

G.I.-30 SEPT. 1976

GEOCRES No. 30M12-118DIST. 6 REGION W.P. No. 127-66-37CONT. No. 76-120W. O. No. STR. SITE No. CHWY. No. 401/410LOCATION Retaining Wall #1
Ramp E-SNo of PAGES -=====OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. REMARKS:



Memorandum

To: Mr. C. Mirza,
Head, Soils Mechanics Section,
West Building.

From: G.C.E. Burkhardt,
Structural Planning Office,
3501 Dufferin Street

Attention:

Date: December 10, 1975

Our File Ref.

In Reply to

Subject:

Retaining Wall No. 1
Ramp 'E - S'
W.P. 127-66-37, Site 24
District 6, Toronto

In reference to our request on November 25, 1975 for a foundation investigation for the above mentioned project, we would now like to cancel that request. The cancellation of this request was made verbally to Mr. M. Devata of your office on December 4, 1975.

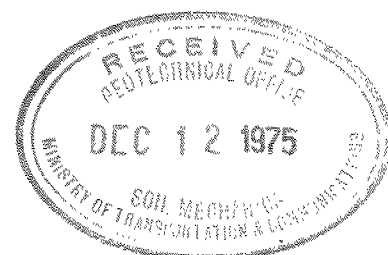
We have discovered that a foundation investigation which was temporarily overlooked for this retaining wall has been previously carried out in 1973. The Foundation Investigation Report No. W.O. 73-11072, W.P. 127-66-50 provides the required information.

We understand that no field work was carried out and would like to apologize for any inconvenience caused by the request.

R.A. Jeffries,
Structural Planning Supervisor,
for:
G.C.E. Burkhardt,
REG. STRUCTURAL PLANNING ENG.

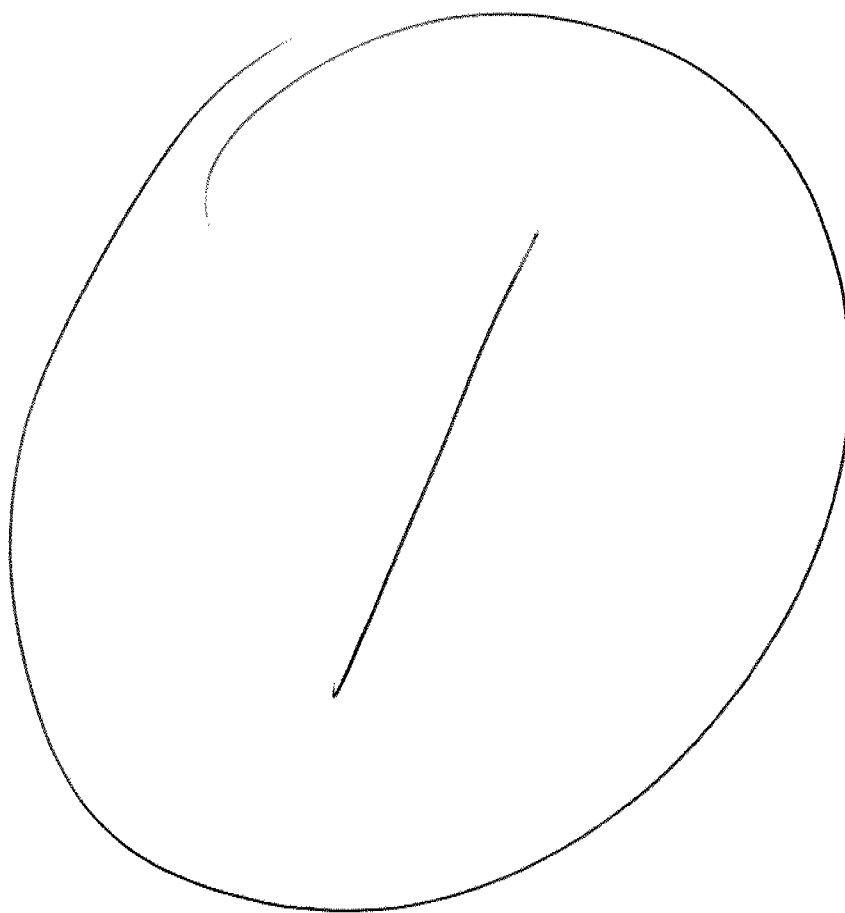
RJ:vk

c.c. W. Roters
Z Byblow
J. Anderson
R. Fitzgibbon



35MM

DRAWING



DOCUMENT MICROFILMING IDENTIFICATION

G.I.-30 SEPT 1976

GEOCRES No. 30M12-118

DIST. 6 REGION Central

W.P. No. 127-66-50

CONT. No. 76-120

W. O. No. _____

STR. SITE No. 24RW2 and 24RW3

HWY. No. _____

LOCATION Retaining Walls #2
and #3

=====

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 2

REMARKS: documents to be unfolded
before microfilmed

FOUNDATION INVESTIGATION REPORT

For

Retaining Walls #2 and #3
W.P. 127-66-50, Site No's. 24RW2 and 24RW3
District #6, Toronto

INTRODUCTION

This report contains the results of a foundation investigation carried out at the site of the above mentioned project. Field work was carried out on the days of December 13, 1973 for Retaining wall No. 3 and May 10, 1976 for Retaining wall No. 2 using a continuous flight auger machine equipped with hollow stem augers and a conventional diamond drill adapted for soil sampling purposes. BXL size core samples were obtained to prove bedrock.

SITE DESCRIPTION

The sites of Retaining walls No. 2 and 3 are located within the northeast quadrant of the intersection of Hwy. 401 and Heart Lake Road. Retaining wall No. 3 is located approximately some 500 feet east of the intersection, while Retaining wall No. 2 is located immediately adjacent to the intersection.

It was observed at the time of investigation (May, 1976) that an embankment up to 20 feet in height was constructed in the vicinity of Retaining wall No. 2.

Topography of the general area is flat to gently undulating. The land is utilized for farming purposes.

Physiographically, the site is located in the region referred to as the "Peel Plain". Across this plain rivers and streams have cut deep valleys and consequently there are no large undrained depressions, swamps or bogs, although in many of the interstream areas the drainage is imperfect.

The characteristic geological material of this region is a glacial till underlain by shale bedrock.

SUBSURFACE CONDITIONS

General

Subsoil conditions in general were found to be uniform at the site. The subsoil consists of a relatively shallow deposit ranging in thickness from 8 feet to 17 feet of glacial till which is a heterogeneous mixture of clayey silt, sand and gravel, followed by shale bedrock. In certain locations the overburden is overlain by fill material up to 20 feet in height. The boundaries between the overburden and bedrock are shown on the Record of Borehole Sheets contained in the Appendix. The estimated stratigraphical profiles for the sites of Retaining walls No. 2 and #3 are shown respectively on Dwg. 24-RW3-4 and 24-RW2-5 of the Contract Drawings. From ground level downwards the overburden and bedrock details are described as follows:

Fill Material

This fill material is part of the east approach embankment of the proposed structure No. 52 in this area. The embankment material is composed of the parent overburden material (glacial till with an extensive amount of shale fragments).

The 'N' values in the fill material ranged from 15 to 37 blows per foot, indicating that the fill has been subjected to reasonable compaction.

Heterogeneous Mixture of Clayey Silt, Sand and Gravel (Glacial Till)

This material was intersected in all boreholes. At the retaining wall No. 2 location the thickness of the stratum was found to be about 8 feet, while at the Retaining wall No. 3 location the thickness ranges from 14 feet to 17 feet. The material in this deposit consists mainly of a cohesive matrix of clayey silt with some sand and gravel of a glacial origin.

Laboratory tests carried out on selected samples revealed the following physical properties:

	<u>Range</u>
Liquid Limit (W_L) (%)	17-28
Plastic Limit (W_p) (%)	13-16
Natural Moisture Content (W) (%)	10-12

Typical grain size distribution curves are plotted on Fig. 1 of the Appendix.

Standard Penetration Tests carried out within this cohesive glacial till gave 'N' values ranging from 54 to in excess of 100 blows per foot generally increasing with depth. The consistency of the overall deposit based on the 'N' values is estimated to be hard.

Shale Bedrock

Bedrock was found underlying the glacial till stratum.

The dominant type of bedrock encountered across the site is a dark grey shale with occasional bands of limestone. The bedrock surface at the investigated site was found to be at approximate elevation 557.0 in the vicinity of Retaining wall No. 2 and at about elevation 528.0 in the proximity of Retaining wall No. 3.

Groundwater

Groundwater level observations were carried out during the period of investigation by recording the water levels in the open boreholes. The results indicate that the groundwater level in the vicinity of Retaining wall No. 2 is at elevation 562 and in the proximity of Retaining wall No. 3, varies between elevations 535 and 539.

M. Devata
M. Devata, P. Eng.
Supervising Engineer



MD/gs
December, 1976

ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 1

WP 127-66-50

LOCATION Co-ord's, 857, 864N; 959, 294E

ORIGINATED BY VK

DIST 6 HWY 403

BORING DATE May 10, 1976

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Hollow Stem Auger

CHECKED BY 10

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w			UNIT WEIGHT γ	REMARKS % GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	N° V° ES		20	40	60	80	100	w_p	w	w_L		
585.0	Ground Level															
0.0	FILL		1	SS	37	580										
			2	SS	15											
			3	SS	20	570										
565.0	Het. mix. of clayey silt, sand & gravel- glacial till															
20.0			4	SS	90/8"	560										
557.0	Hard. Weathered Sound Shale Bedrock with interbedded limestone layers															
28.0			5	SS	100/5"											
550.5			6	BXL	100% Rec.											
34.5	End of Borehole															

20
15 ϕ 5 % STRAIN AT FAILURE
10

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO

ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 2

WP 127-66-50 LOCATION Co-ord's. 857, 805N; 959, 230E ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE May 10, 1976 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE Hollow Stem Auger CHECKED BY 10

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W			UNIT WEIGHT γ	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	W_P	W	W_L		
565.0	Ground Level															GR SA SI CL
0.0	Het. mix. of clayey silt, sand and gravel - glacial till - Hard		1	SS	120/	560										
557.0																
8.0	Weathered															
	Sound Shale Bedrock with interbedded limestone layers		2	BXL	100% Rec	550										
548.5																
16.5	End of Borehole															

20
15 5 % STRAIN AT FAILURE
10

ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 5

WP 127-66-50 LOCATION Co-ords. 15,858,585 N; 960,484 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE July 9, 1973 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE Drill with tricone and BXL bits CHECKED BY 10

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT				LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			UNIT WEIGHT γ	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	w_p	w	w_L	
542.7	Ground Level														
0.0	Het. mix. of clayey silt with sand, trace of gravel (Glacial Till)		1	SS	56	540									
			2	SS	102										
530.7	Hard — — — Brown		3	SS	115										
528.0	Grey		4	SS	110										
14.0	Weathered		5	BXL	70%										
525.7			6	BXL	50%										
17.0	Sound		7	BXL	95%										
	Shale Bedrock with interbedded limestone layers		8	BXL	Rec 80%	520									
			9	BXL	95%										
512.2			10	BXL	90%										
30.5	End of Borehole					510									

20
15 \diamond 5 % STRAIN AT FAILURE
10

ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 6

WP 127-66-50

LOCATION Co-ords. 15,858,614 N; 960,582 E.

ORIGINATED BY VK

DIST 6 HWY 403

BORING DATE July 6, 1973

COMPILED BY VK

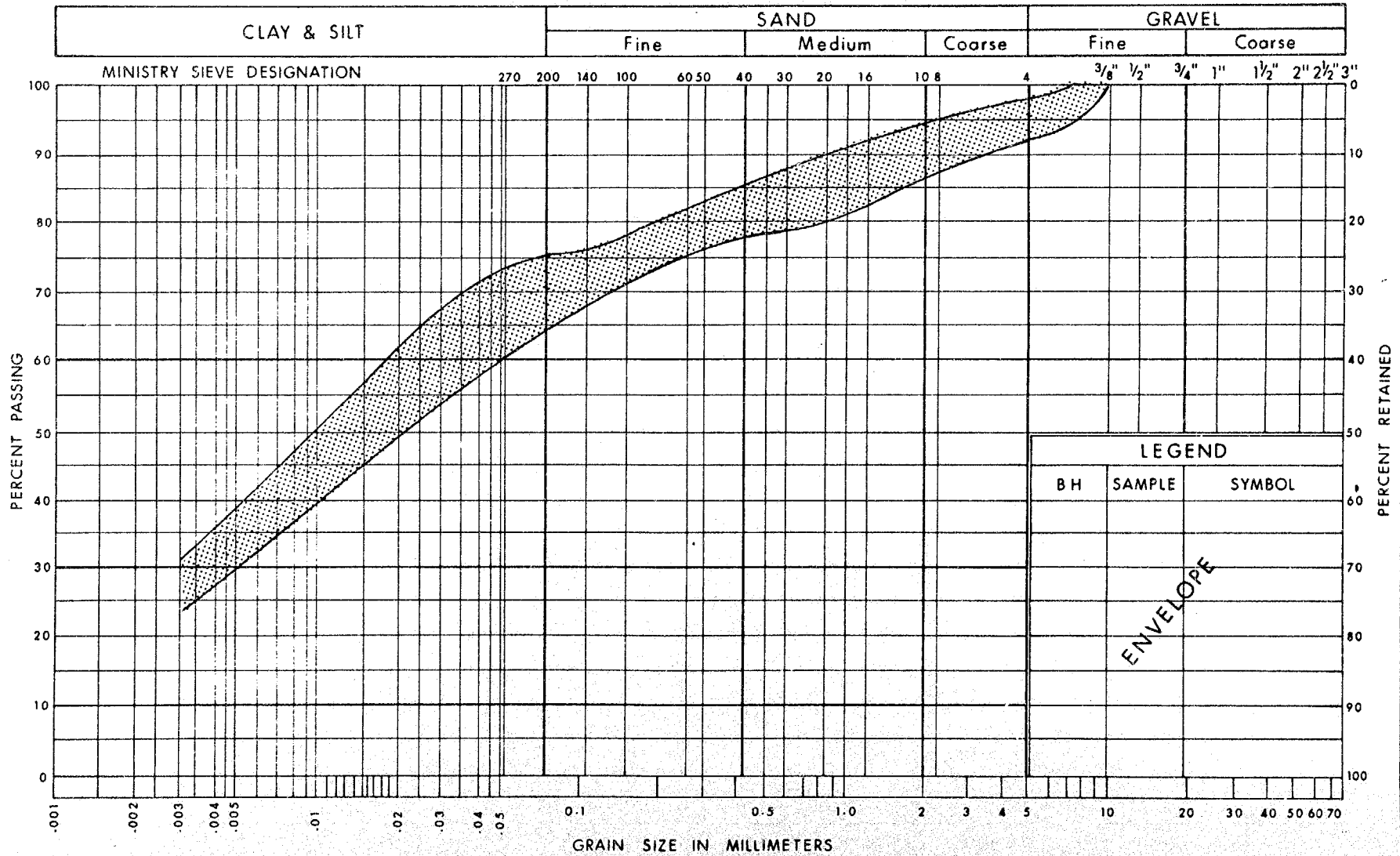
DATUM Geodetic

BOREHOLE TYPE Drill with Tricone and BXL bits

CHECKED BY *[Signature]*

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w w_p — w — w_L WATER CONTENT % 20 40 60	UNIT WEIGHT γ	REMARKS % GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	VALUES					
545.0	Ground Level									
0.0	Het. mix. of clayey silt with sand, trace of gravel (Glacial Till)		1	SS	54					
			2	SS	58					
			3	SS	74					
531.5	Hard	Brown	4	SS	102					
13.5		Grey	5	SS	122					
528.0			6	SS	100	4"				
17.0	Weathered		7	BXL	90					
525.7			8	BXL	70					
19.3	Sound Shale Bedrock with interbedded limestone layers									
520.5										
24.5	End of Borehole									

UNIFIED SOIL CLASSIFICATION SYSTEM



LEGEND

BH	SAMPLE	SYMBOL
ENVELOPE		



Ministry of
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ENGINEERING SERVICES BRANCH

GRAIN SIZE DISTRIBUTION GLACIAL TILL

FIG No 1

W P 127-66-50

INTRODUCTION

In conjunction with the construction of Hwy. 401, 403 and 410 interchange, several structures including retaining walls, are planned for construction. This report pertains to two retaining walls, namely:

- a) Retaining Wall #2 (southeast portion of Bridge 52 - Hwy. 403 WB lane over Heart Lake Road and Hwy. 401).
- b) Retaining wall #3 (southeast portion of Bridge 47 - Dixie W. lane under "Ramp E-S/N").

Information pertinent to wall No. 3 has been utilized from our previous foundation investigation report under W.P. 127-66-43 submitted on September 24, 1973. For retaining wall No. 2, two additional boreholes were carried out at the request of Mr. G.C. E. Burkhardt, Regional Structural Planning Engineer (memo dated May 10, 1976).

Included in this report are the details of the subsurface conditions, together with our recommendations pertaining to the design of the proposed retaining walls and the related stability considerations.

DESCRIPTION OF THE SITE AND GEOLOGY

The site of retaining wall No. 2 is located immediately to the northeast corner of Hwy. 401 and Heart Lake Road crossing while retaining wall No. 3 is located some 500 ft. east of the intersection of Hwy. 401 and Heart Lake Road.

Topography of the general area is flat to gently undulating. The land is utilized for farming purposes.

Physiographically, the site is located in the region referred to as the "Peel Plain". Across this plain rivers and streams have cut deep valleys and consequently there are no large undrained depressions, swamps or bogs, although in many of the interstream areas the drainage is imperfect.

The characteristic geological material of this region is a glacial till underlain by shale bedrock.

FIELD AND LABORATORY INVESTIGATION

Two sampled boreholes for wall No. 2 and two other sampled boreholes for wall No. 3 have been carried out during the course of the field investigation. Boring was done by means of a Bombardier mounted auger machine commercially known as a C.M.E. #55 adapted for soil sampling purposes. Disturbed samples were taken by means of a 2" O.D. split-spoon sampler. The energy used in driving the sampler conforms to the Specifications of the Standard Penetration Test.

The bedrock was proven at all borehole locations by obtaining BXL size core samples. The soil, bedrock and groundwater conditions encountered at the boring locations are presented in the Record of Borehole Sheets which are contained in the Appendix to this report. The locations and elevations of the various boreholes were provided by personnel from Engineering Surveys, Central Region. The elevations in this report are referred to a Geodetic Datum. Boring locations, tied into a co-ordinate system, and elevations, together with estimated stratigraphical profiles, are shown on drawing No. 1276650-A.

All samples were subjected to a careful visual examination in the field and subsequently in the laboratory. Laboratory tests were carried out on selected representative samples to determine the physical properties of the soil, namely:

Natural Moisture Contents

Atterberg Limits

Grain Size Distributions

The results of this testing are plotted on the Record of Borehole Sheets and summarized on Fig. 1 and 2 inclusive, all contained in the Appendix to this report.

SUBSURFACE CONDITIONS

General

Subsoil conditions in general, were found to be uniform at the site. The subsoil consists of a relatively shallow deposit, ranging in thickness from 8 ft. to 17 ft. of glacial till which is a heterogeneous mixture of clayey silt, sand and gravel, followed by shale bedrock.

It was observed at the time of investigation (April, 1976) that an embankment up to 20 ft. in height had been constructed at the location of B.H. 1 of Retaining wall No. 2.

Fill Material (B.H. 1 - wall No. 2)

This fill material is the east approach embankment of the proposed structure No. 52 in this area. The embankment material is composed of the parent overburden material (glacial till with extensive amount of shale fragments).

The 'N' values in the fill material ranged from 15 to 37 blows per foot, indicating that the fill has been subjected to reasonable compaction.

Heterogeneous Mixture of Clayey Silt, Sand and Gravel (Glacial Till)

This material was intersected in all boreholes. At the retaining wall No. 2 location (B.H.'s 1 and 2) the thickness of the stratum was found to be about 8 ft. while at the retaining wall No. 3 location (B.H.'s 5 and 6) the thickness ranges from 14 ft. to 17 ft.

The material in this deposit mainly consists of a cohesive matrix of clayey silt with some sand and gravel of a glacial origin.

Laboratory tests carried out on selected samples revealed the following physical properties:

	<u>Range</u>
Liquid Limit (W_L) (%)	17-28
Plastic Limit (W_p) (%)	13-16
Natural Moisture Content (W) (%)	10-12

Typical grain size distribution curves are plotted on Fig. 2 of the Appendix.

Standard Penetration Tests carried out within this cohesive glacial till gave 'N' values ranging from 54 to in excess of 100 blows per foot generally increasing with depth. The consistency of the overall deposit based on the 'N' values is estimated to be hard.

Shale Bedrock

Bedrock was found underlying the glacial till stratum. The bedrock was proven in all boring locations by obtaining BXL size core samples.

The dominant type of bedrock encountered across the site is a dark grey shale with occasional bands of limestone. The bedrock surface at the investigated site was found to be as follows:

Bedrock Surface

B.H.'s 1 and 2 (Wall No. 2)	elev. 557.0
B.H.'s 5 and 6 (Wall No. 3)	elev. 528.0

The upper 2.5 to 3.5 ft. portion of the bedrock appears to be weathered. Below this the bedrock is generally in a sound condition.

GROUNDWATER CONDITIONS

Groundwater level observations were carried out during the period of investigation by recording the water levels in the open boreholes. The observations are recorded on the Record of Borehole Sheets and summarized on Drawing No. 1276650-A. The results indicate that the groundwater level at wall No. 2 location (B.H.'s 1 and 2) is at elevation 562 and at wall No. 3 (B.H.'s 5 and 6) varies between elevations 535 and 539.0.

DISCUSSION AND RECOMMENDATIONS

General

In conjunction with the proposed Hwy. 401, 403 and 410 interchange, two retaining walls (#2 and #3) will be required. Retaining wall No. 2 will extend from the end of the southeast wingwall of structure No. 52 about 80 ft. easterly. Retaining wall No. 3 will extend from the southeast corner of structure No. 47 about 250 ft. easterly.

The subsoil at the site consists of a hard cohesive glacial till underlain by shale bedrock (at a depth of 8 to 17 ft. below ground surface except in certain areas - east approach of structure No. 52 - overlain by fill material up to 20 ft. in height).

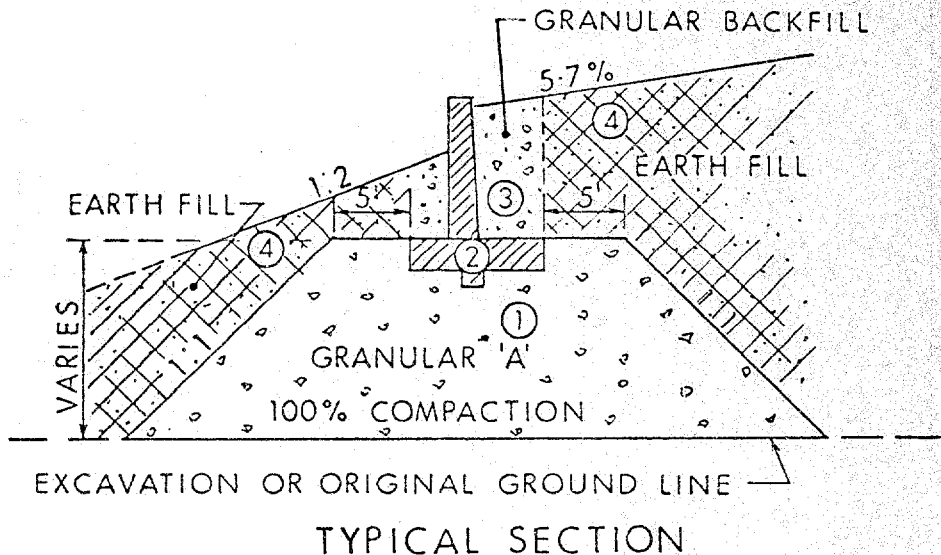
Foundations for Retaining Walls

Retaining wall No. 3 (B.H.'s 5 and 6): This wall will retain fill placed along Ramp E-S/N. The subsoil conditions are generally favourable and the proposed retaining wall can be supported on spread footings within the parent upper portion of the glacial till. In order to satisfy the frost protection requirements in the area, it is recommended to provide at least 4 ft. of earth cover above the underside of the footing. A footing satisfying these requirements could be designed using an allowable bearing pressure of up to 4.0 tsf.

In some locations footing excavations may be carried out below the prevailing groundwater level. Since the subsoil is relatively impervious, no major dewatering problems are anticipated.

Retaining wall No. 2 (B.H.'s 1 and 2): This wall will retain fill placed along Hwy. 403 WB lanes.

It is understood that this wall will be a barrier wall and in view of this our recommendation for the support of this wall will be as illustrated in the figure below:



SEQUENCE OF CONSTRUCTION :

- 1 CONSTRUCT GRANULAR FILL (GRANULAR 'A')
- 2 RE-EXCAVATE AND CONSTRUCT FOOTING FOR THE RETAINING STRUCTURE (MIN. 5' OF COVER, BELOW THE FINISHED GRADE)
- 3 CONSTRUCT GRANULAR BACKFILL
- 4 CONSTRUCT EARTH FILL TO THE REQUIRED GRADE

If the aforementioned methods are followed the footing retaining structure can be designed using an allowable load of 2.5 tsf.

Alternatively, the retaining wall can be supported on spread footings within the parent upper portion of the glacial till. In order to satisfy the frost protection requirements in the area, it is recommended that at least 4 ft. of earth cover be provided above the underside of the footing. A footing satisfying these requirements could be designed using an allowable bearing pressure of up to 4.0 tsf.

In some locations footing excavations may be carried out below the prevailing groundwater level. Since the subsoil is relatively impervious, no major dewatering problems are anticipated. However, any minor seepage or surface runoff into the excavations could be handled by pumping from sumps.

For the design of the retaining walls a coefficient of active earth pressure (K_a) of 0.33 can be used. In computing the horizontal resistance of the footings, an adhesion value of 3000 psf may be used between the rough concrete surface and the cohesive glacial till. In the case of footings constructed on compacted granular 'A' material a value of 0.60 should be used in computing the frictional resistance between the rough concrete and the granular material.

MISCELLANEOUS

The field investigation for retaining wall No. 2 (B.H.'s 1 and 2) was carried out on May 10, 1976 and for retaining wall No. 3 (B.H.'s 5 and 6) on December 13, 1973, under the supervision of Mr. V. Korlu, Project Engineer, who also prepared this report.

Equipment was owned and operated by Atcost Soil Drilling Inc. of Toronto and Canadian Longyear Ltd. of Toronto.

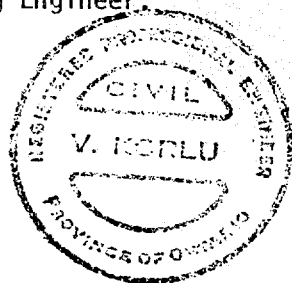
This report was reviewed by Mr. M. Devata, Supervising Engineer.

V. Korlu

V. Korlu
Project Engineer

M. Devata

M. Devata, P. Eng.
Supervising Engineer



VK/gs
August, 1976

RECORD OF BOREHOLE NO 1

WP 127-66-50

LOCATION Co-ord's. 857, 864N; 959, 294E

ORIGINATED BY VK

DIST 6 HWY 403

BORING DATE May 10, 1976

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE 5.1 (1) M.V.H.S.

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 γ	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	VALUES		20	40	60	80	100	W_P	W	W_L		
585.0	Ground Level															
0.0	FILL		1	SS	37	580										
			2	SS	15											
			3	SS	20	570										
565.0	Het. mix. of clayey silt, sand & gravel- glacial till		4	SS	90/8"	560										
20.0			5	SS	100/5"											
557.0	Hard.															
28.0	Weathered															
30.5	Sound shale Bedrock															
550.5			6	BXH	100% R.C.											
34.5	End of Borehole															

ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 2

WP 127-66-50 LOCATION Co-ord's. 857, 805N; 959, 230E ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE May 10, 1976 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE 5.1 (1) M.V.H.S. 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 γ	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	w_p	w	w_L		
565.0	Ground Level															GR SA SI CL
0.0	Het. mix. of clayey silt, sand and gravel - glacial till - Hard		1	SS	120/	9"560										
557.0																
8.0	Weathered															
548.5	Sound shale bedrock		2	Re BXL	100% Rec	550										
16.5	End of Borehole															

RECORD OF BOREHOLE NO 5

WP 127-66-50 LOCATION Co-ords. 15,858,585 N; 960,484 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE July 9, 1973 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE Drill with tricone and BXL bits CHECKED BY

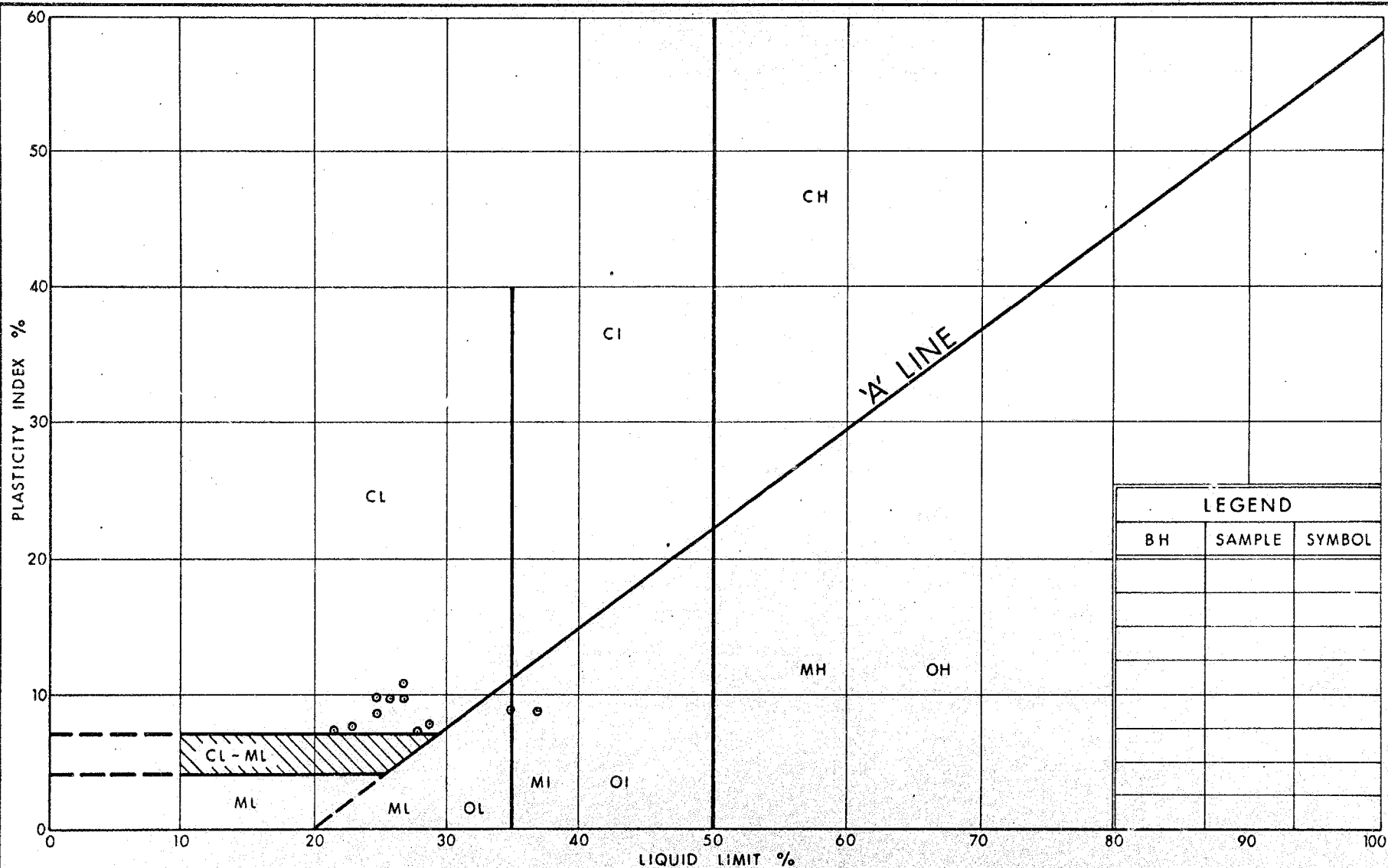
SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w			UNIT WEIGHT γ	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	w_p	w	w_L		
542.7	Ground Level															
0.0	Het.mix. of clayey silt with sand, trace of gravel (Glacial Till)		1	SS	56	540										
530.7	Hard		2	SS	102											
12.0	Brown		3	SS	115											
528.7	Grey		4	SS	110											
14.0	Weathered		5	BXL	70%											
525.7			6	BXL	50%											
17.0	Sound		7	BXL	95%											
	Shale Bedrock		8	BXL	Rec 80%											
			9	BXL	95%											
512.2			10	BXL	90%											
30.5	End of Borehole					510										

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO
ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 6

W.P. 127-66-50 LOCATION Co-ords. 15,858,614 N; 960,582 E. ORIGINATED BY VK
 DIST 6 HWY 403 BORING DATE July 6, 1973 COMPILED BY VK
 DATUM Geodetic BOREHOLE TYPE Drill with Tricone and EXL bits 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 γ	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	W_P	W	W_L		
545.0	Ground Level															
0.0	Het. mix. of clayey silt with sand, trace of gravel (Glacial Till)		1	SS	54											
			2	SS	58											
			3	SS	74											
531.5	Hard	Brown	4	SS	102											
13.5		Grey	5	SS	122											
528.0			6	SS	100											
17.0	Weathered		7	BXL	90%											
525.7																
19.3	Sound															
520.5	Shale Bedrock		8	BXL	70%											
24.5	End of Borehole															



LEGEND		
BH	SAMPLE	SYMBOL



Ministry of
Transportation and
Communications

Ontario

ENGINEERING SERVICES BRANCH

PLASTICITY CHART GLACIAL TILL HET. MIX. OF CLAYEY SILT, SAND & GRAVEL

FIG No 1

W P 127-66-50

CLAY & SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse

Fine

Medium

Coarse

Fine

Coarse

270

200

100

60

0 :

0.

3.

10

8

4

3/

8/1

3/4

100

1

 $\frac{1}{2}$ "

2" 2

$1\frac{1}{2}'' 3$

11

1

100

90

80

70

60

50

40

30

20

10

1

PERCENT RETAINED

BH

SAMPLE

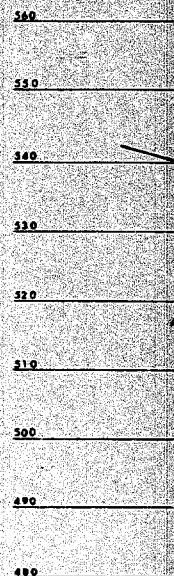
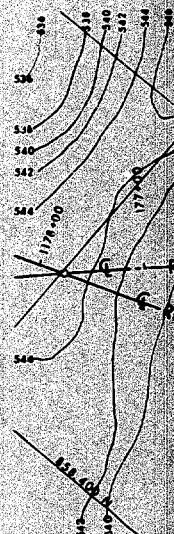
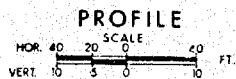
SYMBOL

FIG No 2

W P 127-66-50



ENGINEERING SERVICES BRANCH



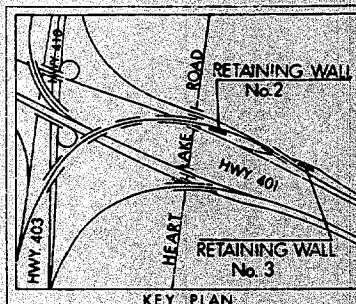
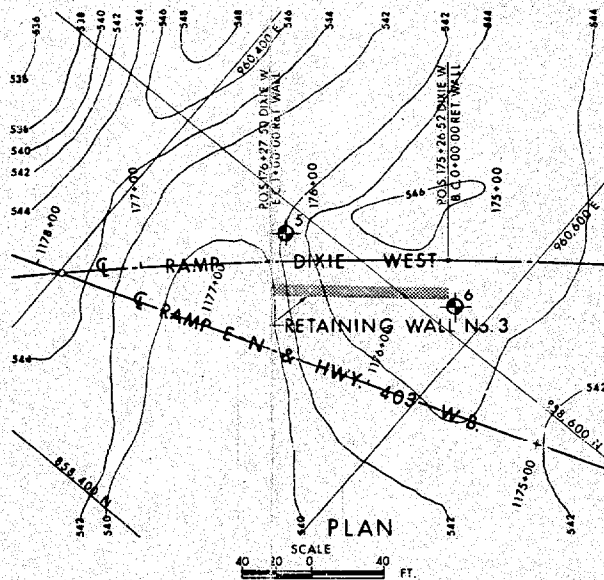
CONT No
WP No 127-66-50



RET. WALL NO. 2 & 3
HWY. 401 & 403

SHEET

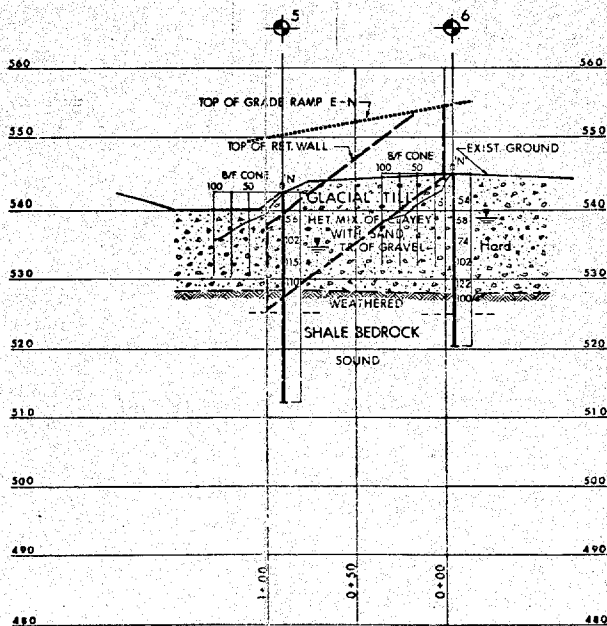
BORE HOLE LOCATIONS & SOIL STRATA



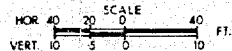
LEGEND

- ◆ Bore Hole
- ⊕ Dynamic Cone Penetration Test (Cone)
- ◆ Bore Hole & Cone
- N' Blows/ft (3rd Pen Test, 350 ft lbs energy)
- CONE Blows/ft (50" Cone, 350 ft lbs energy)
- ↓ W/L at time of investigation
B.H. No. 1 & 2 MAY 1976
B.H. No. 5 & 6 DEC. 1973

No	ELEVATION	CO-ORDINATES	
		NORTH	EAST
1	585.0	857.864	959.294
2	565.0	857.805	959.230
5	542.7	858.585	960.484
6	543.0	858.614	960.582



PROFILE



-NOTE-

The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence.

REVISIONS	DATE	BY	DESCRIPTION

HWY. No. 401 & 403
SUEMD V.L. CHECKED DATE 25 6 76 SITE
DRAWN C.L. CHECKED DATE 25 6 76 DWS 1276650A

GEOGRAPHIC No. 2012-116

DIST. 2 REGION CENTRAL

W.P. No. 107-66-56

CONT. No. 78-121

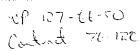
W.C. No. _____

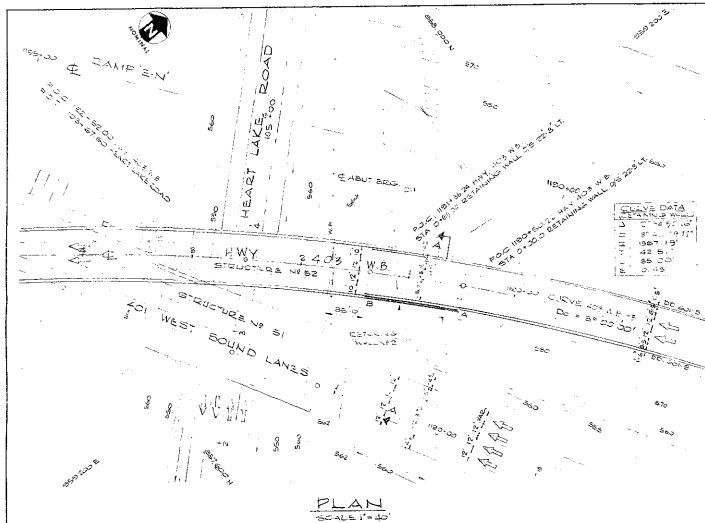
STR. SITE No. 24K22 AND 24K23

HWY. No. _____

LOCATION STANLEY WALLS, N. 2

AND # 3





GENERAL NOTES

- CLASS OF CONCRETE
RET. WALL 3000 P.S.I.
BARRIER 3000 P.S.I.
BARRIER W. 5000 P.S.I.
- CLEAR COVER TO REINFORCING STEEL
RET. WALL 3"
BARRIER W. 1 1/2"
- REINFORCING STEEL SHALL BE HARD GRADE (650)

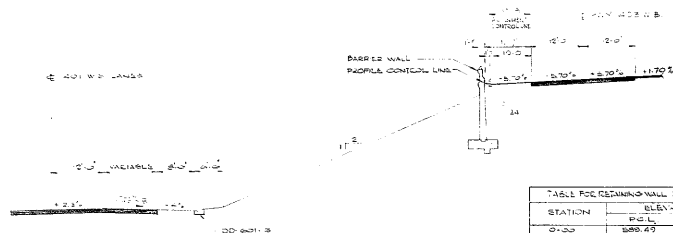
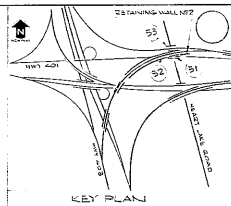
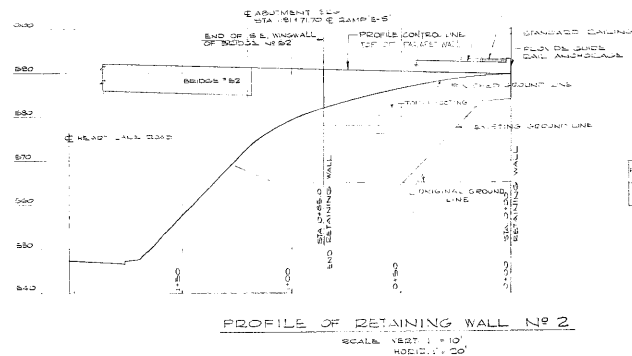


TABLE FOR RETAINING WALL ELEVATIONS		
STATION	ELEVATIONS	
	RET. WALL	BARRIER WALL
0+00	850.45	850.25
0+10	850.65	850.25
0+20	850.85	850.25
0+30	850.00	850.25
0+40	850.17	850.25
0+50	850.74	850.25
0+60	850.97	850.25
0+70	850.67	850.25
0+80	850.13	850.25
0+90	850.74	850.25
0+00	850.74	850.25

SECTION A-A



- LIST OF DRAWINGS
- GENERAL NOTES
 - RETAINING WALL NO. 2
 - CONCRETE BARRIER WALLS TO RETAINING WALL NO. 2
 - TRUCK WEIGHTS - SINGLE TRUCK
 - GENERAL DRAWINGS
 - RETAINING WALL NO. 2
 - STANDARD DETAILS

CONCRETE QUANTITIES
CONCRETE FOR BARRIER WALL 10 CY
CONCRETE FOR RETAINING WALL 45.0 CY

PRINT RECORD
NO. 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

POINT	STATION	NORTH	EAST	W. B. 401	W. B. 401	W. B. 401
A	0+00.00	850.45	850.25	850.45	850.25	850.45
B	0+05.00	850.65	850.25	850.65	850.25	850.65

REVISION	DATE	BY	CHKD	DESCRIPTION
1	10/1/80	J. J. J.	J. J. J.	REVISION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO
FOUNDATION OF CANADIAN ENGINEERING
CORPORATION LIMITED

RETAINING WALL No. 2
KIND'S HIGHWAY No. 401
SECTION OF ROAD
CITY OF MISSISSAUGA
JOB NO. 101
CON. E.E.

GENERAL DRAWING			
APPROVED	DESIGNED	CONTRACT No.	DATE
BY: J. J. J.	BY: J. J. J.	127-66-50	10/1/80
DRWING: J. J. J.	CHKD: J. J. J.	DATE: 10/1/80	SHEET 1

FOR REDUCED PLAN

