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DIST. 6 REGION                     

W.P. No. 86/87-78-00

CONT. No.                     

W. O. No.                     

STR. SITE No.                     

HWY. No. 407

LOCATION Hwy 407 (FROM  
AIRPORT RD to Hwy 10)

No. of PAGES -                     

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OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT.                     

REMARKS:

ENGINEERING MATERIALS OFFICE  
PAVEMENT & FOUNDATION DESIGN SECTION

WP's 86-78-00 & 87-78-00 DIST 6

HWY 407 STR SITE

Feasibility Study of Hwy. 407

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# FOUNDATION INVESTIGATION REPORT

For

Feasibility Study of Hwy. 407  
From Hwy. 10 to Hwy. 401, W.P. 86-78-00  
From Hwy. 10 to Airport Rd., W.P. 87-78-00  
District 6, Toronto

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## INTRODUCTION

This report contains the results of a foundation investigation carried out for the above projects. The fieldwork consisted of 10 sampled boreholes advanced by means of solid and hollow stem augers to depths of up to 110 feet below ground surface. In addition, 5 boreholes (B.H. 1-6 inclusive) previously carried out by this Office are incorporated in this Report. An additional 9 boreholes (B.H. 34 to 97) carried out by Ontario Hydro for their own purposes have also been incorporated into this report.

## SITE DESCRIPTION AND GEOLOGY

The area under consideration is located to the north-west of Toronto in the Regional Municipality of Peel. The section of proposed Hwy. 407 under this study extends from Hwy. 401 easterly to Airport Road and is bounded to the north by Steeles Ave. and to the south by Derry Rd.

Topographically the overall area can be described as gently undulating, the exception being where creeks or rivers have cut valleys. Land use in the proposed highway right-of-way consists mainly of agricultural uses.

Physiographically the study area is wholly located within the region known as the "Peel Plain". The region is found to be at elevation 500 to 700 feet above sea level and has a gradual slope to Lake Ontario. Across the plain, rivers and streams have cut deep valleys and there is, therefore, no large undrained depressions, swamp or bogs in the whole area. The plain is furthermore, characterized by an underlying till or boulder clay. In much of the Peel Plain this has been modified by a veneer of clay which, when deep enough, is clearly seen to be varved.

### SUBSURFACE CONDITIONS

Subsurface conditions across the site are quite uniform. On the western portion of the study area from Winston Churchill Blvd. easterly to First Line West the subsurface conditions consist of an extensive deposit of generally very dense, 'N' values greater than 100 blows per foot, granular glacial till. On the eastern portion of the study area from Hwy. 10 easterly to Mimico Creek the dominant subsurface conditions consist of an extensive deposit of generally hard, 'N' values greater than 100 blows per foot, cohesive type of glacial till. Shale bedrock was encountered only in the area of the proposed Hwy. 410 and Etobicoke Creek and was found to exist beneath relatively shallow cohesive glacial till deposits. Two borings put down in the vicinity of the proposed Credit River structure revealed the presence of a firm to stiff reworked cohesive glacial till. This zone of firm cohesive material presents the only difficulty from a geotechnical point of view in the entire study area. It will be necessary to limit approach fill heights or to design berms to avoid overstressing the underlying firm deposit.

For a more detailed description of the subsurface and groundwater conditions encountered reference should be made to the Record of Borehole Log Sheets contained in the Appendix of this report. A very general simplified soil stratigraphy along the Hwy. 407  $\varnothing$  is given on Drawing No. 86 and 877800-C.

## DISCUSSION AND RECOMMENDATIONS

It is proposed to construct a new east-west expressway, Hwy. 407, to freeway design standards, to be located immediately south of existing Hwy. 7. This report is concerned with that section of Hwy. 407 between Winston Churchill Blvd. and Mimico Creek including the section of Hwy. 410. This portion of the project will require the crossing of 1 major waterway, some 5 interchanges including 1 major interchange and 3 crossings of railways; in all requiring some 48 structures. The recommended grade for Hwy. 407 will involve cuts up to 22 feet deep and fills up to 64 feet high.

Our comments for the feasibility, design and construction of the various structures are given on the Foundation Data Sheets included in the Appendix. A data sheet is supplied for each of 34 areas; the area location is described on these sheets and is also shown on Drawing No. 86 and 877800 A and B. An explanation of information supplied on the data sheet is outlined below.

1. The site number given (i.e. B1, B2, etc.) is a numbering system developed for the purposes of the feasibility study only. The actual location is shown on Drawing No. 86 and 887800-A and B.
2. The original ground elevation range given is based on a small scale  $\nabla$  profile and as such the accuracy is not great.
3. The proposed roadway-railway grades are based on a small scale  $\nabla$  profile at the intersection of centrelines. The grade given is understood to be preferred by Planning and Design; the grade in brackets is an alternative "second choice" grade under consideration.
4. Subsurface conditions are described here very briefly and are based on generally not more than one boring per area. Consistencies and relative densities, where applicable, are given.
5. Recommendations - Structure

The recommendations are discussed separately for abutments and piers. The options for structure foundations are given in preferential order based on geotechnical/economical considerations. Some general details of structure recommendations are given below.

Compacted Granular Pad - This option is for abutments only where subsurface conditions are competent. This option is not recommended for water crossings. The minimum requirements of a compacted granular pad are shown on Figure 1 in the Appendix. Furthermore, the footing for this scheme could be designed using a maximum allowable load of 3.0 t.s.f.

Spread Footings - This option is given for abutments and piers where subsurface conditions are competent. The maximum elevation and corresponding maximum design load is given. It is to be noted the spread footings should be provided with a minimum of 4 feet of earth cover for frost protection purposes. In addition, where the spread footing is to be founded on a cohesive deposit, subject to softening upon exposure, it may be necessary to protect the base of the footing from softening by placing 3 inches of mass concrete upon completion of the footing excavation. Also, where the footing is located in a granular deposit and the water table is at or above the footing founding level, it will be necessary to prevent the base of the footing from boiling due to an unbalanced excess hydrostatic head. In this case a dewatering scheme would be required, thus alternative dewatering schemes are shown on Figure 2 and Figure 3.

End Bearing Piles - This founding scheme is recommended for abutments and piers where appropriate. The recommendation gives the estimated pile tip elevation. Generally, the end bearing piles can be designed for the maximum allowable structural capacity which is dependent on the pile section chosen. For example, the maximum allowable load for a 12BP74 steel 'H' pile would be 130 tons per pile. It is generally assumed steel 'H' piles will be used.

#### 6. Recommendation - Approaches

The recommendations for fill slopes, cut slopes and berm requirements, are based on the proposed preliminary grades assuming fills are constructed of acceptable earth borrow according to current M.T.C. Specifications. Any changes in profile grade would require a reassessment of these recommendations. Also discussed under this heading is special treatment, i.e. benching, etc., that is anticipated at this location.

7. Remarks

In this column are discussed actual creek/river flood plain and bed conditions, geotechnical preference of schemes if appropriate, and other options or considerations to be evaluated during this stage of design.

MISCELLANEOUS

The fieldwork for this investigation was carried out under the supervision of Mr. M. MacLean, Project Foundations Engineer, using equipment rented from Master Soil Investigation Limited.

This report was written by Mr. M. MacLean and reviewed by Mr. M. Devata, Senior Foundations Engineer.

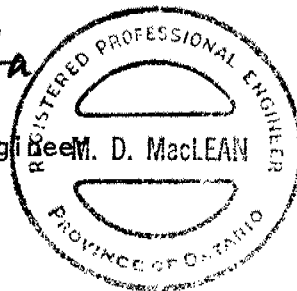
*M. MacLean*

M. MacLean, P. Eng.  
Project Foundations Engineer

*M. Devata*

M. Devata, P. Eng.  
Senior Foundations Engineer

May 29, 1980.



## APPENDIX



# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B1 LOCATION Hwy. 407 at Mimico Creek  
 ORIGINAL GROUND ELEV. 560 to 575 PROPOSED HWY. GRADE ELEV. 581+ (624+)  
 Mimico Creek H.W.L. 573+

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 1 0-8' silty clay stiff to very stiff 8-14' silt, some sand dense 14-30' sand, some silt compact 30-42' + glacial till hard  <u>Groundwater</u>	<u>Abutments</u> 1. Spread footings at or below elevation 555.0. Design for maximum allowable load of 2.5 tsf. Dewatering scheme required. 2. End bearing piles. Estimated tip elevation 525.0. Designed for maximum allowable structural capacity per pile.  <u>Piers</u> 1. End bearing piles as discussed above.	Fill heights up to 30 ft. will be stable with forward and side slopes of 2:1. Fills heights up to 64ft. will be stable with a 40' wide mid height counter balancing berm with slopes of 2:1.  The higher profile grade would result in fill heights up to 64 feet. Fill heights of this magnitude would have inherent settlement.  Future maintenance on such embankments would be appreciable and thus the higher grade is to be discouraged.	At this location during the field-work the creek had depth of water up to 1 foot with imperceptible flow. The creek bed is undefined, concealed by long grass.  At this location a concrete box type culvert or steel pipe or pipe arch is suitable based on geotechnical considerations.

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B2 LOCATION Hwy. 407 at Bramport Terminal Spurline  
 ORIGINAL GROUND ELEV. 575 to 580 PROPOSED HWY. 407 GRADE ELEV. 580+ (630+)  
 Proposed Bramport terminal spurline grade elevation 601+

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 6 0-25' glacial till very stiff to hard  25-32' silt, some sand very dense           <u>Groundwater</u> Not encountered	<u>Abutments</u>  1. Compacted granular pad  2. Spread footings at or below elevation 592.0, designed for maximum allowable load of 3.0 tsf.  3. End bearing piles. Estimated tip elevation 565.0. Designed for maximum allowable structural capacity per pile.  <u>Piers</u>  1. Spread footings as discussed above  2. End bearing piles as discussed above	Fill heights up to 30 ft. will be stable with forward and side slopes of 2:1.  Fill heights up to 64 ft. will be stable with a 40' wide mid height counter balancing berm with slopes of 2:1.  The higher profile grade would result in fill heights up to 64 ft. Fill heights of this magnitude would have inherent settlement.  Future maintenance on such embankments would be appreciable and thus the higher grade is to be discouraged.	

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B3 LOCATION Hwy. 407 at Airport Road  
 ORIGINAL GROUND ELEV. 594-597 PROPOSED HWY. 407 GRADE ELEV. 595+  
 Proposed Airport Road Grade Elevation 616+

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 6  0-25'    glacial till very stiff to hard  25-32'    + silt, some sand very dense          <u>Groundwater</u>  Not encountered	<u>Abutments</u>  1.    Compacted granular pad  2.    Spread footings at or below ele- vation 592.0, designed for maxi- mum allowable load of 3.0 tsf.  3.    End bearing piles. Estimated tip elevation 565.0. Designed for maximum allowable structural capacity per pile.  <u>Piers</u>  1.    Spread footings as discussed above  2.    End bearing piles as discussed above	Fill heights up to 22 ft. will be stable with forward and side slopes of 2:1.	

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B4 LOCATION Hwy. 407 at Steeles Avenue  
 ORIGINAL GROUND ELEV. 590-595 PROPOSED HWY. 407 GRADE ELEV. 589  
 Proposed Steeles Avenue Grade Elevation 611

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<p>Reference Boreholes 107 Ground surface 593.0</p> <p>0-50' hard glacial till</p> <p><u>Groundwater</u> Elevation 584±</p>	<p><u>Abutments</u></p> <ol style="list-style-type: none"> <li>1. Spread footing on a compacted granular pad.</li> <li>2. Spread footings at or below elevation 585.0. Designed for maximum allowable load of 3.0 t.s.f.</li> <li>3. End bearing piles. Estimated tip elevation 545. Designed for maximum allowable structural capacity per pile.</li> </ol> <p><u>Piers</u></p> <ol style="list-style-type: none"> <li>1. Spread footing at or below elevation 585.0 as discussed above.</li> <li>2. End bearing piles as discussed above.</li> </ol>	<p>Fill heights up to 21 ft. will be stable with forward and side slopes of 2:1.</p> <p>Cut slopes up to 6 feet deep will be stable with side slopes of 2:1.</p>	<p>Note that a dewatering scheme may be necessary to prevent basal heave for footings located at or below the ground water level.</p>

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B5 LOCATION Hwy. 407 at Torbram Road  
 ORIGINAL GROUND ELEV. 593-597 PROPOSED HWY. 407 GRADE ELEV. 597  
 Proposed Torbram Road Grade Elevation 617

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 97 Ground surface 590.0  0-5' silty clay, some sand, hard  5-15' dense to very dense sandy silt  15-35' very dense, silty sand   <u>Groundwater</u> Elevation 578+	<u>Abutments</u>  1. Compacted granular pad.  2. Spread footings at or below elevation 592.0. Designed for maximum allowable load of 3.5 t.s.f.  <u>Piers</u>  1. Spread footings as discussed above.  2. End bearing piles driven to elevation 570.0 designed for maximum structural capacity per pile section.	Fill heights up to 24 ft. will be stable with forward and side slopes of 2:1.	

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B6 LOCATION Hwy. 407 & C.N.R.-Halton Subdivision  
 ORIGINAL GROUND ELEV. 595-605 PROPOSED HWY. 407 GRADE ELEV. 630  
 Existing Grade C.N.R. Elevation 604±

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 106 Ground surface 604.0  0-7' silty clay, hard  7-14' sandy silt, very dense  14-35' hard glacial till          <u>Groundwater</u> Elevation 586±	<u>Abutments</u>  1. Compacted granular pad.  2. Spread footings at or below elevation 600.0. Designed for maximum allowable load of 5.0 t.s.f.  3. End bearing piles driven to elevation 585.0. Designed for maximum allowable structural capacity per pile section.  <u>Piers</u>  1. Spread footings as discussed above.  2. End bearing piles as discussed above.	Fill heights up to 35 ft. will be stable with forward and side slopes of 2:1.	

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B7 LOCATION Proposed Bramalea Road & C.N.R. Halton Subdivision

ORIGINAL GROUND ELEV. 610-615 PROPOSED Bramalea Rd GRADE ELEV. 643 (592)

Existing Grade C.N.R. 614.0

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 106 Ground surface 604.0 0-7' silty clay, hard 7-14' sandy silt, very dense 14-35' hard glacial till  <u>Groundwater</u> Elevation 586±	<u>Abutments</u> <ol style="list-style-type: none"> <li>1. Compacted granular pad.</li> <li>2. Spread footings at or below elevation 610.0. Designed for a maximum allowable load of 3 t.s.f.</li> <li>3. End bearing piles driven to elevation 590. Designed for maximum structural capacity per pile section</li> </ol> <u>Piers</u> <ol style="list-style-type: none"> <li>1. Spread footings as discussed above.</li> <li>2. End bearing piles as discussed above.</li> </ol>	Fill heights up to 33 ft. will be stable with forward and side slopes of 2:1.  Cut slopes up to 15 feet deep will be stable with slopes of 2:1.  Cut slopes up to 23 feet deep will be stable with slopes of 2:1 and a mid height berm of 5 feet wide.	From a geotechnical point of view, there is no appreciable difference in foundation costs between Bramalea Rd. going over or going under the railway track.

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B8 LOCATION Hwy. 407 & Bramalea Road  
 ORIGINAL GROUND ELEV. 600-605 PROPOSED HWY. 407 GRADE ELEV. 590 (625)  
 Proposed Bramalea Road Grade Elevation 595 (632)

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 106 Grain surface 604.0 0-7' silty clay, hard 7-14' sandy silt, very dense 14-35' hard glacial till   <u>Groundwater</u> Elevation 586±	<u>Abutments</u> 1. Spread footings on compacted granular. 2. Spread footings at or below elevation 603.0. Designed for maximum allowable load of 3.0 t.s.f. 3. Spread footings at or below elevation 596. Designed for maximum allowable load of 5.0 t.s.f.  <u>Piers</u> 1. Spread footings at or below elevation 603 at 3.0 t.s.f. or below elevation 596 at 5.0 t.s.f. as discussed above.	Fill heights up to 32 ft. will be stable with forward and side slopes of 2:1. Cut slopes up to 15 feet deep will be stable with slopes of 2:1.	From a geotechnical point of view there is no appreciable difference in foundation costs between Bramalea Rd. going over or going under the Hwy. 407.



# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B9 LOCATION Hwy. 407 & Watercourse West of Bramalea Road  
 ORIGINAL GROUND ELEV. 590-600 PROPOSED HWY. 407 GRADE ELEV. 591 (604)  
 Approximate Invert Watercourse 590

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 106 Ground surface 604.0 0-7' silty clay, hard 7-14' sandy silt 14-35' hard glacial till  <u>Groundwater</u> Elevation 586+	<u>Abutments and Piers</u>  Spread footings at or below elevation 586 designed for maximum allowable load of 4.0 t.s.f.	Fill heights up to 15 ft. will be stable with forward and side slopes of 2:1.	

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B10 LOCATION Hwy. 407 & Dixie Road  
ORIGINAL GROUND ELEV. 600-610 PROPOSED HWY. 407 GRADE ELEV. 605 (625)  
Proposed Dixie Road Grade Elevation 625 (605)

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<p><u>Reference Boreholes</u>    105 Ground surface 600.0  0-5'   silty clay, hard  5-32'   hard glacial          till</p> <p>          </p> <p><u>Groundwater</u> Elevation 571+</p>	<p><u>Abutments</u></p> <ol style="list-style-type: none"> <li>1.   Compacted granular pad.</li> <li>2.   Spread footings located at or below elevation 600.0 designed for a maximum allowable load of 4.0 t.s.f.</li> <li>3.   End bearing piles driven to elevation 570.0 designed for maximum structural capacity of pile section.</li> </ol> <p><u>Piers</u></p> <ol style="list-style-type: none"> <li>1.   Spread footings as discussed above.</li> <li>2.   End bearing piles as discussed above.</li> </ol>	<p>Fill heights up to 25 ft. will be stable with forward and side slopes of 2:1.</p>	<p>From a geotechnical point of view, there is no significant cost saving between Dixie Road going over 407 or 407 going over Dixie Road.</p>

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B11 LOCATION Hwy. 407 & Relocated Heart Lake Road  
 ORIGINAL GROUND ELEV. 613-615 PROPOSED HWY. 407 GRADE ELEV. 624  
 Assumed Heart Lake Road Grade 604

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 104 Ground surface 620.0 0-14' hard, glacial till 14-32' weathered shale bedrock  <u>Groundwater</u> No groundwater encountered.	<u>Abutments</u> 1. Spread footings on a compacted granular pad. 2. Spread footings at or below elevation 615.0. Designed for maximum allowable load of 5 t.s.f.  <u>Piers</u> Spread footings at or below elevation 615.0 as above.	Fill heights up to 11 ft. will be stable with forward and side slopes of 2:1. Cut slopes up to 11 feet deep will be stable with 2:1 slopes.	

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B12 LOCATION Hwy. 407 & Proposed Etobicoke Creek Relocation  
 ORIGINAL GROUND ELEV. 600-620 PROPOSED HWY. 407 GRADE ELEV. 611  
 Etobicoke Creek HWL Elevation 606.0

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 104 Ground surface 620.0 0-14' hard glacial till 14-32' weathered shale bedrock  <u>Groundwater</u> No groundwater encountered.	<u>Abutments and Piers</u> 1. Spread footing at or below elevation 611 designed for 5 t.s.f. 2. End bearing piles driven to elevation 600.0 designed for maximum structural capacity per pile section.	Fill heights up to 11 ft. will be stable with forward and side slopes of 2:1. Cut slopes up to 10 feet deep will be stable with 2:1 slopes.	

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B13 LOCATION Relocated Heart Lake Road & Etobicoke Creek Relocation  
 ORIGINAL GROUND ELEV. 600-620 PROPOSED Heart Lake GRADE ELEV. 605+ Assumed  
 Road  
 Etobicoke Creek HWL 606+

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 104 Ground surface 620.0 0-14' hard glacial till 14-32' shale bedrock weathered  <u>Groundwater</u> No groundwater encountered.	<u>Abutments</u> 1. Spread footings at or below elevation 615.0. Designed for maximum allowable load of 5 t.s.f. 2. End bearing piles. Estimated tip elevation 600. Designed for the maximum structured capacity per pile section.	Fill heights up to 25 ft. will be stable with forward and side slopes of 2:1. Cut slopes up to 15 feet deep will be stable with side slope of 2:1.	

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B14 LOCATION Ramp 407 W. to 410 N. Over Etobicoke Creek Relocation  
 ORIGINAL GROUND ELEV. 610-615 PROPOSED Ramp GRADE ELEV. Not Available  
 Etobicoke Creek Invert 612+

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 4 Ground surface 615.7 0-6' compact silty sand 6-10' stiff to hard glacial till 10-17' sound shale bedrock  <u>Groundwater</u> Elevation 609+	<u>Abutments and Piers</u> 1. Spread footings at or below elevation 610 designed for a maximum allowable load of 5 t.s.f. 2. End bearing piles driven to estimated tip elevation 605. Designed for maximum structural capacity per pile section.	Fill heights up to 25 ft. will be stable with forward and side slopes of 2:1.	

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B15 LOCATION Ramp Hwy. 407 E. to Hwy. 410 N. over Etobicoke Creek  
ORIGINAL GROUND ELEV. 610-650 PROPOSED Ramp GRADE ELEV. Not Available  
Etobicoke Creek Invert 612+

[illegible]

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B16 LOCATION Hwy. 410 & Etobicoke Creek

ORIGINAL GROUND ELEV. 610-650 — — — — — PROPOSED HWY. 410 GRADE ELEV. 634 — — — — —  
Etobicoke Creek Invert 612+

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 4 Ground surface 615.7  0-6'    compact silty sand  6-10'    stiff to hard glacial till  10'+    sound shale bed-rock          <u>Groundwater</u> Elevation 609±	<u>Abutments and Piers</u>  1.    Spread footing on shale bedrock at elevation 605.0 designed for a maximum allowable bearing capacity of 10 t.s.f.  2.    End bearing piles driven to estimated tip elevation 600.0. Designed for maximum structural capacity per pile section.	Fill heights up to 25 ft. will be stable with forward and side slopes of 2:1.  Cut slopes up to 18 feet deep will be stable with 2:1 slopes.	



# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B17 LOCATION Ramp Hwy. 410 S. to Hwy. 407 over Etobicoke Creek  
ORIGINAL GROUND ELEV. 620-650 PROPOSED Ramp GRADE ELEV. Not Available  
Etobicoke Creek Invert 612+

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 4 Ground surface 615.7  0-6' compact silty sand  6-10' stiff to hard glacial till  10'+ ground shale bedrock          <u>Groundwater</u> Elevation 609±	<u>Abutments and Piers</u>  As discussed under B16.	Fill heights up to 38 ft. will be stable with forward and side slopes of 2:1.  Cut slopes up to 20 ft. deep will be stable with slopes of 2:1.	

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B18 LOCATION Hwy. 410/407 Weaving Ramp, North of Hwy. 407, West  
ORIGINAL GROUND ELEV. 637-642 PROPOSED Ramp GRADE ELEV. Not Available of Hwy. 410

[illegible]

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B19 LOCATION Hwy. 410/407 Weaving Ramp, North of Hwy. 407, East  
ORIGINAL GROUND ELEV. 627-632 PROPOSED Ramp. GRADE ELEV. Not Available of Hwy. 410

[illegible]

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B20 LOCATION Hwy. 407 & Hwy. 410  
ORIGINAL GROUND ELEV. 633-640 PROPOSED HWY. 410 GRADE ELEV. 641  
Proposed Hwy. 407 Grade Elevation 619

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS								
	STRUCTURE	APPROACHES									
<div>Reference Boreholes    5</div> <div>Ground surface 634.5</div> <div>0-15' hard glacial till</div> <div>15' bedrock</div> <div><div>Groundwater</div><div>Elevation 628±</div></div>	<div>Abutments and Piers</div> <div>Spread footings at or below elevation 634.0 designed for maximum allowable load of 5 t.s.f.</div> <div>or</div> <div>End bearing piles estimated tip elevation 620.0. Designed for maximum structural capacity per pile section.</div>	<div>Fill heights up to 35 ft. will be stable with forward and side slopes of 2:1.</div> <div>Cut slopes up to 21 feet deep will be stable with 2:1 slopes.</div> <div>For interchange ramps grades up to elevation 666 (first stage) and elevation 686 (second stage) may be required.</div> <div>For berm requirements refer to the following table. Note for high fills adjacent to cut slopes the fill height should be taken from the top of fill to bottom of cut slope.</div> <table><tr><th>Fill Height</th><th>Berm Requirements (Assuming 2:1 side slopes)</th></tr><tr><td>up to 35'</td><td>Not required</td></tr><tr><td>up to 45'</td><td>Mid height berm 10' wide</td></tr><tr><td>up to 70'</td><td>Two 1/3 height berms 10' wide</td></tr></table>	Fill Height	Berm Requirements (Assuming 2:1 side slopes)	up to 35'	Not required	up to 45'	Mid height berm 10' wide	up to 70'	Two 1/3 height berms 10' wide	
Fill Height	Berm Requirements (Assuming 2:1 side slopes)										
up to 35'	Not required										
up to 45'	Mid height berm 10' wide										
up to 70'	Two 1/3 height berms 10' wide										

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B21 LOCATION Hwy. 410/407 Weaving Ramps, South of Hwy. 407, East  
ORIGINAL GROUND ELEV. 620-625 PROPOSED Ramp GRADE ELEV. Not Available of Hwy. 410

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<p><u>Reference Boreholes</u> 74S</p> <p>Ground surface 628.0</p> <p>0-27' very dense sandy silt</p> <p><u>Groundwater</u></p> <p>Elevation 614±</p>	<p><u>Abutments</u></p> <ol style="list-style-type: none"> <li>1. Spread footings on compacted granular.</li> <li>2. Spread footings at or below elevation 625.0 designed for maximum allowable load of 4 t.s.f.</li> <li>3. End bearing piles driven to estimated tip elevation 610. Designed for maximum structural capacity per pile section.</li> </ol> <p><u>Piers</u></p> <ol style="list-style-type: none"> <li>1. Spread footings at or below elevation 625 as discussed above.</li> <li>2. End bearing piles as discussed above.</li> </ol>	<p>Fill heights up to 25 ft. will be stable with forward and side slopes of 2:1.</p>	

# FOUNDATION DATA SHEET

87-78-00 SITE B22 LOCATION Hwy. 407/410 Ramps, South of Hwy. 407, West of  
ORIGINAL GROUND ELEV. 623-629 PROPOSED Ramp GRADE ELEV. Not Available Hwy. 410

[illegible]

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B23 LOCATION Hwy. 407 & First Line East  
 ORIGINAL GROUND ELEV. 640-647 PROPOSED HWY. 407 GRADE ELEV. 639  
 Proposed First Line East Grade Elevation 660

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<p>Reference Boreholes 103</p> <p>Ground elevation 640.0</p> <p>0-11.5' stiff to hard glacial till</p> <p>11.5'+ shale bedrock</p> <p>Groundwater Elevation 636±</p>	<p><u>Abutments</u></p> <ol style="list-style-type: none"> <li>1. Spread footings on compacted granular.</li> <li>2. Spread footings at or below elevation 635.0. Designed for maximum allowable load of 4 t.s.f.</li> <li>3. End bearing piles driven to elevation 628.0. Designed for maximum structural capacity per pile section.</li> </ol> <p><u>Piers</u></p> <ol style="list-style-type: none"> <li>1. Spread footings at or below elevation 635.0 as discussed above.</li> <li>2. End bearing piles as discussed above.</li> </ol>	<p>Fill heights up to 20 ft. will be stable with forward and side slopes of 2:1.</p> <p>Cut slopes up to 8 feet deep will be stable with 2:1 slopes.</p>	

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B24 LOCATION Hwy. 407 & Hwy. 10  
 ORIGINAL GROUND ELEV. 673-678 PROPOSED HWY. 407 GRADE ELEV. 675, (695)  
 Proposed Hwy. 10 Grade Elevation 674, (695)

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 102 Ground surface 674.0 0-34' very stiff to hard glacial till 34-52' very dense glacial till  <u>Groundwater</u> No Groundwater Encountered.	<u>Abutments</u> <ol style="list-style-type: none"> <li>1. Spread footings on compacted granular pad.</li> <li>2. Spread footings at or below elevation 670.0 designed for maximum allowable load of 3.0 t.s.f.</li> <li>3. End bearing piles driven estimated tip elevation 620.0 designed for maximum structural capacity per pile section.</li> </ol> <u>Piers</u> <ol style="list-style-type: none"> <li>1. Spread footings at or below elevation 670.0 as discussed above.</li> <li>2. End bearing piles as discussed above.</li> </ol>	Fill heights up to 22 ft. will be stable with forward and side slopes of 2:1.	From a geotechnical point of view, there is no significant foundation cost savings between Hwy. 10 going over Hwy. 407 or Hwy. 407 going over Hwy. 10.



# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B25 LOCATION Hwy. 407 & Fletcher's Creek  
ORIGINAL GROUND ELEV. 640-660 PROPOSED HWY. 407 GRADE ELEV. 659  
Fletcher's Creek Invert Elevation 640.0

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 110 Ground surface 645.0  0-7.5' loose to compact silty sand  7.5-40.9' hard to very dense glacial till          <u>Groundwater</u> Elevation 641+	<u>Abutments and Piers</u>  1. Spread footings at or below elevation 638.0 designed for a maximum allowable pressure of 4 t.s.f.  2. End bearing piles driven to elevation 615.0 designed for maximum allowable load per pile section.	Fill heights up to 19 ft. will be stable with forward and side slopes of 2:1.	

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B26 LOCATION Hwy. 407 & First Line West  
ORIGINAL GROUND ELEV. 665-670 PROPOSED HWY. 407 GRADE ELEV. 667  
Proposed First Line West Grade Elevation 688

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<p><u>Reference Boreholes</u> 61 Ground elevation 665.0</p> <p>0-36' compact to very dense sandy silt</p> <p><u>Groundwater</u> Elevation 656±</p>	<p><u>Abutments</u></p> <ol style="list-style-type: none"> <li>1. Spread footings on compacted granular pad.</li> <li>2. Spread footings at or below elevation 662 designed for maximum allowable load of 4.5 t.s.f.</li> <li>3. End bearing piles driven to elevation 635.0 designed for maximum structural capacity per pile section.</li> </ol> <p><u>Piers</u></p> <ol style="list-style-type: none"> <li>1. Spread footings at or below elevation 662 as discussed above.</li> <li>2. End bearing piles as discussed above.</li> </ol>	<p>Fill heights up to 23 ft. will be stable with forward and side slopes of 2:1.</p>	

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B27 LOCATION Hwy. 407 & Second Line West  
 ORIGINAL GROUND ELEV. 600-610 PROPOSED HWY. 407 GRADE ELEV. 602  
 Proposed Second Line West Grade Elevation 625

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 56 Ground elevation 607.0 0-20' dense sandy silt 20-30' dense silt 30-34' very dense silt 34-36.5' dense silty clay  <u>Groundwater</u> Elevation 577±	<u>Abutments</u> 1. Spread footings on compacted granular. 2. Spread footings at or below elevation 598.0 designed for a maximum allowable load of 3.5 t.s.f.  <u>Piers</u> 1. Spread footings at or below elevation 598 as discussed above.	Fill heights up to 25 ft. will be stable with forward and side slopes of 2:1.	

# FOUNDATION DATA SHEET

JOB 87-78-00 SITE B28 LOCATION Hwy. 407 & Credit River (and CPR)  
 ORIGINAL GROUND ELEV. 548-555 PROPOSED HWY. 407 GRADE ELEV. 588  
 HWL Credit River 570.0

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes 108 &amp; 109</u> BH 108 Ground elevation 558.0 0-7.5' compact sand and gravel 7.5-40' firm to stiff glacial till 40-51' dense to very dense silty sand 51-105' hard glacial till  BH 109 Ground elevation 560.0 0-10' very stiff silty clay 10-45' very dense silty sand 45-71' hard glacial till  <u>Groundwater</u> Elevation 540.0	<u>Abutments and Piers</u>  End bearing piles estimated tip elevation 460.0. Designed for maximum structural capacity per pile section less 15% for negative friction.	Fill heights up to 30 ft. will be stable with forward and side slopes of 2:1. Fill heights up to 35 ft. will be stable with slopes of 2:1 and a mid height berm of 15 ft. wide.  Note: In order to reduce post construction maintenance costs due to settlement of the approaches it would be advantageous to construct the embankment and leave it for two months prior to paving. Anticipated settlements of the 42 ft. high embankments are expected to be in the order of 4-6" as a result of consolidation of the underlying firm substrata.  Fill heights up to 42 ft. will be stable with for-	ward and side slopes of 2:1 and a mid height berm 50 feet wide.  Note: Fill heights should be taken from final grade to the River bottom in areas near the Credit River.

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B29 LOCATION Hwy. 407 & Creditview Road  
ORIGINAL GROUND ELEV. 598+ PROPOSED HWY. 407 GRADE ELEV. 587  
Proposed Creditview Road Grade Elevation 609

[illegible]

# FOUNDATION DATA SHEET

87-78-00 SITE B30 LOCATION Hwy 407 & Levi Creek  
ORIGINAL GROUND ELEV. 573-600 PROPOSED HWY. 407 GRADE ELEV. 596  
Levi Creek HWL 578

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<p><u>Reference Boreholes</u>    47</p> <p>Ground elevation 587.0</p> <p>0-8' dense silt</p> <p>8-36' very dense sandy silt</p>  <p><u>Groundwater</u> Elevation 567±</p>	<p><u>Abutments and Piers</u></p> <ol style="list-style-type: none"> <li>1. Spread footings at or below elevation 582.0 designed for maximum allowable load of 5 t.s.f.</li> <li>2. End bearing piles driven to elevation 567.0 designed for maximum allowable load per pile section.</li> </ol>	<p>Fill heights up to 23 ft. will be stable with forward and side slopes of 2:1.</p>	<p>Note: A dewatering scheme will be required to prevent basal heave for footings located below the prevailing groundwater level.</p>

# FOUNDATION DATA SHEET

W.P. 87-78-00 SITE B31 LOCATION Hwy. 407 & Mississauga Road  
ORIGINAL GROUND ELEV. 610-612 PROPOSED HWY. 407 GRADE ELEV. 598  
Proposed Mississauga Road Grade Elevation 625

[illegible]

# FOUNDATION DATA SHEET

W P 87-78-00 SITE B32 LOCATION Hwy. 407 & Fifth Line West  
ORIGINAL GROUND ELEV. 663+ PROPOSED HWY. 407 GRADE ELEV. 655  
Proposed Fifth Line West Grade Elevation 675

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> -40 Ground elevation 665.0  0-25' very dense sandy silt  25-36' very dense sand          <u>Groundwater</u> Elevation 644+	<u>Abutments and Piers</u>  1. (Abutments only) Spread footings on compacted granular.  2. Spread footings at or below elevation 660.0 designed for maximum allowable load of 5 t.s.f.  3. End bearing piles driven to elevation 645.0 designed for the maximum structural capacity per pile section.	Fill heights up to 12 ft. will be stable with forward and side slopes of 2:1.  Cut slopes up to 9 feet deep will be stable with 2:1 side slopes.	



# FOUNDATION DATA SHEET

P. 87-78-00 SITE B33 LOCATION Hwy. 407 & Winston Churchill Boulevard  
 ORIGINAL GROUND ELEV. 685-688 PROPOSED HWY. 407 GRADE ELEV. 688  
 Proposed Winston Churchill Boulevard Grade Elevation 708

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<p><u>Reference Boreholes</u>    34</p> <p>Ground elevation 685.0</p> <p>0-14'    very dense sandy silt</p> <p>14-35.5'    very dense sand</p> <p>  &lt;</p>			

# FOUNDATION DATA SHEET

A.P. 87-78-00 SITE B34 LOCATION Hwy. 407 at Hwy. 401  
 ORIGINAL GROUND ELEV. 705-690 PROPOSED HWY. 401 GRADE ELEV. 695+  
 Proposed Hwy. 407 Grade Elevation 720 (Assumed)

SUBSURFACE CONDITIONS	RECOMMENDATIONS		REMARKS
	STRUCTURE	APPROACHES	
<u>Reference Boreholes</u> 101 Ground elevation 706.0  0-30' very dense silty sand  30-31.5' very dense sand          <u>Groundwater</u> Elevation 679+	<u>Abutments and Piers</u>  1. (Abutments only) Spread footings on compacted granular.  2. Spread footings at or below elevation 702.0 designed for an maximum allowable bearing capacity of 5 t.s.f.  3. End bearing piles driven to estimated tip elevation 690.0 designed for maximum structural capacity per pile section.	Fill heights up to 25 ft. will be stable with forward and side slopes of 2:1.	



Ministry of  
Transportation and  
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HIGHWAY ENGINEERING DIVISION - ENGINEERING MATERIALS OFFICE - SOIL MECHANICS SECTION

RECORD OF BOREHOLE No 1 (Formerly BH. 1, W.P. 88-78-00)

W.P. 87-78-00 LOCATION Hwy. 407 & Mimico Creek ORIGINATED BY M.M.  
DIST 6 HWY 407 BOREHOLE TYPE Solid Stem Augers (0-25'), Hollow Stem Augers COMPILED BY M.M.  
DATUM Geodetic DATE October 13, 1978 (24-40) CHECKED BY W.J.

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100					
564.8	Ground Surface															
0.0	Clayey Silt		1	SS	9											
	Stiff		2	SS	16											
	Very Stiff		3	SS	42											
540.0	Silt, Some Sand		4	SS	44											
550.9	Dense		5	SS	18											
14.1	Sand, Some Silt		6	SS	34											
	Compact		7	SS	39											
534.8			8	SS	50/ 3"											
30.0	Heterogeneous Mixture Clayey Silt Sand and Gravel		9	SS	100/ 3"											
	Occasional Cobbles															
	Hard															
523.3	Glacial Till															
41.5	End of Borehole															

+3, x5: Numbers refer to  
Sensitivity

20  
15 5 (%) STRAIN AT FAILURE  
10

# RECORD OF BOREHOLE No 3 (Formerly B.H. 3, W.P. 103-69-08)

W P 87-78-00 LOCATION Co-ords. N 15 870 376; E 945 660 ORIGINATED BY VK  
 DIST 6 HWY 410 BOREHOLE TYPE C.M.E. 5.1 (1) M.V.H.S. COMPILED BY VK  
 DATUM Geodetic DATE July 22, 1976 CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION [%]
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20 40 60 80 100						
630.0	Ground Level													
0.0														
	Brown		1	SS	43									8 22 49 21
	Grey		2	SS	129									25 32 29 14
			3	SS	50									
	Heterogeneous		4	SS	120									9 33 56 2
	Mixture of Clayey		5	SS	137	6"								
	Silt, Sand and		6	SS	100	6"								
	Gravel													
	(Glacial Till)													
603.5	Hard		7	SS	160									12 23 46 19
26.5	End of Borehole													

OFFICE REPORT ON SOIL EXPLORATION

+3, x5: Numbers refer to  
Sensitivity

20  
15 ± 5 (%) STRAIN AT FAILURE  
10

ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE - SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 4 (Formerly BH. 4, W.P. 103-69-00)

W.P. 87-78-00 LOCATION Co-ords. 868,935 N; 946,010 E. ORIGINATED BY VK  
 DIST. 6 HWY. 410 BORING DATE June 25, 1975 COMPILED BY OY  
 DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger & BX Casing CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER ELEV.	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$			UNIT WEIGHT $\gamma$	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20 40 60 80 100					$w_p$ — $w$ — $w_L$				
							SHEAR STRENGTH ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE					WATER CONTENT % 10 20 30				
615.7	Ground Level															
0.0	Silty sand with gravel, trace of clay														38 24 28 10	
609.7	Compact		1	SS	14	610										
6.0	Het. mix. of clayey silty sand and gravel															
605.2	Stiff to Hard Grey		2	SS	1007	6"										
10.5	Weathered															
11.5	Sound Shale Bedrock		3	BXL REC	100%											
599.2						600										
16.5	End of Borehole															

## ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

## RECORD OF BOREHOLE NO 5 (Formerly BH. 3, W.P. 103-69-00)

W.P. 87-78-00

LOCATION Co-ords. 867,280 N; 946,985 E.

ORIGINATED BY VK

DIST. 6 HWY. 410

BORING DATE June 26, 1975

COMPILED BY OY

DATUM Geodetic

BOREHOLE TYPE Hollow Stem Auger &amp; BX Casing

CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER ELEV.	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT $w_L$ PLASTIC LIMIT $w_p$ WATER CONTENT $w$			UNIT WEIGHT $\gamma$	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	$w_p$	$w$	$w_L$		
634.5	Ground Level															
0.0	Het. mixture of clayey silt, sand and gravel	Brown Grey	1	SS	124	630										
			2	SS	100	6"										
619.5	Hard					620										
15.0	Weathered		3	SS	106	6"										
617.5																
17.0	Sound Shale Bedrock				90%											
612.0			4	BXL	REC											
22.5	End of Borehole															



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HIGHWAY ENGINEERING DIVISION-ENGINEERING MATERIALS OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE No 6 (Formerly BH. 4, W.P. 88-78-00)

W P 87-78-00 LOCATION Hwy. 407 & Airport Road ORIGINATED BY MM  
DIST 6 HWY 407 BOREHOLE TYPE Solid Stem Augers COPILED BY MM  
DATUM Geodetic DATE October 16, 1978 CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
596.3	Ground Surface																
0.0	Heterogeneous Mixture Clayey Silt Sand and Gravel Very Stiff to Hard Brown Grey Very Stiff to Hard		1	SS	32		590										2 12 46 40
			2	SS	35												
			3	SS	49												
			4	SS	26												
			5	SS	27		580										
			6	SS	40												
571.3			7	SS	68/	6"	570										
25.0	Silt, Some Sand Very Dense		8	SS	125												
564.8																	
31.5	End of Borehole Note: Groundwater Not Encountered																

+3, x5: Numbers refer to  
Sensitivity

20  
15  
10  
5 (% STRAIN AT FAILURE)

# RECORD OF BOREHOLE No 34

W P 87-78-00 LOCATION Co-ords. N 15 842 942; E 922 920 ORIGINATED BY HYDRO  
 DIST 6 HWY 407 BOREHOLE TYPE Hollow Stem Augers COMPILED BY PL  
 DATUM Geodetic DATE April 13, 1976 CHECKED BY En

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
685.0	Ground Level																
0.0	Very Dense Brown Sandy Silt with Trace Clay and Gravel	.	1	SS	80		680										
			2	SS	66												
			3	SS	80												
			4	SS	69												
671.0	Very Dense Grey Sand with Trace Silt and Gravel	.	5	SS	50/	3"	670										
14.0			6	SS	100/	4"											
			7	SS	100/	5"	660										
			8	SS	78/	6"											
			9	SS	100/	6"	650										
649.5	End of Borehole																
35.5																	

OFFICE REPORT ON SOIL EXPLORATION

+<sup>3</sup>, x<sup>5</sup>: Numbers refer to  
Sensitivity

20  
15  
10  
5  
(%) STRAIN AT FAILURE



# RECORD OF BOREHOLE No 40

W P 87-78-00 LOCATION Co-ords. N 15 846 161; E 927 038 ORIGINATED BY HYDRO  
 DIST 6 HWY 407 BOREHOLE TYPE Hollow Stem Augers COMPILED BY PL  
 DATUM Geodetic DATE April 15, 1976 CHECKED BY \_\_\_\_\_

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
665.0	Ground Level																
0.0			1	SS	38		660										
	Very Dense Brown Sandy Silt with Trace Gravel		2	SS	122												
			3	SS	53/6	"											
			4	SS	100/7	6"											
			5	SS	60/1	"	650										
			6	SS	53/6	"											
640.0			7	SS	53/6	"	640										
25.0			8	SS	60/6	"											
	Very Dense Grey Sand with Trace Silt		9	SS	67/6	"	630										
629.3																	
35.7	End of Borehole																

OFFICE REPORT ON SOIL EXPLORATION

+<sup>3</sup>, x<sup>5</sup>: Numbers refer to  
Sensitivity

20  
15  
10  
5 (%) STRAIN AT FAILURE

# RECORD OF BOREHOLE No 45

W P 87-78-00 LOCATION Co-ords. N 15 847 671; E 930 707 ORIGINATED BY HYDRO  
 DIST 6 HWY 407 BOREHOLE TYPE Hollow Stem Augers COMPILED BY PL  
 DATUM Geodetic DATE March 29, 1976 CHECKED BY PL

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100					
617.0	Ground Level															
0.0	Very Dense Brown Sandy Silt with Some Clay and Trace Gravel		1	TW	SH										140.6	
			2	TW	SH										143.4	
			3	TW	SH										143.1	
604.0			4	SS	90/6	"									149.2	
13.0	Very Dense Grey-Brown Silt with Some Sand and Clay and Gravel, Trace Cobbles.		5	SS	110											
697.0			6	SS	75/4	"									145.8	
20.0	Very Dense Sandy Silt with Some Gravel and Cobbles		7	SS	100/7	6"										
687.0			8	SS	100/7	3"										
30.0	Very Dense Silt, Some Sand, Trace Clay and Shale		9	SS	100/7	3"										
682.0																
35.0	End of Borehole															

OFFICE REPORT ON SOIL EXPLORATION

+<sup>3</sup>, x<sup>5</sup>: Numbers refer to  
Sensitivity

20  
15 → 5 (%) STRAIN AT FAILURE  
10

# RECORD OF BOREHOLE No 47

W P 87-78-00 LOCATION Co-ords. N 15 849 098; E 931 848 ORIGINATED BY HYDRO  
 DIST 6 HWY 407 BOREHOLE TYPE Hollow Stem Augers COMPILED BY PL  
 DATUM Geodetic DATE April 22, 1976 CHECKED BY PL

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100					
587.0	Ground Level															
0.0	Dense Brown Silt with Some Fine Sand and Clay and Trace Gravel		1	SS	42								o		119.9	
579.0			2	SS	60								o		139.7	
8.0	Very Dense Grey Sandy Silt with Trace Clay and Gravel plus Cobbles		3	SS	60/6 "								o			
			4	SS	55/1 "								o			
			5	SS	60/6 "								o		139.3	
			6	SS	50/6 "								o		149.1	
			7	SS	105											
			8	SS	-								o			
552.0			9	SS	-								o		140.8	
36.0	End of Borehole															
	Very Dense Reddish Brown Clayey Silt Some Sand															

OFFICE REPORT ON SOIL EXPLORATION

# RECORD OF BOREHOLE No 50

W P 87-78-00 LOCATION Co-ords. N 15 850 565; E 933 028 ORIGINATED BY HYDRO  
 DIST 6 HWY 407 BOREHOLE TYPE Hollow Stem Augers COMPILED BY PL  
 DATUM Geodetic DATE April 23, 1980 CHECKED BY PL

SOIL PROFILE		STRAT PLOT	SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION		NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
582.0	Ground Level																
0.0	Dense Brown Fine to Coarse Sandy Silt, Trace Gravel and Clay		1	SS	27		580									124.0	
			2	SS	24											129.7	
			3	SS	33											117.8	
	V. Dense		4	SS	58		570									147.8	
			5	SS	60/6 "												
			6	SS	100/3 "		560										
	Cobbles and Boulders																
550.0																	
32.0	End of Borehole																

OFFICE REPORT ON SOIL EXPLORATION

+3, x5: Numbers refer to Sensitivity  
 20  
 15 5 (%) STRAIN AT FAILURE  
 10

# RECORD OF BOREHOLE No 56

W P 87-78-00 LOCATION Co-ords. N 15 855 407; E 936 923 ORIGINATED BY HYDRO  
 DIST 6 HWY 407 BOREHOLE TYPE Hollow Stem Augers COMPILED BY PL  
 DATUM Geodetic DATE April 20, 1976 CHECKED BY K.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
607.0	Ground Level																
0.0																	
	Dense Brown-Grey		1	SS	34											125.1	
	Sandy Silt, Some		2	SS	37												
	Clay		3	SS	37											138.6	
			4	SS	40												
			5	SS	32												
587.0																	
20.0	Dense Grey Silt		6	SS	30											144.3	
	With Trace Sand,		7	SS	35												
	Clay and Fine Gravel																
577.0																	
30.0	Very Dense Grey Sandy		8	SS	78											144.6	
	Silt with Some Clay,																
573.0	Trace Fine Gravel																
34.0	Dense Grey Clayey Silt,															146.5	
570.5	Tr. Sand & Fine Gravel		9	SS	31												
36.5	End of Borehole																

OFFICE REPORT ON SOIL EXPLORATION

+3, x<sup>5</sup>: Numbers refer to  
Sensitivity

20  
15  $\pm$  5 (%) STRAIN AT FAILURE  
10

# RECORD OF BOREHOLE No 61

W P 87-78-00 LOCATION Co-ords. N 15 858 408; E 940 170 ORIGINATED BY HYDRO  
 DIST 6 HWY 407 BOREHOLE TYPE Hollow Stem Auger COMPILED BY PL  
 DATUM Geodetic DATE April 27, 1976 CHECKED BY 7

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
665.0	Ground Level																
0.0	Compact to Very Dense, Brown Sandy Silt, Trace Clay and Gravel		1	SS	28		660										
			2	SS	46												
			3	SS	71												
			4	SS	70/6												
			5	SS	60/6		650										
			6	SS	80/6												
			7	SS	100/5		640										
			8	SS	100/1												
629.1			9	SS	50/5		630										
35.9	End of Borehole																

OFFICE REPORT ON SOIL EXPLORATION

+<sup>3</sup>, x<sup>5</sup>: Numbers refer to  
Sensitivity

20  
15  
10  
5 (%) STRAIN AT FAILURE

# RECORD OF BOREHOLE No 74 S

W P 87-78-00 LOCATION Co-ords. N 15 865 710; E 948 038 ORIGINATED BY HYDRO  
 DIST 6 HWY 407 BOREHOLE TYPE Hollow Stem Augers COMPILED BY PL  
 DATUM Geodetic DATE May 18, 1976 CHECKED BY

SOIL PROFILE		STRAT PLOT	SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV. DEPTH	DESCRIPTION		NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
628.0	Ground Level																
0.0	Very Dense Sandy Silt, Trace Clay, Gravel and Cobbles.	*	1	SS	40												
		*	2	SS	46												
		*	3	SS	100/	5"											
		*	4	SS	70/6	5"											
		*	5	SS	100/	5"											
		*	6	SS	100/	5"											
		*	7	SS	60/2	"											
601.0																	
27.0	End of Borehole																

OFFICE REPORT ON SOIL EXPLORATION

# RECORD OF BOREHOLE No 97

W P 87-78-00 LOCATION Co-ords. N 15 882 114; E 953 943 ORIGINATED BY HYDRO  
 DIST 6 HWY 407 BOREHOLE TYPE Hollow Stem Augers COMPILED BY PL  
 DATUM Geodetic DATE May 25, 1976 CHECKED BY

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL		
ELEV DEPTH	DESCRIPTION	STRAT	PLOT	NUMBER			TYPE	'N' VALUES	20 40 60 80 100									
									SHEAR STRENGTH									
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE					WATER CONTENT (%)						
590.0	Ground Level																	
0.0	Clayey Silt																	
585.0	Some Fine Sand Hard			1	SS	49												
5.0	Sandy Silt, Some Clay, Trace Gravel			2	SS	39												
				3	SS	50/4"												
	Dense to V. Dense			4	SS	100/6"												
575.0				5	SS	100/3"												
15.0	Silty Sand																	
	Trace Gravel, Occasional Cobbles			6	SS	100/6"												
				7	SS	66/6"												
	Very Dense			8	SS	60/2"												
555.0				9	SS	80/4"												
35.0	End of Borehole																	

OFFICE REPORT ON SOIL EXPLORATION



# RECORD OF BOREHOLE No 101

W P 87-78-00 LOCATION Co-ords. N 15 841 625; E 921 010 ORIGINATED BY MM  
 DIST 6 HWY 407 BOREHOLE TYPE Solid Stem Augers COMPILED BY PL  
 DATUM Geodetic DATE April 8, 1980 CHECKED BY

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT $\gamma$	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES		20 40 60 80 100		W <sub>p</sub>	W	W <sub>L</sub>		
706.0	Ground Level												
0.0	Heterogeneous Mixture Silt, Sand and Gravel, Trace Clay  Very Dense  (Glacial Till)		1	SS	68	10"							8 34 44 14
			2	SS	97/	6"							
			3	SS	56/								
			4	SS	157								
			5	SS	98/	6"							
			6	SS	100/	6"							
			7	SS	100/	3"							
			8	SS	100/	6"							
676.0													
30.0	Sand, Fine to Med. V. Dense		9	SS	100/	4"							
31.5	End of Borehole												

OFFICE REPORT ON SOIL EXPLORATION

+3, x5 : Numbers refer to  
Sensitivity

20  
15  $\pm$  5 (%) STRAIN AT FAILURE  
10

# RECORD OF BOREHOLE No 102

W P 87-78-00 LOCATION Co-ords. N 15 861 730; E 942 530 ORIGINATED BY MM  
DIST 6 HWY 407 BOREHOLE TYPE Solid Stem Augers COMPILED BY PL  
DATUM Geodetic DATE April 9, 1980 CHECKED BY RS

SOIL PROFILE		STRAT PLOT	SAMPLES		GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION		NUMBER	TYPE			'N' VALUES	20 40 60 80 100	W <sub>p</sub>	W		
674.0	Ground Level											GR SA SI CL
0.0	Heterogeneous Mixture  - Brown - Grey Clayey Silt, Sand and Gravel V. Stiff to Hard (Glacial Till)		1	SS	12							
			2	SS	55							
			3	SS	69							
			4	SS	87							
			5	SS	46							
			6	SS	30							
			7	SS	33							
			8	SS	23							
			9	SS	33							
640.0	Heterogeneous Mixture Silt, Sand and Gravel (Glacial Till) Very Dense		10	SS	68							
34.0			11	SS	122							
			12	SS	56							
			13	SS	100/ 5"							
622.5	End of Borehole											
51.5	Note: No Groundwater Encountered.											


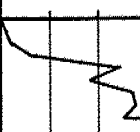
OFFICE REPORT ON SOIL EXPLORATION

+3, x5: Numbers refer to  
Sensitivity

20  
15 5 (%) STRAIN AT FAILURE  
10

# RECORD OF BOREHOLE No 103

W P 87-78-00 LOCATION Co-ords. N 15 865 385; E 945 529 ORIGINATED BY MM  
 DIST 6 HWY 407 BOREHOLE TYPE Hollow Stem Augers COMPILED BY PL  
 DATUM Geodetic DATE April 9, 1980 CHECKED BY

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT  Y	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	NUMBER	TYPE	'N' VALUES			20 40 60 80 100	W <sub>p</sub>	W	W <sub>L</sub>		
640.0	Ground Level											
0.0	Heterogeneous Mixture	1	SS	27		630		10	20	30		
	Clayey Silt, Sand	2	SS	47								
	and Gravel	3	SS	91								
	Hard (Glacial Till)	4	SS	100								
628.5	End of Borehole											
11.5	Probable Bedrock											

OFFICE REPORT ON SOIL EXPLORATION

+3, x5: Numbers refer to  
Sensitivity


20  
15 5 (%) STRAIN AT FAILURE  
10



Ministry of  
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Ontario

## RECORD OF BOREHOLE No 104

W P 87-78-00 LOCATION Co-ords. N 15 869 968; E 948 075; ORIGINATED BY MM  
DIST 6 HWY 407 BOREHOLE TYPE Solid Stem Augers COMPILED BY FL  
DATUM Geodetic DATE April 9, 1980 CHECKED BY RS

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20 40 60 80 100						
								SHEAR STRENGTH		WATER CONTENT (%)				
620.0	Ground Level													
0.0	Heterogeneous Mixture Clayey Silt, Sand and Gravel Hard (Glacial Till)		1	SS	19									
			2	SS	68									
			3	SS	78									
			4	SS	100/	4"								
606.0	With Limestone Layers - Weathered		5	RC	REC	5%								
14.0			6	SS	100/	3"								
	Shale Bedrock		7	SS	100/	1"								
			8	SS	100/	3"								
588.0			9	RC	REC	100%								
32.0	End of Borehole													
	<u>*Note:</u> Groundwater Not Encountered.													

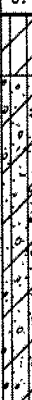
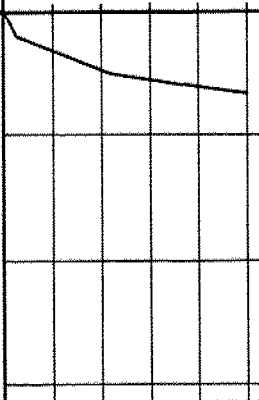
OFFICE REPORT ON SOIL EXPLORATION

+3, x5: Numbers refer to  
Sensitivity

20  
15-5 (%) STRAIN AT FAILURE  
10

# RECORD OF BOREHOLE No 105

W P 87-78-00 LOCATION Co-ords. N 15 874 170; E 949 411 ORIGINATED BY MM  
 DIST 6 HWY 407 BOREHOLE TYPE Solid Stem Augers COMPILED BY PL  
 DATUM Geodetic DATE April 11, 1980 CHECKED BY

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			'N' VALUES					
600.0	Ground Level											
0.0	Clayey Silt to Silty Clay		1	SS	33							
595.0	Hard		2	SS	42							
5.0	Heterogeneous Mixture		3	SS	75							
	Clayey Silt, Sand and Gravel		4	SS	90							
			5	SS	136							
			6	SS	125							
	Hard		7	SS	100/4"							
	(Glacial Till)		8	SS	100/4"							
568.5			9	SS	100/3"							
31.5	End of Borehole											

OFFICE REPORT ON SOIL EXPLORATION

+3, x5: Numbers refer to  
Sensitivity

20  
15  
10  
5 (%) STRAIN AT FAILURE

# RECORD OF BOREHOLE No 106

W P 87-78-00 LOCATION Co-ords. N 15 878 489; E 951 385 ORIGINATED BY PL  
DIST 6 HWY 407 BOREHOLE TYPE Solid Stem Augers COMPILED BY PL  
DATUM Geodetic DATE April 15, 1980 CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES			20 40 60 80 100						
604.0	Ground Level													
0.0	Silty Clay		1	SS	34									
597.0	Hard		2	SS	42									
7.0	Sandy Silt		3	SS	135									
	Very Dense		4	SS	100	4"								12 40 39 9
			5	SS	100	5"								
579.0	Heterogeneous Mixture		6	SS	125									
15.0	Silty Clay, Sand and Gravel (Glacial Till)		7	SS	100	3"								
	Hard		8	SS	100	4"								
			9	SS	100	3"								
568.7			10	SS	100	4"								
35.5	End of Borehole													

OFFICE REPORT ON SOIL EXPLORATION

+3, x5: Numbers refer to  
Sensitivity

20  
15 5 (%) STRAIN AT FAILURE  
10

# RECORD OF BOREHOLE No 107

W P 87-78-00 LOCATION Co-ords. N 15 885 204; E 953 646 ORIGINATED BY PL  
 DIST 6 HWY 407 BOREHOLE TYPE Solid Stem Augers COMPILED BY PL  
 DATUM Geodetic DATE April 15, 1980 CHECKED BY ES

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE								
593.0	Ground Level											
0.0												
	Heterogeneous Mixture		1	SS	33							
	Silty Clay, Sand and		2	SS	34							
	Gravel		3	SS	39							
	Hard		4	SS	42							
	(Glacial Till)		5	SS	25							
			6	SS	14							
			7	SS	25							
			8	SS	21							
			9	SS	157							
			10	SS	100/4"							
			11	SS	100/4"							
			12	SS	100/3"							
			13	SS	100/2"							
543.0												
50.0	End of Borehole											

OFFICE REPORT ON SOIL EXPLORATION

+<sup>3</sup>, x<sup>5</sup>: Numbers refer to  
Sensitivity

20  
15  $\phi$  5 (%) STRAIN AT FAILURE  
10

# RECORD OF BOREHOLE No 108

W P 87-78-00 LOCATION Co-ords. N 15 853 348; E 934 368 ORIGINATED BY PL  
DIST 6 HWY 407 BOREHOLE TYPE Hollow Stem Augers COMPILED BY PL  
DATUM Geodetic DATE April 16, 1980 CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ (pcf)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20 40 60 80 100						
								SHEAR STRENGTH (psf)						
							○ UNCONFINED	+ FIELD VANE			WATER CONTENT (%)			
							● QUICK TRIAXIAL	x LAB VANE			10 20 30			
							400 800 1200 1600 2000							
556.0	Ground Level													
0.0	Sand, Some Silt With Gravel Compact		1	SS	20									59 30 9 2
548.5			2	SS	30									
7.5	Heterogeneous Mixture Silty Clay and Sand		3	SS	19									
			4	SS	16									
		Stiff	5	SS	18									
		Firm	6	SS	9									
			7	TW	PH								135	5 22 42 31
			8	TW	PH									
	(Glacial Till)													
		Stiff	9	TW	PH								138	
			10	SS	19									
			11	SS	9									
516.0			12	SS	18									
40.0	Silty Sand Dense to Very Dense		13	SS	48									0 50 40 10
			14	SS	60									
505.0														
51.0	Heterogeneous Mixture Silty Clay, Sand and Gravel													
			15	SS	45									
	Hard													
	(Glacial Till)													
			16	SS	70									34 40 22 4
			17	SS	100/ 5"									
			18	SS	67									47 29 17 7
			19	SS	150/ 3"									
451.0			20	SS	100/ 1"									
105.0	End of Borehole													

OFFICE REPORT ON SOIL EXPLORATION

+3, x5 : Numbers refer to  
Sensitivity

20  
15 + 5 (%) STRAIN AT FAILURE  
10



# RECORD OF BOREHOLE No 109

W P 87-78-00 LOCATION Co-ords. N 15 853 788; E 934 730 ORIGINATED BY PL  
DIST 6 HWY 407 BOREHOLE TYPE Hollow Stem Augers COMPILED BY PL  
DATUM Geodetic DATE April 21, 1980 CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40						60	80	100
								SHEAR STRENGTH (PSF)							WATER CONTENT (%)		
560.0	Ground Level																
0.0	Silty Clay Very Stiff		1	SS	22												
550.0			2	SS	19												
10.0	Heterogeneous Mixture Silty Clay, Sand and Gravel  (Glacial Till) Very Stiff Stiff		3	SS	11												
			4	TW	PH												
			5	SS	5												
			6	TW	PH												
			7	SS	10												
			8	SS	12												
515.0			9	SS	17												
45.0	Silty Sand Very Dense																
			10	SS	93												
489.5																	
70.5	Heterogeneous Mixture Silty Clay, Sand and Gravel  Hard  (Glacial Till)		11	SS	100/6"									10 22 43 25			
			12	SS	73												
			13	SS	75												
			14	SS	76												
450.0			15	SS	100/1"												
110.0	End of Borehole																

+3, x5 : Numbers refer to  
Sensitivity

20  
15 5 (%) STRAIN AT FAILURE  
10

OFFICE REPORT ON SOIL EXPLORATION

# RECORD OF BOREHOLE No 110

W P 87-78-00 LOCATION Co-ords. N 15 860 285; E 940 990 ORIGINATED BY PL  
 DIST 6 HWY 407 BOREHOLE TYPE Solid Stem Augers COMPILED BY PL  
 DATUM Geodetic DATE April 23, 1980 CHECKED BY

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100					
645.0	Ground Level															
0.0	Silty Sand Trace Clay Loose to Compact		1	SS	3											
637.5			2	SS	13											5 44 38 13
7.5	Heterogeneous Mixture Silty Clay, Sand and Gravel		3	SS	71											
			4	SS	62											16 35 41 8
			5	SS	106											
			6	SS	114											
	Hard Very Dense  (Glacial Till)		7	SS	100/3"											
			8	SS	100/5"											
			9	SS	100/5"											29 30 37 4
			10	SS	100/5"											
604.1			11	SS	100/5"											
40.9	End of Borehole															

OFFICE REPORT ON SOIL EXPLORATION

+3, x5: Numbers refer to  
Sensitivity

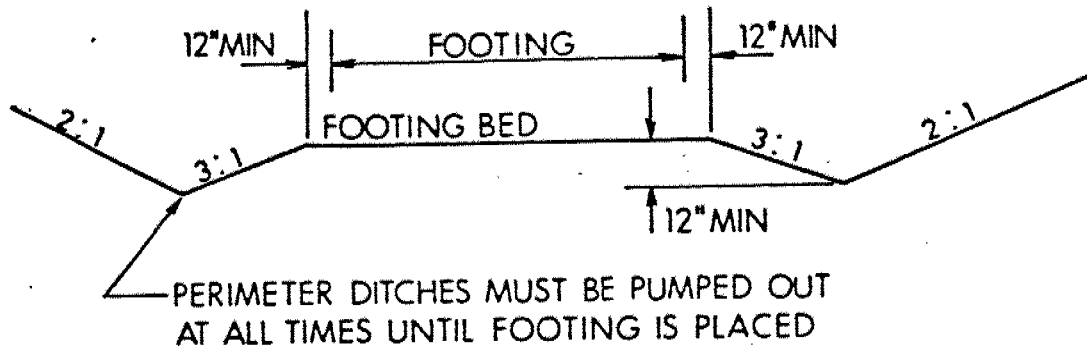
20  
15  
10  
5 (%) STRAIN AT FAILURE

The diagram illustrates a cross-section of a road embankment. At the base is a horizontal line labeled 'X SECTION'. The embankment consists of a central core of 'GRANULAR 'A'' and two side slopes of 'EARTH FILL'. The granular core is a rectangle with a width of '3' MIN' on both sides and a height of '1''. The earth fill slopes are indicated by dashed lines with a '2:1' ratio. A horizontal line runs through the center of the granular core. A diagonal line labeled 'FROST' indicates the frost line, which is shown to be below the granular core. The slopes of the earth fill are labeled '1:1' and '2:1'.



- 1-REMOVE TOPSOIL &/OR SOFT SUBSOIL UNDER AREA OF COMPACTED GRANULAR 'A' & EARTH FILL.
- 2-PLACE GRANULAR 'A' & EARTH FILL TO TOP OF FOOTING LEVEL, COMPACTED ACCORDING TO CURRENT M.T.C. STANDARDS.
- 3-EXCAVATE COMPACTED GRANULAR 'A' & EARTH FILL FOR FOOTING.

FIG. 1



## OVERSIZE EXCAVATION WITH PERIMETER DRAINS

FIG No 2

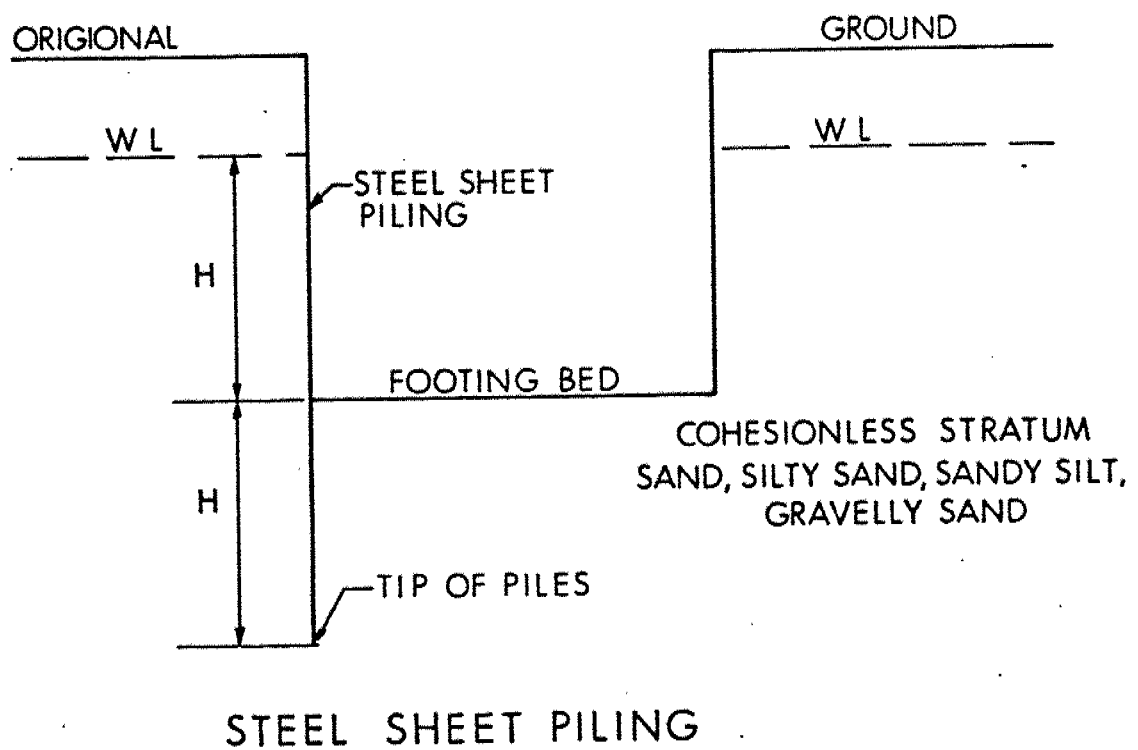


FIG No 3

## ALTERNATE DEWATERING SCHEMES

# EXPLANATION OF TERMS USED IN REPORT

'N' VALUE: AN INDICATOR OF SUBSOIL QUALITY. IT IS OBTAINED FROM THE STANDARD PENETRATION TEST (CSA STD. A119.1). SPT 'N' VALUE IS THE NUMBER OF BLOWS REQUIRED TO CAUSE A STANDARD 2 INCH O.D. SPLIT-BARREL SAMPLER TO PENETRATE 12 INCHES INTO UNDISTURBED GROUND IN A BOREHOLE WHEN DRIVEN BY A HAMMER WEIGHING 140 POUNDS, FALLING FREELY A DISTANCE OF 30 INCHES. FOR PENETRATIONS OF LESS THAN 12 INCHES 'N' VALUES ARE INDICATED AS THE NUMBER OF BLOWS FOR THE PENETRATION ACHIEVED. 'N' VALUES CORRECTED FOR OVERBURDEN PRESSURE ARE DENOTED THUS  $N_c$ .

DYNAMIC CONE PENETRATION TEST (CSA STD. A119.3): CONTINUOUS PENETRATION OF A CONICAL STEEL POINT (2" O.D. 60 CONE ANGLE) DRIVEN BY 350 FT-LB IMPACTS ON 'A' SIZE DRILL RODS. THE RESISTANCE TO CONE PENETRATION IS MEASURED AS THE NUMBER OF BLOWS FOR EACH 12 INCH ADVANCE OF THE CONICAL POINT INTO THE UNDISTURBED GROUND.

SOIL QUALITY: SOILS ARE DESCRIBED BY THEIR COMPOSITION AND CONSISTENCY OR DENSITY.

CONSISTENCY: COHESIVE SOILS ARE DESCRIBED ON THE BASIS OF THEIR UNDRAINED SHEAR STRENGTH AS FOLLOWS:

$S_u$ (PSF)	0 - 250	250 - 500	500 - 1000	1000 - 2000	2000 - 4000	> 4000
	VERY SOFT	SOFT	FIRM	STIFF	VERY STIFF	HARD

DENSENESS: COHESIONLESS SOILS ARE DESCRIBED ON THE BASIS OF SPT 'N' VALUES AS FOLLOWS:

'N' (BLOW/FT)	0 - 5	5 - 10	10 - 30	30 - 50	> 50
	VERY LOOSE	LOOSE	COMPACT	DENSE	VERY DENSE

ROCK QUALITY: ROCKS ARE DESCRIBED BY THEIR COMPOSITION AND STRUCTURAL FEATURES AND/OR STRENGTH.

RECOVERY: SUM OF ALL RECOVERED ROCK CORE PIECES FROM A CORING RUN EXPRESSED AS A PERCENT OF THE TOTAL LENGTH DRILLED IN THAT CORING RUN.

MODIFIED RECOVERY: SUM OF THOSE NATURALLY FRACTURED CORE PIECES, 4" IN LENGTH EXPRESSED AS A PERCENT OF THE LENGTH OF THE CORING RUN. THE ROCK QUALITY DESIGNATION (RQD), FOR MODIFIED RECOVERY, IS:

RQD (%)	0 - 25	25 - 50	50 - 75	75 - 90	90 - 100
	VERY POOR	POOR	FAIR	GOOD	EXCELLENT

JOINTING AND BEDDING:

SPACING	2"	2" - 12"	1' - 3'	3' - 10'	> 10'
JOINTING	VERY CLOSE	CLOSE	MOD. CLOSE	WIDE	VERY WIDE
BEDDING	VERY THIN	THIN	MEDIUM	THICK	VERY THICK

## ABBREVIATIONS & SYMBOLS

### LABORATORY TESTING

TRIAxIAL TESTS ARE DESCRIBED IN TERMS OF WHETHER THEY ARE CONSOLIDATED (C) OR NOT (U) ISOTROPICALLY (I) OR NOT (A) AND SHEARED DRAINED (D) OR UNDRAINED (U) WITH PORE PRESSURE MEASUREMENTS (BAR OVER SYMBOLS) EG.  $\bar{C}U$  = CONSOLIDATED ISOTROPIC UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENT UNLESS OTHERWISE SPECIFIED IN REPORT ALL TESTS ARE IN COMPRESSION

### FIELD SAMPLING

S S SPLIT SPOON  
W S WASH SAMPLE  
S T SLOTTED TUBE SAMPLE  
B S BLOCK SAMPLE  
C S CHUNK SAMPLE  
T W THINWALL OPEN  
T P THINWALL PISTON  
O S OSTERBERG SAMPLE  
F S FOIL SAMPLE  
R C ROCK CORE  
P H T.W. ADVANCED HYDRAULICALLY  
P M T.W. ADVANCED MANUALLY

### EARTH PRESSURE TERMS

$\mu$  COEFFICIENT OF FRICTION  
 $\delta$  ANGLE OF WALL FRICTION  
 $k_o$  COEFFICIENT OF EARTH PRESSURE AT REST  
 $k_A$  COEFFICIENT OF ACTIVE EARTH PRESSURE  
 $k_P$  COEFFICIENT OF PASSIVE EARTH PRESSURE  
 $i$  ANGLE OF INCLINATION OF SURCHARGE  
 $w$  SLOPE ANGLE-BACKFACE OF WALL  
 $\beta$  ANGLE OF SLOPE  
 $N_q, N_c, N_{\gamma}$  BEARING CAPACITY FACTORS  
 $D_f$  DEPTH OF FOOTING  
 $B, L$  FOOTING DIMENSIONS

### INDEX PROPERTIES

$\gamma$  UNIT WEIGHT OF SOIL (BULK DENSITY)  
 $\gamma_w$  UNIT WEIGHT OF WATER  
 $\gamma_d$  UNIT DRY WEIGHT OF SOIL (DRY DENSITY)  
 $\gamma'$  UNIT WEIGHT OF SUBMERGED SOIL  
 $G_s$  SPECIFIC GRAVITY OF SOLIDS  
 $e$  VOIDS RATIO  
 $e_o$  INITIAL VOIDS RATIO  
 $e_{max}$   $e$  IN LOOSEST STATE  
 $e_{min}$   $e$  IN DENSEST STATE  
 $D_r$  RELATIVE DENSITY =  $\frac{e_{max} - e}{e_{max} - e_{min}}$   
 $n$  POROSITY  
 $w$  WATER CONTENT  
 $w_L$  LIQUID LIMIT  
 $w_P$  PLASTIC LIMIT  
 $w_S$  SHRINKAGE LIMIT  
 $I_P$  PLASTICITY INDEX =  $w_L - w_P$   
 $I_L$  LIQUIDITY INDEX =  $\frac{w - w_P}{I_P}$   
 $I_C$  CONSISTENCY INDEX =  $\frac{w_L - w}{I_P}$   
 $A_c$  ACTIVITY =  $\frac{I_P \text{ of soil}}{I_P \text{ of } \mu m \text{ Soil Fraction}}$   
 $O_m$  ORGANIC MATTER CONTENT  
 $S_r$  DEGREE OF SATURATION  
 $S$  SENSITIVITY =  $\frac{S_u(\text{undisturbed})}{S_u(\text{remoulded})}$

### STRENGTH PARAMETERS

$\phi$  ANGLE OF SHEARING RESISTANCE  
 $\tau_f$  PEAK SHEAR STRENGTH  
 $\tau_R$  RESIDUAL SHEAR STRENGTH  
 $c$  COHESION INTERCEPT  
 $\sigma_1, \sigma_2, \sigma_3$  NORMAL PRINCIPAL STRESSES  
 $u$  PORE WATER PRESSURE  
 $u_e$  EXCESS  $u$   
 $r_u$  PORE PRESSURE RATIO  
 $q_u$  UNCONFINED COMPRESSIVE STRENGTH  
 $s_u$  UNDRAINED SHEAR STRENGTH  
 $\epsilon$  LINEAR STRAIN  
 $\gamma$  SHEAR STRAIN  
 $\nu$  POISSON'S RATIO  
 $E$  MODULUS OF ELASTICITY  
 $G$  MODULUS OF SHEAR DEFORMATION  
 $k_s$  MODULUS OF SUBGRADE REACTION  
 $m, n$  STABILITY COEFFICIENTS  
 $A, B$  PORE PRESSURE COEFFICIENTS

### HYDRAULIC TERMS

$h$  HYDRAULIC HEAD OR POTENTIAL  
 $q$  RATE OF DISCHARGE  
 $v$  VELOCITY OF FLOW  
 $i$  HYDRAULIC GRADIENT  
 $j$  SEEPAGE FORCE PER UNIT VOLUME  
 $\eta$  COEFFICIENT OF VISCOSITY  
 $k$  COEFFICIENT OF HYDRAULIC CONDUCTIVITY  
 $k_h$   $k$  IN HORIZONTAL DIRECTION  
 $k_v$   $k$  IN VERTICAL DIRECTION  
 $m_v$  COEFFICIENT OF VOLUME CHANGE  
 $c_v$  COEFFICIENT OF CONSOLIDATION  
 $C_c$  COMPRESSION INDEX  
 $C_r$  RECOMPRESSION INDEX  
 $d$  DRAINAGE PATH DISTANCE  
 $T_v$  TIME FACTOR  
 $U$  DEGREE OF CONSOLIDATION  
 $O_r$  OVERCONSOLIDATION RATIO (OCR)

NOTE: EFFECTIVE STRESS PARAMETERS ARE DENOTED BY USE OF APOSTROPHE ABOVE THE SYMBOL, THUS:  
 $\phi'$  = EFFECTIVE ANGLE OF SHEARING RESISTANCE;  
 $\sigma'$  = EFFECTIVE NORMAL STRESS



*Rec'd Nov 14/78*

MILTON TS TO CLAIRVILLE TS  
500 KV TL - SOILS INVESTIGATION

Report No 76-442-H

H.S. Radhakrishna  
Engineer  
Soils Section  
Civil Research Department

RESEARCH DIVISION

FOR ONTARIO HYDRO USE ONLY

Information in this report must not be disclosed outside  
without authority from a director or a regional manager.

At the location of heavy anchor type towers the boreholes were extended to a depth of 60 feet or more. The boreholes at the location of suspension type towers were terminated at a depth of about 35 feet unless poor soil conditions were encountered, in which case the borehole was continued until a good bearing stratum or bedrock was encountered. In cases in which refusal was met within 30 feet of the ground surface, a minimum of 5 feet of unweathered rock core was taken, to confirm the depth to bedrock and assess the quality of rock for anchorage.

Soil samples were obtained at 3 foot intervals by means of Shelby tubes in cohesive material and by means of the split spoon sampler in cohesionless soils. Standard penetration tests were done while driving the split spoon sampler into granular soils.

The laboratory testing consisted of soil classification tests and the measurement of moisture content, density and shear strength values. The rock cores recovered from the boreholes were examined and logged in detail in the laboratory.

The field observations and laboratory test data are summarized in Figures 2 to 126.

#### SOIL CONDITIONS

The proposed corridor is confined entirely to the Peel Plain physiographic region of Southern Ontario which is characterized by level to undulating tracts of clay or varved clays underlain by tills. Deep deposits of alluvial and glacial outwash sand are common to the flood plains of the Credit and West Humber Rivers. A summary of the major types of soil conditions encountered along the line is given in the following paragraphs:

##### Towers 1 to 50

The soils encountered in this section were predominantly dense to very dense sandy silts, with intermittent clay deposits. The ground water was generally below 10 feet from the ground surface. Bedrock was not encountered in the boreholes which were put down to a depth of 35 feet or more. The conditions for augering large diameter holes appear to be generally favourable, except at one or two tower locations in the flood plain of Oakville Creek.

##### Towers 51 to 54.

The soils in this section of the line consist of deep alluvial deposits and soft clays of the Credit River flood plain. High ground water and some artesian conditions were encountered. Conditions for augering large diameter holes are rather poor, requiring special techniques such as the use of bentonite mud and permanent casing.



#### Towers 55 to 71

Soil conditions in this section of the corridor are essentially the same as those encountered between towers 1 to 50.

#### Towers 72 to 82

The soils in this section are predominantly dense sandy silts and stiff to very stiff clays underlain by weathered grey shale bedrock at depths varying from 8 to 25 feet. The bedrock is weathered to a varying degree and has often a cap of medium to hard limestone beds, which may impede augerability in the weathered shale.

#### Towers 83 to 100

Soil conditions are the same as those encountered between towers 1 to 50.

#### Towers 101 to 121

Deep deposits of layered silty clays and dense sandy silt till with perched water conditions were encountered in this section. Augerability is generally good for this portion of the line.

#### Towers 120 to 132

Dense to very dense sandy silts with some clay beds were encountered. No major caving problems for installing augered footings are likely in this area.

The soil conditions as indicated by the borehole data at each of the tower locations are summarized in Table I. This table also shows the depths to bedrock, and ground water levels along with observations made on caving conditions within the boreholes. Figures 2 to 126 show detailed soil profiles at each of the locations tested. In Table I it may be noted that in some cases the chainage of the borehole and that of the tower are somewhat different. This was because of some changes that were made in the tower numbers and their locations after the soil testing program was completed.

The following explanation on some of the notes and remarks made in the soil profiles (Figures 2 to 126) is considered useful in evaluating soil conditions for the design and construction of tower foundations. The ground water levels were measured both during and after the test holes were drilled. If the depth at which free water appeared in the borehole is not the same as the final water level in the hole it would indicate that a perched water condition exists in a somewhat permeable sandy layer above a more impervious layer such as a clay or dense silt.



# Hydro Tower - Borehole log sheets.

Location: Hwy 401 (Proposed) x Winston Churchill Boulevard & Airport Road.

26150  
REV. B. 1973

SAMPLE NO.	DEPTH BELOW DATUM (FT.)	ELEV.	GWL	'N' VALUES	TOWER 36 DESCRIPTION	REMARKS
1B	5			80	VERY DENSE BROWN SANDY SILT WITH A LITTLE CLAY AND GRAVEL	
2B				66		
3B	10			80		CHANGE TO GREY
4B				69	14.0'	
5B	15		10.0'	50/3	VERY DENSE GREY SAND WITH A LITTLE SILT AND GRAVEL	
6B	20			100/3.3		
7B	25			100/4.5		INCREASE IN SILT CONTENT
8B	30	CAVING 28.0'		78/6		
9B	35			100/6	35.5'	
					END OF HOLE	
LOCATION - CHAINAGE 292 + 95						
NOTES - 1) HOLE ADVANCED BY FLIGHT AUGERS 2) CONSTRUCTION HOLE ONLY 3) W.L. AT 28.0' AT COMPLETION OF AUGERING						

HOLE 26

DATE OF BORING: APRIL 13, 1976

OBSERVER: D. FRASER

THE HYDRO-ELECTRIC POWER COMMISSION  
OF ONTARIO  
RESEARCH DIVISION

FIGURE 23  
MILTON TS - CLAIREVILLE TS 500 KV TL  
FOUNDATION INVESTIGATION  
TOWER 34 - LINE 6

**SYMBOLS**

~ APPROX. DEPTH

☑ UNDISTURBED SAMPLE

☒ DISTURBED SAMPLE

☐ SAMPLE NOT RECOVERED

A 1-3/4 IN. O.D. SPLIT TUBE

B 2 IN. O.D. SPLIT TUBE

C 2 IN. O.D. SHELBY TUBE

D 2 IN. O.D. SPLIT TUBE WITH INSERT

E 2-5/8 IN. O.D. SHELBY TUBE

F 2-1/2 IN. O.D. SPLIT TUBE

G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT

H 4-3/4 IN. O.D. SHELBY TUBE

'N' VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES

'PUSH' DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD

DRAWN: AEM

CHECKED:

PASSED:

TORONTO: ..... 19...

136418 - RD

SAMPLE NO.	DEPTH BELOW DATUM FT	ELEV.	GWL	N <sup>1</sup> VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY PCF	MOISTURE CONT. % DRY WT	ATTERBERG LIMITS		SHEAR STRENGTH - PSF			1-INCH DYNAMIC CONE TEST
									L.L.	P.L.	UN- CONF.	VANE	TRIAXIAL	
1B	5			21	DENSE TO VERY DENSE SANDY SILT WITH SOME CLAY AND GRAVEL			12.2						
2B	10			30			130.2	12.6						
3B	15			53				11.2						
4B	20			47	14.0'		140.8	8.9						
5B	25			30	STIFF GREY CLAYEY SILT WITH SOME SAND AND GRAVEL		140.8	9.4						
6B	30			85/8"	18.0'			8.0						
7B	35			100/8"	VERY DENSE GREY SANDY SILT WITH A LITTLE GRAVEL			6.9						
8B	40			90/8"				8.8						
9B	45			35.8'	END OF HOLE									

HOLE 27

DATE OF BORING: APRIL 13, 1976

OBSERVER: D. FRASER

SYMBOLS	
~	APPROX. DEPTH
☐	UNDISTURBED SAMPLE
☒	DISTURBED SAMPLE
☐	SAMPLE NOT RECOVERED
A	1-1/4 IN. O.D. SPLIT TUBE
B	2 IN. O.D. SPLIT TUBE
C	1 IN. O.D. SHELBY TUBE
D	2 IN. O.D. SPLIT TUBE WITH INSERT
E	1-1/8 IN. O.D. SHELBY TUBE
F	2-1/4 IN. O.D. SPLIT TUBE
G	1-1/2 IN. O.D. SPLIT TUBE WITH INSERT
H	1-3/4 IN. O.D. SHELBY TUBE

N<sup>1</sup> VALUES AND 1-INCH  
CONE VALUES OBTAINED  
WITH 140-LB HAMMER  
DROPPING 30 INCHES

PUSH<sup>1</sup> DENOTES  
INSERTING SAMPLER  
BY PUSHING WITH  
HYDRAULIC HEAD

THE HYDRO-ELECTRIC POWER COMMISSION  
OF ONTARIO  
RESEARCH DIVISION

FIGURE 24  
MILTON TS - CLAIREVILLE TS 500 KV TL  
FOUNDATION INVESTIGATION  
TOWER NO (35) LINE 6

DRAWN	CHECKED	PASSED
AEM		
TORONTO..... 19...		27628 - RD

LOCATION - CHAINAGE 298 + 95

NOTES - 1. HOLE ADVANCED BY FLIGHT AUGER  
2. FREE WATER APPEARED AT 18.0' DURING AUGERING. WATER LEVEL AT THE  
COMPLETION OF HOLE 29.0'

SAMPLE NO.	DEPTH BELOW DATUM (FT.)	ELEV.	GWL	'N' VALUES	DESCRIPTION	REMARKS
1B	5			38	VERY DENSE BROWN <u>SANDY SILT</u> WITH LITTLE GRAVEL	
2B				122		
3B	10			55/6		
4B				100/6		
5B	15			60/1		
		CAVING 16.0'				
6B	20		21.0'	55/6		NO GRAVEL
7B	25			53/6	25.0'	TURNING GREY
8B	30			60/6	VERY DENSE GREY <u>SAND</u> WITH LITTLE SILT	SOME SILT LITTLE GRAVEL
9B	35			62/2	35.7'	
	40				END OF HOLE	
<p>LOCATION - CHAINAGE 341 + 10</p> <p>NOTES - 1) HOLE ADVANCED BY FLIGHT AUGER 2) CONSTRUCTION HOLE ONLY 3) W.L. AFTER AUGERING ROSE TO 14.0'</p>						

HOLE 32

DATE OF BORING: APRIL 15, 1976

OBSERVER: D. FRASER

**SYMBOLS**

~ APPROX. DEPTH

■ UNDISTURBED SAMPLE

⊠ DISTURBED SAMPLE

□ SAMPLE NOT RECOVERED

A 1-3/4 IN. O.D. SPLIT TUBE

B 2 IN. O.D. SPLIT TUBE

C 2 IN. O.D. SHELBY TUBE

D 2 IN. O.D. SPLIT TUBE WITH INSERT

E 2-3/8 IN. O.D. SHELBY TUBE

F 2-1/2 IN. O.D. SPLIT TUBE

G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT

H 4-3/4 IN. O.D. SHELBY TUBE

'N' VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES

'PUSH' DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD

**THE HYDRO-ELECTRIC POWER COMMISSION**

OF ONTARIO  
RESEARCH DIVISION

**FIGURE 29**

**MILTON TS - CLAIREVILLE TS 500 KV TL**  
**FOUNDATION INVESTIGATION**  
**TOWER (40) - LINE 6**

DRAWN	CHECKED	PASSED
AEM		

TORONTO..... 19....

136421 - RD

SAMPLE NO.	DEPTH BELOW DATUM (FT.)	ELEV.	GWL	N <sup>1</sup> VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY (PCF)	MOISTURE CONT. % (GRY WT)	ATTERBERG LIMITS		SHEAR STRENGTH - PSF			3-INCH DYNAMIC CONE TEST
									L.L.	P.L.	UN. CONF.	VANE	TRIAXIAL	
1C	5			PUSH	VERY DENSE BROWN SANDY SILT WITH SOME CLAY AND A LITTLE GRAVEL (TILL-LIKE)		140.6	15.1						6035
2C	10			PUSH			143.4	13.6						6175
3C	15			PUSH			143.1	12.6						6480
4D	20			90/6"	VERY DENSE GREY-BROWN SILT WITH SOME SAND AND CLAY AND GRAVEL WITH A LITTLE COBBLES		149.2	8.8						6665
5B	25			110				7.8						
6D	30	CAVING 21.5'	SEE NOTE 4 20.0'	75/4"	VERY DENSE SANDY SILT WITH SOME GRAVEL AND COBBLES		145.9	8.5						
7B	35			100/6"				9.4						
8D	40			100/3"	VERY DENSE SILT WITH SOME SAND AND A LITTLE CLAY AND SHALE			9.8						
9B	45			100/3 1/2"	FRACTURED SOIL, VERY DENSE			7.3						
	50				END OF HOLE									

HOLE 16

DATE OF BORING: MARCH 29, 1976

OBSERVER: A.H. LEACH

SYMBOLS  
 ~ APPROX. DEPTH  
 [ ] UNDISTURBED SAMPLE  
 [X] DISTURBED SAMPLE  
 [ ] SAMPLE NOT RECOVERED  
 A 1-3/4 IN. O.D. SPLIT TUBE  
 B 2 IN. O.D. SPLIT TUBE  
 C 2 IN. O.D. SHELBY TUBE  
 D 1 IN. O.D. SPLIT TUBE WITH INSERT  
 E 2-3/8 IN. O.D. SHELBY TUBE  
 F 2-1/2 IN. O.D. SPLIT TUBE  
 G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT  
 H 4 IN. O.D. SHELBY TUBE

N<sup>1</sup> VALUES AND 3-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES  
 "PUSH" DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD

THE HYDRO-ELECTRIC POWER COMMISSION  
 OF ONTARIO  
 RESEARCH DIVISION

FIGURE 34  
 MILTON TS - CLAIREVILLE TS 500 KV TL  
 FOUNDATION INVESTIGATIONS  
 TOWER (45) LINE 6

DRAWN ALM

CHECKED

PASSED

TORONTO..... 19...

27632 - RD

LOCATION - CHAINAGE 330 + 74

- NOTES - 1. HOLE ADVANCED BY 4 1/2" FLIGHT AUGER  
 2. FROM 34.0' ANX CORE DRILL USED  
 3. FINAL W/L AT 5.5'. SOME MAY HAVE COME FROM SURFACE FLOW  
 4. FREE WATER FIRST ENCOUNTERED

26150  
REV. 8. 1973

SAMPLE NO.	DEPTH BELOW DATUM (FT)	ELEV.	GWL	<sup>1</sup> / <sub>N</sub> VALUES	DESCRIPTION	REMARKS
1B	5			30	DENSE GREY-BROWN <u>SANDY SILT</u> WITH A LITTLE CLAY	LITTLE GRAVEL
2B				41		
3B	10			85		
4B				100		
5B	15			97	VERY DENSE GREY <u>SANDY SILT</u> WITH A LITTLE CLAY, GRAVEL AND BOULDERS	COBBLES AND BOULDERS
6B	20		20.0'	80/4		
7B	25			85		
8B	30			82	31.0'	
9B	35			55/4	35.9'	
	40				END OF HOLE	
					LOCATION - CHAINAGE 389 + 52	
					NOTES - 1) HOLE ADVANCED BY FLIGHT AUGER	
					2) CONSTRUCTION HOLE ONLY	
					3) W.L. AT COMPLETION OF AUGERING AT 14.5'	

DATE OF BORING: APRIL 21, 1976		OBSERVER: D. FRASER	
<b>SYMBOLS</b> ~ APPROX. DEPTH [ ] UNDISTURBED SAMPLE [X] DISTURBED SAMPLE [ ] SAMPLE NOT RECOVERED A 1-3/4 IN. O.D. SPLIT TUBE B 2 IN. O.D. SPLIT TUBE C 2 IN. O.D. SHELBY TUBE D 2 IN. O.D. SPLIT TUBE WITH INSERT E 2-5/8 IN. O.D. SHELBY TUBE F 2-1/2 IN. O.D. SPLIT TUBE G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT H 4-3/4 IN. O.D. SHELBY TUBE		THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO RESEARCH DIVISION  <b>FIGURE 35</b> MILTON TS - CLAIREVILLE TS 500 KVTL FOUNDATION INVESTIGATION TOWER 45 - LINE 6	
DRAWN AEM		CHECKED  PASSED  TORONTO..... 19....	
		136425 - RD	

SAMPLE NO.	DEPTH BELOW DATUM ( FT )	ELEV.	GWL	(N) VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY PCF	MOISTURE CONT. % DRY WT	ATTERBERG LIMITS		SHEAR STRENGTH - PSF			2-INCH DYNAMIC CONE TEST
									L.L.	P.L.	UN- CONF.	VANE	TRIAXIAL	
1B	5			42	DENSE BROWN SILT WITH SOME FINE SAND AND CLAY AND A TRACE OF GRAVEL		119.9	12.8						
2B	10			50			139.7	11.9						
3B	15			60/6 <sup>11</sup>	VERY DENSE GREY <u>SANDY</u> SILT WITH A TRACE OF CLAY AND GRAVEL AND COBBLES			8.2						
4B	20			39/1 <sup>11</sup>				6.6						
5B	25			60/6 <sup>11</sup>			139.3	7.4						
6B	30			50/6 <sup>11</sup>			149.7	7.8						
7B	35			105										
8B	40					BROWN	140.8	10.1						
9B	45			32.0 36.0	VERY DENSE REDDISH BROWN <u>CLAY SILT</u> WITH SOME SAND			11.0						
	50				END OF HOLE									

DATE OF BORING: APRIL 22, 1976

OBSERVER: D. FRASER

SYMBOLS  
 ~ APPROX. DEPTH  
 [ ] UNDISTURBED SAMPLE  
 [X] DISTURBED SAMPLE  
 [ ] SAMPLE NOT RECOVERED  
 A 1-3/4 IN. O.D. SPLIT TUBE  
 B 1 IN. O.D. SPLIT TUBE  
 C 1 IN. O.D. SHELBY TUBE  
 D 1 IN. O.D. SPLIT TUBE WITH INSERT  
 E 1-5/8 IN. O.D. SHELBY TUBE  
 F 1-1/4 IN. O.D. SPLIT TUBE  
 G 1-1/2 IN. O.D. SPLIT TUBE WITH INSERT  
 H 1-3/4 IN. O.D. SHELBY TUBE

N<sup>1</sup> VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LS HAMMER DROPPING 30 INCHES  
<sup>11</sup>PUSH<sup>11</sup> DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD

THE HYDRO-ELECTRIC POWER COMMISSION  
 OF ONTARIO  
 RESEARCH DIVISION

FIGURE 36  
 MILTON TS-CLAIREVILLE TS 500 KV TL  
 FOUNDATION INVESTIGATION  
 TOWER (47) - LINE 6

DRAWN CHECKED PASSED  
 TORONTO: 19... 27633 - RD

LOCATION - CHAINAGE 389 + 82  
 TOWER TYPE VIS

NOTES - 1. HOLE ADVANCED BY FLIGHT AUGER  
 2. W.L. AFTER COMPLETION OF AUGERING REMAINED AT 28.9'

SAMPLE NO.	DEPTH BELOW DATUM (FT)	ELEV.	GWL	N <sup>1</sup> VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY PCF	MOISTURE CONT. % DRY WT	ATTENBERG LIMITS		SHEAR STRENGTH - PSF			2-INCH DYNAMIC CONE TEST
									L.L.	P.L.	UN-CONF.	VALE	TRIAXIAL	
1B	5			27	DENSE BROWN FINE TO COARSE SANDY SILT, LITTLE GRAVEL AND TRACE OF CLAY		124.0	16.7						
2B	10			24			129.7	19.9			5895			
3B	15			33			117.8	9.9						
4B	20			38		CHANGING TO DENSE AND VERY DENSE	147.8	8.6						
5B	25			40/5"				8.2						
6B	30			100/3"		COBBLES AND BOULDERS		19.2						
	32.0'				END OF HOLE									

HOLE 41

DATE OF BORING: APRIL 23, 1976		OBSERVER: D. FRASER	
SYMBOLS ✓ APPROX. DEPTH [ ] UNDISTURBED SAMPLE [X] DISTURBED SAMPLE [ ] SAMPLE NOT RECOVERED A 1-3/4 IN. O.D. SPLIT TUBE B 1 IN. O.D. SPLIT TUBE C 1 IN. O.D. SHELBY TUBE D 1 IN. O.D. SPLIT TUBE WITH INSERT E 2-1/2 IN. O.D. SHELBY TUBE F 2-1/2 IN. O.D. SPLIT TUBE G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT H 4-1/2 IN. O.D. SHELBY TUBE		N <sup>1</sup> VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DRIPPING 30 INCHES PUSHER DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD <b>THE HYDRO-ELECTRIC POWER COMMISSION</b> OF ONTARIO RESEARCH DIVISION <b>FIGURE 38</b> MILTON TS-CLAIREVILLE TS 500 KV TL FOUNDATION INVESTIGATION TOWER 49 AND 50 LINE 6 DRAWN: AEM CHECKED: [ ] PASSED: [ ] TORONTO: [ ] 1976 27634 - RD	

LOCATION - CHAINAGE 417 + 87

NOTES - 1. HOLE ADVANCED BY FLIGHT AUGER  
2. ONLY WATER PRESENT IN PERCHED WATER TABLE

28150  
REV. 8, 1973

SAMPLE NO.	DEPTH BELOW DATUM (FT.)	ELEV.	GWL	'N' VALUES	DESCRIPTION	REMARKS
			PERCHED			
1B	5		2.0	21	COMPACT BROWNISH GREY <u>SANDY SILT</u> WITH SOME CLAY	
2B	10			15	8.0 <sup>1</sup>	
3B	15			3	12.0 <sup>1</sup>	FIRM GREY <u>CLAYEY SILT</u> WITH LITTLE FINE SAND
4B	20			4		LOOSE GREY <u>SANDY SILT</u> WITH SOME CLAY
5B	25			3	19.0 <sup>1</sup>	
6B	30			42		DENSE GREY <u>SANDY SILT</u> WITH LITTLE GRAVEL AND A TRACE OF CLAY
7B	35			26		
8B	40			32		
9B	45			46	36.5 <sup>1</sup>	END OF HOLE
						LOCATION - 436 + 40
						NOTES - 1) HOLE ADVANCED BY FLIGHT AUGER 2) CONSTRUCTION HOLE ONLY 3) NO WATER IN HOLE AT COMPLETION OF AUGERING

HOLE 43

DATE OF BORING: APRIL 26, 1976

OBSERVER: D. FRASER

**SYMBOLS**

~ APPROX. DEPTH

■ UNDISTURBED SAMPLE

⊗ DISTURBED SAMPLE

□ SAMPLE NOT RECOVERED

A 1-3/4 IN. O.D. SPLIT TUBE

B 2 IN. O.D. SPLIT TUBE

C 2 IN. O.D. SHELBY TUBE

D 2 IN. O.D. SPLIT TUBE WITH INSERT

E 2-3/8 IN. O.D. SHELBY TUBE

F 2-1/2 IN. O.D. SPLIT TUBE

G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT

H 4-3/4 IN. O.D. SHELBY TUBE

'N' VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES

'PUSH' DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD

**THE HYDRO-ELECTRIC POWER COMMISSION**

OF ONTARIO  
RESEARCH DIVISION

**FIGURE 39**

**MILTON TS - CLAIREVILLE TS 500 KVTL**  
**FOUNDATION INVESTIGATION**  
**TOWER 51 - LINE 6**

DRAWN AEM	CHECKED	PASSED
TORONTO..... 18....		136427 - RD



SAMPLE NO.	DEPTH BELOW DATUM (FT.)	ELEV.	GWL	N <sup>1</sup> VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY P.L.	MOISTURE CONT. % DRY WT.	ATTERBERG LIMITS		SHEAR STRENGTH - PSF			2-INCH DYNAMIC CONE TEST
									L.L.	P.L.	UN-CONF.	VANE	TRIAXIAL	
1B	5		3.0 <sup>1</sup>	3	VERY LOOSE BROWN SANDY SILT			43.8						
2B	10			48				12.3						
3B	15			34	DENSE SAND AND GRAVEL WITH A LITTLE SILT			8.1						
4B	20			30										
IC, 5B	25	CAVING 15.0 <sup>1</sup>		4	FIRM TO STIFF GREY SILTY CLAY WITH SOME SAND	21.0 <sup>1</sup> CHANGE TO STIFF	115.7	41.3				642.2		
2C, 6C	30						139.4	16.8				2793		
1C, 7B	35			20			140.8	17.7				2060		
1C, 8C	40						132.5	21.1				2491		
	45						133.5	21.3				1896		
	50						137.0	17.7				1018		
9B	55			11	END OF HOLE		131.9	22.5				2631		
	60							22.1						

Plat  
as done

DATE OF BORING: APRIL 24, 1976

OBSERVER: D. FRASER

SYMBOLS

- ~ APPROX. DEPTH
- ☒ UNDISTURBED SAMPLE
- ☒ DISTURBED SAMPLE
- ☐ SAMPLE NOT RECOVERED
- A 1-3/4 IN. O.D. SPLIT TUBE
- B 2 IN. O.D. SPLIT TUBE
- C 1 IN. O.D. SHELBY TUBE
- D 1 IN. O.D. SPLIT TUBE WITH INSERT
- E 2-3/8 IN. O.D. SHELBY TUBE
- F 2-1/4 IN. O.D. SPLIT TUBE
- G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT
- H 2-3/4 IN. O.D. SHELBY TUBE

N<sup>1</sup> VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES  
PUSH DOWN 1/2 INCHES INSERTING SAMPLE BY PUSHING WITH HYDRAULIC HEAD

THE HYDRO-ELECTRIC POWER COMMISSION  
OF ONTARIO  
RESEARCH DIVISION

FIGURE 40  
MILTON TS - CLAIREVILLE TS 500 KV TL  
FOUNDATION INVESTIGATION  
TOWER 52 LINE 6

DRAWN  
AFM

CHECKED

PASSED

TORONTO:..... 19 .....

27635 - RD

LOCATION - CHAINAGE 344 + 52

TOWER TYPE VIB

- NOTES - 1. HOLE ADVANCED BY FLIGHT AUGER AND HOLLOW STEM AUGER  
2. WATER ENCOUNTERED AT 3.0<sup>1</sup>. THIS ROSE TO 2.0<sup>1</sup> AT COMPLETION OF AUGERING  
3. POTENTIAL CAVING CONDITIONS IN THE UPPER 15 FEET OF SATURATED SAND

SAMPLE NO.	DEPTH BELOW DATUM (FT.)	ELEV.	GWL	N <sup>1</sup> VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY PCF	MOISTURE CONT. % DRY WT	ATTERBERG LIMITS		SHEAR STRENGTH - PSF UN-CONF.	VANE	STRENGTH - PSF TRIAXIAL	2-INCH DYNAMIC CONE TEST
									L.L.	P.L.				
AG1				PUSH	LOOSE FINE BROWN SILTY SAND									
AG2				PUSH	WITH TRACES OF GRAVEL									
1B	5		2.0	7	4.5 <sup>1</sup>									
2B	10			29	COMPACT BROWN SAND AND GRAVEL									
3B				10	WITH A LITTLE SILT									
4B	15			19	12.0 <sup>1</sup> LOOSE BROWN SANDY SILT WITH SOME GRAVEL									
5B				8	15.0 <sup>1</sup> COMPACT BROWN SAND AND GRAVEL WITH A LITTLE SILT									
6B	20			8	FIRM TO STIFF GREY SILTY CLAY WITH SOME SAND AND TRACES OF GRAVEL									
7B	25			3/PUSH			133.2	28.7					1450	
8B	30			18/PUSH			150.4	26.2					1119	
9B	35			13/PUSH			137.2	18.9					2040	
4C	40			PUSH			125.6	28.1					4040	
5C	45			PUSH	13.0 <sup>1</sup>									
6B	50			20	COMPACT GREY SILTY SAND WITH TRACES OF CLAY	TRACE GRAVEL								
7B	55			16										
8B	60			41										
	65			80.0 <sup>1</sup>	END OF HOLE									

DATE OF BORING: APRIL 23, MAY 3, 1976

OBSERVER: D. FRASER

## SYMBOLS

- ~ APPROX. DEPTH  
□ UNDISTURBED SAMPLE  
⊗ DISTURBED SAMPLE  
□ SAMPLE NOT RECOVERED  
A 1-3/4 IN. O.D. SPLIT TUBE  
W 2 IN. O.D. SHELBY TUBE  
C 1 IN. O.D. SHELBY TUBE  
D 2 IN. O.D. SPLIT TUBE WITH INSERT  
E 4-1/8 IN. O.D. SHELBY TUBE  
F 2-1/2 IN. O.D. SPLIT TUBE  
G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT  
H 4 3/4 IN. O.D. SHELBY TUBE

<sup>1</sup>N<sup>1</sup> VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES

<sup>1</sup>PUSH<sup>1</sup> DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD

## THE HYDRO-ELECTRIC POWER COMMISSION

OF ONTARIO  
RESEARCH DIVISION

## FIGURE 41

MILTON TS - CLAIREVILLE TS 500 kV TL  
FOUNDATION INVESTIGATION  
TOWER NO. (53) LINE 6

DRAWN CHECKED PASSED

TORONTO..... 19 ..

27636 - RD

LOCATION - CHAINAGE 453 ± 67

TOWER TYPE - VIB

NOTES - 1. HOLE ADVANCED BY HOLLOW STEM AUGERS

2. W.L. AT 2.0'

3. CAVING OCCURS IN REGION 5.0' TO 10.0', NOT BELOW THIS

SAMPLE NO.	DEPTH BELOW DATUM ( FT )	ELEV.	GWL	N <sup>1</sup> VALUES	DESCRIPTION	REMARKS	HOLE 47(A)	NATURAL DENSITY PCF	MOISTURE CONT. % DRY WT	ATTENBERG LIMITS		SHEAR STRENGTH - PSP UN-CONF.	STRENGTH - PSP VANE	STRENGTH - PSP TRIAXIAL	2-INCH DYNAMIC CONE TEST
										L.L.	P.L.				
1C	5			PUSH	FIRM TO VERY STIFF, GREY SILTY CLAY WITH A LITTLE FINE SAND			118.8	22.4			1850			
2C				PUSH				129.8	23.2			880			
3C	10			PUSH				137.5	16.7			1565			
4C				PUSH		38.9 <sup>1</sup>		137.7	16.3			2220			
5C	15			PUSH	STIFF TO VERY STIFF, GREY CLAYEY SILT WITH A LITTLE FINE SAND AND GRAVEL			140.3	14.4			1620			
6C	20			18			148.1	12.3			1180				
7D	25			8		27.0 <sup>1</sup>		130.8	17.7			7826			
8D	30			12			132.8	20.8			780				
9D	35			25	LOOSE TO COMPACT, GREY, FINE SILTY SAND				17.1						
10D	40			32	41.5 <sup>1</sup>										
	45				END OF HOLE										

DATE OF BORING: AUGUST 26, 1973

OBSERVER: D. FRASER

SYMBOLS

✓ APPROX. DEPTH

☐ UNDISTURBED SAMPLE

☒ DISTURBED SAMPLE

☐ SAMPLE NOT RECOVERED

A 1-1/2 IN. O.D. SPLIT TUBE

B 2 IN. O.D. SPLIT TUBE

C 3 IN. O.D. SHELBY TUBE

D 4 IN. O.D. SPLIT TUBE WITH INSERT

E 2-1/2 IN. O.D. SHELBY TUBE

F 2-1/2 IN. O.D. SPLIT TUBE

G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT

H 2-1/4 IN. O.D. SHELBY TUBE

N<sup>1</sup> VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES

PUSH<sup>1</sup> DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD

THE HYDRO-ELECTRIC POWER COMMISSION

OF ONTARIO  
RESEARCH DIVISION

FIGURE 43

MILTON TS - CLAIREVILLE TS 500 KV TL  
FOUNDATION INVESTIGATION  
TOWER NO. 55 LINE 6

DRAWN

CHECKED

PASSED

AT

TORONTO..... 18...

27639 - RD

LOCATION - CHAINAGE 471 + 38

- NOTES - 1. BOREHOLE AT NEW TOWER LOCATION 100' EAST OF BH. 37 OUT OF SWAMPY AREA,  
2. HOLE ADVANCED BY FLYTE AUGER  
3. HOLE WAS TERMINATED AT 41.9' TO AVOID THE RISK OF HITTING ARTERIAN  
CONDITION AS WAS EVIDENCED IN THE ADJACENT HOLES

SAMPLE NO.	DEPTH BELOW DATUM (FT.)	ELEV.	GWL	1" N <sup>1</sup> VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY PCF	MOISTURE CONT. % DRY WT	ATTENBERG LIMITS		SHEAR STRENGTH - PSF			2-INCH DYNAMIC CONE TEST
									L.L.	P.L.	UN-CONF.	VANE	TRIAIAL	
1B	5			34	DENSE BROWN-GREY SANDY SILT WITH SOME CLAY		125.1	17.7						
2B	10			37				13.5						
3B	15			37			130.6							
4B	20			40				11.6						
5B	25			32		CHANGING TO GREY AND LITTLE GRAVEL		12.2						
6B	30			30.0 <sup>1</sup>			124.3	10.0						
7B	35			35	DENSE GREY SILT WITH A LITTLE SAND AND CLAY AND A TRACE OF FINE GRAVEL			9.0						
8B	40			30.0 <sup>1</sup>			124.8	9.8						
9B	45			34.0 <sup>1</sup>	VERY DENSE GREY SANDY SILT WITH SOME CLAY AND A TRACE OF FINE GRAVEL									
				36.5 <sup>1</sup>	DENSE GREY CLAYEY SILT WITH A LITTLE SAND AND FINE GRAVEL		125.5	10.9						
	40				END OF HOLE									

DATE OF BORING: APRIL 30, 1976

OBSERVER: D. FRASER

**SYMBOLS**

✓ APPROX. DEPTH

☐ UNDISTURBED SAMPLE

☒ DISTURBED SAMPLE

☐ SAMPLE NOT RECOVERED

A 1-1/4 IN. O.D. SPLIT TUBE

B 1 IN. O.D. SPLIT TUBE

C 1 IN. O.D. SHELBY TUBE

D 1 IN. O.D. SPLIT TUBE WITH INSERT

E 1-1/2 IN. O.D. SHELBY TUBE

F 1-1/2 IN. O.D. SPLIT TUBE

G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT

H 4-3/8 IN. O.D. SHELBY TUBE

<sup>1</sup>N<sup>1</sup> VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES

<sup>1</sup>PUSH<sup>1</sup> DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD

**THE HYDRO-ELECTRIC POWER COMMISSION**

OF ONTARIO  
RESEARCH DIVISION

FIGURE 44  
MILTON TS--CLAIREVILLE TS 500 KV TL  
FOUNDATION INVESTIGATION  
TOWER 66 - LINE 6

DRAWN

AFM

CHECKED

PASSED

TORONTO.....19...

27640 - RD

LOCATION - CHAINAGE 480 + 09

NOTES - 1. HOLE ADVANCED BY FLIGHT AUGER

2. 2<sup>1</sup> OF WATER AT BOTTOM OF HOLE AT COMPLETION OF AUGERING

3. FREE WATER ENCOUNTERED FIRST AT 30.0<sup>1</sup>

SAMPLE NO.	DEPTH BELOW DATUM (FT.)	ELEV.	GWL	N <sub>60</sub> VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY PCF	MOISTURE CONT. % DRY WT	ATTENBERG'S LIMITS		SHEAR STRENGTH - PSF			2-INCH DYNAMIC CONE TEST
									L.L.	P.L.	UN-CONF.	VANE	TRIAxIAL	
1B	5			17	DENSE BROWN CLAYEY SILT WITH SOME SAND		139.2	17.8						
2B	10			42				16.3						
3B	15			57	VERY DENSE BROWN SANDY SILT, WITH SOME SAND AND LITTLE GRAVEL		141.9	12.7						
4B	20			38			143.7	12.9						
5B	25			55			142.5	12.5						
6B	30			57	VERY DENSE GREY CLAY SILT WITH SOME SAND AND LITTLE GRAVEL		126.7	15.9						
7B	35			57			133.5	17.8						
8B	40			60/5"	VERY DENSE SILT WITH SOME FINE SAND AND A LITTLE CLAY	SANDY SILT LAYERING	139.2	14.8						
9B	45			55/5"	END OF HOLE			19.4						

DATE OF BORING: APRIL 27, 1976

OBSERVER: D. FRASER

SYMBOLS

✓ APPROX. DEPTH

☒ UNDISTURBED SAMPLE

☒ DISTURBED SAMPLE

☐ SAMPLE NOT RECOVERED

A 1-1/4 IN. O.D. SPLIT TUBE

B 1 IN. O.D. SPLIT TUBE

C 1 IN. O.D. SHELBY TUBE

D 1 IN. O.D. SPLIT TUBE WITH INSERT

E 2-1/2 IN. O.D. SHELBY TUBE

F 2-1/2 IN. O.D. SPLIT TUBE

G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT

H 4-3/4 IN. O.D. SHELBY TUBE

N<sub>60</sub> VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES

'PUSH' DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD

THE HYDRO-ELECTRIC POWER COMMISSION

OF ONTARIO  
RESEARCH DIVISION

FIGURE 47

MILTON TS - CLAIREVILLE TS 500 KV TL  
FOUNDATION INVESTIGATION  
TOWER 60 LINE 6

DRAWN

AEM

CHECKED

PASSED

YES

TORONTO..... 19...

27642 - RD

LOCATION - CHAINAGE 514 + 91  
TOWER TYPE V18

NOTES - 1. HOLE ADVANCED BY FLIGHT AUGER

2. AT COMPLETION OF HOLE W.L. AT SURFACE. THIS WAS DUE TO GROUNDWATER FLOWING INTO HOLE, OTHERWISE IT PROBABLY WOULD BE DRY

SAMPLE NO.	DEPTH BELOW DATUM (FT.)	ELEV.	GWL	'N' VALUES	DESCRIPTION	REMARKS
1B	5			28	COMPACT TO VERY DENSE BROWN SANDY SILT WITH A LITTLE CLAY AND A TRACE OF GRAVEL	
2B			PERCHED	46		
3B	10		9.0'	71		
4B				70/6"		
5B	15			60/6"		
6B	20			80/6"		
7B	25			100/5"		
8B	30			100/1"		
9B	35			50/5"		
	40			35.9'	END OF HOLE	
					LOCATION - CHAINAGE 324 + 41	
					TOWER TYPE VIS	
					NOTES - 1. HOLE ADVANCED BY A FLIGHT AUGER	
					2. 5' OF WATER AT BOTTOM OF HOLE AT COMPLETION OF AUGERING. POSSIBLE SURFACE RUNOFF	
					3. NO LABORATORY TESTING	

HOLE 53

GREY

DATE OF BORING: APRIL 27, 1976

SYMBOLS

~ APPROX. DEPTH

■ UNDISTURBED SAMPLE

⊗ DISTURBED SAMPLE

□ SAMPLE NOT RECOVERED

A 1-3/4 IN. O.D. SPLIT TUBE

B 2 IN. O.D. SPLIT TUBE

C 2 IN. O.D. SHELBY TUBE

D 2 IN. O.D. SPLIT TUBE WITH INSERT

E 2-5/8 IN. O.D. SHELBY TUBE

F 2-1/2 IN. O.D. SPLIT TUBE

G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT

H 4-3/4 IN. O.D. SHELBY TUBE

'N' VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES

'PUSH' DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD

THE HYDRO-ELECTRIC POWER COMMISSION

OF ONTARIO

RESEARCH DIVISION

FIGURE 48

MILTON TS--CLAIREVILLE TS 500 KV TL

FOUNDATION INVESTIGATION

TOWER 61 LINE 6

DRAWN	CHECKED	PASSED
AEM		

TORONTO..... 19....

136430 - RD

26150  
REV. 9. 1973

SAMPLE NO.	DEPTH BELOW DATUM (FT.)	ELEV.	GWL	'N' VALUES	DESCRIPTION	REMARKS
1B	5			29	COMPACT BROWN <u>SANDY SILT</u> WITH SOME CLAY AND TRACE GRAVEL	HOLE 54
2B	7.0'			35		
3B	10			50/6	VERY DENSE BROWN FINE TO COARSE <u>SANDY SILT</u> WITH LITTLE CLAY AND GRAVEL	
4B	15			100/3		
5B	15.0'			50/3		
6B	20			100/6	VERY DENSE GREY <u>SILTY SAND</u> AND TRACE GRAVEL	
7B	24.0'			36	COMPACT DENSE <u>SILTY SAND</u>	
8B	30.0'			100/4		
9B	35.3'			100/4	END OF HOLE	
		CAVING				
<p>LOCATION - CHAINAGE 533 + 91 TOWER TYPE VIS</p> <p>NOTES 1. HOLE ADVANCED BY FLIGHT AUGER 2. W.L. AT 24.0' DURING AUGERING AT COMPLETION WAS AT 18.0' 3. NO LABORATORY TESTING</p>						

DATE OF BORING: APRIL 27, 1976		OBSERVER: D. FRASER							
<p>SYMBOLS</p> <p>~ APPROX. DEPTH</p> <p>■ UNDISTURBED SAMPLE</p> <p>⊗ DISTURBED SAMPLE</p> <p>□ SAMPLE NOT RECOVERED</p> <p>A 1-3/4 IN. O.D. SPLIT TUBE</p> <p>B 2 IN. O.D. SPLIT TUBE</p> <p>C 2 IN. O.D. SHELBY TUBE</p> <p>D 2 IN. O.D. SPLIT TUBE WITH INSERT</p> <p>E 2-5/8 IN. O.D. SHELBY TUBE</p> <p>F 2-1/2 IN. O.D. SPLIT TUBE</p> <p>G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT</p> <p>H 4-3/4 IN. O.D. SHELBY TUBE</p>		<p>'N' VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES</p> <p>'PUSH' DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD</p> <p>THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO RESEARCH DIVISION</p> <p>FIGURE 49</p> <p>MILTON TS - CLAIREVILLE TS 500 KV TL FOUNDATION INVESTIGATION TOWER 62 LINE 6</p> <table border="1"> <tr> <td>DRAWN AEM</td> <td>CHECKED</td> <td>PASSED</td> </tr> <tr> <td colspan="2">TORONTO..... 19....</td> <td>136431 - RD</td> </tr> </table>		DRAWN AEM	CHECKED	PASSED	TORONTO..... 19....		136431 - RD
DRAWN AEM	CHECKED	PASSED							
TORONTO..... 19....		136431 - RD							

SAMPLE NO.	DEPTH BELOW DATUM FT	ELEV.	GWL	N <sup>1</sup> VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY PCF	MOISTURE CONT. % DRY WT	ATTERBERG LIMITS		SHEAR STRENGTH - PSF			2-INCH DYNAMIC CONE TEST
									L.L.	P.L.	UN-CONF.	VANE	TRIAXIAL	
AG1 AG2 IC				17 1.0'	DENSE FINE TO COARSE BROWN SAND WITH A LITTLE SILT AND GRAVEL		22.5	22.5						
2B	5			40				14.2						
3B	10			55/3		CHANGING TO GREY		22.2						
4B	15	CAVING		100/5		12.0' BECOMING MORE GRAVELLY		12.3						
5B	19	13.5'		90/5				11.0						
6B	20			90/5		TRACE OF FINE GRAVEL		14.9						
7B	25			90/5				16.5						
8B	30			105/5				17.1						
9B	35			100/3	35.2'	END OF HOLE		20.1						
	40													
	45													

DATE OF BORING: MAY 13, 1976

OBSERVER: D. FRASER

SYMBOLS

- ✓ APPROX. DEPTH
- ☒ UNDISTURBED SAMPLE
- ☒ DISTURBED SAMPLE
- ☐ SAMPLE NOT RECOVERED
- A 1-1/4 IN. O.D. SPLIT TUBE
- B 2 IN. O.D. SPLIT TUBE
- C 1 IN. O.D. SHELBY TUBE
- D 1 IN. O.D. SPLIT TUBE WITH INSERT
- E 1-3/8 IN. O.D. SHELBY TUBE
- F 1-1/2 IN. O.D. SPLIT TUBE
- G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT
- H 4-3/4 IN. O.D. SHELBY TUBE

N<sup>1</sup> VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES  
PUSH<sup>1</sup> DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD

THE HYDRO-ELECTRIC POWER COMMISSION  
OF ONTARIO  
RESEARCH DIVISION

FIGURE 50  
MILTON TS - CLAIREVILLE TS 500 kV TL  
FOUNDATION INVESTIGATION  
TOWER NO. 63 LINE 6

DRAWN  
AEM

TORONTO..... 19...

27643 - RD

LOCATION - CHAINAGE 343 + 43

TOWER TYPE - VIB

NOTES - 1. HOLE ADVANCED BY FLIGHT AUGER

2. W. L. AT 1.0' DURING AND AT COMPLETION OF AUGERING



SAMPLE NO.	DEPTH BELOW DATUM (FT.)	ELEV.	GWL	1 IN. N' VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY PLF	MOISTURE CONT. % DRY WT	ATTERBERG LIMITS		SHEAR STRENGTH - PSF			2-INCH DYNAMIC CONE TEST
									L.L.	P.L.	UN-CONF.	VANE	TRIAXIAL	
AG1				PUSH										
AG2				PUSH										
IC	5			PUSH			134.8	18.1			2880			
2B	10			50	VERY DENSE TO DENSE GREY SANDY SILT WITH SOME CLAY AND A LITTLE GRAVEL		134.6				2650			
3B	15			55										
4B	20			41										
5B	25			38										
6B	30			35										
7C	35			25, 0'	STIFF GREY CLAYEY SILT WITH SOME SAND AND A LITTLE GRAVEL, TRACES OF COBBLES		145.1	12.8			1880			
8B	40			27, 0'	VERY DENSE GREY SILTY SAND WITH A LITTLE COARSE TO FINE GRAVEL		145.1	12.8			1895			
9B	45			29, 0'	END OF HOLE									

DATE OF BORING: APRIL 14, 1976

OBSERVER: D. FRASER

SYMBOLS  
 ✓ APPROX. DEPTH  
 [ ] UNDISTURBED SAMPLE  
 [X] DISTURBED SAMPLE  
 [ ] SAMPLE NOT RECOVERED  
 A 1-1/4 IN. O.D. SPLIT TUBE  
 B 1 IN. O.D. SPLIT TUBE  
 C 1 IN. O.D. SHELBY TUBE  
 D 2 IN. O.D. SPLIT TUBE WITH INSERT  
 E 2-1/8 IN. O.D. SHELBY TUBE  
 F 2-1/4 IN. O.D. SPLIT TUBE  
 G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT  
 H 3-1/8 IN. O.D. SHELBY TUBE

1' N' VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DRIPPING 30 INCHES

1' PUSH' DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD

THE HYDRO-ELECTRIC POWER COMMISSION  
OF ONTARIO  
RESEARCH DIVISION

FIGURE 51  
MILTON TS - CLAIREVILLE TS 500 KV TL  
FOUNDATION INVESTIGATION  
TOWER NO. 64 LINE 6

DRAWN: AEM  
CHECKED: PASSED  
TORONTO: 1976 27644 - RD

LOCATION - CHAINAGE 267 + 40

TOWER TYPE - VIS

NOTES - 1. HOLE ADVANCED BY FLIGHT AUGERS

SAMPLE NO.	DEPTH BELOW DATUM (FT.)	ELEV.	GWL	N <sub>60</sub> VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY PLF	MOISTURE CONT. % DRY WT	ATTERBERG LIMITS		SHEAR STRENGTH - PEF			3-INCH DYNAMIC CONE TEST
									L.L.	P.L.	UN-CONF.	VANE	TRIAxIAL	
10A	5			33	DENSE BROWN SANDY SILT WITH SOME CLAY AND A TRACE OF FINE GRAVEL									
2B	10			35										
3B	15			70		CHANGE TO GREY								
4B	20			40										
5B	25			32										
6B	30			20.0 <sup>1</sup>	DENSE GREY CLAYEY SILT WITH SOME FINE TO COARSE SAND AND A TRACE OF GRAVEL									
7C	35			25.0 <sup>1</sup>			148.9	11.3			4718			
8B	40			PUSH	DENSE GREY SANDY SILT WITH LITTLE GRAVEL AND A TRACE OF CLAY									
9C	45			18		INCREASE IN CLAY								
10B	50			35.0 <sup>1</sup>	VERY DENSE GREY SANDY SILT WITH SOME CLAY AND A TRACE OF GRAVEL		148.6	10.2					1819	
	55			41.5 <sup>1</sup>			136.3						1919	
	60			95	END OF HOLE									

DATE OF BORING: MAY 14, 1976

OBSERVER: D. FRANK

SYMBOLS

✓ APPROX. DEPTH

☐ UNDISTURBED SAMPLE

☒ DISTURBED SAMPLE

☐ SAMPLE NOT RECOVERED

A 1-1/2 IN. O.D. SPLIT TUBE

B 1 IN. O.D. SPLIT TUBE

C 1 IN. O.D. SHELBY TUBE

D 1 IN. O.D. SPLIT TUBE WITH INSERT

E 2-5/8 IN. O.D. SHELBY TUBE

F 1-1/2 IN. O.D. SPLIT TUBE

G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT

H 2-1/2 IN. O.D. SHELBY TUBE

N<sub>60</sub> VALUES AND 3-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES

<sup>1</sup>PUSH DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD

THE HYDRO-ELECTRIC POWER COMMISSION

OF ONTARIO  
RESEARCH DIVISION

FIGURE 52

MILTON TS - CLAIREVILLE TS 500 KV TL  
FOUNDATION INVESTIGATION  
TOWER 65 - LINE 6

DRAWN  
AEM

CHECKED

PASSED

TORONTO.....

27645 - RD

LOCATION - CHAINAGE 581 + 62

TOWER TYPE VIL

NOTES - 1. HOLE ADVANCED USING FLIGHT AUGER

2. WATER ENCOUNTERED AT 35.0'. W.L. REMAINED AT 35.0' ON COMPLETION OF AUGERING

SAMPLE NO.	DEPTH BELOW DATUM (FT.)	ELEV.	GWL	IN. VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY PLF	MOISTURE CONT. % DRY WT	ATTENBERG LIMITS		SHEAR STRENGTH - P&T			2-INCH DYNAMIC CONE TEST
									L.L.	P.L.	UN-CONF.	VANE	TRIALIAL	
					0.7'	TOP SOIL								
1C	5			PUSH	VERY STIFF BROWN SILTY CLAY WITH A LITTLE SAND AND A TRACE OF GRAVEL		137.3	17.3					2465	
2C	10			PUSH			144.0	12.9					6540	
3D	15			30			141.2	13.5					4490	
4C	20			PUSH	HARD GREY SILTY CLAY WITH A LITTLE AND A TRACE OF GRAVEL		148.1	11.7					7415	
5B	25			41			140.2	11.3						
6D	30			30	VERY STIFF GREY SILTY CLAY WITH A LITTLE SAND AND GRAVEL		147.3	11.4					3670	
7B	35			23			139.8	13.8						
8D	40			26			144.2	13.3					3300	
9B	45			50			150.2	12.5						
10B	50			55	VERY DENSE GREY SANDY SILT WITH SOME CLAY AND GRAVEL	INCREASED SAND AND GRAVEL AND DECREASED IN SILT WITH DEPTH	149.8	7.8						
11B	55			58			146.4	7.9						
12B	60			61			148.4	7.9						
13B	65			100			152.2	6.3						
14B	70			80			149.8	6.3						
					END OF HOLE									

DATE OF BORING: MARCH 30, 1976

OBSERVER: A. H. LEACH

SYMBOLS

- ~ APPROX. DEPTH
- ☒ UNDISTURBED SAMPLE
- ☒ DISTURBED SAMPLE
- ☐ SAMPLE NOT RECOVERED
- A 1-1/4 IN. O.D. SPLIT TUBE
- B 2 IN. O.D. SPLIT TUBE
- C 4 IN. O.D. SHELBY TUBE
- D 2 IN. O.D. SPLIT TUBE WITH INSERT
- E 2-3/8 IN. O.D. SHELBY TUBE
- F 2-1/2 IN. O.D. SPLIT TUBE
- G 1-1/2 IN. O.D. SPLIT TUBE WITH INSERT
- H 2-3/4 IN. O.D. SHELBY TUBE

IN. VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES

PUSH DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD

THE HYDRO-ELECTRIC POWER COMMISSION

OF ONTARIO  
RESEARCH DIVISION

FIGURE 53

MILTON TS - CLAIREVILLE TS 500 KV TL  
FOUNDATION INVESTIGATION  
TOWER NO. 66 LINE 6

DRAWN AEM	CHECKED	PASSED
TORONTO..... 19...		27646 - RD

LOCATION - CHAINAGE 860 + 08

TOWER TYPE - VIB

- NOTES - 1. HOLE ADVANCED BY 6" HOLLOW STEM AUGER
- 2. FINAL WATER LEVEL AT 24.8' AFTER AUGERING

SAMPLE NO.	DEPTH BELOW DATUM (FT.)	ELEV.	GWL	N <sup>1</sup> VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY P.C.F.	MOISTURE CONT. % DRY WT.	ATTENBERG LIMITS		SHEAR STRENGTH - PSF		2-INCH DYNAMIC CONE TEST
									L.L.	P.L.	UN-CONF.	VANE	
IC	3				VERY STIFF BROWN SILTY CLAY WITH SOME SAND AND A LITTLE ORGANICS								
2B	5			48	DENSE TO VERY DENSE BROWN SANDY SILT WITH SOME CLAY AND GRAVEL		132.8	19.8					2715
3B	10			48				13.1					
4D	12			78				11.2					
5B	15			100/2"	VERY DENSE BROWN TO GREY SANDY SILT WITH SOME GRAVEL		148.0	14.8					4115
6B	20			100/4"				4.0					
	21	CAVE			VERY DENSE GREY CLAY SILT WITH SOME FINE TO COARSE SAND AND GRAVEL			8.7					
	22												
	25				SOFT GREY THINLY BEDDED WEATHERED SHALE WITH OCCASSIONAL BEDS OF MEDIUM HARD SILT STONE AND NUMEROUS CLAY BEAMS								
	27					27.0' 3" CLAY BEAM							
BXL	30												
	33.0					2" BEAMS OF SOFT CLAY MATERIAL							
					END OF HOLE - 37.6'								

DATE OF BORING: APRIL 6, 1978	OBSERVER: A. H. LEACH
<b>SYMBOLS</b> ~ APPROX. DEPTH □ UNDISTURBED SAMPLE ⊗ DISTURBED SAMPLE □ SAMPLE NOT RECOVERED A 1-3/4 IN. O.D. SPLIT TUBE B 1 IN. O.D. SPLIT TUBE C 1 IN. O.D. SHELBY TUBE D 1 IN. O.D. SPLIT TUBE WITH INSERT E 2-1/8 IN. O.D. SHELBY TUBE F 2-1/4 IN. O.D. SPLIT TUBE G 2-1/4 IN. O.D. SPLIT TUBE WITH INSERT H 4-3/4 IN. O.D. SHELBY TUBE	
<b>N<sup>1</sup> VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES</b> "PUSH" DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD	
<b>THE HYDRO-ELECTRIC POWER COMMISSION</b> OF ONTARIO RESEARCH DIVISION <b>FIGURE 66</b> MILTON TS - CLAIREVILLE TS 500 kV TL FOUNDATION INVESTIGATION TOWER NO. 75 SOUTH LINE 6	
DRAWN AEM	CHECKED PASSED
TORONTO..... 19... 27656 - RD	

LOCATION - 837 + 01
TOWER TYPE - VIB
NOTES - 1. HOLE ADVANCED BY A 7" HOLLOW STEM AUGER 2. W/L AT 12.0' BUT MAY BE FROM DRILLING WATER 3. BEDROCK CORED WITH BX CORE BARREL 4. THE BEDROCK WEATHERED SHALE IS CONSIDERED AUGERABLE

$$\begin{array}{r} 73 \\ \times 6.5 \\ \hline 365 \\ 4380 \\ \hline 4745 \end{array}$$

SAMPLE NO.	DEPTH BELOW DATUM, FT.	ELEV.	O.W.L.	N <sup>1</sup> VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY P.C.P.	MOISTURE CONT. % DRY WT.	ATTERBERG LIMITS		SHEAR STRENGTH - PSP UN- CONF.	VANE	TRIAXIAL	3-INCH DYNAMIC CONE TEST
									L.L.	P.L.				
1B	5			36	DENSE BROWN CLAYEY SILT WITH SOME SAND			22.0						
2B	10			34	VERY DENSE BROWN-GREY FINE TO COARSE SANDY SILT WITH SOME TO A LITTLE CLAY AND GRAVEL									
3B	15			60/6										
4B	20			40/6										
5B	25			100/4										
6B	30			78/6	VERY DENSE GREY SANDY SILT WITH A LITTLE GRAVEL									
7B	35			40/6										
	30.0				END OF HOLE									

DATE OF BORING: MAY 18, 1974

OBSERVER: D. FRASER

## SYMBOLS

~ APPROX. DEPTH

☒ UNDISTURBED SAMPLE☒ DISTURBED SAMPLE☐ SAMPLE NOT RECOVERED

A 1-1/4 IN. O.D. SPLIT TUBE

B 1 IN. O.D. SPLIT TUBE

C 1 IN. O.D. SHELBY TUBE

D 1 IN. O.D. SPLIT TUBE WITH INSERT

E 2-1/8 IN. O.D. SHELBY TUBE

F 2-1/2 IN. O.D. SPLIT TUBE

G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT

H 3-1/4 IN. O.D. SHELBY TUBE

N<sup>1</sup> VALUES AND 3-INCH  
CONE VALUES OBTAINED  
WITH 140-LB HAMMER  
DROPPING 30 INCHESPUSH PROBES  
INSERTING SAMPLER  
BY PUSHING WITH  
HYDRAULIC HEAD

## THE HYDRO-ELECTRIC POWER COMMISSION

OF ONTARIO  
RESEARCH DIVISIONFIGURE 64  
MILTON TS - CLAIREVILLE TS 500 KV TL  
FOUNDATION INVESTIGATION  
TOWER NO. 74 N LINE 6B

DRAWN

AFM

CHECKED

PASSED

TORONTO, ONTARIO, CANADA

27655 - RD

LOCATION - CHAINAGE 632 + 12

TOWER TYPE - VIS

NOTES - 1. HOLE ADVANCED BY FLIGHT AUGERS

2. HOLE ADVANCED TO REFUSAL AT 30.0'. POSSIBLE BEDROCK.

3. NO WATER IN HOLE

SAMPLE NO.	DEPTH BELOW DATUM (FT.)	ELEV.	GWL	N <sup>1</sup> VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY PCF	MOISTURE CONT. % DRY WT.	ATTERBERG LIMITS		SHEAR STRENGTH - PSF			2-INCH DYNAMIC CONE TEST
									UN- CONF.	VANE	TRIAIAL			
1B	5			35	DENSE, BROWN, FISSURED CLAYEY SILT		131.8	17.0						
2B	10			44				11.1						
3B	15		8.9'	91	2.5'			8.5						
4B	20		100/3"		VERY DENSE, SILTY SAND WITH SOME GRAVEL; GRAVEL CONTENT INCREASES WITH DEPTH	BOULDERS		8.9						
5B	25			45	20.5'			8.3						
6B	30			97	DENSE TO VERY DENSE, GREY, FINE, SANDY SILT WITH A LITTLE CLAY AND GRAVEL	ODD CORNERS		8.3						
7B	35			73/4"				6.8						
8B	35	CAVED FROM 33.0		80/4"	33.4'	END OF HOLE		8.5						

DATE OF BORING: AUGUST 25, 1974

OBSERVER: D. FRASER

SYMBOLS

✓ APPROX. DEPTH

☐ UNDISTURBED SAMPLE

☒ DISTURBED SAMPLE

☐ SAMPLE NOT RECOVERED

A 1-1/4 IN. O.D. SPLIT TUBE

B 1 IN. O.D. SPLIT TUBE

C 1 IN. O.D. SHELBY TUBE

D 1 IN. O.D. SPLIT TUBE WITH INSERT

E 2-3/8 IN. O.D. SHELBY TUBE

F 2-1/2 IN. O.D. SPLIT TUBE

G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT

H 2-3/4 IN. O.D. SHELBY TUBE

N<sup>1</sup> VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES

"PUSH" DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD

THE HYDRO-ELECTRIC POWER COMMISSION  
OF ONTARIO  
RESEARCH DIVISION

FIGURE 81

MILTON TS - CLAIREVILLE TS 500 KV TL  
FOUNDATION INVESTIGATION  
TOWER NO. (90N) LINE 68

DRAWN

CHECKED

PASSED

AT

27666 - RD

TORONTO..... 19...

LOCATION - CHAINAGE 75 + 73

NOTES - 1. HOLE ADVANCED BY FLYTE AUGER, CMR 55

2. HOLE MOVED 4 FEET ONCE AFTER HITTING BOULDER AT 15.6'

SAMPLE NO.	DEPTH BELOW DATUM FT.	ELEV.	GWL	N <sup>1</sup> VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY P.C.P.	MOISTURE CONT. % DRY WT.	ATTERBERG LIMITS		SHEAR STRENGTH - P.S.F.			2-INCH DYNAMIC CONE TEST
									L.L.	P.L.	UN-CONF.	VANE	TRIAXIAL	
1C	5				COMPACT BROWN CLAYEY SILT WITH SOME FINE TO COARSE SAND		143.2	12.8					7370	
2B	10			32										
3B	10			92/10"										
4B	10			89/5"	VERY DENSE GREY FINE TO COARSE SANDY SILT WITH SOME FINE TO COARSE GRAVEL									
5B	15			102		LITTLE CLAY								
6B	20			77										
7B	25			128	VERY DENSE GREY CLAYEY SILT WITH A TRACE OF SAND AND GRAVEL	LESS CLAY								
8B	30			32/8"										
9B	35			100/8"	VERY DENSE GREY SILT WITH A LITTLE CLAY									
	40			35.4'	END OF HOLE									

DATE OF BORING: MAY 21, 1976

OBSERVER: D. FRASER

## SYMBOLS

~ APPROX. DEPTH

☐ UNDISTURBED SAMPLE

☒ DISTURBED SAMPLE

☐ SAMPLE NOT RECOVERED

A 1-1/2 IN. O.D. SPLIT TUBE

B 2 IN. O.D. SPLIT TUBE

C 1 IN. O.D. SHELBY TUBE

D 1 IN. O.D. SPLIT TUBE WITH INSERT

E 2-3/8 IN. O.D. SHELBY TUBE

F 1-1/2 IN. O.D. SPLIT TUBE

G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT

H 2-3/8 IN. O.D. SHELBY TUBE

N<sup>1</sup> VALUES AND 2-INCH  
CONE VALUES OBTAINED  
WITH 140-LB HAMMER  
DROPPING 30 INCHES

DASH DENOTES  
INSERTING SAMPLE  
BY PUSHING WITH  
HYDRAULIC HEAD

## THE HYDRO-ELECTRIC POWER COMMISSION

OF ONTARIO  
RESEARCH DIVISION

FIGURE 82  
MILTON TS - CLAIREVILLE TS 500 W TL  
FOUNDATION INVESTIGATION  
TOWER NO. 9 SOUTH LINE 6

DRAWN	CHECKED	PASSED
ATM		

TORONTO..... 19...

27667 - RD

LOCATION - CHAINAGE 782 + 00  
TOWER TYPE - V19


NOTES - 1. HOLE ADVANCED BY A FLIGHT AUGER

2. W.L. AT COMPLETION OF AUGERING 29.4'. THIS PROBABLY FROM PERCHED  
WATER TABLE AT 18.6'

3. ALL SPLIT TUBE SAMPLES ONLY FIELD INSPECTED



25150  
REV. 8, 1973

SAMPLE NO.	DEPTH BELOW DATUM (FT.)	ELEV.	GWL	N <sup>1</sup> VALUES	DESCRIPTION	REMARKS
1B	5	HOLE OPEN	 12.0'	49	DENSE BROWN CLAYEY SILT WITH SOME FINE TO COARSE SAND AND TRACES OF BROWNISH BLACK SAND LENSES	LAYERS OF FINE GREY SAND
2B	10			39	DENSE TO VERY DENSE BROWN SANDY SILT WITH SOME CLAY AND A LITTLE FINE TO COARSE GRAVEL	
3B	15			50/4"		
4B	20			100/6"		
5B	25			100/3"		
6B	30			100/6"		
7B	35			66/6"		
8B	40			60/2"		
9B	45			80/4"		
					END OF HOLE	
					LOCATION - CHAINAGE 808 + 94	
					TOWER TYPE - VIS	
					NOTES - 1. HOLE ADVANCED BY FLIGHT AUGER	
					2. W.L. FIRST ENCOUNTERED AT 12.0'	
					W.L. AT COMPLETION OF AUGERING AT 23.0'	

HOLE 90

DATE OF BORING: MAY 25, 1976
 OBSERVER: D. FRASER

**SYMBOLS**

~ APPROX. DEPTH

■ UNDISTURBED SAMPLE

⊠ DISTURBED SAMPLE

□ SAMPLE NOT RECOVERED

A 1-3/4 IN. O.D. SPLIT TUBE

B 2 IN. O.D. SPLIT TUBE

C 2 IN. O.D. SHELBY TUBE

D 2 IN. O.D. SPLIT TUBE WITH INSERT

E 2-5/8 IN. O.D. SHELBY TUBE

F 2-1/2 IN. O.D. SPLIT TUBE

G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT

H 4-3/4 IN. O.D. SHELBY TUBE

N<sup>1</sup> VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES

'PUSH' DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD

THE HYDRO-ELECTRIC POWER COMMISSION  
OF ONTARIO  
RESEARCH DIVISION

FIGURE 88  
MILTON TS - CLAIREVILLE TS 500 kV TL  
FOUNDATION INVESTIGATION  
TOWER NO. 97 NORTH LINE 68

DRAWN  
AEM

CHECKED

PASSED

TORONTO..... 19....

136442 - RD

SAMPLE NO.	DEPTH BLOW DATUM (FT.)	ELEV.	GWL	N <sup>1</sup> VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY P.C.F.	MOISTURE CONT. % DRY WT.	ATTENBERG LIMITS		SHEAR STRENGTH - PSF			2-INCH DYNAMIC CONE TEST
									L.L.	P.L.	UN- CONF.	VANE	TRIAxIAL	
AG1 AG2 IC	1			PUSH PUSH PUSH	DENSE BROWN CLAYEY SILT WITH SOME SAND		132.4	14.8			3000			
2C	5			PUSH			141.0	14.8			6180 - EXCEEDED RING MAXIMUM			
3C	10			PUSH			143.2	13.3			8235	"	"	"
4B	12.5			PERCHED 73	VERY DENSE FINE GREY SILTY SAND WITH TRACKS OF GRAVEL									
5B	15			47										
6B	20			65/8"		COBBLES TO 3/8"								
7B	25			60	DENSE TO VERY DENSE GREY SANDY SILT WITH A LITTLE GRAVEL									
8B	35			120	END OF HOLE									

DATE OF BORING: MAY 26, 1974

OBSERVER: D. FRASER

SYMBOLS  
~ APPROX. DEPTH  
☐ UNDISTURBED SAMPLE  
☒ DISTURBED SAMPLE  
☐ SAMPLE NOT RECOVERED  
A 1-1/4 IN. O.D. SPLIT TUBE  
B 1 IN. O.D. SPLIT TUBE  
C 1 IN. O.D. SHELBY TUBE  
D 1 IN. O.D. SPLIT TUBE WITH INSERT  
E 1-1/8 IN. O.D. SHELBY TUBE  
F 1-1/2 IN. O.D. SPLIT TUBE  
G 2-1/2 IN. O.D. SPLIT TUBE WITH INSERT  
H 4-3/4 IN. O.D. SHELBY TUBE

N<sup>1</sup> VALUES AND 2-INCH  
CONE VALUES OBTAINED  
WITH 140-LB HAMMER  
DROPPING 30 INCHES  
"PUSH" DENOTES  
INSERTING SAMPLER  
BY PUSHING WITH  
HYDRAULIC HEAD

THE HYDRO-ELECTRIC POWER COMMISSION  
OF ONTARIO  
RESEARCH DIVISIONFIGURE 89  
MILTON TS - CLAIREVILLE TS 500 KV TL  
FOUNDATION INVESTIGATION  
TOWER NO. 98N LINE 6

DRAWN AEM	CHECKED	PASSED
TORONTO..... IS ..		27672 - RD

LOCATION - CHAINAGE 818 + 36

TOWER TYPE - VIB

NOTES - 1. HOLE ADVANCED BY FLIGHT AUGERS  
2. HOLE DRY AFTER AUGERING

SAMPLE NO.	DEPTH BELOW DATUM (FT.)	ELEV.	GWL	N <sup>1</sup> VALUES	DESCRIPTION	REMARKS	NATURAL DENSITY P.L.F.	MOISTURE CONT. % DRY WT.	ATTENBERG'S LIMITS		SHEAR STRENGTH - PSF			2-INCH DYNAMIC CONE TEST
									L.L.	P.L.	UN-CONF.	VANE	TRIAXIAL	
AG1				PUSH										
AG2				PUSH										
1C	5			PUSH			137.3	18.1			5190			
2C	10			PUSH	DENSE TO VERY DENSE BROWN CLAYEY SILT WITH SOME FINE TO COARSE SAND AND TRACES OF GRAVEL		135.2	15.8			3965			
3B	15			50										
4B	20			60										
5B	25			15.0 <sup>1</sup>										
6C	30			27	COMPACT GREY CLAYEY SILT WITH A LITTLE SAND, AND TRACES OF GRAVEL			16.0						
7B	35			20.0 <sup>1</sup>										
8B	40			PUSH			148.0	9.0			9948			
9B	45			45	DENSE GREY SILT WITH SOME SAND AND TRACES OF GRAVEL									
	50			30.0 <sup>1</sup>										
	55			44	DENSE GREY SILTY SAND WITH TRACES OF GRAVEL									
	60			80/5 <sup>11</sup>	36.0 <sup>1</sup>									
	65				END OF HOLE									

DATE OF BORING: MAY 27, 1976

OBSERVER: J. KUBICK

SYMBOLS

- ✓ APPROX. DEPTH
- ☐ UNDISTURBED SAMPLE
- ☒ DISTURBED SAMPLE
- ☐ SAMPLE NOT RECOVERED
- A 1-3/4 IN. O.D. SPLIT TUBE
- B 1 IN. O.D. SPLIT TUBE
- C 1 IN. O.D. SHELBY TUBE
- D 1 IN. O.D. SPLIT TUBE WITH INSERT
- E 1-1/4 IN. O.D. SHELBY TUBE
- F 2-1/4 IN. O.D. SPLIT TUBE
- G 1-1/2 IN. O.D. SPLIT TUBE WITH INSERT
- H 1-3/4 IN. O.D. SHELBY TUBE

<sup>1</sup>N<sup>1</sup> VALUES AND 2-INCH CONE VALUES OBTAINED WITH 140-LB HAMMER DROPPING 30 INCHES

<sup>1</sup>PUSH<sup>1</sup> DENOTES INSERTING SAMPLER BY PUSHING WITH HYDRAULIC HEAD

THE HYDRO-ELECTRIC POWER COMMISSION

OF ONTARIO  
RESEARCH DIVISION

FIGURE 91  
MILTON TS - CLAIREVILLE TS 500KV TL  
FOUNDATION INVESTIGATION  
TOWER NO. 1005 LINE 6

DRAWN BY: AFM CHECKED: PASSED:

TORONTO ... 19...

27674 - RD

LOCATION - CHAINAGE 838 + 35

TOWER TYPE - VIB

NOTES - 1, HOLE ADVANCED BY FLIGHT AUGER  
2, W.L. AT COMPLETION OF AUGERING AT 30.0<sup>1</sup>



Ontario

WP 87-78-00

Ministry of  
Transportation and  
Communications

Pavement & Foundation Design Section  
Engineering Materials Office  
Room 313, Central Building  
1201 Wilson Avenue  
Downsview, Ontario  
M3M 1J8

Tel: (416) 248-3282

April 8, 1980

Master Soil Investigation Ltd.  
104 Kenbar Dr.  
Weston, Ontario  
M9L 1N4

Dear Sirs:

This letter confirms our request by telephone of April 1, 1980 for the supply of a 5.3 (I), auger machine, together with all necessary equipment as per your Tender for Supply Contract S-79-3284 at Hwy. 401 and Mississauga Rd. on April 8, 1980.

Mobilization will be from Toronto.

Our project number is 87-78-00.

Yours truly,

M. Devata  
Senior Foundations Engineer

To: Mr. M.S. Devata,  
Senior Foundation Engineer,  
Soil Mechanics Section,  
Central Building, Downsview.

Date: 79-09-21

Central Region

RE: Highway 407, From Airport Rd. to Highway 10,  
W.P. 87-78-00, District 6, Toronto

The above mentioned project is now in its planning stage. In order to study the feasibility of the proposed Highway 407 alignment, would you please prepare a Preliminary Foundation Investigation Report on the bridges as numbered in the 1:500 B- plans enclosed. As can be seen in the plans, one number may not necessarily mean one bridge. It is believed that the number and location of bore holes to be taken for each bridge will be left to the discretion of your section.

(The portion of Highway 407 from Highway 10 to Highway 401 is under W.P. 86-78-00.) As it stands now, this portion of Highway 407 would probably be assigned to the same Consulting firm early next year. It is therefore advisable, in view of economy and efficiency, to request Foundation information on Highway 407 from Airport Road westerly to Highway 401.

Enclosed please find two sets of 1:500 plans and profiles with the bridges numbered. As indicated on the plans, bore holes have been taken on some bridges under other W.P. numbers. Whether or not new bore holes are required for these bridges would be decided by your section.

It is to be noted that at the interchange of Highways 407 and 410, the second stage calls for two long ramp structures which will then eliminate the two 32° ramps.

The bridges requiring Foundation investigations are numbered and listed as follows:

- B1: 407/Mimico Creek
- B2: 407/Proposed Bramport Service Track
- B3: 407/Airport Road
- B4: 407/Steeles Avenue
- B5: 407/Torham Road
- B6: 407/C.N.R. Halton Subdivision
- B7: Bramalea Road/C.N.R. Halton Subdivision
- B8: 407/Bramalea Road
- B9: 407/Creek Crossing 1700'± West of Bramalea Rd.
- B10: 407/Dixie Road
- B11: 407/Relocated Heart Lake Road
- B12: 407/Relocated Etobicoke Creek
- B13: Relocated Etobicoke Creek/410 Ramp & Heart Lake Road
- B14: 407 Ramp/Etobicoke Creek
- B15: 410/Etobicoke Creek

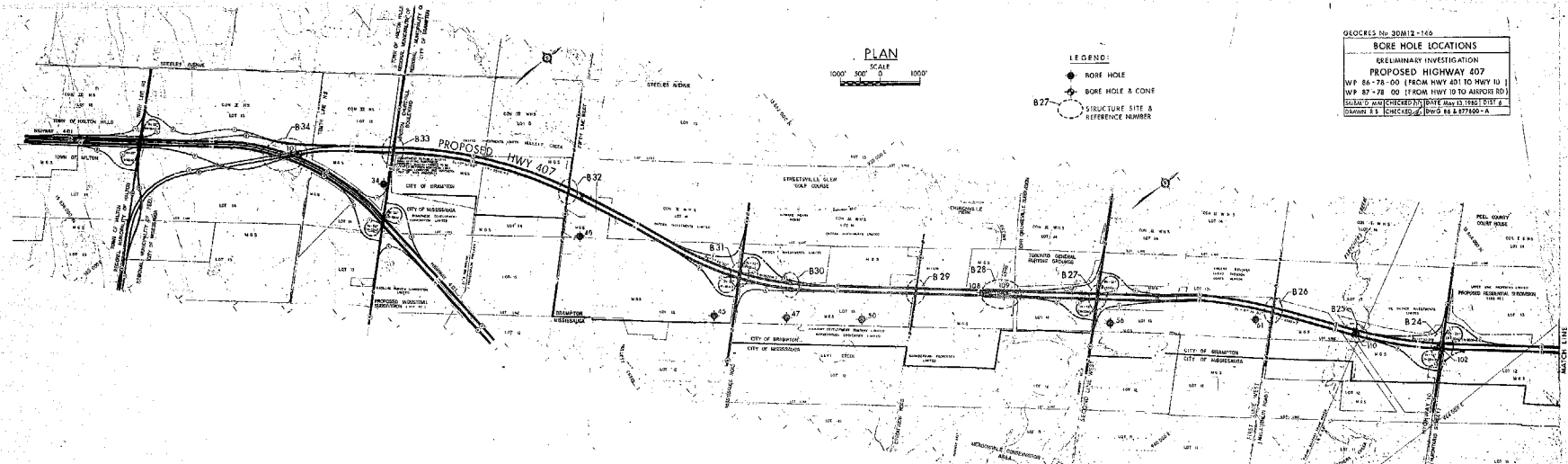
B16: 410/Etobicoke Creek -  
B17: 410 Ramp/Etobicoke Creek  
B18: 410/410 N-E Ramp  
B19: 407 Ramp/410  
B20: 407/410 Interchange  
B21: 410/410 Ramp  
B22: 410/407 Ramp  
B23: 407/First Line East  
B24: 407/10  
B25: 407/Fletchers Creek  
B26: 407/First Line West  
B27: 407/Second Line West  
B28: 407/Credit River & C.P.R.  
B29: 407/Creditview Road  
B30: 407/Creek Crossing 1300'+ East of  
Mississauga Road  
B31: 407/Mississauga Road Interchange  
B32: 407/Fifth Line West  
B33: 407/Winston Churchill Boulevard  
B34: 407/401 Interchange

We would appreciate receiving your report by 80-05-15.  
Should additional information or clarification be required,  
please do not hesitate to contact the undersigned.

FC:gj  
Encl.

*Frank D. Chan*  
F. Chan,  
Senior Structural Engineer,  
for:  
G.C.E. Burkhardt,  
Head, Structural Section.

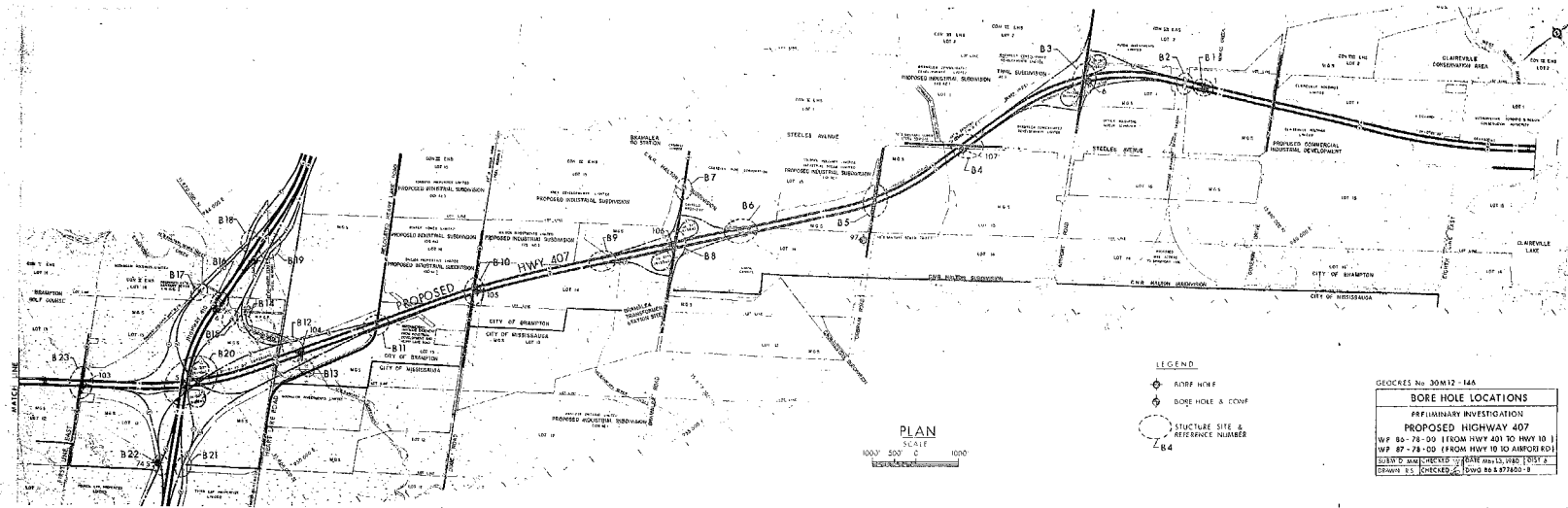
c.c. L. Dutchak  
P. Penev  
R. Fitzgibbon



**PLAN**  
SCALE  
1000' 500' 0 500' 1000'

- LEGEND:**
- BORE HOLE
  - ⊙ BORE HOLE & CONE
  - STRUCTURE SITE & REFERENCE NUMBER

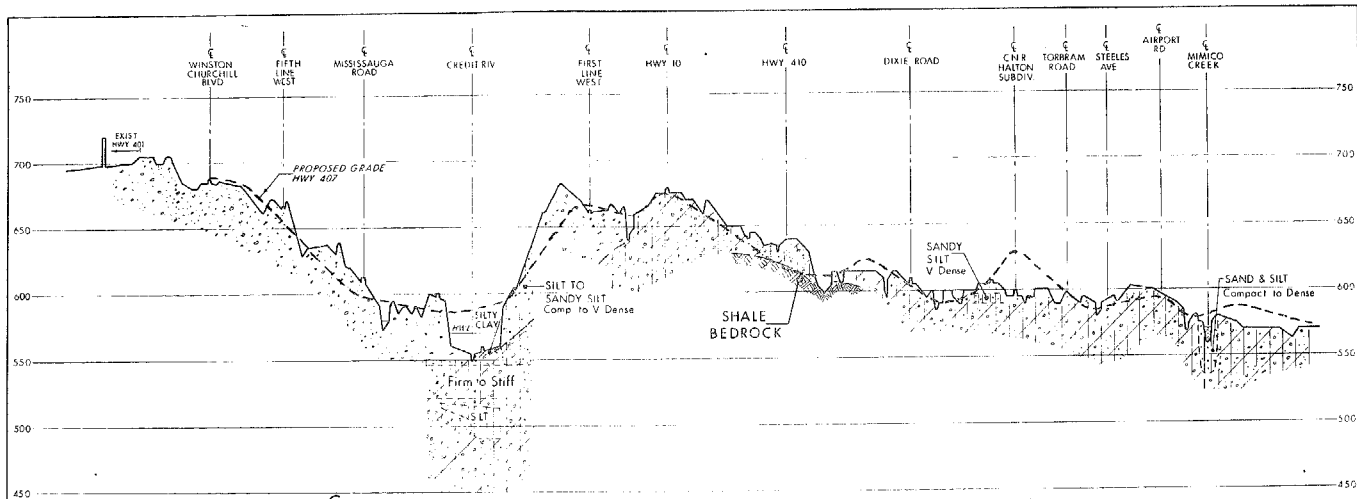
GEOCRE'S No 30M12-146	
<b>BORE HOLE LOCATIONS</b>	
PRELIMINARY INVESTIGATION	
<b>PROPOSED HIGHWAY 407</b>	
WP 86-78-00 (FROM HWY 401 TO HWY 10)	
WP 87-78-00 (FROM HWY 10 TO AIRPORT RD)	
SUBMITTAL	CHECKED BY DATE
MAILED	MAY 13 1988 DIST 6
DRAWN BY	CHECKED BY DWG 86 & 877400-A



GEOGRAPHIC No. 30M12-146

BORE HOLE LOCATIONS			
PRELIMINARY INVESTIGATION			
PROPOSED HIGHWAY 407			
WP 66-78-00 (FROM HWY 401 TO HWY 10)			
WP 87-78-00 (FROM HWY 10 TO AIRPORT RD)			
SUBV. D. MAN.	CHECKED	DATE	APR 13, 1980
DRAWN	R.S.	CHECKED	DWG No. 877820-B





PROFILE-PROPOSED HWY 407 FROM HWY 401 TO AIRPORT ROAD

**SOIL STRATIGRAPHY LEGEND:**



GLACIAL TILL, Very Dense  
HET MIX OF SAND, SILT & GRAVEL TRACE OF CLAY



GLACIAL TILL, Hard  
HET MIX OF CLAYEY SILT, SAND & GRAVEL



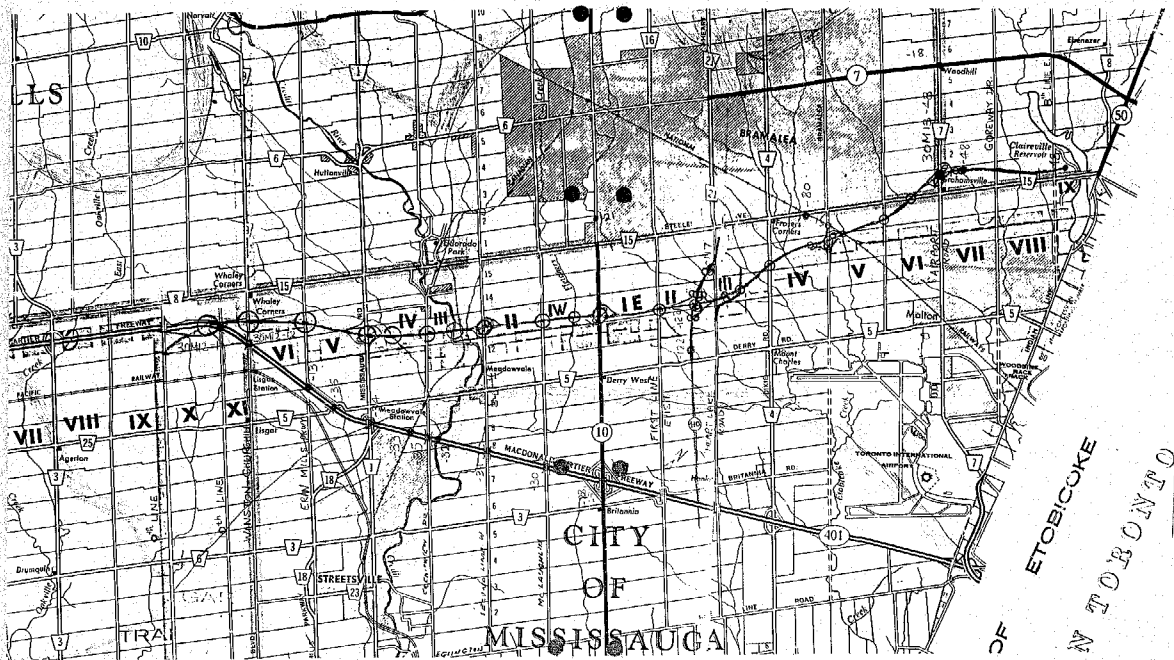
GEOCRE No 30M12-146

**SIMPLIFIED SOIL STRATIGRAPHY**

PRELIMINARY INVESTIGATION  
PROPOSED HIGHWAY 407

WP 86-78-00 [FROM HWY 401 TO HWY 10]  
WP 87-78-00 [FROM HWY 10 TO AIRPORT RD]

SURV DMM [CHECKED: R] DATE May 13, 1980 DIST 6  
DRAWN R.S. [CHECKED: P] DWG 86 & 877800-C



- ( ) REVEALED TILL PLAINS SAND PLAINS  
 ( ) TILL PLAINS (DRAIN AGED) SAND PLAINS  
 ( ) TILL PLAINS (DRAIN AGED) SAND PLAINS