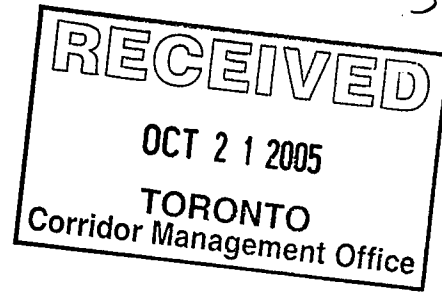


GEOCRES No
31D-543



**GEOTECHNICAL INVESTIGATION
HIGHWAY 400 CROSSING
BARRIE, ONTARIO**

for

EXPERTECH NETWORKS INSTALLATION INC.

PETO MacCALLUM LTD.
19 CHURCHILL DRIVE
BARRIE, ONTARIO
L4N 8Z5
PHONE: (705) 734-3900
FAX: (705) 734-9911
EMAIL: barrie@petomacallum.com

Distribution:
3 cc: Expertech
1 cc: PML Barrie
1 cc: PML Toronto

PML Ref.: 05BF059
Report: 1
October 2005

October 13, 2005

PML Ref.: 05BF059
Report: 1

Mr. Jim Julian
Contract Inspector – Line Manager
Expertech Network Installation Inc.
114 John Street
Barrie, Ontario
L4N 2K9

Dear Mr. Julian

**Geotechnical Investigation
Highway 400 Crossing
Barrie, Ontario**

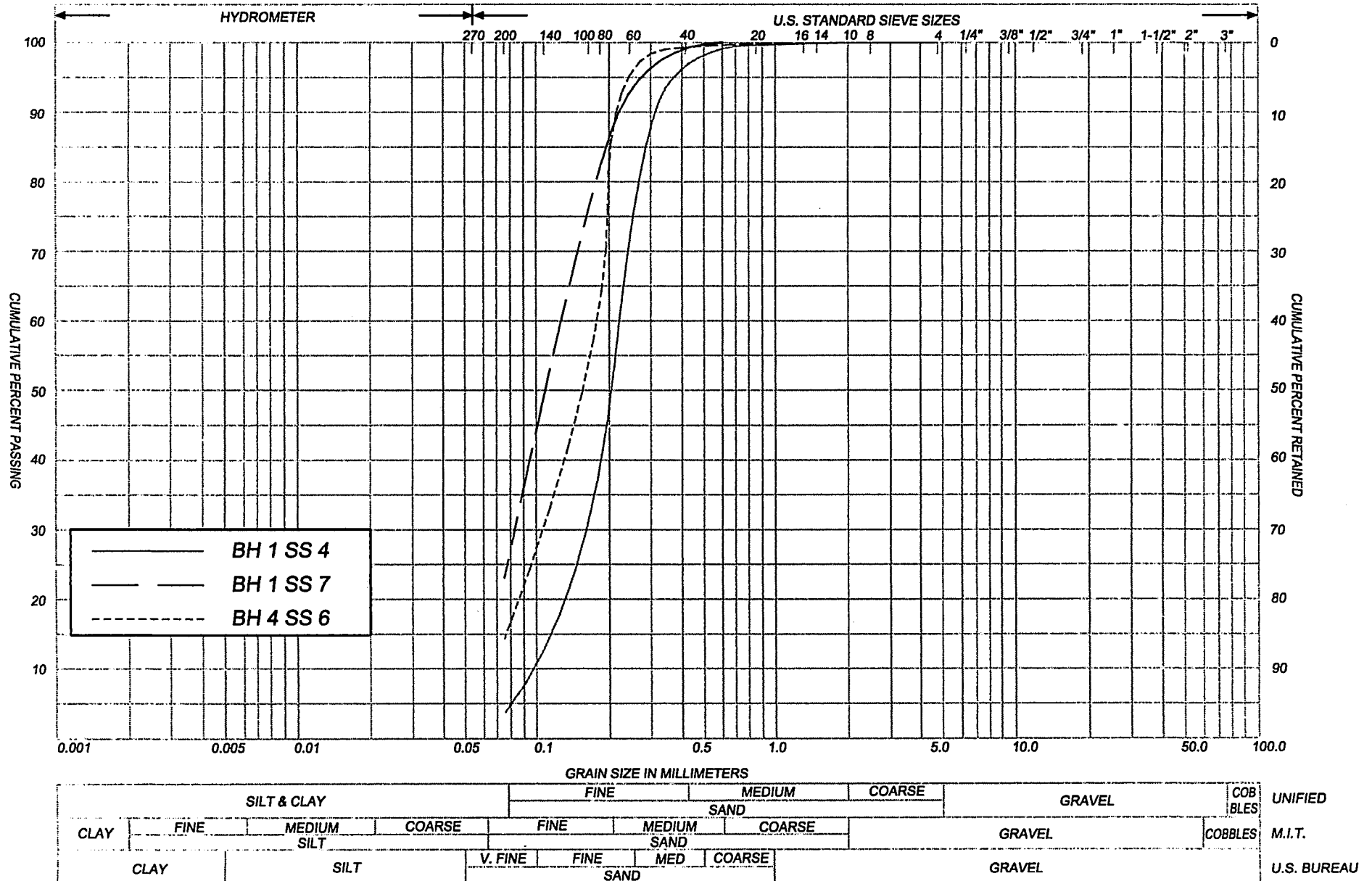
We are pleased to present the results of the geotechnical investigation recently completed at the above noted project site. The work described in this report was authorized by Mr. J. Julian of Expertech Network Installation Inc. in the signed Engineering Services Agreement, PML Ref.: 05BF059, dated September 16, 2005.

The project involves installation of multiple conduit / fibre cable across Highway 400 between Lockhart Road and Salem Road as illustrated on Drawing No. 1, appended. The Highway is located within a 9 to 10 m deep cut at this location. The cable will be run in a 61 m long 400 mm diameter steel pipe to be installed beneath the Highway using directional boring techniques. It is understood the obvert of the pipe will be at least 5 m below road level.

The purpose of this assignment was to determine the subsurface soil and groundwater conditions at the site and based on this information, to provide an engineering report with geotechnical recommendations and comments to assist in planning the proposed crossing.

PARTICLE SIZE DISTRIBUTION CHART

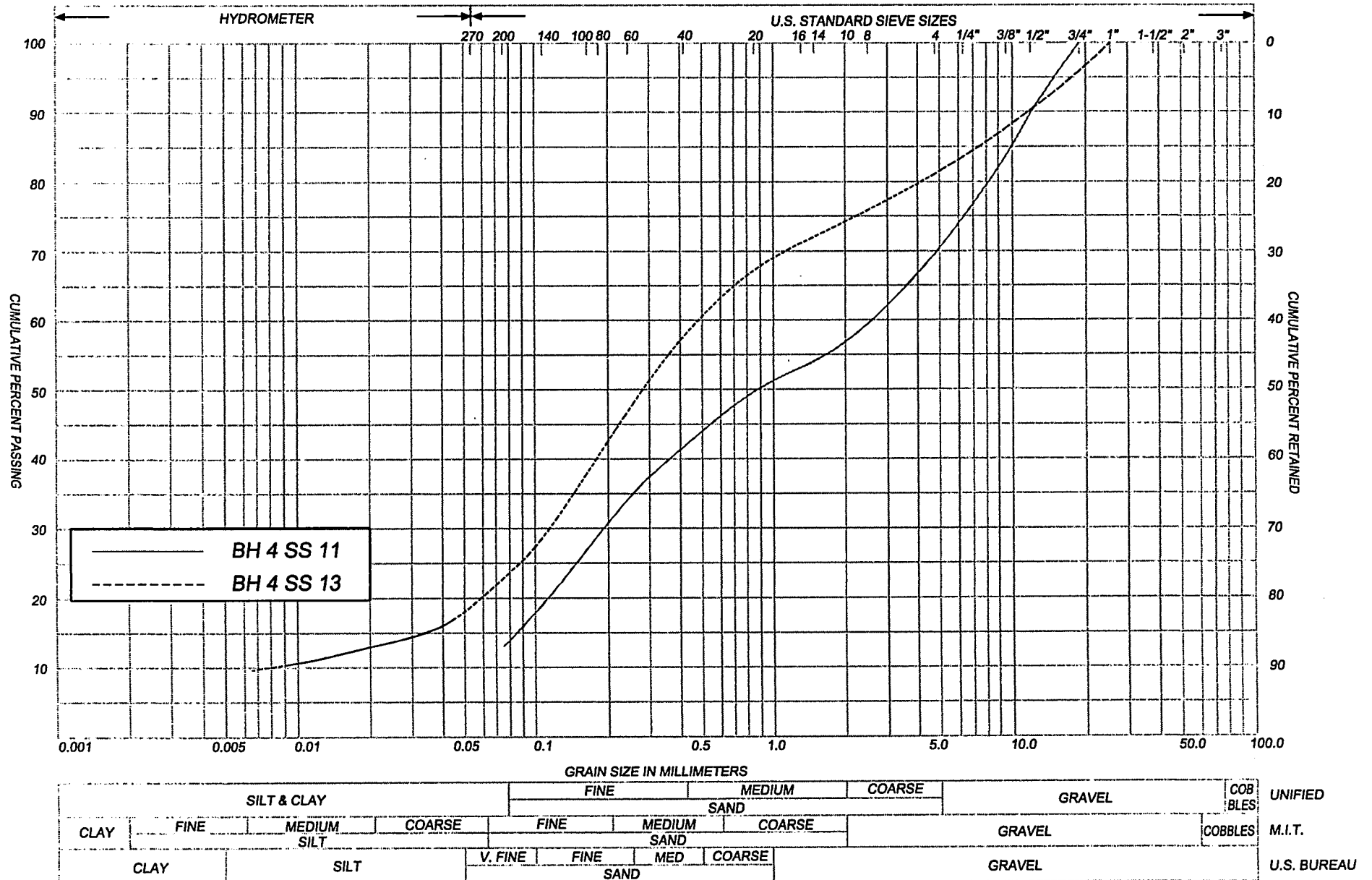
PML Ref.: 05BF059
Figure No.: 1





PARTICLE SIZE DISTRIBUTION CHART

PML Ref.: 05BF059
Figure No.: 2



LIST OF ABBREVIATIONS



PENETRATION RESISTANCE

Standard Penetration Resistance N: - The number of blows required to advance a standard split spoon sampler 0.3 m into the subsoil. Driven by means of a 63.5 kg hammer falling freely a distance of 0.76 m.

Dynamic Penetration Resistance: - The number of blows required to advance a 51 mm, 60 degree cone, fitted to the end of drill rods, 0.3 m into the subsoil. The driving energy being 475 J per blow.

DESCRIPTION OF SOIL

The consistency of cohesive soils and the relative density or denseness of cohesionless soils are described in the following terms:

<u>CONSISTENCY</u>	<u>N (blows/0.3 m)</u>	<u>c (kPa)</u>	<u>DENSENESS</u>	<u>N (blows/0.3 m)</u>
Very Soft	0 - 2	0 - 12	Very Loose	0 - 4
Soft	2 - 4	12 - 25	Loose	4 - 10
Firm	4 - 8	25 - 50	Compact	10 - 30
Stiff	8 - 15	50 - 100	Dense	30 - 50
Very Stiff	15 - 30	100 - 200	Very Dense	> 50
Hard	> 30	> 200		
WTPL	Wetter Than Plastic Limit			
APL	About Plastic Limit			
DTPL	Drier Than Plastic Limit			

TYPE OF SAMPLE

SS	Split Spoon	TW	Thinwall Open
WS	Washed Sample	TP	Thinwall Piston
SB	Scraper Bucket Sample	OS	Oosterberg Sample
AS	Auger Sample	FS	Foil Sample
CS	Chunk Sample	RC	Rock Core
ST	Slotted Tube Sample		
	PH	Sample Advanced Hydraulically	
	PM	Sample Advanced Manually	

SOIL TESTS

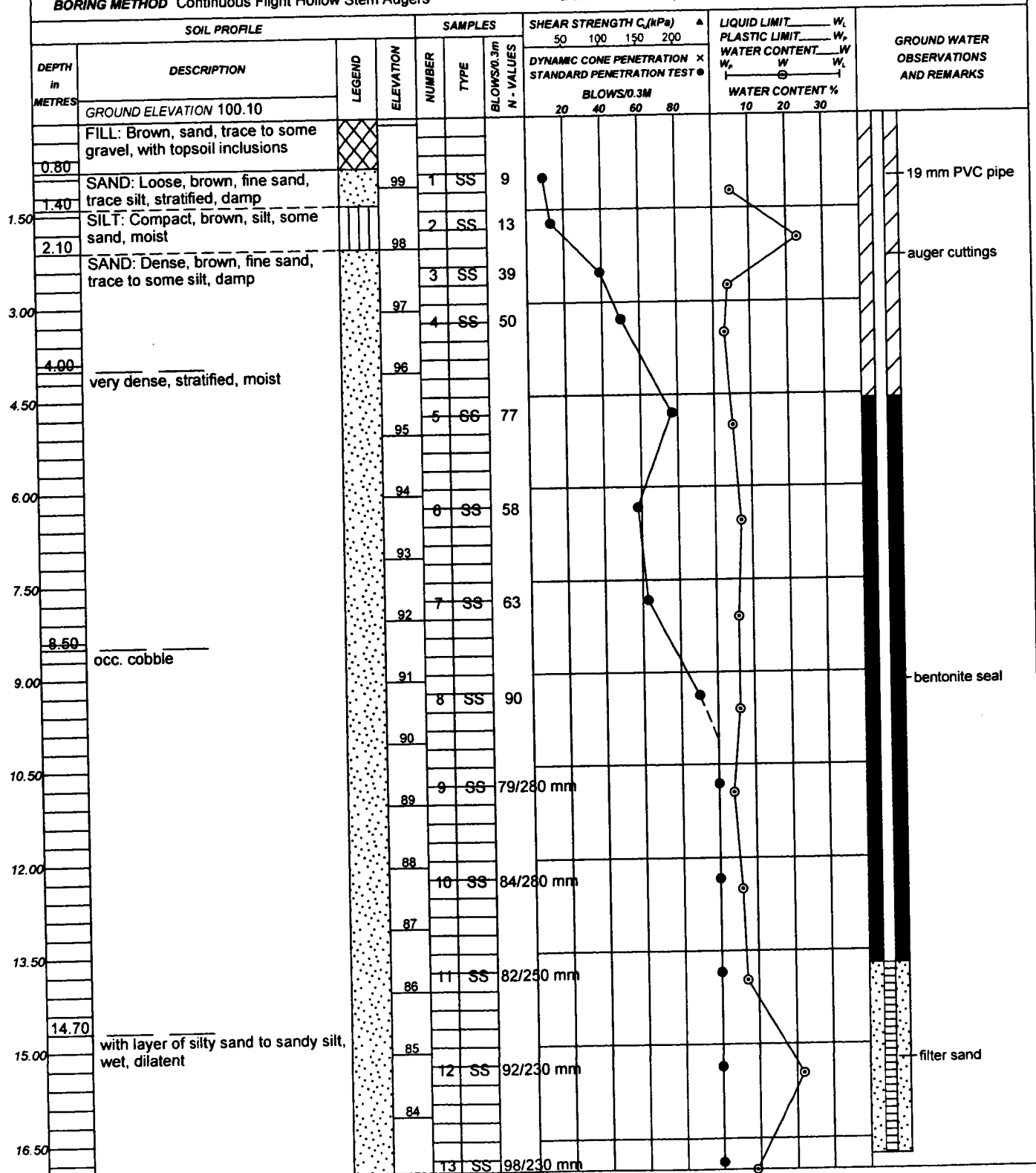
Qu	Unconfined Compression	LV	Laboratory Vane
Q	Undrained Triaxial	FV	Field Vane
Qcu	Consolidated Undrained Triaxial	C	Consolidation
Qd	Drained Triaxial		

LOG OF BOREHOLE NO. 1

PROJECT Highway 400 Crossing
LOCATION Barrie, Ontario
BORING METHOD Continuous Flight Hollow Stem Augers

BORING DATE September 28, 2005

OUR PROJECT NO. 05BF059
ENGINEER JFW
TECHNICIAN RM



NOTES

CHECKED BY

LOG OF BOREHOLE NO. 1

PROJECT Highway 400 Crossing

LOCATION Barrie, Ontario

BORING METHOD Continuous Flight Hollow Stem Augers

BORING DATE September 28, 2005

OUR PROJECT NO. 05BF059

ENGINEER JFW

TECHNICIAN RM

SOIL PROFILE		SAMPLES					SHEAR STRENGTH C_u (kPa) ▲				LIQUID LIMIT _____ W_L PLASTIC LIMIT _____ W_P WATER CONTENT _____ W W_P W W_L ----- WATER CONTENT %				GROUND WATER OBSERVATIONS AND REMARKS
DEPTH in METRES	DESCRIPTION	LEGEND	ELEVATION	NUMBER	TYPE	BLOWS/0.3m N - VALUES	50 100 150 200								
							DYNAMIC CONE PENETRATION ×								
							STANDARD PENETRATION TEST ●								
							BLOWS/0.3M				10 20 30				
CONTINUED FROM PREVIOUS PAGE							20	40	60	80					
17.20	BOREHOLE TERMINATED AT 17.20 m													Upon completion of augering No free water No cave Water Level Readings Date Depth(m) Sep 28 NFW Oct 7 NFW	

NOTES

CHECKED BY

JFW

LOG OF BOREHOLE NO. 2

PROJECT Highway 400 Crossing
LOCATION Barrie, Ontario
BORING METHOD Continuous Flight Solid Stem Augers

BORING DATE October 5, 2005

OUR PROJECT NO. 05BF059
ENGINEER JFW
TECHNICIAN RM

BORING METHOD Continuous Flight Solid Stem Augers										BORING METHOD									
SOIL PROFILE					SAMPLES			SHEAR STRENGTH C_u (kPa) ▲				LIQUID LIMIT W_L				GROUND WATER OBSERVATIONS AND REMARKS			
DEPTH in METRES	DESCRIPTION	LEGEND	ELEVATION	NUMBER	TYPE	BLOWS/0.3m N - VALUES	50 100 150 200				PLASTIC LIMIT W_p								
							DYNAMIC CONE PENETRATION × STANDARD PENETRATION TEST ●				WATER CONTENT W								
							BLOWS/0.3M				WATER CONTENT %								
	GROUND ELEVATION 90.00						20	40	60	80	10	20	30						
0.70	PAVEMENT: 170 mm asphaltic concrete, over 300 mm brown, crushed sand and gravel, trace silt, over brown sand, trace gravel, trace silt		89	1	SS	55													
1.50	SAND: Very dense, brown, fine sand, trace to some silt, stratified, damp		88	2	SS	74													
				3	SS	50/150 mm													
3.00			87	4	SS	88/280 mm													
4.00			86																
4.50	silty sand, trace gravel, moist			5	SS	50/140 mm													
5.60			85																
6.00	fine to medium sand, trace silt, with layers of sandy silt, wet		84	6	SS	97/280 mm													
			83																
7.50	BOREHOLE TERMINATED AT 7.75 m			7	SS	50/130 mm													
														Upon completion of augering No free water No cave					

NOTES


CHECKED BY *JFW*

LOG OF BOREHOLE NO. 3

PROJECT Highway 400 Crossing
LOCATION Barrie, Ontario
BORING METHOD Continuous Flight Solid Stem Augers

BORING DATE October 5, 2005

OUR PROJECT NO. 05BF059
ENGINEER JFW
TECHNICIAN RM

SOIL PROFILE				SAMPLES		SHEAR STRENGTH C_u (kPa) ▲				LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W				GROUND WATER OBSERVATIONS AND REMARKS	
DEPTH in METRES	DESCRIPTION	LEGEND	ELEVATION	NUMBER	TYPE	BLOWS/0.3m N - VALUES	50 100 150 200				W_L W_P W				
							DYNAMIC CONE PENETRATION × STANDARD PENETRATION TEST ●				WATER CONTENT %				
							BLOWS/0.3M				10 20 30				
	GROUND ELEVATION 89.90						20	40	60	80					
0.90	PAVEMENT: 100 mm asphaltic concrete, over 350 mm brown, crushed sand and gravel, trace silt, over brown sand, trace gravel, trace silt		89	1	SS	42									
1.50	SAND: Very dense, brown, fine sand, trace to some silt, stratified, damp		88	2	SS	76									
				3	SS	96/280 mm									
3.00				87	4	SS	82/280 mm								
4.00				86											
4.50	with layers of silty sand to sandy silt, moist			85	5	SS	50/150 mm								
5.60															
6.00	fine to medium sand, trace silt, with layers of sandy silt, wet			84	6	SS	78/290 mm								
7.00				83											
7.50	SAND TILL: Very dense, brown, silty sand to sandy silt, trace gravel, moist			82	7	SS	101								
8.00	BOREHOLE TERMINATED AT 8.00 m														
													Upon completion of augering No free water No cave		

NOTES

CHECKED BY

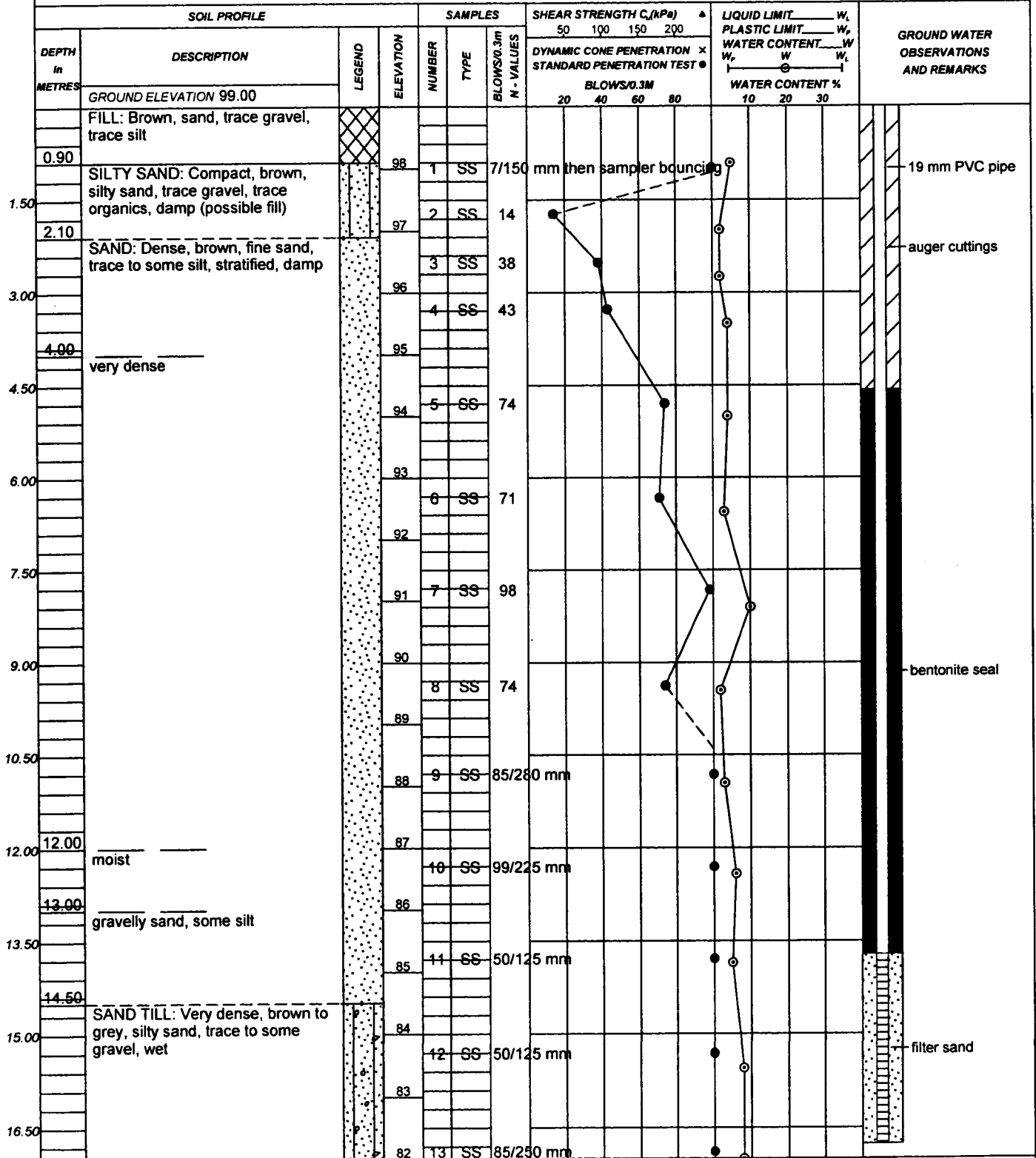
JFW

LOG OF BOREHOLE NO. 4

PROJECT Highway 400 Crossing
LOCATION Barrie, Ontario
BORING METHOD Continuous Flight Solid Stem Augers

OUR PROJECT NO. 05BF059
ENGINEER JFW
TECHNICIAN RM

BORING DATE September 28, 2005



NOTES

CHECKED BY

JFW

LOG OF BOREHOLE NO. 4

PROJECT Highway 400 Crossing

LOCATION Barrie, Ontario

BORING METHOD Continuous Flight Solid Stem Augers

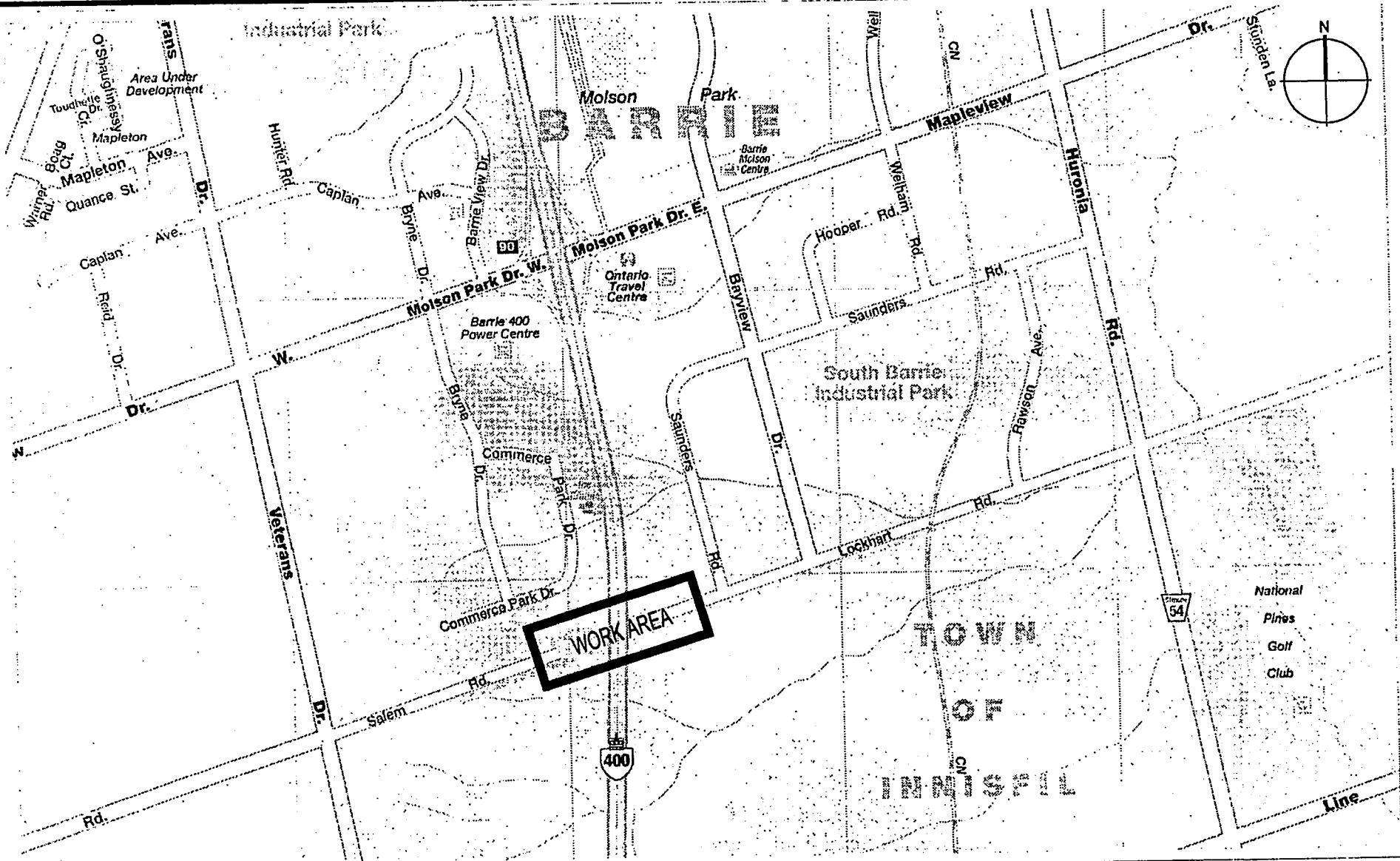
OUR PROJECT NO. 05BF059

ENGINEER JFW

TECHNICIAN RM

BORING DATE September 28, 2005

SOIL PROFILE				SAMPLES			SHEAR STRENGTH C_u (kPa) ▲				LIQUID LIMIT W_L			GROUND WATER OBSERVATIONS AND REMARKS
DEPTH in METRES	DESCRIPTION	LEGEND	ELEVATION	NUMBER	TYPE	BLOWS/0.3m N - VALUES	50 100 150 200				PLASTIC LIMIT W_p			
							DYNAMIC CONE PENETRATION ×				WATER CONTENT W			
							STANDARD PENETRATION TEST ●				W_p W W_L			
							BLOWS/0.3M				WATER CONTENT %			
	CONTINUED FROM PREVIOUS PAGE						20	40	60	80	10	20	30	
17.20	BOREHOLE TERMINATED AT 17.20 m													Upon completion of augering No free water No cave Water Level Readings <u>Date</u> <u>Depth(m)</u> Sep 28 15.8 Oct 7 14.1



LEGEND

WORK AREA

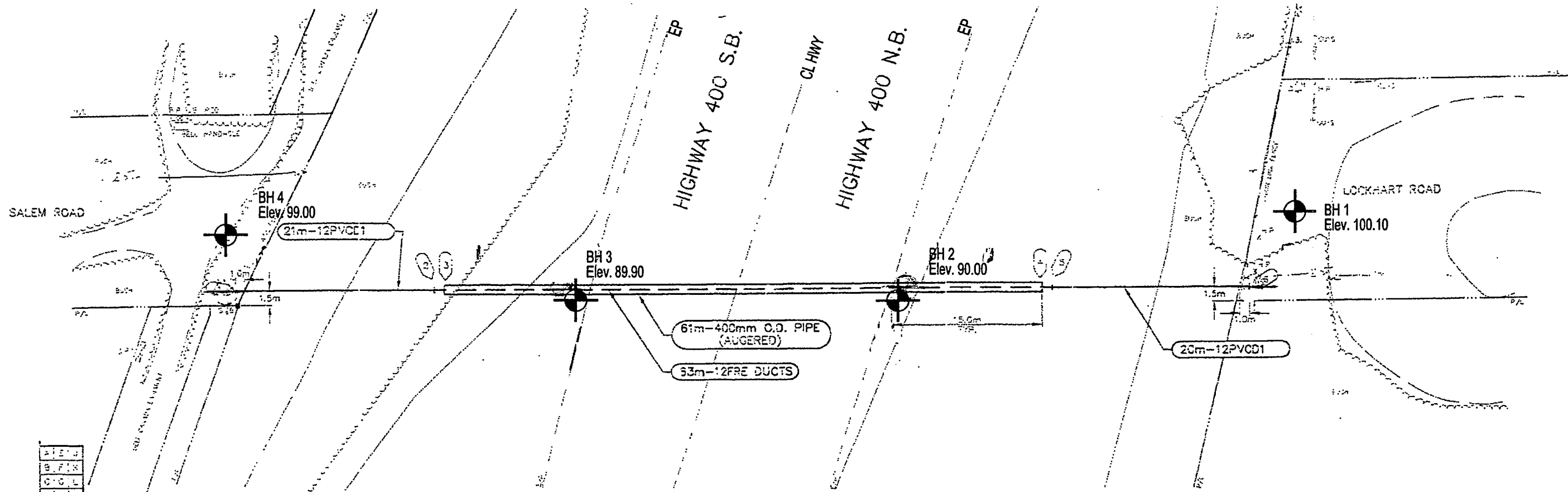
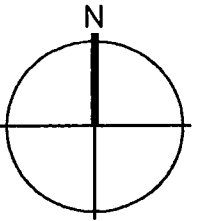
Limits of Work Zone

KEY PLAN


HIGHWAY 400 CROSSING
AT LOCKHART ROAD
BARRIE, ONTARIO

PML **Peto MacCallum Ltd.**
CONSULTING ENGINEERS

DATE	SCALE	JOB NO.	DRAWING NO.
OCTOBER 2005	1:20 000	05BF059	1




LEGEND

 BH 1
Elev. 100.10 Borehole No. 1
Ground Surface Elevation

NOTES:
1. Base plan Provided by Ainley Group, Drawing 205106-1

BOREHOLE LOCATION PLAN

**HIGHWAY 400 CROSSING
AT LOCKHART ROAD
BARRIE, ONTARIO**

**Peto MacCallum Ltd.**
CONSULTING ENGINEERS

DATE	SCALE	JOB NO.	DRAWING NO.
OCTOBER 2005	1:500	05BF059	2