

DOCUMENT MICROFILMING IDENTIFICATION

G.I.-30 SEPT. 1976

GEOCRES No. 30M12-82

DIST. 6 REGION Central

W.P. No. 127-66-09

CONT. No. 76-120

W. O. No. 73-11046

STR. SITE No.                     

HWY. No.                     

LOCATION Hwy 403 Ramps-E  
Over Hwy. 401 E.B. Sub-Coll. &  
Heart Lake Rd.

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. § 3

REMARKS: documents to be  
unfolded before microfilming

# FOUNDATION INVESTIGATION REPORT

For

Bridge No. 42

The Proposed Hwy. #405 Ramp S-E

Structure at the Crossing of

Hwy. #401 E.B. Sub-Collector & Heart Lake Road

Town of Mississauga, County of Peel

District #6 (Toronto, Ont.)

M.C. 75-11016

M.P. 127-66-09

## 1. INTRODUCTION:

The present proposals for the construction programme of Hwy. #401-Hwy. #405 complex will require a major interchange in the vicinity of the intersection of Hwy. #401 and Heart Lake Road. This interchange, designated as 401/410/405 complex, will incorporate some twenty-one structures.

A request for a foundation investigation at the site of the proposed Bridge #42 (Hwy. #405 Ramp S-E, over Hwy. #401 E.B. Sub-Collector and Heart Lake Road) was received from Mr. G. C. E. Burkhardt, Regional Structural Planning Engineer, in a memorandum dated June 6, 1973.

Following this request, a field investigation was carried out by the Foundations Office to determine the subsoil, bedrock and groundwater conditions existing at the site.

This report contains the results of this investigation and our recommendations pertaining to the design of the proposed structure foundations and the stability of the approach fills and cuts.

## 2. DESCRIPTION OF THE SITE AND GEOLOGY:

The site of the proposed structure is located about 1 mile east of the existing Hwy. #401 & Hwy. #10 interchange,

in the Town of Mississauga.

Topographically, 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 containing large amounts of shale and limestone. The overburden is underlain by dark grey shale bedrock of the Meaford-Dundas Formation.

### 3. FIELD AND LABORATORY INVESTIGATION PROCEDURES:

A total of six sampled boreholes was carried out during the course of the field work. Boring was achieved by means of a conventional diamond drilling equipment adapted for soil sampling purposes. During the field work, disturbed samples were obtained by means of a standard split-spoon sampler; the energy used in driving it conformed to the requirements of the Standard Penetration Test (SPT).

The bedrock was proven at all borehole locations using BHL rock coring equipment.

All boreholes were surveyed in the field by District #6 (Toronto) Construction Personnel. The locations referenced to a coordinate system and elevations referenced to Geodetic Datum are shown on Drawing No. 73-11046A which accompanies this report.

All samples were visually examined and classified at the site as well as in the laboratory. Following this inspection, laboratory tests were carried out on selected samples to determine the following engineering properties:

Natural Moisture Content

Atterberg Limits

Grain-Size Distribution

The test results are summarized on the Record of Borehole sheets contained in the Appendix of this paper.

#### 4. SOIL TYPES AND SOIL CONDITIONS:

##### 4.1) General:

Generally uniform subsoil conditions were found to prevail over the site area. The subsoil consists of a relatively shallow deposit ranging in thickness from 6 to 7 ft. of glacial till which is a heterogeneous mixture of clayey silt, some sand and trace of gravel, followed by shale bedrock.

The boundaries of the different deposits are shown on the Record of Borehole sheets attached to the Appendix. The estimated stratigraphical profile of Drawing #73-11046A is based upon this information.

From ground level downward, the various strata are described in some detail with regard to soil types and physical properties as follows:

##### 4.2) Heterogeneous Mixture of Clayey Silt to Silty Clay, Some Sand and Trace of Gravel (Glacial Till):

This deposit was intersected in all borings and extends from immediately below a thin layer of topsoil down to the bedrock surface. The thickness of the stratum ranges from 6 to 7 ft. The lower boundary was found to vary between elevation 556.5 (B.H. #6) and elevation 562.5 (B.H. #2).

The material in the stratum consists of clayey silt to silty clay, some sand and trace of gravel.

Laboratory tests carried out on a limited number of samples indicate the following physical properties:



	<u>Min.</u> - <u>Max.</u>	<u>Average</u>
Natural Moisture Content (%)	10 - 19	14
Liquid Limit (%)	28 - 44	38
Plastic Limit (%)	21 - 27	24

Grain-size distribution curves for the samples of this glacial till stratum are plotted in an envelope form on Figure 1 of the Appendix.

Standard penetration tests carried out within this cohesive deposit gave 'N' values ranging from 28 to over 100 blows per foot.

The consistency of the overall deposit is estimated to be in the range of very stiff to hard.

#### 4.5) Bedrock - Shale:

The glacial till deposit is underlain by a shale bedrock at all of the boring locations. The surface of the bedrock varies between elevation 562± and elevation 556±.

The core recovery ranged from 30% to 100% at the borehole locations. Based on the core recovery and inspection of the core samples the upper 2 to 10 ft. portion of the bedrock appeared to be weathered.

The bedrock is composed of dark grey interbedded shale and limestone.

#### 5. GROUNDWATER CONDITIONS:

Groundwater level observations were carried out during the period of the field investigation, in open boreholes. The observed water levels are presented on the individual Record of Borehole sheets as well as on Drawing No. 73-11046A. The results indicate that the groundwater level varies between elevation 559± and elevation 560±, which correspond to levels ranging from 3 to 10 ft. below the existing ground surface.

No artesian or downward drainage conditions were encountered.

## 6. DISCUSSION AND RECOMMENDATIONS:

### 6.1) General:

It is proposed to build a three-span (100'-140'-100') overpass structure at this location. This structure (Bridge #42) or Ramp S-E will carry the traffic over the reconstructed Hwy. #401 E.B. sub-collector and Heart Lake Road.

Bridge #42 will be part of the proposed Hwy. #401 and Hwy. #405 interchange complex.

The proposed profile grade of Heart Lake Road in the vicinity of the structure will be at approximate elevation 530±. The proposed profile grade of Ramp S-E varies between elevation 565 and elevation 578. The elevation of the existing ground level ranges from elevation 569± to elevation 563±. In order to accommodate these grades, fills up to 10 ft. and cuts up to 40 ft. will be required.

As described in the previous paragraphs of this report, the subsoil at the site consists of a relatively shallow deposit (6 - 7 ft.) of glacial till, followed by shale bedrock.

### 6.2) Foundations - Ramp S-E Structure:

#### 6.2.1) Abutments:

##### (i) West Abutment:

The abutment of the proposed structure may be supported on spread footings placed on well compacted, suitable granular material within the approach fills. A safe design load of 2.5 t.s.f. may be assumed. The granular material should consist of Granular 'A' and should be fully compacted according to current standards. A detailed construction scheme is outlined on Figure 2 of the Appendix.

As an alternative the west abutment for this structure may be perched within the approach fills and supported on end-bearing steel 'H' piles driven to bedrock. The allowable capacity of a pile will be dependent on the pile section chosen. For example, 12 EP 74 steel 'H' piles may be designed for a safe design load of 95 tons. For estimating purposes, it can be assumed that the piles will meet the bedrock surface at the following elevations:

West Abutment: El. 560± - El. 562± (B.H.'s #1 & #2)

Since the pile caps of the perched abutments will be formed within the approaches, no dewatering problems are anticipated.

No boulder or rock fill material should be placed in that portion of the approaches through which piles are to be driven.

(ii) East Abutment:

The footing of the proposed east abutment may be founded on the sound bedrock. The base of the footing excavation should be carefully inspected to ensure that all the probable weathered or fractured part of the shale bedrock is removed. Frost protection (min. 4 ft.) should be provided for the underside of the footings, since the shale is considered susceptible to frost action. To prevent the shale from being softened by uncontrollable surface runoff water at foundation level, it may be advantageous that a concrete working slab be poured immediately after the excavation reached the required foundation level. If these procedures are followed, safe design loads up to 10 t.s.f. may be used for design purposes.

A coefficient of friction of 1.0 between the rough concrete surface and sound shale may be assumed in order to compute the horizontal resistance of the footings.

The settlement of the footings will be negligible in magnitude.



The level of the groundwater in the overburden as established during the field investigation is well above the footing excavation base. This condition, however, should not present any major dewatering problems, due to the relatively impervious nature of the subsoil. Any seepage into the excavation could be easily handled by employing conventional techniques, such as pumping from surps.

#### 6.2.2) Piers:

The excavation for the reconstruction of Heart Lake Road in the vicinity of the pier locations will be carried out into the sound shale bedrock.

The footings of the proposed piers may be founded on the sound bedrock. All the design recommendations given in section 6.2.1) (ii) for the east abutment footing should be applicable here. If those procedures are followed, safe design loads up to 10 t.s.f. may be used for design purposes.

#### 6.3) Approaches:

As described previously, the approaches will consist of partial fill and cut sections. The maximum fill height is about 10 ft. and the deepest portion of the cut is in the order of 40 ft.

##### 6.3.1) Fills:

The underlying subsoil (Glacial Till) is competent to support the proposed 10 ft. high embankment constructed with 2:1 forward and side slopes.

The settlement due to consolidation of the subsoil caused by embankment loading will be negligible in magnitude and it is assumed that major portion of the settlement will take place immediately following the completion of the fill placement.

The fill should consist of well compacted acceptable material.



The topsoil and any soft surficial material should be removed in accordance with the pertinent standards within the construction area.

6.3.2) Cuts:

The cuts for Hwy. #401, up to 40 ft. deep, will be made through the glacial till and into the shale bedrock. The weathered shale, when it is exposed to air and frost action, tends to erode and disintegrate quickly. In view of this, the cuts in weathered shale should be treated as earth cuts, and the slopes in the glacial till as well as in weathered shale should be constructed with 2:1 slopes. However, the cuts in sound shale should be constructed as steep as 1:1 slopes.

7. MISCELLANEOUS:

The field investigation was carried out during the period of June 27 to July 6, 1973, under the supervision of Mr. V. Korlu, Project Foundations Engineer.

Equipment was owned and operated by Canadian Longyear Ltd.

This report was written by Mr. J. T. Bangs, Project Foundations Engineer.

The entire project was under the general supervision of Mr. M. Devata, Supervising Foundations Engineer, who also reviewed this report.

*J. T. Bangs*  
J. T. Bangs

*M. Devata*  
M. Devata, P. Eng.

JTB/ds  
August 30, 1973.

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

## RECORD OF BOREHOLE NO 1

JOB 73-11046

LOCATION Co-ords. 15,856,948 N; 959,661 E.

ORIGINATED BY VK

W.P. 127-66-09

BORING DATE June 27, 1973

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Drill with tricone and BXL Bit

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT _____ $w_L$ PLASTIC LIMIT _____ $w_p$ WATER CONTENT _____ $w$ $w_p$ — $w$ — $w_L$			BULK DENSITY $\gamma$ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F.			WATER CONTENT % 20 40 60				
							○ UNCONFINED ● QUICK TRIAXIAL	+ FIELD VANE x LAB VANE						
568.5	Ground Level													
0.0	Het. mix. of silty clay trace of sand & grav Brown - Grey		1	SS	10	560								
560.7	Stiff to Hard		2	SS	169.9"									
7.8	Grey		3	BXL	no rec.									
			4	SS	100.7"									
			5	BXL	no rec.									
551.5	Weathered		6	SS	100.7"	550								
17.0	Sound		7	BXL	rec. 100%									
542.6	Shale Bedrock		8	BXL	rec. 100%									
25.9	End of Borehole					540								

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

## RECORD OF BOREHOLE NO 2

JOB 73-11046

LOCATION Co-ords. 15,856,926 N; 959,695 E.

ORIGINATED BY VK

W.P. 127-66-09

BORING DATE June 28, 1973

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Drill with tricone and BXL Bits

 CHECKED BY *AK*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT _____ $w_L$ PLASTIC LIMIT _____ $w_p$ WATER CONTENT _____ $w$ $w_p$ $w$ $w_L$			BULK DENSITY $\gamma$ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED      + FIELD VANE ● QUICK TRIAXIAL      x LAB VANE			WATER CONTENT % 20      40      60				
569.5	Ground Level													
0.0	Het. mix. of silty clay, trace of sand & gravel Very Stiff to Hard		1	SS	29	560								2 10 62 26 560.0
562.5	Brown to Grey		2	SS	169/7"									
7.0	Grey		3	BXL	no Rec.									
554.5	weathered		4	BXL	No Rec.	550								
15.0	Sound		5	BXL	70% Rec.									
547.5	Shale Bedrock													
22.0	End of Borehole					540								

OFFICE REPORT ON SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

 RECORD OF BOREHOLE N<sup>o</sup>3

JOB 73-11046

LOCATION Co-ords. 15,857,017 N; 959,737 E.

ORIGINATED BY VK

W.P. 127-66-09

BORING DATE July 3, 1973

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Drill with tricone and BXL Bits

 CHECKED BY *[Signature]*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT				LIQUID LIMIT $w_L$ PLASTIC LIMIT $w_p$ WATER CONTENT $w$				BULK DENSITY $\gamma$ P.C.F. GR SA. SI. CL	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE				WATER CONTENT % $w_p$ $w$ $w_L$ 20 40 60					
567.7	Ground Level															
0.0	Het. mix. of silty clay trace of sand & gravel		1	SS	52	560									5 6 GL 2 560.2	
560.7	Hard. Brown-Grey		2	SS	72											
7.0	Grey		3	SS	100-130											
556.2	weathered		4	BXL	Rec.											
11.5	sound		5	BXL	90% rec.											
549.8	Shale Bedrock					550										
17.9	End of Borehole															
						540										



DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

## RECORD OF BOREHOLE NO 4

JOB 73-11046

LOCATION Co-ords. 15,857,127 N; 959,827 E.

ORIGINATED BY VK

W.P. 127-66-09



BORING DATE July 4, 1973

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Drill with tricone and BXL Bits

CHECKED BY

SOIL PROFILE		STRAT. PLOT	SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT				LIQUID LIMIT $w_L$ PLASTIC LIMIT $w_p$ WATER CONTENT $w$			BULK DENSITY $\gamma$ P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION		NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED      + FIELD VANE ● QUICK TRIAXIAL    x LAB VANE				WATER CONTENT % $w_p$ $w$ $w_L$ 20      40      60					
564.4	Ground Level															
0.0	Het. mix. of silty clay trace of sand & gravel		1	SS	50	560										560.4
557.9	Hard Brown-Grey		2	SS	126	540										1 5 72 22
6.5	Grey															
554.4	Weathered		3	BXL	60% rec.											
10.0	Sound															
	Shale Bedrock		4	BXL	100% rec.	550										
546.4																
13.0	End of Borehole					540										

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

## RECORD OF BOREHOLE NO 5

JOB 73-11046

LOCATION Co-ords. 15,857,187 N; 959,911 E.

ORIGINATED BY VK

W.P. 127-66-09

BORING DATE July 5, 1973

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Drill with tricone and BXL Bits

 CHECKED BY *[Signature]*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$			BULK DENSITY $\gamma$ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE			$w_p$ — $w$ — $w_L$ WATER CONTENT % 20 40 60				
563.1	Ground Level													
0.0	Het. mix. of clayey silty to silty clay with some traces of gravel.		1	SS	46	560								8.26 lb 2
557.1	Hard. Brown-Grey		2	SS	100	550								559.1
6.0	Grey													
554.2	weathered		3	BXL	56%									
8.2	sound													
	Shale Bedrock		4	BXL	100%									
546.6														
16.5	End of Borehole					540								

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

## RECORD OF BOREHOLE NO 6

JOB 73-11046

LOCATION Co-ords. 15,857,215 N; 959,880 E.

ORIGINATED BY VK

W.P. 127-66-09

BORING DATE July 5, 1973

COMPILED BY VK

DATUM Geodetic

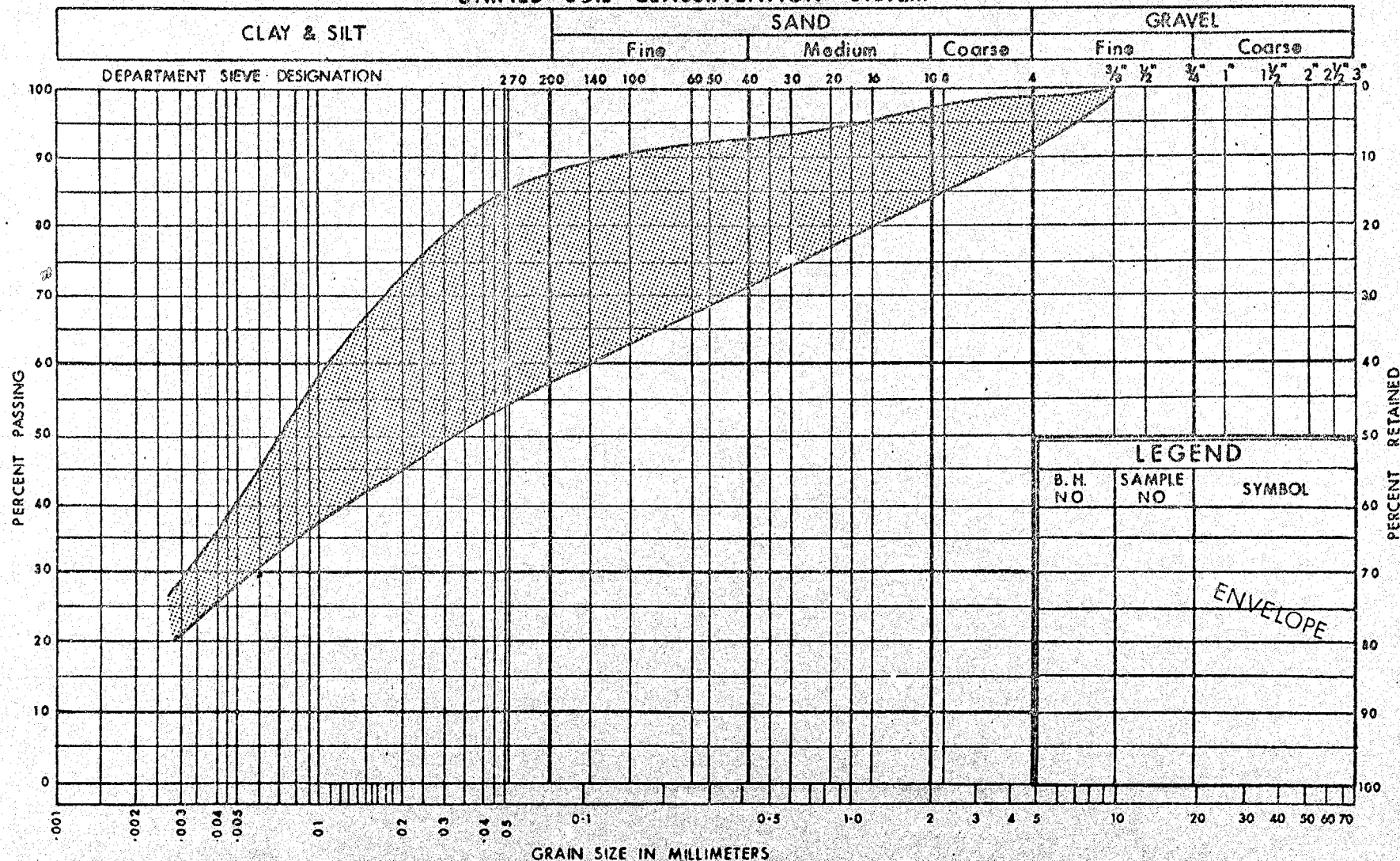
BOREHOLE TYPE Drill with tricone and BXL Bits

CHECKED BY *[Signature]*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — $w_L$			BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT					PLASTIC LIMIT — $w_p$				
562.9	Ground Level						SHEAR STRENGTH P.S.F.					$w_p$ — $w$ — $w_L$				
							○ UNCONFINED + FIELD VANE					WATER CONTENT %				
							● QUICK TRIAXIAL × LAB VANE					20 40 60				
0.0	Het. mix. of clayey silt with sand, trace of gravel.		1	SS	58	560										559.9
556.5	Hard. Brown-Grey															33 39 19
6.1	Grey															
553.0	weathered		2	BXL	rec. 30%											
9.9	sound															
546.6	Shale Bedrock		3	BXL	Rec. 100%	550										
16.3	End of Borehole															
						540										



# UNIFIED SOIL CLASSIFICATION SYSTEM



DEPARTMENT  
OF  
TRANSPORTATION AND COMMUNICATIONS



DESIGN SERVICES  
BRANCH

# GRAIN SIZE DISTRIBUTION GLACIAL TILL

HET. MIX. OF CLAYEY SILT TO SILTY CLAY, WITH SAND,  
TRACE OF GRAVEL

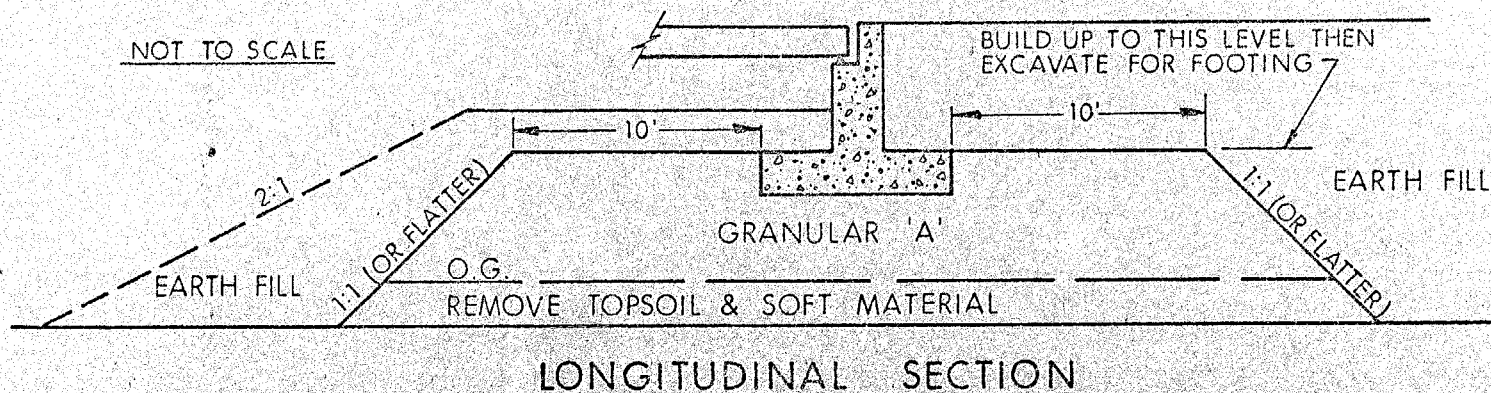
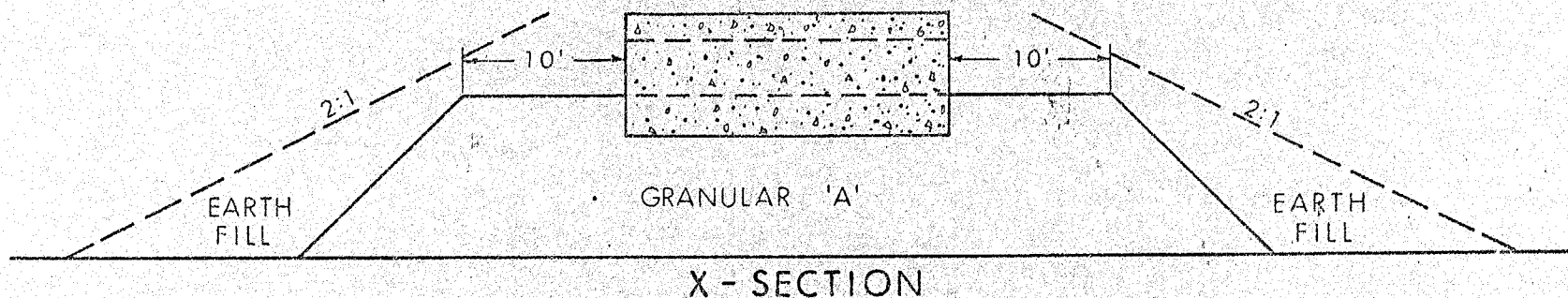
W.P. No. 127-66-09

JOS No. 73-11046

FIG. 1

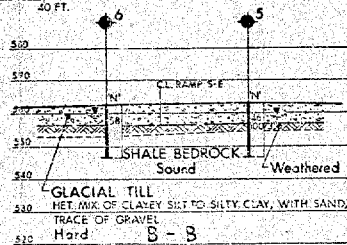
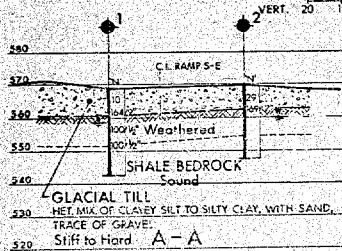
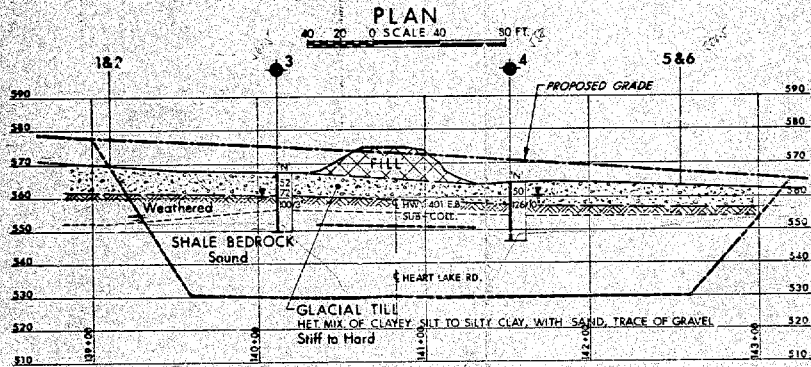
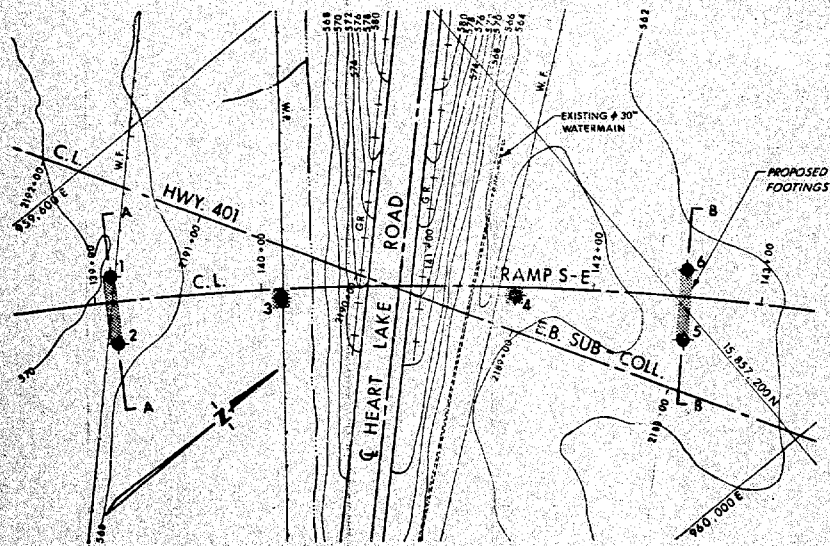


# ABUTMENT ON COMPACTED FILL SHOWING GRANULAR 'A' CORE



## NOTES

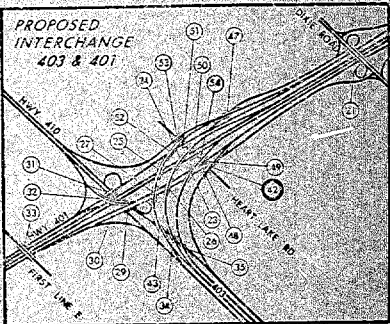
- 1 - REMOVE TOPSOIL & /OR SOFT SUBSOIL UNDER AREA OF COMPACTED GRANULAR 'A'.
- 2 - PLACE GRANULAR 'A' TO TOP OF FOOTING LEVEL, COMPACTED ACCORDING TO CURRENT M.T.C. STANDARDS.
- 3 - EXCAVATE COMPACTED GRANULAR 'A' MATERIAL FOR FOOTING



### SECTIONS

20 10 20 40 FT. 0 SCALE 40

### PROPOSED INTERCHANGE 403 & 401



### LEGEND

- ◆ Bore Hole
- ⊕ Cone Penetration Test
- ◆ Bore Hole & Cone Test
- ⬆ Water Levels established at time of field investigation June & July 1973

NO.	ELEVATION	CO-ORDINATES	
		NORTH	EAST
1	568.3	15,856,940	959,461
2	569.3	15,856,926	959,495
3	567.7	15,857,017	959,737
4	564.4	15,857,127	959,827
5	563.1	15,857,187	959,911
6	562.9	15,857,215	959,880



### NOTE

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

### CONTRACT DOCUMENT NOTE

The complete soil investigation report for this structure may be examined at the Structural and the Foundations Office, Downsview, and at the Toronto District Office.

DATE	BY	DESCRIPTION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO  
DESIGN SERVICES BRANCH-FOUNDATIONS OFFICE

BRIDGE No. 42  
HWY. 403 RAMP S-E OVER HWY. 401 E.B. SUB-COLL  
& HEART LAKE ROAD

HIGHWAY NO. 403 DIST. NO. 6

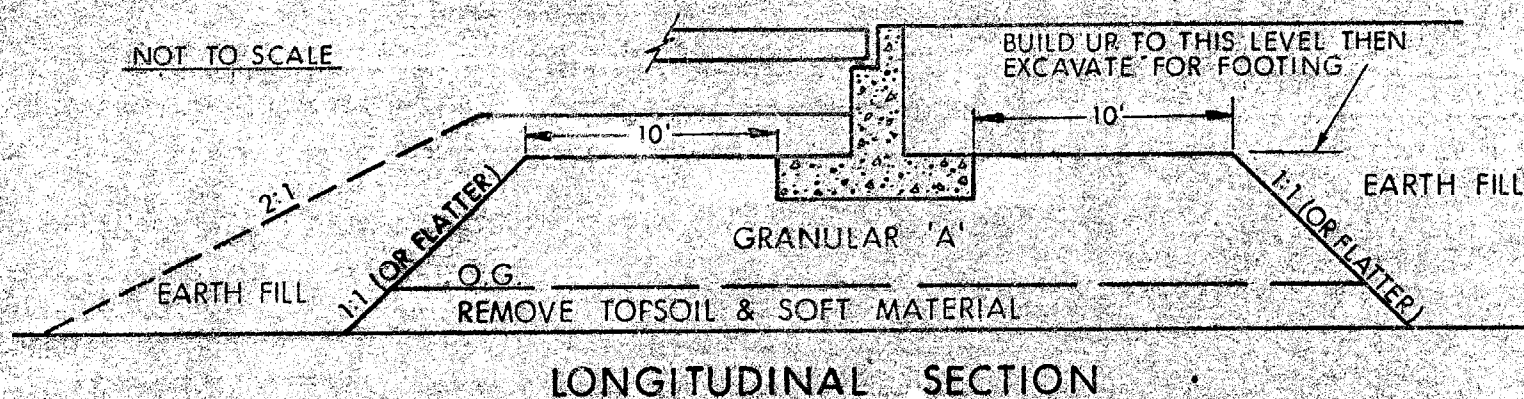
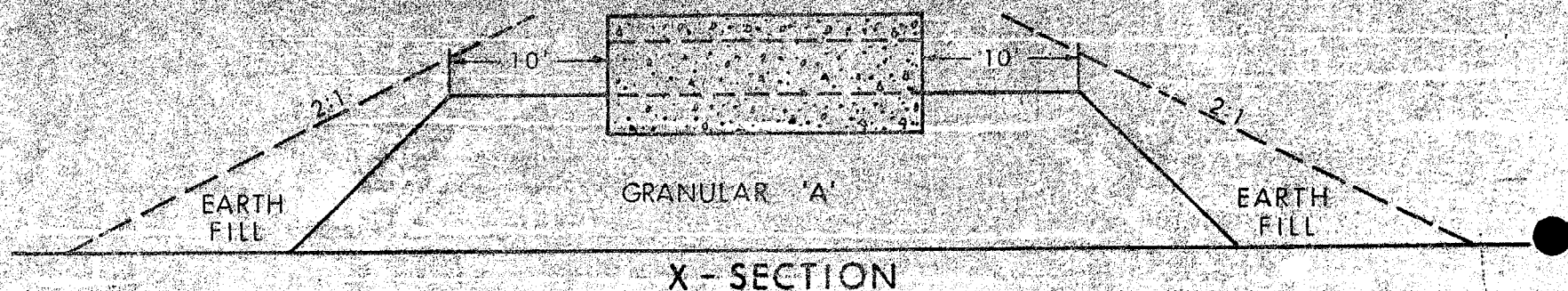
CO. PEEL

TOWN OF MISSISSAUGA LOT CON

BORE HOLE LOCATIONS & SOIL STRATA

SUSWD V.K.	CHECKED 7/73	WF NO. 127-66-19	DRAWING NO.
DRAWN J.P.	CHECKED 7/73	WF NO. 75-110-16	73-11046A
DATE SEPTEMBER 6, 1973	SITE NO.		BRIDGE DRAWING NO.
APPROVED [Signature]	ONT. NO.		

# ABUTMENT ON COMPACTED FILL SHOWING GRANULAR 'A' CORE



## NOTES

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



73-11046

## MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

## MEMORANDUM

TO: Mr. A. G. Stermac,  
Principal Foundation Engineer,  
West Building.

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

ATTENTION: Mr. M. Devata

DATE: June 6, 1973.

OUR FILE REF.

IN REPLY TO

SUBJECT: Ramp S-E Over Hwy. 401 E.B.  
Sub-Collector and Heart Lake Road,  
Bridge #42,  
Site 24-317; W.P. 127-66-09A,  
District 6, Toronto.

The above structure is a part of the Highway 401/403 interchange as covered by W.P. 127-66-01. The location of the structure is shown on the attached "Scheme of Interchange".

You are requested to carry out the foundation investigation and prepare the Report (due date September 26, 1973).

Attached are also two copies of Fenco Drawing #3983-3K-12, on which the following information is shown:

- a) Proposed structure type of bridge and footing location (marked in red).
- b) Profiles of Intersecting roads.
- c) Co-ordinates of control points and road alignment.

The location of footings is tight to the centreline of Heart Lake Road given by the azimuth and co-ordinated point #1, marked in green on the drawing.

The approximate location of the existing 30"Ø watermain is also shown on the drawings. This is the only underground utility in this area according to the information available.

MAA:lc  
Attach.

SEP. 26/73

M. A. Almer, *M. A. Almer*  
STRUCTURAL PLANNING ENGINEER,  
for:  
G. C. E. Burkhardt,  
REG. STRUCTURAL PLANNING ENG.

3097

c.c. W. Roters  
J. Barciay  
R. Fitzgibbon  
J. Anderson

MOD. SEP 26, 1973 ✓



## MEMORANDUM

TO: Mr. A. G. Stermac,  
Principal Foundation Engineer,  
West Building.

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

ATTENTION: Mr. M. Devata

DATE: June 6, 1973.

OUR FILE REF.

IN REPLY TO

SUBJECT: Ramp S-E Over Hwy. 401 E.B.  
Sub-Collector and Heart Lake Road,  
Bridge #42,  
Site 24-317; W.P. 127-66-09, *HL*  
District 6, Toronto.

The above structure is a part of the Highway 401/403 interchange as covered by W.P. 127-66-01. The location of the structure is shown on the attached "Scheme of Interchange".

You are requested to carry out the foundation investigation and prepare the Report (due date September 26, 1973).

Attached are also two copies of Fenco Drawing #3983-3K-12, on which the following information is shown:

- a) Proposed structure type of bridge and footing location (marked in red).
- b) Profiles of Intersecting roads.
- c) Co-ordinates of control points and road alignment.

The location of footings is tight to the centreline of Heart Lake Road given by the azimuth and co-ordinated point #1, marked in green on the drawing.

The approximate location of the existing 30"Ø watermain is also shown on the drawings. This is the only underground utility in this area according to the information available.

MAA:lc  
Attach.

SEP. 26/73

*M. A. Almer*  
M. A. Almer,  
STRUCTURAL PLANNING ENGINEER,  
for:  
G. C. E. Burkhardt,  
REG. STRUCTURAL PLANNING ENG.

c.c. W. Roters  
J. Barclay  
R. Fitzgibbon  
J. Anderson



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MAA:lc  
Attach.

SEP 26/73

M. A. Almer, *M. A. Almer*  
STRUCTURAL PLANNING ENGINEER,  
for:

G. C. E. Burkhardt,  
REG. STRUCTURAL PLANNING ENG.

c.c. W. Roters  
J. Barclay  
R. Fitzgibbon  
J. Anderson

DOCUMENT VERIFICATION / CERTIFICATION

GEOCRES No. 30 H12-82

DIST. 6 REGION CENTRAL

W.P. No. 127-66-09

CONT. No. 76-120

W. O. No. 73-110.46

STR. SITE No. \_\_\_\_\_

HWY. No. \_\_\_\_\_

LOCATION HWY 403 RMH S-E

OVER HWY 401 E.B. SUB-COLL. AND

HEART LATE RD.

OVERSIGHT DOCUMENTS TO BE INCLUDED WITH THIS REPORT 3

REMARKS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

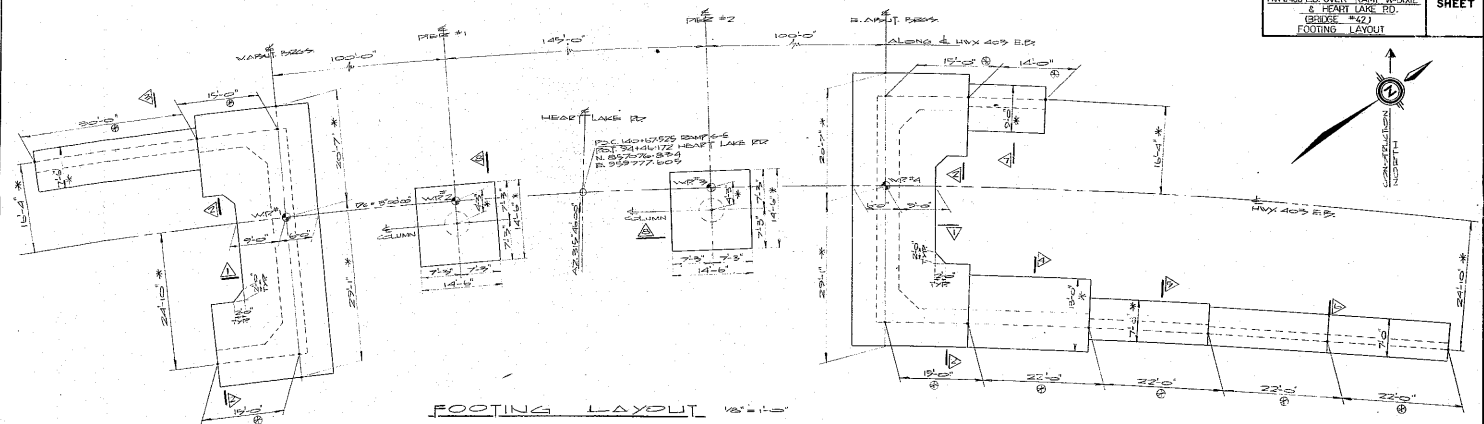
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MINISTRY OF TRANSPORTATION AND COMMUNICATIONS INTERIOR 28-28-15 4-75

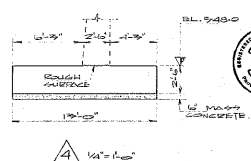
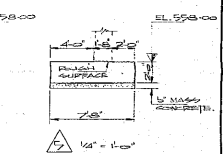
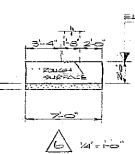
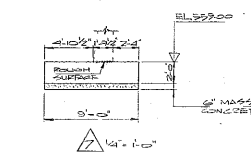
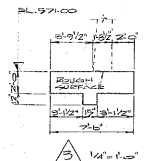
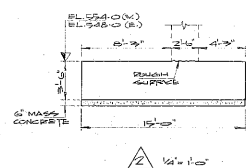
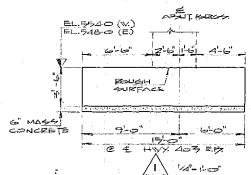
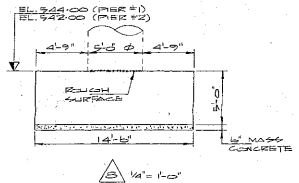
30M12-82

CONT No	WP No	127-66-09	SHEET
HWY 403 E.B. OVER RAMP W/OVIE & HEART LAKE RD.			
BRIDGE #30			
FOOTING LAYOUT			



FOOTING LAYOUT 1/8" = 1'-0"

- NOTE:
- 6" MASS CONCRETE & THE AREA OF ALL FOOTINGS TO BE LEFT EXPOSED UNDISTURBED MATERIAL PLACED IN MASS CONCRETE IMMEDIATELY AFTER EXCAVATION IS COMPLETED.
  - \* - INDICATES EXISTING DIMENSIONS.
  - @ - INDICATES DIMENSIONS PARALLEL TO & HWY 403 E.B.

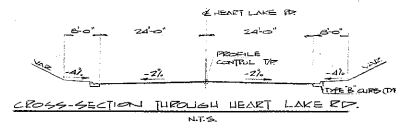
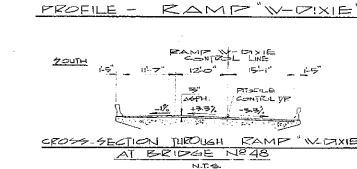
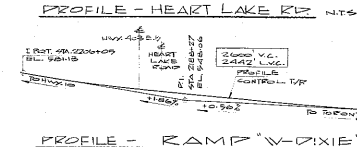
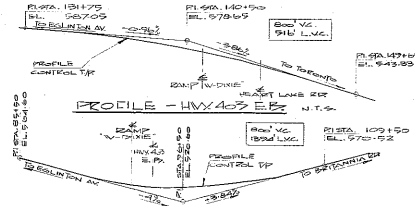
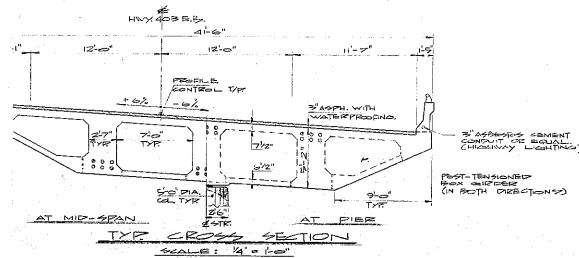
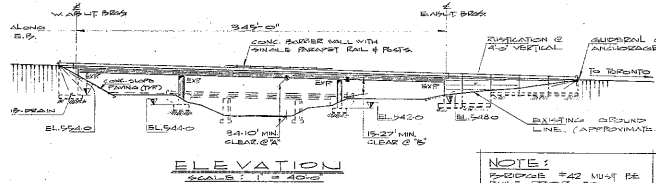
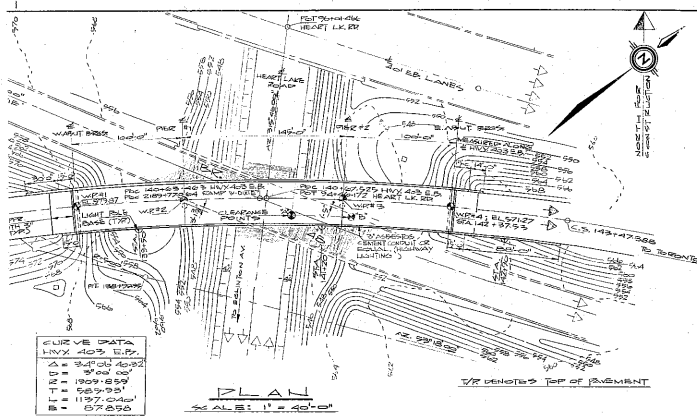


STATION	NORTH	EAST
W/P 1	138+72.53	888821.15
W/P 2	139+72.53	888821.17
W/P 3	141+57.53	888821.20
W/P 4	142+57.53	888821.22
PIER #1 (2 x 6' COLS)	888821.23	888821.23
PIER #2 (2 x 6' COLS)	888821.23	888821.23



FOR REDUCED PLAN  
1/8" SCALE GROUP  
1/8" = 1'-0"  
3 INCHES ON ORIGINAL PLAN

DATE BY	DESCRIPTION
DESIGN BY	CHECKED/LOADING
DRAWING BY	CHECKED/DATE



**CONCRETE QUANTITIES**

Concrete quantities are listed below for the approximate concrete lump sum tender items.

1. CONCRETE IN ABUTMENTS & WINGWALLS.	401 cu. yd.
2. CONCRETE IN RETAINING WALLS.	91 cu. yd.
3. CONCRETE IN DECK.	1448 cu. yd.
4. CONCRETE IN PIERS.	39 cu. yd.
5. CONCRETE IN BARRIER WALLS.	77 cu. yd.
6. CONCRETE IN APPROACH SLABS.	48 cu. yd.
7. CONCRETE IN SLOPE PAVING.	37 cu. yd.



FOR REDUCED PLAN



DIST. 6  
 CONT No  
 WP No 127-55-09

**HWY 403 OVER RAMP "W-DIXIE" & HEART LAKE RD. (BRIDGE #42) GENERAL LAYOUT**

**SHEET**

**KEY PLAN**

**GENERAL NOTES**  
**CLASS OF CONCRETE**  
 DECK, BARRIER WALLS & PIER COLUMNS: 5000 PSI  
 RETAINING: 5000 PSI

**REINFORCING STEEL CLEAR COVER**  
 FOOTINGS, ABUTMENTS & RETAINING WALLS: 5"  
 DECK - TOP: 2"  
 DECK - BOTTOM: 12"  
 PIER COLUMNS: 2"  
 SEE ALSO NOTES

**CONSTRUCTION NOTES**  
 THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE DECKING AND TO THE SPECIFIED ELEVATIONS WITH A TOLERANCE OF 1/8".  
 NO CONCRETE SHALL BE PLACED ABOVE THE ABUTMENT DECKING GRADE UNTIL THE CONCRETE IN THE DECK HAS BEEN PLACED, STEEL SET AND CONCRETE.

**NOTE:**  
 THE APPROACH SLABS, WATERPROOFING AND APPROACH ARE NOT PART OF THE BRIDGE - PORTION OF THE CONTRACT.

- LIST OF DRAWINGS:**
1. GENERAL LAYOUT.
  2. BORE HOLE LOCATIONS & SOIL STRATA.
  3. FOOTING LAYOUT.
  4. ABUTMENTS PER FOOTING REINFORCING.
  5. ABUTMENTS.
  6. PIERS & BEARINGS.
  7. RETAINING WALLS.
  8. DECK LAYOUT.
  9. TRANSVERSE - CABLE DETAILS.
  10. LENGTH - CABLE DETAILS.
  11. DECK REINFORCING.
  12. CONCRETE BARRIER WALL (2'-5" HIGH).
  13. STEEL BARREL RAILING (SINGLE TUBE).
  14. 20'FT APPROACH SLAB (BARRIER WALL).
  15. DETAILS OF CONC. SLOPE PAVING.
  16. AS. CONSTRUCTED ELEV. & DIM.
  17. STANDARD DETAILS I.
  18. STANDARD DETAILS II.
  19. STANDARD DETAILS III.
  20. ELECTRICAL EMBEDDED WORK I.
  21. ELECTRICAL EMBEDDED WORK II.
  22. ELECTRICAL CONSTRUCTION STANDARDS I.
  23. ELECTRICAL CONSTRUCTION STANDARDS II.

DATE	BY	DESCRIPTION
DESIGN	CHANCELLOR	LOADING #20-44
DRAWING	CHANCELLOR	DATE 10-2-57

30M12-82

DIST. 6 CONT No WP No 127-66-09	SHEET
HWY 403 OVER RAMP "V-DIXIE" HEART LAKE RD. BRIDGE GENERAL LAYOUT	
KEY PLAN	

### GENERAL NOTES

#### CLASS OF CONCRETE

DECK, 28 COMPRESSIVE STRENGTH : 5000 PSI  
PIER COLUMNS, RETAINING WALLS : 3000 PSI

#### REINFORCING STEEL CLEAR COVER

REINFORCING, ABUTMENTS & DETAILS OF DECK - TOP : 3"  
REINFORCING, ABUTMENTS & DETAILS OF DECK - BOTTOM : 1 1/2"  
PIER COLUMNS : 1 1/2"  
OR AS NOTED

#### CONSTRUCTION NOTES

THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE BRIDGE DECK TO THE SPECIFIED ELEVATIONS WITH A TOLERANCE OF 1/8".  
NEW CONCRETE SHALL BE PLACED ABOVE THE EXISTING BRIDGE DECK UNTIL THE CONCRETE IN THE DECK HAS BEEN PLACED, SET, CURED AND CEMENTED.

NOTE:  
THE APPROACH SLABS, WATERPROOFING AND ASPHALT ARE NOT PART OF THE BRIDGE PORTION OF THE CONTRACT.

#### LIST OF DRAWINGS

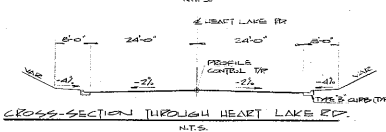
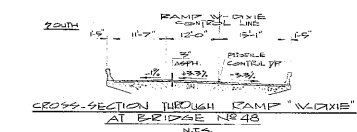
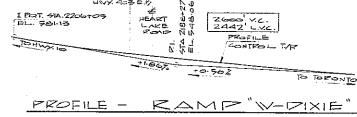
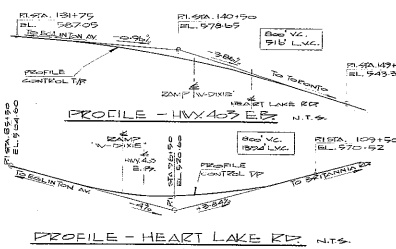
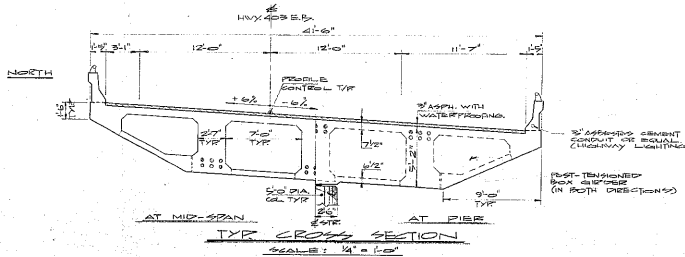
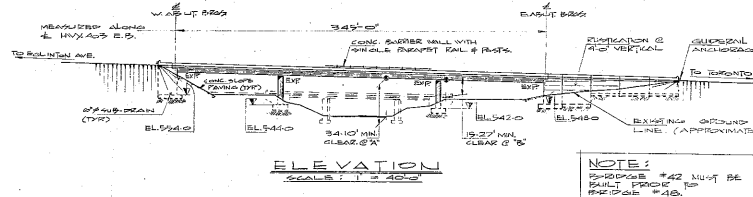
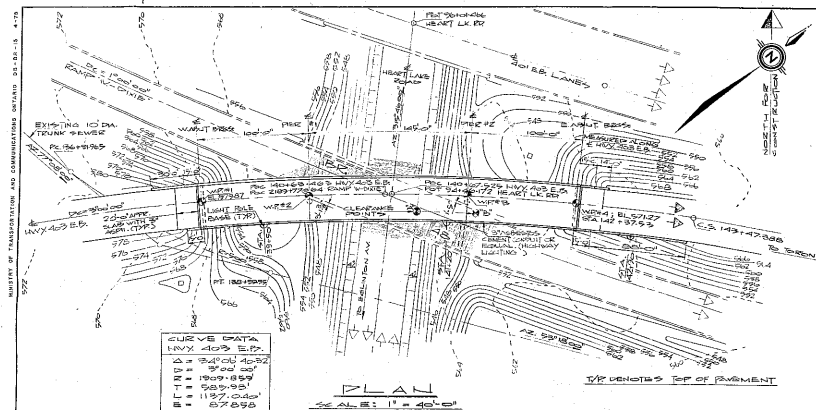
1. GENERAL LAYOUT
2. SOLE HOLE LOCATIONS & SOIL STRATA
3. FOOTING LAYOUT
4. ABUTMENT & PIER FOOTING REINFORCING
5. ABUTMENTS
6. PIERS & BEARINGS
7. RETAINING WALLS
8. DECK LAYOUT
9. TRANSVERSE - CABLE DETAILS
10. LONGIT. - CABLE DETAILS
11. DECK REINFORCING
12. CONCRETE BARRIER WALL, (2'-6" HIGH)
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14. 20FT APPROACH SLAB, (BARRIER WALL)
15. DETAILS OF CONC. SLOPE PAVING
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17. STANDARD DETAILS I
18. STANDARD DETAILS II
19. STANDARD DETAILS III
20. ELECTRICAL EMBEDDED WORK I
21. ELECTRICAL EMBEDDED WORK II
22. ELECTRICAL CONSTRUCTION STANDARDS I
23. ELECTRICAL CONSTRUCTION STANDARDS II



FOR REDUCED PLAN

USE SCALE BELOW  
1" = 30' HORIZ. DIM.  
1" = 3' VERT. DIM.  
1" = 3' HORIZ. DIM. ON ORIGINAL PLAN

DATE	BY	DESCRIPTION
DESIGN	C.A. 1433	DESIGN
DRAWING	C.A. 1433	DRAWING



#### CONCRETE QUANTITIES

CONCRETE QUANTITIES ARE LISTED BELOW FOR THE BRIDGE PORTION OF THE CONTRACT.

- |                                       |             |
|---------------------------------------|-------------|
| 1. CONCRETE IN ABUTMENTS & WINGWALLS. | 401 cu. yd. |
| 2. CONCRETE IN RETAINING WALLS.       | 91 cu. yd.  |
| 3. CONCRETE IN DECK.                  | 146 cu. yd. |
| 4. CONCRETE IN PIERS.                 | 39 cu. yd.  |
| 5. CONCRETE IN BARRIER WALLS.         | 77 cu. yd.  |
| 6. CONCRETE IN APPROACH SLABS.        | 48 cu. yd.  |
| 7. CONCRETE IN SLOPE PAVING.          | 37 cu. yd.  |

