

To: BETTY BENNETT

30M11-218

FOUNDATION INVESTIGATION REPORT

CONTRACT NO. 2002 - 2000

HIGH MAST LIGHTING

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FOUNDATION INVESTIGATION REPORT - MTO COMPILED

(FROM CONTRACT NO. 68-24 DATA) following the above appendices

INTRODUCTION

This report presents the factual results of a geotechnical study that was completed by DST Consulting Engineers (DST) in relation to the construction of proposed High Mast Lighting Poles along Highway 401 between Renforth Drive and Highway 427.

This report is subject to the attached Statement of Limitations of Appendix A.

PART A – FOUNDATION INVESTIGATION REPORT

1.0 SITE DESCRIPTION

The proposed High Mast Lighting (HML) Poles will be installed along Highway 401 between Renforth Drive and Highway 427. More specifically, the HML's will be constructed at various locations within the Highway 401/Highway 427 basket-weave interchange which extends from just west of Renforth Drive to just east of Highway 27.

The topography within the interchange area is dominated by a series of approach embankments and earth cuts associated with the many overpass and underpass structures that are present within the Highway 401 and 427 Interchange. Overall, the terrain with the intersection slopes from west to east and north to south. Drainage through the interchange is dominated by the north south flowing Mimico Creek which passes through the site in a man-made channel a short distance to the east of Highway 27.

The area surrounding the Highway 401/427 interchange is totally developed by a series of commercial and industrial developments.

2.0 INVESTIGATION METHODOLOGY AND RESULTS

The investigation aspects of this study consisted of the following:

1. Compilation of sub-surface information for the general site area as available from within the “Geocres” databank system of the MTO’s Foundation Design Section.
2. Cross-referencing of the data obtained during 1) relative to the proposed HML pole locations, leading to the identification of those most relevant to the present study.
3. Reproduction of the relevant boreholes using present day borehole presentation software to produce a series of legible and consistent looking borehole logs. This included converting the northings, eastings and elevations of the original logs into the present day systems.

This exercise resulted in a total of 48 boreholes (BHC1 though BH C48) being identified as relevant to the proposed works. The location of these boreholes is shown on the attached Borehole Locations Plan, with borehole logs presented in the attached Appendix B. For completeness, Table 1 presents details on the origin of the compiled boreholes relative to their original borehole designation and file number within the MTO’s “geocres” databank system. The prefix C has been added to the borehole numbers of this report to reflect their “compiled” nature and to help avoid confusion with the original borehole numbers. As indicated in Table 1, the boreholes reproduced within this report were all drilled in 1966 and 1967.

Laboratory water content data, plasticity data and grain size data as presented on the original borehole logs has been included on the reproduced borehole logs of Appendix B. However, complete grain size distribution curves as presented as part of the original studies are not reproduced within.

Borehole location data as presented on the reproduced borehole logs of Appendix B and on the Borehole Locations Plan are relevant to the NAD83 system and were obtained based on the assumption the original imperial co-ordinates shown on the logs were based on the NAD23 system. Geodetic elevation data as presented on the logs was determined by straight conversion of the imperial elevation data presented on the original borehole logs. Through discussion with the survey department of Marshall Macklin Monaghan it is understood that this approach may result in the elevations being in error by between 0.1 and 0.2m, which is considered insignificant to the present study.

3.0 SUBSURFACE CONDITIONS

3.1 General

Based on the soil conditions encountered within the boreholes, the original soil profile within the project limits consists of a thin surficial layer of topsoil overlying an extensive layer of clayey silt to sandy silt till that typically extends to the top of the underlying shale bedrock. However, discontinuous layers/pockets of cohesionless sand and gravelly sand are present at many locations within the till. The total thickness of overburden deposits increase from about 5 to 8 m in the vicinity of Renforth Drive to a depth in excess of 15 m to the east of Highway 27. In association with the increasing thickness of overburden deposits, the elevation to the underlying shale bedrock decreases from about elevation 150 m in the vicinity of Renforth Drive to below elevation 130 m to the east of Highway 27. Surficial deposits of fill material associated with the construction of the various embankments that are present within the project limits are also expected, although data relating to the type, consistency and extent of these deposits was not obtained as part of this study. Reported groundwater levels within the various boreholes across the site indicates that the original water table was located at quite shallow depth.

A more in depth discussion on each of the various soil materials identified above is presented in Section 3.2 with an assessment of groundwater conditions presented in Section 3.3. However, for specific information the reader should consult the attached Borehole logs of Appendix B. It should also be noted that the discussion presented within is based on borehole data that dates back to 1966 and 1967. While the sub-surface conditions at depth are not expected to have changed significantly, the conditions within the upper 3 m may vary substantially as a result of construction and landscaping activities that have been undertaken since that time.

3.2 Subsurface Profile

3.2.1 Fill

While surficial fill materials are only reported within two (2) of the boreholes presented within (BH C6 and C21), these types of materials are known to exist throughout the interchange area as part of the many embankments that are present. While not confirmed, it would be expected that the fill would primarily consist of local earth fill similar to that encountered within BH C6 and C21. However, some fill sections constructed with shale bedrock could also be present.

3.2.2 Topsoil

A layer of topsoil varying between 200 and 300 mm was encountered at surface at the location of most of the Boreholes presented in Appendix B. However, it is expected that these depths will have changed as a part of subsequent construction and landscaping activities within the Highway 401/Highway 427 interchange area.

3.2.3 Clayey Silt/Sandy Silt Till

This material represents the dominant overburden layer across the site as evidenced by its presence in every borehole log presented in Appendix B either immediately below the surficial topsoil layer or inter-bedded with interglacial sand deposits. In many instances this material extends uninterrupted to the top of the underlying shale bedrock. The total thickness of overburden till deposits, including the inter-bedded sand layers, varies from about 6 to 8 m in the vicinity of Renforth Drive to greater than 15 m to the east of Highway 27. There is also some evidence to suggest that the total thickness of overburden deposits increases along Highway 27 from north to south.

Texturally, the till material appears to consist of a combination of slightly cohesive clayey silt and more non-plastic sandy silt materials. Traces of gravel and occasional cobbles and boulders are also noted within the till, which is consistent with the glacial origin of this material. The results of 20 grain size distribution analyses on the clayey silt fraction of the deposit as presented on the attached borehole logs reveal the following:

Gravel	Average Content	7 % (range 0 to 18%)
Sand	Average Content	33 % (range 12 to 50 %)
Silt	Average Content	42 % (range 5 to 57 %)
Clay	Average Content	24 % (range 8 to 24 %)

Similarly, the results of 16 grain size distribution analyses for the sandy silt fraction as presented on the attached borehole logs reveal the following:

Gravel	Average Content	12 % (range 0 to 35%)
Sand	Average Content	33 % (range 6 to 75 %)
Silt	Average Content	48 % (range 5 to 93 %)
Clay	Average Content	7 % (range 0 to 16 %)

Atterberg plasticity results completed on clayey silt fraction indicate that the material is of low plasticity, with in-situ water contents that are typically below the plastic limit of the soil.

SPT 'N' values reported on the logs are typically in excess of 30 and most often well in excess of 50, indicating that the plastic clayey silt portion has a hard consistency with the more cohesionless sandy silt material being considered dense to very dense. However, at a few locations, some lower values were recorded in the uppermost 2 to 3 m, suggesting that stiff to very stiff conditions occasionally exist near the surface.

3.2.4 Interglacial Sand and Gravel

This refers to apparently discontinuous layers/pockets of cohesionless sand and gravelly sand mixtures that were frequently encountered either above, within or below the dominant glacial till materials. The maximum confirmed thickness of these materials within the boreholes of Appendix B is 4.4 m at BH C13 although typically, these deposits are present as layers between about 2 to 3 m in thickness. However, thin lenses of similar material are also noted at many other locations within the till unit.

Texturally, the material is quite variable and varies from silty sand through to sand with a trace of silt to gravelly sand materials. The results of 16 grain size distribution analyses as reported on the attached borehole logs from samples of these materials indicate the following:

Gravel	Average Content	21% (range 0 to 68 %)
Sand	Average Content	54 % (range 30 to 87 %)
Silt	Average Content	25% (range 1 to 67 %)

SPT 'N' values within this layer are typically well in excess of 30, with most values being greater than 50. Accordingly, this material is described as having a dense to very dense degree of compactness. However, at a few locations, some lower values were recorded in the uppermost 2 m, suggesting that some compact conditions occasionally exist near the surface.

3.2.5 Shale Bedrock

Shale bedrock of the Georgian Bay formation was confirmed to be present below the clayey silt till and/or interglacial sand deposits within 17 of the 48 borehole logs presented in Appendix C and is expected to underlie the entire site. Overall, the depth to the top of the shale varies from a low of 4.9 m at BH C28 to greater than 17 m at BH C38. However, in general terms the borehole data suggests that the top of the shale is in the order of 6 to 8 m deep in the vicinity of Renforth Drive, increasing to greater than 15 m to the east of Highway 27 and to even greater depths to the south of Eglinton Avenue along Highway 427. In terms of elevation, the shale appears to be present at about elevation 150 m in the vicinity of Renforth Drive decreasing towards the east to about elevation 135 m east of Highway 27 to the north of Eglinton Avenue and to below elevation 130 m to the south Eglinton Avenue along Highway 427.

The borehole data suggests that the upper portion of the shale is weathered which gives way to more sound material at depth. Available data tends to suggest that the unconfined compressive strength of the intact shale of the Georgian Bay Formation is typically quite strong at between about 15 to 25 MPa. However, this formation is known to contain many sub-layers of dolomite and/or limestone, which can be considerably stronger with unconfined compressive strengths that are often in excess of 100 MPa. Typically, these layers are in the order of 100 to 200 mm thick although thicker layers up to about 400 mm are often present.

3.3 Groundwater

The reported groundwater level within the boreholes upon completion of drilling and about 2 weeks after completion of drilling, indicate that stabilized water table at the site was originally quite high, i.e., about 1 to 2 m below ground surface. However, it should be noted that these measurements are relatively short term and may vary seasonally. It is also possible that the groundwater level within the interchange area may have been lowered since the late 60's in response to the many earth cuts that are present.

4.0 CLOSURE

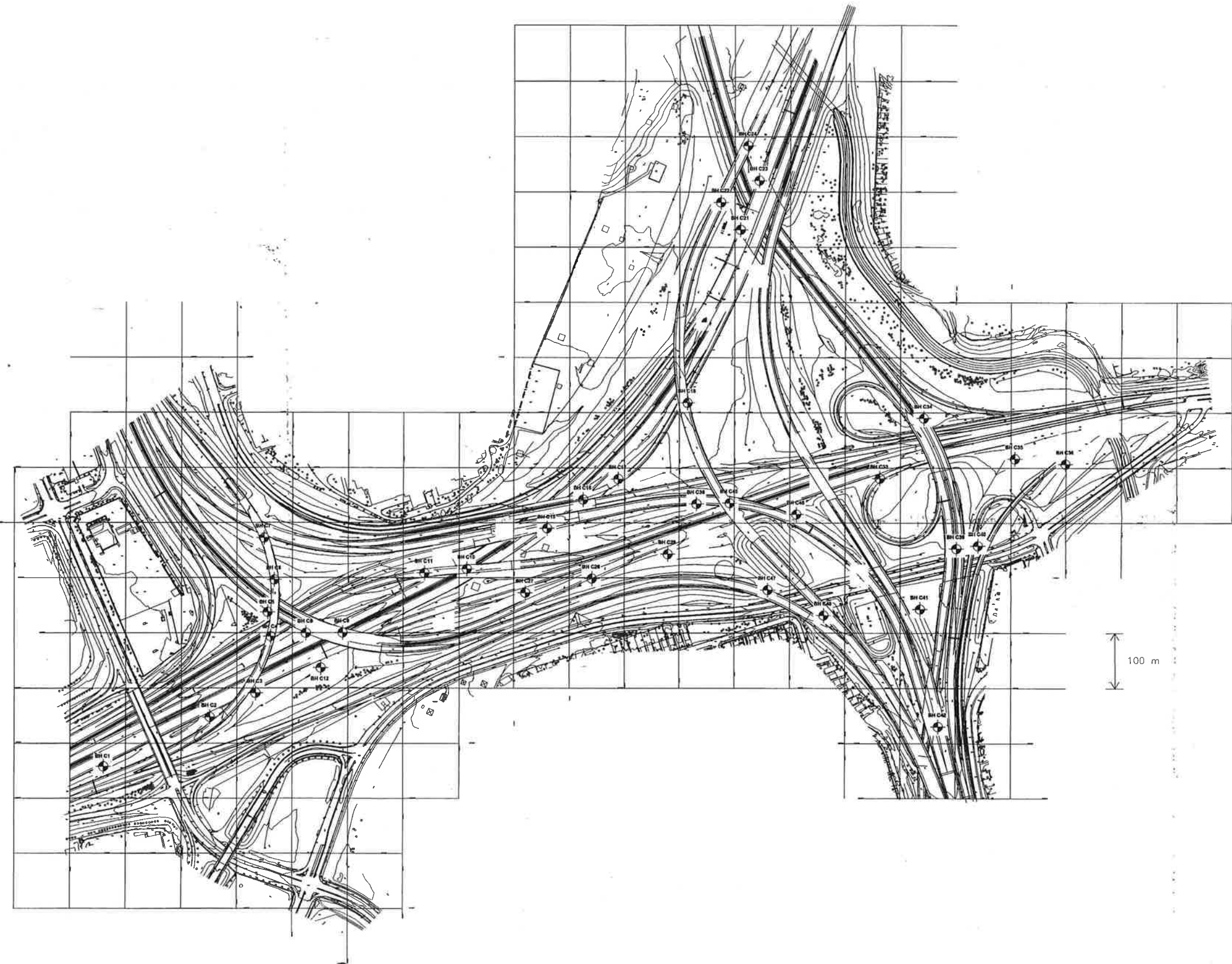
This report was developed from a larger Foundation Investigation and Design Report that was prepared by DST and dated October 19, 2001. The original report was signed and stamped by two registered Professional Engineers in Ontario, i.e., the principal preparer of the report, Ivan Corbett, P.Eng., Manager of DST Toronto and the reviewer of the report, Mike Fabius, P. Eng., DST's designated contact with the MTO's Foundation Design Branch for the provision of geotechnical foundation services.

TABLE 1
HIGHWAY 401 REHABILITATION,
RENFORTH DRIVE TO HIGHWAY 427
HIGH MAST LIGHTING POLE FOUNDATION STUDY
ORIGIN OF COMPILED BOREHOLES

Compiled Borehole Number	MTO DATABANK INFORMATION		
	Date of Drilling	Original Borehole Number	MTO File Number
C1	April 25, 1967	17	30M11-44
C2	April 27, 1967	16	30M11-44
C3	April 26, 1967	15	30M11-44
C4	July 13, 1967	8	30M11-55
C5	July 19-20, 1967	6	30M11-55
C6	August 4, 1967	6a	30M11-55
C7	August 31, 1967	9	30M11-55
C8	June 29, 1967	4	30M11-55
C9	July 5, 1967	3	30M11-55
C10	July 10, 1967	32	30M11-55
C11	July 5, 7, 10, 1967	33	30M11-55
C12	April 26, 1967	14	30M11-44
C13	July 12, 19, 1967	28	30M11-55
C14	July 10, 11, 1967	27	30M11-55
C15	July 5, 6, 1967	23	30M11-55
C16	July 12, 14, 1967	24	30M11-55
C17	July 10, 1967	22	30M11-55
C18	Dec. 14-15, 1966	26	30M11-53
C19	Dec. 15-16, 1966	24	30M11-53
C20	December 22, 1966	31	30M11-53
C21	December 22, 1966	29	30M11-53
C22	Dec. 20-21, 1966	27	30M11-53
C23	December 16, 1966	30	30M11-53
C24	December 16, 1966	28	30M11-53

TABLE 1
HIGHWAY 401 REHABILITATION,
RENFORTH DRIVE TO HIGHWAY 427
HIGH MAST LIGHTING POLE FOUNDATION STUDY
ORIGIN OF COMPILED BOREHOLES

C25	Dec 16, 19, 1966	34	30M11-53
C26	April 27, 1967	12	30M11-44
C27	April 26, 1967	11	30M11-44
C28	April 26, 1967	10	30M11-44
C29	April 25, 1967	9	30M11-44
C30	June 29, 1967	2	30M11-44
C31	July 13, 14, 1967	37	30M11-53
C32	July 14, 1967	35	30M11-53
C33	April 24, 1967	5	30M11-44
C34	December 13, 1966	17	30M11-53
C35	April 27, 1967	3	30M11-44
C36	April 27, 1967	2	30M11-44
C37	December 12, 1966	15	30M11-53
C38	December 9, 1966	5	30M11-53
C39	Dec. 1, 2, 1966	12	30M11-53
C40	December 3, 1966	13	30M11-53
C41	July 20-21, 1967	47	30M11-53
C42	July 5, 1967	39	30M11-53
C43	July 6, 1967	30	30M11-55
C44	April 25, 1967	8	30M11-44
C45	December 14, 1966	20	30M11-53
C46	April 25, 1967	7	30M11-44
C47	Dec. 12-13, 1966	1	30M11-53
C48	Dec. 13-15, 1966	4	30M11-53



METRIC

PLATE No PLATE
CONT No **2002 - 2000**
WP No 47-99-00



HIGHWAY 401 REHABILITATION,
RENFORTH DRIVE TO HIGHWAY 427
BORE HOLE LOCATIONS

SHEET



No	ELEVATION	CO-ORDINATES	
		NORTH	EAST
C1	162.52	4 836 457.9	297 360.1
C2	159.14	4 836 547.5	297 550.9
C3	157.43	4 836 591.1	297 633.2
C4	157.15	4 836 693.5	297 660.3
C5	156.24	4 836 737.7	297 654.8
C6	163.83	4 836 796.3	297 667.0
C7	159.41	4 836 872.2	297 648.1
C8	157.19	4 836 699.6	297 724.0
C9	157.43	4 836 700.3	297 789.8
C10	157.64	4 836 816.1	298 014.2
C11	157.06	4 836 808.5	297 938.3
C12	157.40	4 836 636.9	297 750.5
C13	156.76	4 836 836.8	297 970.6
C14	156.18	4 836 882.8	298 084.9
C15	154.14	4 836 889.8	298 160.2
C16	151.97	4 836 942.6	298 225.1
C17	152.67	4 836 980.1	298 288.8
C18	154.84	4 837 117.8	298 415.0
C19	152.19	4 837 264.1	298 448.5
C20	140.60	4 837 342.1	298 542.1
C21	142.59	4 837 431.8	298 510.1
C22	149.90	4 837 481.5	298 474.4
C23	144.00	4 837 520.8	298 543.6
C24	143.59	4 837 583.9	298 523.5
C25	144.69	4 837 656.7	298 557.6
C26	158.74	4 836 721.3	297 975.8
C27	155.66	4 836 772.8	298 120.9
C28	152.20	4 836 798.7	298 241.0
C29	151.24	4 836 843.2	298 379.3
C30	153.31	4 836 934.9	298 431.5
C31	153.71	4 836 980.1	298 654.0
C32	154.35	4 837 036.1	298 619.8
C33	146.82	4 836 981.0	298 762.8
C34	139.08	4 837 089.8	298 842.3
C35	139.08	4 837 016.3	299 006.6
C36	139.81	4 837 006.9	299 099.3
C37	139.20	4 837 070.6	299 180.0
C38	152.31	4 836 798.7	298 727.1
C39	151.36	4 836 853.3	298 901.5
C40	150.05	4 836 858.4	298 940.1
C41	148.59	4 836 743.2	298 835.9
C42	148.13	4 836 530.5	298 869.1
C43	156.33	4 836 823.1	298 095.3
C44	152.64	4 836 865.5	298 436.9
C45	150.11	4 836 936.5	298 491.2
C46	150.48	4 836 915.7	298 611.9
C47	150.14	4 836 778.0	298 560.4
C48	150.00	4 896 732.2	298 661.9

Rev.				HIGHWAY 401/427 INTERCHANGE				DIST 6
	DATE	BY	DESCRIPTION	SUBM'D IC	CHECKED IC	DATE JAN. 24, 2001	SITE	
GEOCRES No				DRAWN SL	CHECKED MF	APPROVED	DWG 1	

APPENDIX A

Statement of Limitations

LIMITATIONS OF REPORT

The conclusions and recommendations presented in this report are based on information determined at the borehole locations. Subsurface and groundwater conditions between and beyond the boreholes may differ from those encountered at the specific locations tested, and conditions may become apparent during construction which were not detected and could not be anticipated at the time of the site investigation.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with details stated in this report. Since all details of the design may not be known, we recommend that we be retained during the final stage to verify that the design is consistent with our recommendations, and that assumptions made in our analysis are valid.

Unless otherwise noted, the information contained herein in no way reflects on environmental aspects of either the site or the subsurface conditions.

The comments given in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of boreholes may not be sufficient to determine all the factors that may affect construction methods and costs, e.g. the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusion as to how the subsurface conditions may affect their work.

DST CONSULTING ENGINEERS INC.

APPENDIX B

Borehole Logs

RECORD OF BOREHOLE No C1

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836457.9 N; 297360.1E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Solid Stem Augers COMPILED BY KN
DATUM Geodetic DATE 25.4.67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE □ QUICK TRIAXIAL X LAB VANE 20 40 60 80 100	PLASTIC LIMIT W _p NATURAL MOISTURE CONTENT W LIQUID LIMIT W _L WATER CONTENT (%) 10 20 30	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	*N* VALUES						
162.5 0.0	Ground Level SANDY SILT, very dense.					▽	162				
			1	SS	101		161				
							160				
			2	SS	121		159				
							158				0 7 92 1
							157				28 54 (18)
157.8 4.7	SANDY GRAVEL, very dense.						158				
157.0 5.5	CLAYEY SILT with SAND, fragments of shale, glacial till, hard. Glacial Till		4	SS	96		157				
							156				
							155				
154.3 8.2	END OF BOREHOLE AT 8.23 m.										7 19 54 20

+ . X . Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C2

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836547.5 N; 297550.9 E ORIGINATED BY MK
 DIST 6 HWY 401/427 interchange BOREHOLE TYPE Washboring BX Casing COMPILED BY KN
 DATUM Geodetic DATE 27.4.67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
159.1	Ground Level													
0.0	CLAYEY SILT with SAND, hard													
			1	SS	65									
156.7														
2.4	GRAVEL AND SAND, coarse to fine, very dense													
			2	SS	100									
			3	SS	77									
153.4														
5.8	CLAYEY SILT with SAND, hard													
			4	SS	143									
			5	SS	100									
150.9														
8.2	SHALE BEDROCK													
			6	SS	100									
148.0														
			7	SS	100									
11.1	END OF BOREHOLE AT 11.12 m													

+3. X 3. Numbers refer to
Sensitivity

○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C3

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836591.1 N; 297633.2 E ORIGINATED BY MK
 DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Washboring BX Casing COMPILED BY KN
 DATUM Geodetic DATE 26.4.67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
157.4	Ground Level													
0.0	CLAYEY SILT, hard													
			1	SS	99		157							
							156							
							155							
154.4	GRAVEL AND SAND, coarse to fine, very dense		2	SS	100		154							37 5 36 22
							153							
			3	SS	59		152							
152.3	SILTY SAND, with gravel, grey, very dense						151							
	Glacial Till		4	SS	100		150							16 66 (18)
							149							
150.7	SHALE BEDROCK						148							
			5	SS	100									
			6	SS	100									
147.8	END OF BOREHOLE AT 9.60 m													
9.6														

+3, X3: Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C4

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836693.5 N; 297660.3 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Continuous Flight Auger COMPILED BY KN
DATUM Geodetic DATE 13.7.67 CHECKED BY IC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20						40	60	80	100	20
157.2	Ground Level																	
0.0	CLAYEY SILT, with some sand, traces of gravel, stiff to hard		1	SS	12													
			2	SS	31													
			3	SS	25													
			4	SS	74													
			5	SS	100													
151.1	CLAYEY SILT with shale fragments																	
6.1																		
149.4	BEDROCK																	
142.3	END OF BOREHOLE AT 7.86 m																	
7.9																		

+ 3, X 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C5

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836737.7 N; 297654.8 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
DATUM Geodetic DATE 19.7.67 - 20.7.67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
156.2	Ground Level						156							
0.0	CLAYEY SILT with some sand, traces of gravel, very stiff to hard		1	SS	30		155							
			2	SS	19		154							
			3	SS	15		153							
			4	SS	35		152							
150.6			5	SS	100		151							
5.6	CLAYEY SILT with fragments of shale, hard		6	SS	150		150							
	Glacial Till		7	RC			149							
147.2							148							
9.0	SHALE BEDROCK		8	RC			147							
144.2							146							
12.0	END OF BOREHOLE AT 12.04 m						145							

+³ X³ Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C6

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836796.3 N; 297667.0 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
DATUM Geodetic DATE 4.8.67 CHECKED BY IC

SOIL PROFILE

SAMPLES

GROUND WATER
CONDITIONS

ELEVATION SCALE

DYNAMIC CONE PENETRATION RESISTANCE PLOT

20 40 60 80 100
SHEAR STRENGTH kPa
○ UNCONFINED + FIELD VANE
□ QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT
NATURAL MOISTURE CONTENT
LIQUID LIMIT
w_p w w_L
WATER CONTENT (%)
10 20 30

UNIT WEIGHT
γ
kN/m³

REMARKS
&
GRAIN SIZE
DISTRIBUTION
(%)
GR SA SI CL

ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT w _p w w _L WATER CONTENT (%)	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
163.8	Ground Level										
0.0	FILL, clayey silt, some sand pockets, traces of gravel, brown to grey, stiff to very stiff										
			1	SS	8		163				
							162				
			2	SS	15		161				
							160				
			3	SS	28		159				
							158				
			4	SS	26		157				
							156				
			5	SS	9		155				
							154				
			6	SS	29		153				
							152				
			7	SS	13		151				
							150				
			8	SS	33		149				
							148				
							147				
150.4											
13.4	CLAYEY SILT with fragments of shale, grey, hard		9	SS	100		150				
			10	SS	100		149				
							148				
			11	SS	100		147				
146.9											
16.9	END OF BOREHOLE AT 16.92 m										

+ 3 . X 3 : Numbers refer to
Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C7

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836872.2 N; 297648.1 E ORIGINATED BY MK
 DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
 DATUM Geodetic DATE 31.8.67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	*N* VALUES			20 40 60 80 100	20 40 60 80 100					
159.4	Ground Level													
0.0	CLAYEY SILT with SAND, some organics, traces of gravel, stiff to hard		1	SS	29		159							
			2	SS	18		158							
			3	SS	12		157							
			4	SS	30		156							
			5	SS	18		155							
			6	SS	60		154							
			7	SS	100		153							
			8	SS	100		152							
150.6	CLAYEY SILT with fragments of shale, grey, hard		9	SS	100		151							
8.8			10	SS	100		150							
			11	SS	100		149							
			12	SS	100		148							
147.2	END OF BOREHOLE AT 12.19 m		13	SS	100									
12.2														

ON: MOT MTO-015.GPJ ON: MOT.GDT 19/10/01

+ 3 X 3 Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C8

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836699.6 N: 297724.0 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
DATUM Geodetic DATE 29.6.67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
157.2	Ground Level						157							
0.0	CLAYEY SILT, some sand, traces of gravel, very stiff to hard		1	SS	24		156							
			2	SS	96		155							
			3	SS	194		154							
			4	SS	74		153							
			5	SS	58		152							
			6	SS	100		151							
			7	SS	100		150							
			8	SS	100		149							
148.4	SHALE BEDROCK		9	RC			148							
146.4	END OF BOREHOLE AT 10.76 m						147							

+3.X3 Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C9

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836700.3 N; 297789.9 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
DATUM Geodetic DATE 5.7.67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE □ QUICK TRIAXIAL × LAB VANE	WATER CONTENT (%)					
157.4 0.0	Ground Level CLAYEY SILT, becoming SANDY SILT to SILTY SAND with GRAVEL, very dense					V	157							
			1	SS	51			156						
			2	SS	100			155						
			3	SS	52			154						
			4	SS	47			153						
			5	SS	36			152						
151.0 6.4	SHALE BEDROCK		6	RC			151						2 31 54 13	
147.8 9.6	END OF BOREHOLE AT 9.60 m						150							
							149							
							148							

ON MOT MTO-015.GPJ ON MOT.GDT 19/001

RECORD OF BOREHOLE No C10

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836816.1 N: 298014.2 E ORIGINATED BY MK
 DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
 DATUM Geodetic DATE 10.7.67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	*N* VALUES			20 40 60 80 100	20 40 60 80 100	20 40 60 80 100	20 40 60 80 100		
157.6	Ground Level												
0.0	SANDY SILT to SILTY SAND, very dense						157						
155.8			1	SS	94		156						
1.9	SAND with gravel becoming GRAVEL with some sand, very dense						155						
			2	SS	100		154						
							153						
			3	SS	100		152						
151.7							151						
5.9	CLAYEY SILT, with fragments of shale		4	SS	100		150						
			5	SS	100								
149.8			6	SS	12								
8.0	END OF BOREHOLE AT 8.0 m												

+ 3, X 3: Numbers refer to Sensitivity
 O 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C11

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836808.5 N; 297938.3 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
DATUM Geodetic DATE 5.7.67 - 10.7.67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE □ QUICK TRIAXIAL × LAB VANE	WATER CONTENT (%)					
157.1 0.0	Ground Level SANDY SILT, traces of gravel													0 6 93 1
155.3 1.7	SAND with gravel, becoming GRAVEL with sand, occasional boulders, very dense		1	SS	74	▽								
			2	SS	25									
152.5 4.6	CLAYEY SILT, with sand, and numerous fragments of shale, hard		3	SS	74									
			4	SS	75									
149.1 7.9	SHALE BEDROCK WEATHERED		5	SS	100									
147.4 9.7	SOUND		6	RC										
145.3 11.7	END OF BOREHOLE AT 11.73 m													

ON MOT MTO-015.GPJ ON MOT.GDT 19/10/01

RECORD OF BOREHOLE No C12

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836636.9 N: 297750.5 E ORIGINATED BY MK
 DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
 DATUM Geodetic DATE 26.4.67 CHECKED BY IC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20 40 60 80 100					
157.4 0.0	SILTY CLAY TO CLAYEY SILT, hard		1	SS	58								
155.0 2.4	SANDY SILT, traces of gravel, very dense		2	SS	100								
152.8 4.6	SANDY SILT, some gravel and clay, grey Glacial Till		3	SS	52								
151.6 5.8	Shale Bedrock		4	SS	100								
			5	SS	100								
148.6 8.8	END OF BOREHOLE AT 8.84 m		6	SS	100								

+3, X3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C13

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836836.8 N; 297970.6 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
DATUM Geodetic DATE 12.7.67 - 19.7.67 CHECKED BY IC

SOIL PROFILE			SAMPLES		GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20 40 60 80 100					
156.8	Ground Level												
0.0	SAND, some gravel, very dense												
152.3													
4.4	CLAYEY SILT, some sand, gravel and fragments of shale												
150.4													
6.4	SHALE BEDROCK, weathered												
147.6													
9.1	END OF BOREHOLE AT 9.14 m												

+ 3, X 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C15

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836889.8 N; 298160.2 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
DATUM Geodetic DATE 5.7.67 - 6.7.67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)
								○ UNCONFINED □ QUICK TRIAXIAL	+ FIELD VANE × LAB VANE						
154.1	Ground Level							20 40 60 80 100	20 40 60 80 100						
0.0	CLAYEY SILT, with sand, traces of gravel, hard						154								
			1	SS	57		153								
			2	SS	96		152								
			3	SS	199		151								
149.9			4	SS	110		150								
4.3	CLAYEY SILT, with numerous shale fragments, hard		5	SS	106		149								
			6	SS	103		148								
			7	SS	103		147								
			8	SS	103		146								
			9	SS	103		145								
143.2			10	RC			144								
11.0	SHALE BEDROCK						143								
141.0							142								
13.1	END OF BOREHOLE AT 13.1 m														

+ 3, X 3 Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C16

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836942.6 N: 298225.1 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
DATUM Geodetic DATE 12.7.67 - 14.7.67 CHECKED BY IC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20 40 60 80 100					
152.0	Ground Level												
0.0	CLAYEY SILT, with sand and sand seams, traces of gravel, hard		1	SS	49								
			2	SS	130								
			3	SS	123								
			4	SS	130								
146.9	SHALE BEDROCK, weathered												
5.0													
144.5	END OF BOREHOLE AT 7.50 m												
7.5													

+³.X³ Numbers refer to Sensitivity O³% STRAIN AT FAILURE

RECORD OF BOREHOLE No C17

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836980.1 N: 298228.8 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
DATUM Geodetic DATE 10.7.87 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	N° VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)
								○ UNCONFINED □ QUICK TRIAXIAL	+ FIELD VANE × LAB VANE						
152.7 0.0	Ground Level CLAYEY SILT, with sand, traces of gravel, hard							20 40 60 80 100	10 20 30						
			1	SS	62		152								
			2	SS	142		151								
			3	SS	182		150								
			4	SS	116		149								
147.2 5.5	SILTY SAND with gravel, occasional boulders, very dense		5	SS	77		148							6 45 48 1	
			6	SS	100		147								
145.1 7.6	CLAYEY SILT with fragments of shale, hard						146								
143.8 8.8	SHALE BEDROCK, weathered		7	SS	100		145								
			8	RC			144								
141.6 11.1	END OF BOREHOLE AT 11.12 m						143								
							142								

+³, ×³ Numbers refer to Sensitivity ○³% STRAIN AT FAILURE

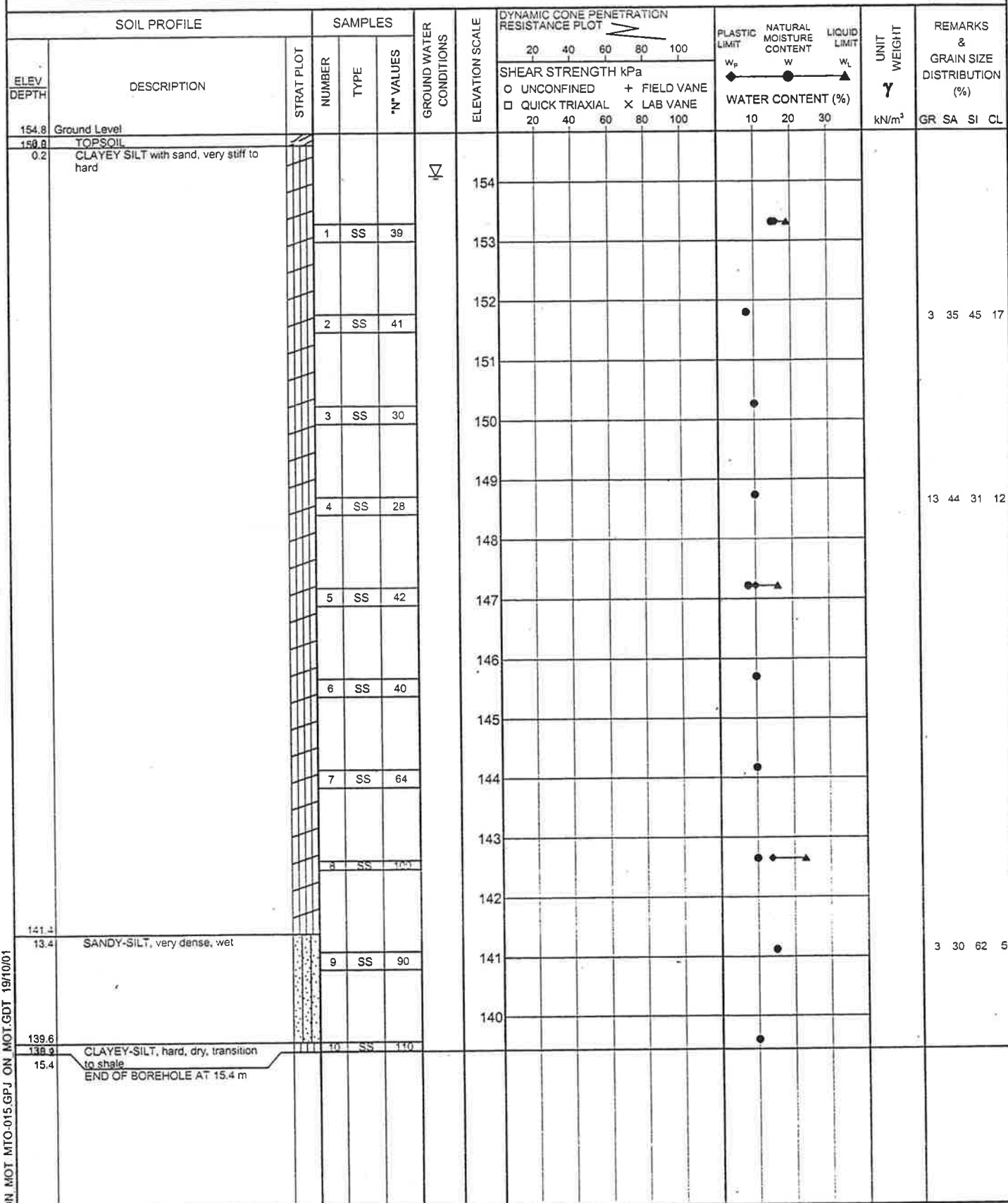
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RECORD OF BOREHOLE No C18

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4837117 8 N: 298415.0 E ORIGINATED BY MK
 DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Solid Stem Augers COMPILED BY KN
 DATUM Geodetic DATE 14, 12, 66 - 15, 12, 66 CHECKED BY IC



+³, X³: Numbers refer to Sensitivity ○³% STRAIN AT FAILURE

RECORD OF BOREHOLE No C19

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4837264.1 N; 298448.5 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Solid Stem Augers COMPILED BY KN
DATUM Geodetic DATE 15.12.66 - 16.12.66 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
152.2	Ground Level													
152.0	TOPSOIL													
0.2	CLAYEY SILT with sand, brown to grey, hard					▽	152							
			1	SS	45		151							
							150							
			2	SS	58		149							
							148							
			3	SS	41		147							7 12 44 17
							146							
			4	SS	42		145							
							144							
			5	SS	56		143							
							142							
142.4	SAND AND SILT, trace of gravel, very dense, wet						141							11 39 45 5
9.8			6	SS	100		140							
140.3	CLAYEY SILT, hard, transition to shale													
11.9			7	SS	8									
139.9														
12.3	END OF BOREHOLE AT 12.3 m													

ON MOT MTO-015.GPJ ON MOT.GDT 19/10/01

+ 3, X 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C20

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4837342.2 N; 298542.1 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Solid Stem Augers COMPILED BY KN
DATUM Geodetic DATE 22.12.66 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
140.6	Ground Level													
140.8	TOPSOIL													
0.2	SANDY SILT, traces of clay, stiff		1	SS	12		140							8 32 46 14
							139							
138.2	CLAYEY SILT with shale fragments, hard		2	SS	128		138							
							137							
							136							
134.4	END OF BOREHOLE AT 6.2 m						135							

+ 3 X 3 Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C21

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4837431 B N, 298510.1 E ORIGINATED BY MK
 DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Solid Stem Augers COMPILED BY KN
 DATUM Geodetic DATE 22.12.66 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa	WATER CONTENT (%)					
142.6	Ground Level													
142.0	TOPSOIL													
0.2	FILL- silty sand, loose													
			1	SS	9									
140.2														
2.4	CLAYEY SILT with SAND, hard													
			2	SS	80									
138.3														
4.3	END OF BOREHOLE AT 4.3 m													

+3, X 3 Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C22

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4837481.5 N; 298474.4 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Solid Stem Augers COMPILED BY KN
DATUM Geodetic DATE 21.12.66 - 21.12.66 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	20 40 60 80 100	20 40 60 80 100		
149.9	Ground Level												
149.9	TOPSOIL												
0.2	CLAYEY SILT with sand, hard												
			1	SS	112		149						
							148						
			2	SS	62		147						
							146						
			3	SS	42		145						8 37 39 16
							144						
			4	SS	55		143						
							142						
			5	SS	45		141						8 48 37 7
141.4	SILTY SAND, with traces of gravel, very dense						140						
8.5							139						
139.5	CLAYEY SILT with sand, hard						138						
10.4							137						
136.0	END OF BOREHOLE AT 13.89 m												
13.9													

+³, X³: Numbers refer to Sensitivity O³% STRAIN AT FAILURE

RECORD OF BOREHOLE No C23

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4837520.8 N; 298543.6 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Solid Stem Augers COMPILED BY KN
DATUM Geodetic DATE 16.12.66 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	*N* VALUES			20 40 60 80 100	20 40 60 80 100					
144.0	Ground Level													
143.9	TOPSOIL AND FILL													
0.3	CLAYEY SILT with SAND, brown, stiff		1	SS	8		143							
141.6	SILTY SAND, trace of gravel, compact		2	SS	29		142							
139.2	CLAYEY SILT with sand, grey, hard		3	SS	62		141							
4.8	Transition to Shale		4	SS	110		140							
136.4	END OF BOREHOLE AT 7.56 m						139							
7.6							138							
							137							

+ 3, X 3 Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C24

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4837583.9 N: 298523.5 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Solid Stem Augers COMPILED BY KN
DATUM Geodetic DATE 16.12.66 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40					
143.6	Ground Level													
143.0	TOPSOIL													
142.8	CLAYEY SILT with sand, brown, hard		1	SS	34									
141.2	SILTY SAND, grey, very dense		2	SS	74									
138.9	CLAYEY SILT with sand, some shale fragments, hard, dry		3	SS	54									
			4	SS	70									
			5	SS	69									
			6	SS	70									
132.9	END OF BOREHOLE AT 10.7 m		7	SS	55									

+ 3, X 3

Numbers refer to
Sensitivity

○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C25

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4837656.7 N; 298557.6 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Washboring BX Casing COMPILED BY KN
DATUM Geodetic DATE 16.12.66 - 19.12.66 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)
								○ UNCONFINED	+ FIELD VANE						
								□ QUICK TRIAXIAL	x LAB VANE						
144.7	Ground Level						20 40 60 80 100								
140.8	TOPSOIL														
0.2	CLAYEY SILT, trace of sand, stiff to very stiff		1	SS	13										
			2	SS	24									0 24 5 21	
140.7															
4.0	GRAVELLY SAND, trace of silt, very dense		3	SS	57									32 53 13 2	
138.9															
5.8	CLAYEY SILT with sand, hard		4	SS	70										
136.8															
7.9	SHALE BEDROCK		6	RC											
			7	RC											
133.7															
11.0	END OF BOREHOLE AT 11.0 m														

IN MOT MTO-015.GPJ ON MOT.GDT 19/10/01

+³ ×³ Numbers refer to Sensitivity ○³% STRAIN AT FAILURE

RECORD OF BOREHOLE No C26

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836721.3 N: 297975 8 E ORIGINATED BY MK
 DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
 DATUM Geodetic DATE 27 4 67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT w_p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa								WATER CONTENT (%)
								\circ UNCONFINED \square QUICK TRIAXIAL	$+$ FIELD VANE \times LAB VANE							
158.7							20 40 60 80 100									
0.0	SANDY SILT TO SILTY SAND, very dense						158									
			1	SS	44		157									
156.0								156								
2.7	GRAVELLY SAND becoming GRAVEL with some sand, very dense		2	SS	50		155									
							154									
			3	SS	90		153									
152.5			4	SS	150		152									
6.2	END OF BOREHOLE AT 6.22 m															
151.1	SHALE BEDROCK in Test Pit															
7.6																

+ 3 X 3

Numbers refer to
Sensitivity

○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C27

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836772.8 N: 298120.9 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
DATUM Geodetic DATE 26.4.67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	*N* VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE □ QUICK TRIAXIAL × LAB VANE						
155.7 0.0	SANDY SILT TO SILT, very dense							20 40 60 80 100						
154.0 1.7	GRAVEL, SAND and SILT, very dense		1	SS	100									
152.5 3.2	CLAYEY SILT TO SANDY SILT, grey Glacial Till		2	SS	50									
			3	SS	150									
150.0 5.6	SHALE BEDROCK WITH LIMESTONE		4	SS	100									
			5	SS	140									
			6	SS	100									
146.1 9.6	END OF BOREHOLE AT 9.60 m													

+³, X³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C28

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836798.7 N; 298241.0 E ORIGINATED BY MK
 DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
 DATUM Geodetic DATE 26.4.67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	*N* VALUES			20' 40' 60' 80' 100'	20' 40' 60' 80' 100'					
152.2 0.0	SANDY SILT TO SILT with some clay, very dense						152							
			1	SS	67		151							
							150							
148.9 3.3	CLAYEY SILT, grey, hard Glacial Till		2	SS	50		149							14 20 50 16
							148							
147.3 4.9	SHALE BEDROCK		3	SS	100		147							
							146							
			4	SS	150		145							
144.4 7.8	END OF BOREHOLE AT 7.77 m		5	SS	200									

+³, x³: Numbers refer to
Sensitivity

○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C29

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836843.2 N; 298379.3 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
DATUM Geodetic DATE 25.4.67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)			
								○ UNCONFINED + FIELD VANE □ QUICK TRIAXIAL × LAB VANE										
151.2							20	40	60	80	100							
0.0	SANDY SILT with some clay and gravel, very dense	+																
			1	SS	94													
			2	SS	100													
146.7	SANDY SILT with some clay and shale fragments, very dense Glacial Till	+	3	SS	100									4 29 53 14				
4.6																		
			4	SS	100										8 42 39 11			
			5	SS	100													
143.1	END OF BOREHOLE AT 8.1 m	+																
8.1																		

+3, ×3 Numbers refer to
Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C30

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836935 0 N; 298431 5 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
DATUM Geodetic DATE 29.6.67 CHECKED BY IC

SOIL PROFILE

SAMPLES

GROUND WATER CONDITIONS

ELEVATION SCALE

DYNAMIC CONE PENETRATION RESISTANCE PLOT

PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT

W_p W W_L
WATER CONTENT (%)

UNIT WEIGHT
γ

REMARKS
&
GRAIN SIZE
DISTRIBUTION
(%)

ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	20 40 60 80 100	20 40 60 80 100	10 20 30	UNIT WEIGHT γ kN/m ³	GR SA SI CL
153.3											
0.0	CLAYEY SILT, traces of sand and gravel, hard										
			1	SS	30						
			2	SS	58						
			3	SS	47						
			4	SS	51						
			5	SS	40						
			6	SS	46						
144.6			7	SS	150						10 35 47 8
8.7	SILT TO SILTY SAND, traces of gravel, very dense		8	SS	197						
			9	SS	203						
			10	SS	125						
139.4			11	SS	140						7 39 45 9
13.9	END OF BOREHOLE AT 13.3 m										

+3 X 3

Numbers refer to
Sensitivity

3% STRAIN AT FAILURE

NOT FOR CONSTRUCTION ON JUL 19/10

RECORD OF BOREHOLE No C31

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836980.1 N: 298654.0 E ORIGINATED BY MK
 DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
 DATUM Geodetic DATE 13.7.67 - 14.7.67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	W _p	W	W _L		
153.7 0.0	Ground Level CLAYEY SILT, some sand, trace of gravel, occasional cobbles, hard					17	153							
			1	SS	85		152							
							151							
			2	SS	150		150							
							149							
			3	SS	71		148							
							147							
			4	SS	64		146							
						145								
			5	SS	65	144								
			6	SS	68	143								
			7	SS	82	142								
142.7 11.0	SILTY SAND with gravel, very dense		8	SS	95	141								
						140								
						139								
138.4 15.3	END OF BOREHOLE AT 15.33 m													

ON MOT MTO-015.GPJ ON MOT.GDT 19/10/01

RECORD OF BOREHOLE No C32

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4837036 1 N, 298169.8 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
DATUM Geodetic DATE 14.7.67 CHECKED BY IC

SOIL PROFILE

SAMPLES

GROUND WATER CONDITIONS

ELEVATION SCALE

DYNAMIC CONE PENETRATION RESISTANCE PLOT

20 40 60 80 100
SHEAR STRENGTH kPa
○ UNCONFINED + FIELD VANE
□ QUICK TRIAXIAL X LAB VANE

PLASTIC
LIMIT

NATURAL
MOISTURE
CONTENT

LIQUID
LIMIT

W_p W W_L
WATER CONTENT (%)

UNIT
WEIGHT

γ

REMARKS
&
GRAIN SIZE
DISTRIBUTION
(%)

GR SA SI CL

ELEV
DEPTH

DESCRIPTION

STRAT PLOT

NUMBER

TYPE

N VALUES

154.4
0.0

Ground Level
CLAYEY SILT, some sand, trace of
gravel, hard

1 SS 73

2 SS 76

3 SS 83

5 SS 115

6 SS 44

7 SS 54

8 SS 56

9 SS 91

10 SS 100

11 SS 120

12 SS 100

139.4
14.9

CLAYEY SILT with fragments of
shale, hard

137.4
17.0

END OF BOREHOLE AT 16.95 m

+3 X3 Numbers refer to
Sensitivity ○3% STRAIN AT FAILURE

ON MOT MTO-015.GPJ ON MOT.GDT 19/10/01

RECORD OF BOREHOLE No C33

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 48369801.0 N: 298762.8 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
DATUM Geodetic DATE 24.4.67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE □ QUICK TRIAXIAL × LAB VANE						
146.8	Ground Level							20 40 60 80 100						
0.0	SANDY SILT to SILT with traces of gravel and clay, very dense													
			1	SS	26									
			2	SS	45									
			3	SS	40									
			5	SS	127									
			6	SS	74									
140.7														
6.1	SILTY SAND, some clay, grey, very dense		7	SS	87									8 57 (35)
			8	SS	135									
137.7														
9.1	SHALE FRAGMENTS		9	SS	125									12 21 45 22
137.2														
9.6	END OF BOREHOLE AT 9.60 m													

+ 3 x 3 Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C34

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4837089.8 N; 298842.3 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Solid Stem Augers COMPILED BY KN
DATUM Geodetic DATE 13.12.66 CHECKED BY IC

SOIL PROFILE

SAMPLES

GROUND WATER
CONDITIONS

ELEVATION SCALE

DYNAMIC CONE PENETRATION RESISTANCE PLOT

20 40 60 80 100
SHEAR STRENGTH kPa
○ UNCONFINED + FIELD VANE
□ QUICK TRIAXIAL X LAB VANE
20 40 60 80 100

PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT
W_p W W_L
WATER CONTENT (%)
10 20 30

UNIT WEIGHT
γ
kN/m³

REMARKS
&
GRAIN SIZE
DISTRIBUTION
(%)
GR SA SI CL

ELEV
DEPTH

DESCRIPTION

STRAT PLOT

NUMBER

TYPE

"N" VALUES

139.1

Ground Level

0.0

SAND, trace of silt, loose to compact

135.4

CLAYEY SILT with sand, hard

3.7

133.0

END OF BOREHOLE AT 6.04 m

6.0

▽

138

137

136

135

134

0 87 (13)

RECORD OF BOREHOLE No C35

1 OF 1

METRIC

W.P. 47-99-00

LOCATION 4837016.3 N; 299006.6 E

ORIGINATED BY MK

DIST 6 HWY 401/427 Interchange

BOREHOLE TYPE Bombardier Flight Auger

COMPILED BY KN

DATUM Geodetic

DATE 27.4.67

CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)
								○ UNCONFINED □ QUICK TRIAXIAL	+ FIELD VANE × LAB VANE						
139.1 0.0	Ground Level SANDY SILT to SILTY SAND, traces of gravel and clay, very dense							20 40 60 80 100							
			1	SS	9		138								
							137								
			2	SS	50		136								
							135								
			3	SS	64		134							16 75 (9)	
							133							9 40 46 5	
			4	SS	139		132								
							131								
131.9 7.2	CLAYEY SILT with shale, grey, hard														
130.6 8.5	END OF BOREHOLE AT 8.53 m														

ON MOT MTO-015.GPJ ON MOT.GDT 19/10/01

+ 3, X 3

Numbers refer to
Sensitivity

○ 3%

STRAIN AT FAILURE

RECORD OF BOREHOLE No C37

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4837070.6 N: 299180.0 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Solid Stem Augers COMPILED BY KN
DATUM Geodetic DATE 12.12.66 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	*N* VALUES			20 40 60 80 100	20 40 60 80 100					
139.2	Ground Level						139							
139.0	TOPSOIL						138							
0.2	CLAYEY SILT with sand, soft to firm		1	SS	4		137							
136.9			2	SS	40		136							
2.3	SILT, grey, dense to very dense		3	SS	80		135							
136.0							134							
3.2	CLAYEY SILT with sand, some gravel, hard, dry						133							
							132							
131.5														
7.7	END OF BOREHOLE AT 7.7 m													

+ 3 x 3

Numbers refer to
Sensitivity

○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C38

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836798 7 N; 298727 1 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Solid Stem Augers COMPILED BY KN
DATUM Geodetic DATE 9.12.66 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	N° VALUES			20 40 60 80 100	20 40 60 80 100					
152.3	Ground Level						152							
152.0	TOPSOIL						151							
0.2	CLAYEY SILT with sand, brown to grey, hard		1	SS	68		150							
			2	SS	96		149							
			3	SS	79		148							
			4	SS	64		147							
			5	SS	65		146							
			6	SS	88		145							
							144							
							143							
							142							
							141							
	BOULDER AT 12.2 m						140							
							139							
							138							
137.7	CLAYEY SILT, hard, dry						137							
14.6	Transition to Shale						136							
135.5	END OF BOREHOLE AT 16.86 m													
16.9														

+ 3, X 3 Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C39

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836853.3 N; 298901.5 E ORIGINATED BY MK
 DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Solid Stem Augers COMPILED BY KN
 DATUM Geodetic DATE 1.12.66 - 2.12.66 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
151.4	Ground Level													
150.2	TOPSOIL													
0.2	CLAYEY SILT with SAND, brown to grey, hard													
			1	SS	54		151							
							150							
			2	SS	85		149							
							148							
			3	SS	73		147							6 39 39 16
							146							
			4	SS	54		145							
							144							
			5	SS	37		143							
							142							3 40 40 17
141.3	END OF BOREHOLE AT 10.06 m													
10.1														

+³, X³ Numbers refer to Sensitivity ○³% STRAIN AT FAILURE

RECORD OF BOREHOLE No C40

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836858 4 N; 298940.2 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Solid Stem Augers COMPILED BY KN
DATUM Geodetic DATE 3.12.66 CHECKED BY IC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					
150.1	Ground Level												
149.9	TOPSOIL												
0.2	CLAYEY SILT with sand, occasional cobbles, brown to grey, hard to very stiff		10	AS									
			1	SS	52								
				2	SS	50							
				3	SS	29							
			4	SS	33								
			5	SS	21								
140.6			6	SS	31								
9.4	SILTY SAND with gravel, dense to very dense												
			7	SS	50								
138.8													
11.3	END OF BOREHOLE AT 11.3 m												

+ 3 x 3 Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

METRIC

[illegible]

+³, ×³ Numbers refer to Sensitivity ○^{3%} STRAIN AT FAILURE

RECORD OF BOREHOLE No C42

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836530.5 N; 298869.1 E ORIGINATED BY MK
 DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Continuous Flight Auger COMPILED BY KN
 DATUM Geodetic DATE 5.7.67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
148.1	Ground Level												
0.0	CLAYEY SILT, some sand, trace of gravel, hard						148						
			1	SS	51		147						
							146						
			2	SS	140		145						
							144						
			3	SS	60		143						
			4	SS	69		142						
			5	SS	77		141						
			6	SS	155		140						
			7	SS	75		139						
			8	SS	114		138						
							137						
137.1	SILT to SANDY SILT, very dense												
11.1													
136.2													
11.9	END OF BOREHOLE AT 11.9 m												

+³, X³ Numbers refer to Sensitivity O³% STRAIN AT FAILURE

RECORD OF BOREHOLE No C44

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836865.5 N; 298436.9 E ORIGINATED BY MK
 DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Cont. Flight Auger COMPILED BY KN
 DATUM Geodetic DATE 25.4.67 CHECKED BY IC

SOIL PROFILE

SAMPLES

GROUND WATER CONDITIONS

ELEVATION SCALE

DYNAMIC CONE PENETRATION RESISTANCE PLOT

20 40 60 80 100

SHEAR STRENGTH kPa

○ UNCONFINED + FIELD VANE

□ QUICK TRIAXIAL × LAB VANE

PLASTIC
LIMIT

NATURAL
MOISTURE
CONTENT

LIQUID
LIMIT

w_p

w

w_L

10

20

30

WATER CONTENT (%)

UNIT
WEIGHT

γ

kN/m³

REMARKS
&
GRAIN SIZE
DISTRIBUTION
(%)

GR SA SI CL

ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	*N VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT	REMARKS & GRAIN SIZE DISTRIBUTION (%)
152.6	Ground Level												
0.0	SANDY SILT with some clay and gravel, very dense												
			1	SS	39		152						
							151						
			2	SS	100		150						8 32 46 14
							149						
148.1	SANDY SILT traces of clay and gravel, grey, very dense		3	SS	32		148						
4.6	Glacial Till						147						12 37 45 6
			4	SS	35		146						
							145						
			5	SS	100		144						
			6	SS	100								
143.0	END OF BOREHOLE AT 9.60 m												
9.6													

+³ ×³ Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C45

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836936.5 N; 298491.2 E ORIGINATED BY MK
 DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Solid Stem Augers COMPILED BY KN
 DATUM Geodetic DATE 14.12.66 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)
								○ UNCONFINED □ QUICK TRIAXIAL	+ FIELD VANE × LAB VANE						
150.1	Ground Level														
149.8	TOPSOIL														
0.3	CLAYEY SILT with sand, stiff to hard, brown to grey														
	Glacial Till														
			1	SS	24										
			2	SS	36										
			3	SS	80										
			4	SS	100										
			5	SS	100									7 36 43 14	
			6	SS	100										
140.7	SITLY SAND, trace of clay and gravel, very dense, damp														
9.4															
139.3	END OF BOREHOLE AT 10.79 m													9 46 36 10	
10.8															

N MOT MTO-015.GPJ ON MOT.GDT 19/10/01

ON MOT MTO-015.GPJ ON MOT.GDT 19/10/01

+³, X³: Numbers refer to Sensitivity O³% STRAIN AT FAILURE

RECORD OF BOREHOLE No C46

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836915.8 N; 298611.9 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Washboring BX Casing COMPILED BY KN
DATUM Geodetic DATE 25.4.67 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
150.5	Ground Level													
0.0	CLAYEY SILT, trace of gravel, hard		1	SS	50		149							
			2	SS	100		148							
146.5	CLAYEY SILT with sand, hard Glacial Till		3	SS	67		146							
4.0			4	SS	40		144							
			5	SS	85		143							
			6	SS	50		141							
140.9	END OF BOREHOLE AT 9.60 m													
9.6														

+ 3 . X 3 . Numbers refer to
Sensitivity

○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C47

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836778.0 N: 298560.4 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Solid Stem Augers COMPILED BY KN
DATUM Geodetic DATE 12.12.66 - 13.12.66 CHECKED BY IC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
150.1	Ground Level													
0.0	CLAYEY SILT with sand, brown to grey, hard Glacial Till													
			1	SS	50									
			2	SS	100									
			3	SS	67									
			4	SS	48									4 39 40 17
			5	SS	100									
			6	SS	100									
139.5			7	SS	100									
10.7	SANDY SILT, trace of gravel and clay, very dense		8	SS	100									7 38 49 6
			9	SS	100									
134.9			10	SS	100									
15.2	END OF BOREHOLE AT 15.24 m													

ON MOT MTO-015 GPJ ON MOT.GDT 19/10/01

+ 3, X 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No C48

1 OF 1

METRIC

W.P. 47-99-00 LOCATION 4836732.0 N, 298661.9 E ORIGINATED BY MK
DIST 6 HWY 401/427 Interchange BOREHOLE TYPE Washboring BX Casing COMPILED BY KN
DATUM Geodetic DATE 13.12.66 - 15.12.66 CHECKED BY IC

SOIL PROFILE

SAMPLES

DYNAMIC CONE PENETRATION RESISTANCE PLOT

ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	20 40 60 80 100	20 40 60 80 100	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
150.0	Ground Level													
0.0	FILL- TOPSOIL and CLAYEY SILT with SAND													
148.8							149							
1.2	CLAYEY SILT with sand, brown to grey, hard Glacial Till		1	SS	45		148							
			2	SS	79		147							
			3	SS	50		146							
			4	SS	54		145							
			5	SS	90		144							4 35 42 19
			6	SS	70		143							
139.8			7	SS	100		142							
10.2	GRAVELLY SAND with some silt, very dense Glacial Till		8	SS	115		141							40 45 (15)
136.2							140							
13.8	END OF BOREHOLE AT 13.79 m						139							
							138							
							137							

+ 3 . X 3 Numbers refer to
Sensitivity

○ 3% STRAIN AT FAILURE

Foundation Investigation Report
for
Highway 401 Rehabilitation
Highway 27 Overpass Reconstruction
W.P. 47-99-00, Site 37-815
Central Region

The following report is a copy of the factual information from the Foundation Investigation and Design Report for WP 201-62-1, Contract 68-24. The foundation investigation report was prepared for the existing structure by the MTO Foundations Unit and represents the subsurface conditions for the proposed reconstruction of the existing Highway 401 overpass structure at Highway 27.

Imperial units of measure are used in the report and on the Record of Borehole sheets. The original ground elevations shown on the borehole logs may differ from present day elevations as a result of the construction of the existing structures.

This report contains the general subsurface conditions across the entire interchange, the Record of Borehole sheets pertinent to the structure, and the location of the borings in plan.



D. Dundas

D. Dundas, P.Eng.
Sr. Foundation Engineer

FOUNDATION INVESTIGATION REPORT
For
The Proposed Hwy. #401, Hwy. #27 and
Richview Expressway Interchange
District #6 (Toronto)
"Contract #7 (Yellow)"
W.J. 66-F-102 -- W.P. 201-62-1

1. INTRODUCTION:

In a memo, dated November 24, 1966, the Regional Bridge Location Engineer, Mr. W. S. Melinyshyn, requested a foundation investigation at the proposed site of Hwy. #401, Hwy. #27 and Richview Expressway interchange.

The request covers Contract #7 (Yellow), which is the first part of the whole complex of the proposed interchange and Hwy. #27 improvement, and contains some 16 bridges. Due to the magnitude of the project and the very tight time schedule, it was agreed that a conditional report be submitted only, based on a limited number of boreholes at each proposed structure.

After the exact locations of the footings and the geometrics for the bridges are made available, it is intended to review this report, and additional investigation will be carried out, if necessary. A supplementary report will likely follow these studies.

The field work, laboratory test program and the preparation of the geotechnical data sheets for the boreholes were undertaken by Dominion Soil Investigation Ltd. The boreholes were located and surveyed in the field by personnel from the construction staff of District #6.

Presented in this report are the results of the investigation, together with the evaluation of the soil stratigraphy and the recommendations pertaining to the foundations.

cont'd. /2 ...

2. DESCRIPTION OF THE SITE:

A large part of the area is occupied by the existing interchange of Hwy. #401 and Hwy. #27, the vicinity being generally a built up residential, light industrial and farming zone.

The site under investigation, belongs to the physiographic region known as the "South Slope", forming part of the belt of the till plain and moraine, south of "Peel Plain". The terrain of this portion of the region consists of ground moraines with irregular knolls and hollows.

3. FIELD INVESTIGATION PROCEDURE:

Some 34 sampled boreholes and, adjacent to the borings, 34 dynamic cone penetration tests were carried out during the course of the field investigation. The soils exploration was performed by means of three continuous flight augers and two conventional diamond core drills adapted for soil sampling purposes. 2-inch O.D. split-spoon samplers were used to recover soil samples, advanced by a free falling hammer of 140 lb., utilizing an energy of 350 ft.-lb. Usually, two boreholes were placed in the vicinity of each proposed structure. The soil stratigraphy at the locations of the future piers is, therefore, not exact; in fact, may be subject to considerable error.

The locations and elevations of the borings, as well as the soil profiles along the individual structures, are presented on Drawing #66-F-102A and #66-F-102B.

4. SOIL CONDITIONS:

4.1) General:

The entire area investigated, is covered by deposits of glacial till of the Wisconsin, or more recent age. From the engineering standpoint, two main strata may be recognized - i.e., a fine-grained cohesive, and a coarse-grained granular layer.

cont'd. /3 ...

4. SOIL CONDITIONS: (cont'd.) ...

4.1) General: (cont'd.) ...

In their undisturbed state the deposits are usually hard or very dense; at certain locations, however, due to recent fills or other disturbances, firm to stiff material was also encountered.

Grey shale bedrock underlies the overburden.

Field and laboratory tests were performed on representative soil specimens, the results of which are plotted on the geotechnical data sheets accompanying this report. The description of the various layers is presented as follows:

4.2) Clayey Silt (Glacial Till):

The cohesive portion of the glacial till was variously identified to be clayey silt with sand and traces of gravel, clayey silt with layers of cobbles and boulders, clayey silt with gravel, etc. The layer exhibits slight plasticity, having an average value of plastic limit of 14% and liquid limit of 21%. The natural moisture content usually falls below the plastic limit, averaging about 10%. The grain-size analyses of the samples show great variations, so characteristic of the glacial drifts. The range of the constituent grain sizes expressed as a percentage of weight, are listed below:

Gravel	:	0	-	16%
Sand	:	12	-	46%
Silt	:	24	-	59%
Clay	:	12	-	26%

The consistency of the clayey silt is generally hard, indicated by penetration 'N' values much in excess of 100 blows/ft. In certain boreholes, consistencies of soft to very stiff, were also observed - usually within the upper portion.

cont'd. /4 ...

4. SOIL CONDITIONS: (cont'd.) ...

4.3) Sands and Silts:

The granular variety of the subsoil was even more heterogeneous than the cohesive. Based on the grain-size distribution of the samples tested, the soils within the main stratum were specified to be sandy silts, silty sands, fine sands, gravelly sands with traces of silt, etc. The granular material usually appears beneath the cohesive one and exhibits a very dense relative density, corresponding to 'N' values in excess of 100 blows/ft. penetration. The upper and lower limits of the observed natural moisture contents and the constituent grains of the samples, are as follows:

		%
Natural Moisture		0 - 21
Grain Size Distribution	Gravel	0 - 40
	Sand	22 - 87
	Silt	13 - 62
	Clay	0 - 13

4.4) Bedrock:

Grey shale bedrock was proved by diamond drilling for a depth of 10 ft. at three borehole locations. The elevation of the bedrock was found to vary between 425 and 449 ft., corresponding to depths of 55 - 26 ft. below ground level.

cont'd. /5 ...

5. GROUNDWATER CONDITIONS:

Groundwater was established in every borehole at relatively shallow depths. The depth of water was measured to lie between 0 and 15 ft. below existing ground. The average depth of groundwater may be taken to be 2 - 3 ft. below ground level.

GEOTECHNICAL DATA SHEET FOR BOREHOLE . 27 .

OUR REFERENCE NO. 6-11-11
Your Ref. No. W.J. 66-F-102

CLIENT D. H. O.

PROJECT HWYS. 401, 27 & RICHVIEW EXPWY. INTERCHANGE

LOCATION 870, 273 N; 975, 195 E.

DATUM ELEVATION G.S.C.

METHOD OF BORING AUGERING

DIAMETER OF BOREHOLE 3 1/2"

DATE DEC 20-21, 1966

W.F. 201-62-1

ENCLOSURE NO.

ELEVATION ft	DEPTH ft	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot				CONSISTENCY water content %				REMARKS
				NUMBER	TYPE	IN ft Advance of Sampler	20	40	60	80	100	PL	W	LI	
491.6	0	GROUND SURFACE													
		TOP SOIL													
490															
	5			1	S.S.	112									
485		CLAYEY													
	10	SILT brown grey		2	SS.	62									
480		with													
	15	sand		3	S.S.	42									
475		(glacial till)													
	20	hard		4	S.S.	55									
470															
	25			5	S.S.	45									
465															
	28.0	SILTY													
	30	SAND		6	S.S.	60/4"									
460		with a trace													
		of gravel.													
	34.0	very dense													
	35			7	S.S.	70/4"									
455		CLAYEY SILT													
		with sand.													
	40	(glacial till)		8	S.S.	70/6"									
450		hard													
	45			9	S.S.	100/6"									
445		END OF BOREHOLE													
	50														

W.L. El. 489.3'
Dec. 22, 1966

GR. 8% ; SA. 37%
SI. 39% ; CL. 16%

W.L. El. 473.3'
Dec. 21, 1966

GR. 8% ; SA. 48%
SI. 37% ; CL. 7%

VERTICAL SCALE 1" = 10' 5' FI

DOMINION SOIL INVESTIGATION LIMITED

MADE D.A.M.

Handwritten signature

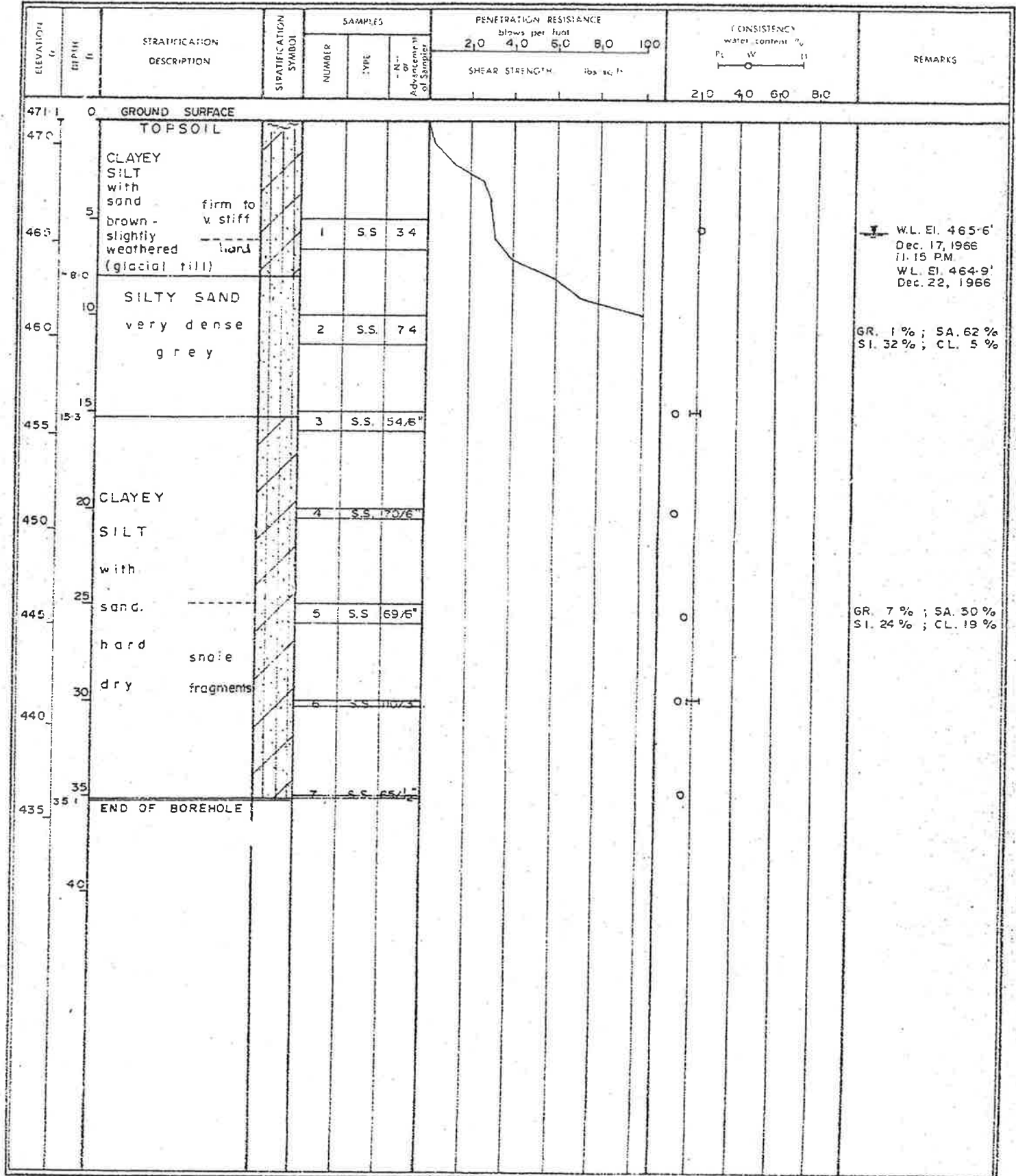
GEOTECHNICAL DATA SHEET FOR BOREHOLE . 28 .

OUR REFERENCE NO. 6-11-11
Your Ref. No. W.U. 66-F-102

CLIENT: D.H.O.
PROJECT: HWYS. 401, 27 & RICHVIEW EXPWY. INTERCHANGE
LOCATION: 870, 509 N; 979, 356 E.
DATUM: ELEVATION G. S. C

METHOD OF BORING: AUGERING
DIAMETER OF BOREHOLE: 3 1/2"
DATE: DEC. 16, 1966
W.P. 201-62-1

ENCLOSURE NO.



VERTICAL SCALE 1 IN TO 5 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE D A M. CHD *Koch*

GEOTECHNICAL DATA SHEET FOR BOREHOLE .29.

OUR REFERENCE NO. 6-11-11
Your Ref. No. W.J. 66-F-102

CLIENT D.H.O.

PROJECT HWYS. 401, 27 & RICHVIEW EXPWY. INTERCHANGE

METHOD OF BORING AUGERING

DIAMETER OF BOREHOLE 3 1/2"

ENCLOSURE NO.

LOCATION 870, 110 N; 979, 312 E.

DATE DEC 22, 1966

DATUM ELEVATION G.S.C

W.P. 201-52-1

ELEVATION ft	DEPTH ft	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot		CONSISTENCY water content %	REMARKS
				NUMBER	TYPE	N - H - Advancement of Sampler	2.0	4.0		
467.8	0	GROUND SURFACE								
		TOPSOIL								
465	5	SILTY SAND (FILL) loose		1	S.S.	9				
460	8.0	CLAYEY SILT with sand (glacial till) hard		2	S.S.	60/3"				
455	14.1	END OF BOREHOLE								
450	20									

W.L. Et 465.3'
Dec. 22, 1966

VERTICAL SCALE 1 IN TO 5 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE: D. A. M. CHD *Rees*

GEOTECHNICAL DATA SHEET FOR BOREHOLE 30

JOB REFERENCE NO. 6-11-11
 Your Ref. No. WJ.66-F-102

CLIENT: D.H.O.

PROJECT: HWYS. 401, 27 & RICHVIEW EXPWY INTERCHANGE

LOCATION: 870, 402 N, 979, 422 E.

DATUM ELEVATION: G.S.C.

METHOD OF BORING: AUGERING

DIAMETER OF BOREHOLE: 3 1/2"

DATE: DEC 16, 1966

W.P. 201-62-1

ENCLOSURE NO.

ELEVATION ft.	DEPTH ft.	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content % PL W LI	REMARKS
				NUMBER	TYPE	No. of Advancements of Sampler	20	40	60	80	100		
472.4	0	GROUND SURFACE											
		TOPSOIL & FILL											
470		CLAYEY SILT with sand stiff, brown		1	SS	8							
465	8.0	SILTY SAND with a trace of gravel. compact		2	SS	29							
450	15			3	SS	62							
455	20	CLAYEY SILT with sand hard, grey		4	SS	110/6"							
450													
448	24.8	(transition to shale)		5	SS	100/4"							
		END OF BOREHOLE											
445	30												

W.L. EL. 465.0'
 DEC. 17, 1966
 11:15 P.M.

GR. 10%; SA. 63%
 SI. 21%; CL. 6%

VERTICAL SCALE 1 IN TO 5 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE D.A.M. CHD *Reel*

GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 3.1 . .

OUR REFERENCE NO. 6-11-11

Your Ref. No. WJ. 66-F-102

CLIENT D. H. O.

PROJECT HWYS. 401, 27 B RICHVIEW EXPWY. INTERCHANGE

METHOD OF BORING AUGERING

DIAMETER OF BOREHOLE 3 1/2"

ENCLOSURE NO

LOCATION 869, 816 N; 979, 417 E

DATE DEC. 22, 1966

DATUM ELEVATION G. S. C.

W. P. 201-62-1

ELEVATION ft.	DEPTH ft.	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content %				REMARKS
				NUMBER	TYPE	N or Advance of Sampler	2.0	4.0	6.0	8.0	10.0	PL	W	LI		
461.3	0	GROUND SURFACE														
460		TOPSOIL														W. L. AT GROUND SURFACE Dec. 22, 1966
455	5	SANDY SILT brown with a trace grey of clay.		1	S.S.	12										GR. 8 % ; SA. 32% SI. 46 % ; CL. 14 %
450	10	CLAYEY SILT		2	S.S.	128/11"										
445	15	(glacial with till) shale hard fragments		3	S.S.	63/6"										
440	20	END OF BOREHOLE		4	S.S.	100/2"										
	25															

VERTICAL SCALE 1 IN TO 5 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE D. A. M. CH'D Rolko

