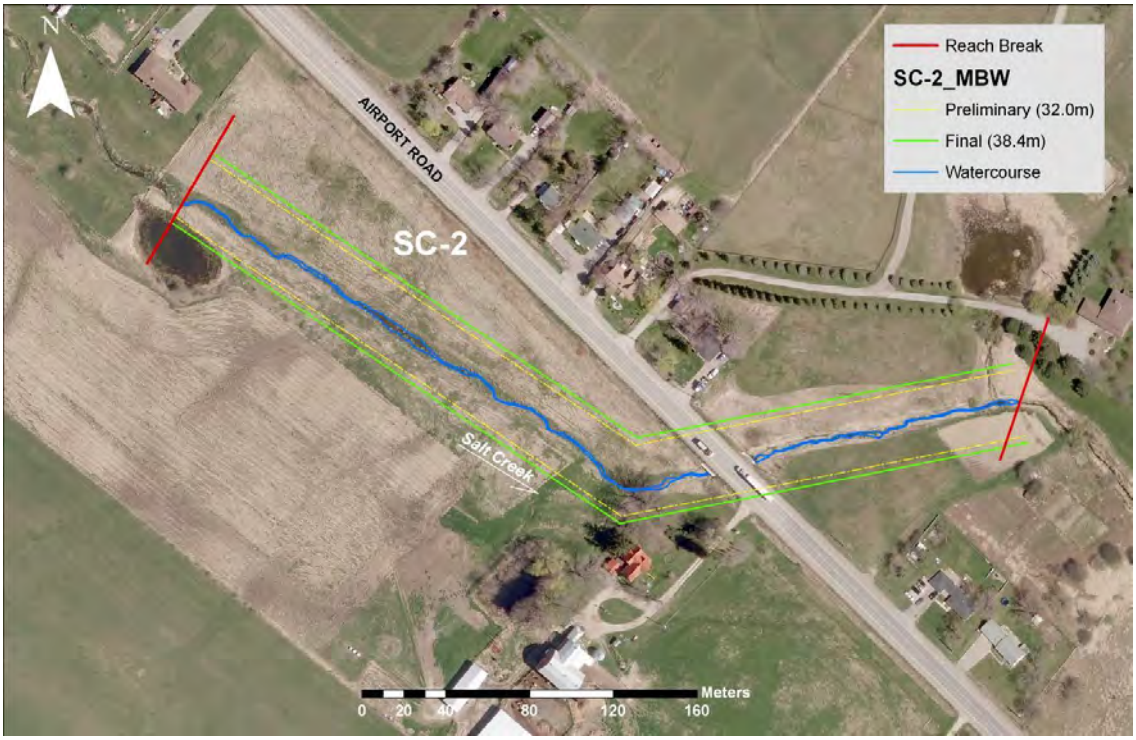

Figure 6.1: Delineation of preliminary meander belt width and factor of safety applied to Salt Creek reach SC-2.

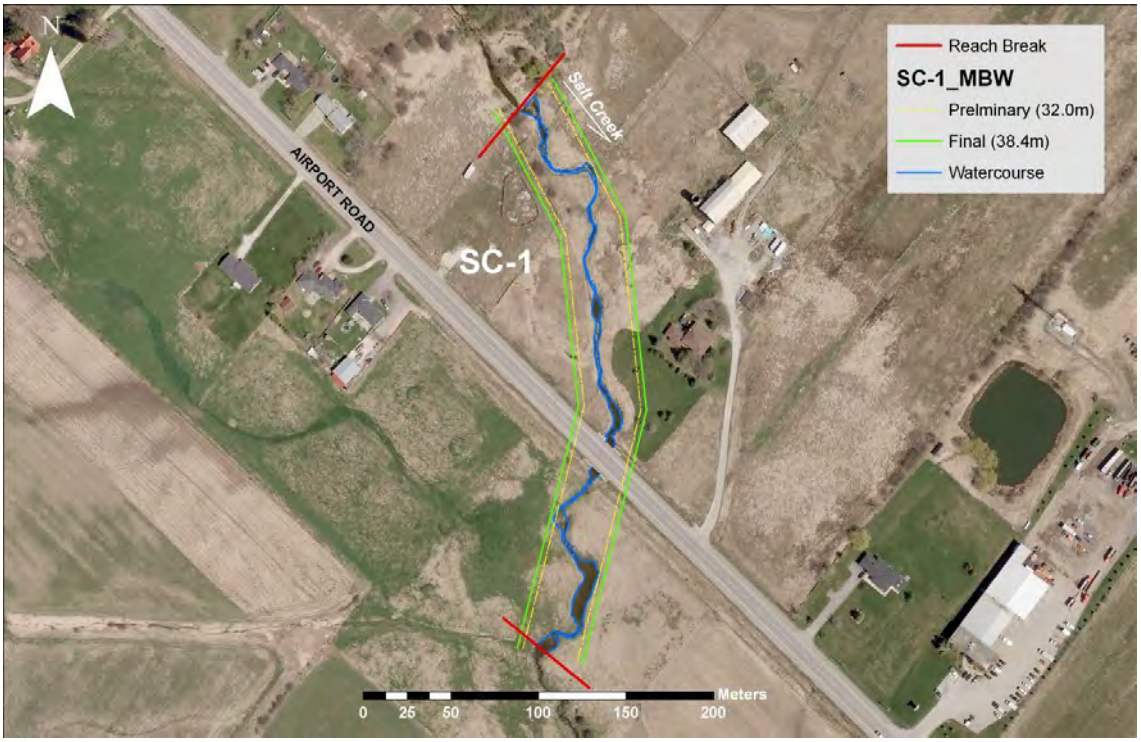

Figure 6.2: Delineation of preliminary meander belt width and factor of safety applied to Salt Creek reach SC-1.

Figure 6.3: Delineation of preliminary meander belt width and factor of safety applied to West Humber Tributary reach WH-3.

7. Geomorphic Crossing Assessment

To provide insight towards structure sizing for watercourse crossings, a risk-based procedure is typically applied. This procedure takes into account six main parameters, including channel size, valley setting, meander belt width, meander amplitude, channel stability and the 100-year migration rate. All of these risk factors encompass a wide range of data sources at a variety of spatial and temporal sales in order to evaluate and determine whether a crossing structure size is appropriate from a geomorphic perspective. Each risk factor is described below, while **Table 7** presents the resulting data specific to the study site.

- *Channel Size*: The potential for lateral channel movement and erosion tends to increase with stream size. Headwater stream tend to exhibit low rates of lateral migration due to the stabilizing influence of vegetation on the channel bed and banks. Erosive forces in larger watercourses tend to exceed the stabilizing properties of vegetation and result in higher migration rates.

- *Valley Setting*: Watercourses with wide, flat floodplains and low valley and channel slopes tend to migrate laterally across the floodplain over time. Watercourses that are confined in narrow, well drained valleys are less likely to erode laterally but are more susceptible to down-cutting and channel widening, particularly where there are changes in upstream land use. Typically the classification of the valley will fall into one of three categories: confined, partially confined, and unconfined.

- *Meander Belt Width*: The meander belt width represents the maximum expression of the meander pattern within a channel reach. Therefore, this width/corridor covers the lateral area that the channel could potentially occupy over time. This value has been used by regulatory agencies for corridor delineation associated with natural hazards and the meander belt width is typically of a similar dimension to the regulatory floodplain. The use of the meander belt width of structure sizing has been established as a criterion by some regulatory agencies and certainly represents a very conservative approach

- *Meander Amplitude*: The meander amplitude and wavelength are important parameters to ensure that channel processes and functions can be maintained within the crossing. For the purposes of this protocol, the meander amplitude of the watercourse would be measured in vicinity of the crossing and used as a guide to determine the relative risk to the structure. The number of meander wavelengths to be considered is both dependent on the scale of the watercourse and the degree of valley confinement.

- *Rapid Geomorphic Assessment (RGA) Score*: An RGA score is essentially a measure of the stability of the channel. Channels that are unstable tend to be actively adjusting and thus are sensitive to the possible effects of the proposed crossing. Accordingly, there is more risk associated with unstable channels. While the actual RGA score will be reported, there are three levels of stability: 0-0.20 is stable; 0.21-0.40 is moderately stable; >0.40 is unstable.

- *100-year Migration Rates*: Using historical aerial photographs, migration rates may be quantified (where possible) for each crossing location. A higher migration rate indicates a more unstable system and higher geomorphic risk. Ideally, watercourse crossing structures should be aligned perpendicular to and centered on a straight section of channel, or at an appropriate skew that would not affect channel processes. In terms of sizing, the structure would ideally span the meander belt width in order to

accommodate the downstream migration of meander features. In many cases, however, the costs prohibit such structure sizes. From a geomorphic perspective, larger structures are favored to minimize the long-term risk and maintenance associated with natural channel adjustment.

Table 7: Summary of risk assessment parameters for Airport Road crossings of Salt Crk and West Humber Trib

Reach	Bankfull Width (m)	Valley Setting	Meander Belt Width (m)	Meander Amplitude (m)	RGA stability index	100-year Migration Rate (m/yr)
SC-2	1.0-2.0	Semi-confined	38.4	N/A*	0.220	N/A
SC-1	1.5-2.0	Semi-confined	38.4	8.0	0.272	N/A
WH-3	2.0-6.0	Semi-confined	40.8	17.0	0.300	N/A

*Meander amplitude not applicable: the proposed infrastructure is located along a straight section of channel planform, with no sizeable upstream meander features.

The potential risk associated with the Airport Road crossings would typically be attributed to the dense channel vegetation and tendency for planimetric adjustment via the formation of multiple thread channels. However, each site displays localized widening upstream of each crossing which backwaters flow and reduces erosion potential. Risk due to geomorphic processes is also minimal due to the small scale of both Salt Creek and the West Humber Tributary. Currently, each of the existing culverts is large enough to accommodate the geomorphic form and function of each respective watercourse. The Salt Creek Culvert, Deans Culvert and Norris Bridge displayed opening widths of approximately 7.0, 6.0, and 10.0m, respectively; however, none of the observed watercourses maintain their channel form through these crossing structures. Each of the channels loses definition at the crossings and result in pooling and wetted widths that maximize the width of each culvert. The existing structures therefore provide adequate capacity, but result in issues regarding sediment transport and fish passage. The Salt Creek Culvert and Norris Bridge displayed some aggradation and would likely become fish barriers during low-flow periods. Deposition of fine materials was also observed at Deans Culvert; however, fish passage would not be a concern due to the considerable depths at this location.

8. Conclusions & Recommendations

A meander belt width and crossing risk assessment was undertaken for sections of Salt Creek and a West Humber Tributary within the vicinity of proposed roadway improvements to Airport Road in Caledon, ON. The purpose of this report was to establish the hazard limits and review the associated crossing structures from a geomorphic perspective. This study included a range of desktop analyses to characterize the geomorphic conditions, which was then supported by a field evaluation that confirmed existing conditions.

Based on a review of available mapping and aerial images, a single reach was delineated in the vicinity of each of the three major watercourse crossings indentified within the Airport Road EA study limits. These reaches were based primarily on land-use and hydrologic controls. A preliminary belt width was governed by the lateral extent of the meander form and was determined to be 32.0m for reach SC-1 and 34.0m for reach WH-3. The 32.0m preliminary width was subsequently utilized as a surrogate measurement for upstream reach SC-2 due to its altered planform. A factor of safety representing 10% of the preliminary belt widths was then applied to either side of the channel, resulting in final widths of 38.4m (SC-2 and SC-1) and 40.8m (WH-3). The belt widths were then reviewed collectively with other risk factors to determine whether the existing crossing structures are appropriate sizes to accommodate the respective geomorphic conditions.

Much of the liability surrounding both the Salt Creek and West Humber Tributary crossings is due to dense vegetation and inclination towards planimetric adjustment. This risk is generally negated, however, due to the small size of the watercourses and high degree of channel alterations. Each displayed localized widening and loss of channel form at each of the crossing locations, resulting in pooling and wetted widths that occupy the extent of the structures. While larger structures are always favorable from a geomorphic perspective, the existing openings would likely support the long term form and function of each watercourse and limit risk to proposed infrastructure, provided that the channel form is restored at each site. Rather than increasing the structure width at each site, geomorphic function would benefit from improvements to the channel form. This can be achieved through installation of material within the culverts to define the channels and would mitigate both fish passage and sediment transport issues.

9. References

Chapman, L.J. and Putnam, D.F. 1984. Physiology of southern Ontario. Ontario Geological Survey Special Volume 2. 270p.

Chapman, L.J. and Putnam, D.F. 2007. Physiography of Southern Ontario: Ontario Geological Survey, Miscellaneous Release – Data 228.

Galli, J., 1996. *Rapid stream assessment technique, field methods.* Metropolitan Washington Council of Governments. 36pp.

Ministry of Environment. 2003. *Revised Stormwater Management Guidelines Draft Report.*

(Ontario) Ministry of the Environment. 2003. Stormwater Management Planning and Design Manual, Ontario Ministry of Environment, March 2003.

PARISH Geomorphic Ltd. 2002. *Geomorphological protocols for subwatershed studies.* Submitted to: Regional Municipality of Ottawa-Carleton.

Parish Geomorphic Ltd. 2004. Belt Width Delineation Procedures. Submitted to: Toronto and Region Conservation Authority.