

#67-F-202

W.P. #81-59

Hwy #401

DRAKE SIDE

ROAD

EXTRA COPY

D O M I N I O N S O I L I N V E S T I G A T I O N L I M I T E D

77 CROCKFORD BOULEVARD - SCARBOROUGH ONTARIO CANADA - TELEPHONE 751-6565

**NCH
QUEENS AVENUE
LONDON, ONTARIO
TELEPHONE GE. 3-3861**



FOUNDATION ENGINEERS

**ASSOCIATED COMPANY
SOIL TESTING AND ENGINEERING LTD.
84 BRENTFORD ROAD,
KINGSTON 5, JAMAICA, WEST INDIES
TELEPHONE: 68886**

Our Ref. No: 7-5-14

June 5, 1967.

**Department of Highways, Ontario,
Materials and Testing Division,
Downsview Avenue,
Downsview, Ontario.**

WP 81-59

**Attention: Mr. M. Devata, P.Eng.
Supervising Foundation Engineer**

**Re: Soil Investigation for Proposed
Crossing of Highway No. 401 and
Drake side road, District I,
Chatham, Ontario.**

Dear Sirs:

We have completed the soil investigation at the above site which has been carried out according to your verbal instructions and your letter of authorization dated, May 24, 1967. The factual information obtained during the investigation is attached and the procedures followed in the field are briefly described herein.

SCOPE OF INVESTIGATION:

The extent and objective of the investigation were discussed with you in your office on May 18, 1967, and it was agreed that from an earlier investigation carried out in 1960, sufficient information is available about the general sub-surface conditions and that the purpose of the present investigation should be to determine only the nature and

DOMINION SOIL INVESTIGATION LIMITED

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Department of Highways, Ontario,
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thickness of the desiccated crust in the area of the revised structure location. To obtain this information, five (5) additional boreholes were considered to be necessary and the depths of the boreholes was tentatively set to be 15 to 25 ft. In order to avoid confusion with the previous boreholes, the new boreholes were numbered from 5 to 9 inclusive.

METHOD OF INVESTIGATION:

The investigation was under the supervision of our engineer, Mr. V. Chan.

The boreholes in the field were laid out in accordance with your Plan No. E-4800-1 dated 1967, using the corners of the concrete box culvert at station 384 + 80 as reference points. The location of the boreholes is shown on the plan and on the attached Borehole Logs.

Elevations were referred to the bench mark indicated on the above plan which was described as a nail and washer in the north-east root of a 4 ft. diameter oak tree, 148 ft. left of Station 384 + 31. The elevation of this bench mark was given as 584.84 ft.

The boreholes were advanced by augering using a trailer-mounted Pennndrill. Both disturbed and undisturbed

D O M I N I O N S O I L I N V E S T I G A T I O N L I M I T E D

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samples were recovered at 2½ and 3 ft. intervals of depth. When recovering disturbed soil samples with the 2-inch outside diameter split spoon sampler, Standard Penetration tests were performed. Each borehole was accompanied by an adjacent dynamic Cone Penetration test. Both the standard and dynamic penetration tests were carried out in accordance with the present ASTM standards.

In between samples the undrained shear strength of the soil was measured by in situ field vane tests. A 2-inch diameter, 4-inch long vane was used which has a vane constant of 60. The torque was applied at ground surface by two spring scales each acting at a 12-inch lever arm attached to the drilling rod. The torque was applied in a manner that the reading on both scales was the same and the reading on a single scale in pounds is given on the field Borehole Logs.

FORWARDED INFORMATION:

Accompanying this letter is the following information:

- a) Your Plan No: E-4800-1 showing the location of the boreholes.
- b) Field Borehole Logs for Boreholes No. 5, 6, 7, 8 and 9.
- c) Surveying notes.

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- d) Two (2) boxes of jar samples.
- e) 14 Shelby tube samples.
- f) Two (2) copies of finished Borehole Logs
for Boreholes No. 5, 6, 7, 8 and 9.

We trust the information contained in this letter
and on the accompanying Borehole Logs is sufficient for your
requirements. Should you have any queries however, please
do not hesitate to contact us.

Yours very truly,

DOMINION SOIL INVESTIGATION LTD.



I.P. Lieszakowsky, P.Eng.
Chief Engineer

IPL:vb
encls.

LOG OF BOREHOLE ...5.....

Our Reference No. 7-5-14
 YOUR REF. No. W.P. 81-59
 CLIENT: D.H.O.
 PROJECT: PROP. CROSSING HWY. No. 401 - DRAKE SD. RD.
 LOCATION: STA. 383+24 97' LT.
 DATUM ELEVATION: GEODETIC

Enclosure No. 1

DRILLING DATA

Method: AUGERING
 Diameter: 4.5"
 Date: 24 MAY/67

SUBSURFACE PROFILE				SAMPLES		PENETRATION RESISTANCE Blows / Foot					WATER CONTENT %			REMARKS
ELEVATION Ft.	DEPTH Ft.	DESCRIPTION	SYMBOL	GROUND WATER	NUMBER	TYPE	'N' Blows / Foot	UNDRAINED SHEAR + FIELD VANE TEST	STRENGTH 1000 • COMPRESSION TEST	lbs/sq. ft.	PLASTIC LIMIT W _p	NATURAL W	LIQUID LIMIT W _L	
								20	40	60	80	100		
582.0	0	GROUND SURFACE												
		4" TOPSOIL												
580					1	SS	17							
	5	v. stiff hard			2	TW	PH							
		brown grey												
575					3	SS	29							
	10	CLAYEY SILT with some Sand and embedded Gravel			4	TW	PH							
570		(glacial till)												
	15				5	SS	24							
565														
	20				6	TW	PH							
560	22.5	END OF BOREHOLE												
555	25													

VERTICAL SCALE: 1 inch to 5 feet

DOMINION SOIL INVESTIGATION LIMITED

MADE: DGH

CHECKED:

LOG OF BOREHOLE 6

Our Reference No. 7-5-14
 YOUR REF. No. W.P. 81-59
 CLIENT: D.H.O.
 PROJECT: PROP. CROSSING HWY. No. 401 - DRAKE SD. RD.
 LOCATION: STA. 383 + 83 60' LT.
 DATUM ELEVATION: GEODETIC

Enclosure No. 2

DRILLING DATA

Method: AUGERING
 Diameter: 4.5"
 Date: 24 MAY/67

SUBSURFACE PROFILE				SAMPLES			PENETRATION RESISTANCE					WATER CONTENT %			REMARKS				
ELEVATION Ft.	DEPTH Ft.	DESCRIPTION	SYMBOL	GROUND WATER	NUMBER	TYPE	'N' Blows / Foot	Blows / Foot					PLASTIC LIMIT	NATURAL		LIQUID LIMIT			
								20	40	60	80	100	UNDRAINED SHEAR + FIELD VANE TEST	STRENGTH 1000 • COMPRESSION TEST		1000 lbs./sq. ft.	W _p	W	W _L
589.4	0	GROUND SURFACE																	
		18" SAND & GRAVEL																	
		multicoloured																	
		CLAYEY SILT			1	SS	19												
585	5	with some Organic Matter			2	SS	21												
		FILL																	
		v. stiff																	
581.4	8.0				3	SS	19												
580	10				4	TW	PH												
					5	SS	41												
573	15	Hard brown grey			6	TW	PH												
		CLAYEY SILT																	
		with some Sand																	
		and embedded Gravel																	
		occ. Silt pockets or seams																	
570	20	(glacial till)			7	SS	35												
22.5		END OF BOREHOLE																	
565	25																		

VERTICAL SCALE: 1 inch to 5 feet

DOMINION SOIL INVESTIGATION LIMITED

MADE: D.G.H. CHECKED:

LOG OF BOREHOLE.....7.....

Our Reference No. 75-14
 YOUR REF. No. W.P. 81-59
 CLIENT: D.H.O.
 PROJECT: PROP. CROSSING HWY. No 401 - DRAKE SO. RD.
 LOCATION: STA. 384 + 09 1' RT
 DATUM ELEVATION: GEODETIC

Enclosure No. 3

DRILLING DATA

Method: AUGERING
 Diameter: 4.5"
 Date: 24 MAY/67

SUBSURFACE PROFILE				SAMPLES			PENETRATION RESISTANCE Blows / Foot					WATER CONTENT %			REMARKS						
ELEVATION Ft.	DEPTH Ft.	DESCRIPTION	SYMBOL	GROUND WATER	NUMBER	TYPE	'N' Blows / Foot	20	40	60	80	100	PLASTIC LIMIT	NATURAL		LIQUID LIMIT					
								UNDRAINED SHEAR STRENGTH 1000 lbs/sq.ft.													
								+ FIELD VANE TEST					● COMPRESSION TEST					W _p W W _L			
								1	2	3	4	5									
586.6	0	GROUND SURFACE																			
		3" TOPSOIL																			
585		CLAYEY SILT																			
		brown-grey mottled																			
	5	FILL																			
580		v. stiff																			
579.6	7.0																				
		Hard																			
		CLAYEY SILT																			
		with some Sand																			
		and embeded Gravel																			
		brown																			
		grey																			
	10																				
575																					
	15	(glacial till)																			
570																					
569.1	17.5	END OF BOREHOLE																			
565																					
	20																				

VERTICAL SCALE: 1 inch to 5 feet

DOMINION SOIL INVESTIGATION LIMITED

MADE: DGH CHECKED:

LOG OF BOREHOLE.....8.....

Enclosure N^o 4.....

Our Reference N^o 7-5-14
 YOUR REF. No. W.P. 81-59
 CLIENT: D.H.O.
 PROJECT: PROP. CROSSING HWY. No.401 - DRAKE SD. RD.
 LOCATION: STA. 384 + 32 64' RT.
 DATUM ELEVATION: GEODETIC

DRILLING DATA

Method: AUGERING
 Diameter: 4.5"
 Date: 24 MAY/67

SUBSURFACE PROFILE				SAMPLES			PENETRATION RESISTANCE Blows / Foot					WATER CONTENT %			REMARKS						
ELEVATION Ft.	DEPTH Ft.	DESCRIPTION	SYMBOL	GROUND WATER	NUMBER	TYPE	'N' Blows / Foot	20	40	60	80	100	PLASTIC LIMIT	NATURAL		LIQUID LIMIT					
								UNDRAINED SHEAR STRENGTH 1000 lbs/sq. ft.													
								+ FIELD VANE TEST • COMPRESSION TEST													
								1	2	3	4	5	W _p	W	W _L						
589.9	0	GROUND SURFACE																			
		24" SAND & GRAVEL																			
		CLAYEY SILT			1	SS	23														
		FILL																			
585	5				2	TW	PH														
		v. stiff - multicoloured																			
581.9	8.0				3	SS	15														
580	10				4	TW	PH														
	120	v. stiff hard																			
575	15	brown grey			5	SS	48														
		CLAYEY SILT with some Sand and embedded Gravel																			
570	20	(glacial fill)			6	TW	PH														
567.4	22.5	END OF BOREHOLE																			
565	25																				

VERTICAL SCALE: 1 inch to 5 feet

DOMINION SOIL INVESTIGATION LIMITED

MADE: DGH CHECKED:

LOG OF BOREHOLE ...9.....

Our Reference No. 7-5-14.....

YOUR REF. No. WP. 81-59

CLIENT: D.H.O.

PROJECT: PROP. CROSSING HWY. NO. 401 - DRAKE SD. RD.

LOCATION: STA. 384 + 09 97' RT.

DATUM ELEVATION: GEODETIC

Enclosure No. 5.....

DRILLING DATA

Method: AUGERING

Diameter: 4.5"

Date: 23 MAY/67

SUBSURFACE PROFILE				SAMPLES			PENETRATION RESISTANCE Blows / Foot					WATER CONTENT %			REMARKS			
ELEVATION ft.	DEPTH ft.	DESCRIPTION	SYMBOL	GROUND WATER	NUMBER	TYPE	'N' Blows / Foot	20	40	60	80	100	PLASTIC LIMIT	NATURAL		LIQUID LIMIT		
								UNDRAINED SHEAR STRENGTH 1000 lbs./sq. ft.										
								+ FIELD VANE TEST & COMPRESSION TEST										
								2	3	4	5		W _p	W	W _L			
582.1	0	GROUND SURFACE																
		3" TOPSOIL																
580					1	SS	29											
	5	v. stiff hard			2	TW	PH						>6000 ⁺					
		brown grey																
57					3	SS	56											
	10	CLAYEY SILT			4	TW	PH											
		with some Sand																
570		and embedded Gravel			5	SS	46						6000 ⁺					
	15	(glacial till)			6	SS	35											
565																		
	20				7	TW	PH						15 ⁺					
559.6	22.5	END OF BOREHOLE																
	25																	

VERTICAL SCALE: 1 inch to 5 feet

DOMINION SOIL INVESTIGATION LIMITED

MADE: DGH *CHECKED:

cc: Mr. H. Szymanski (1 of 2)

401 & Keele St.,
Scarborough, Ontario.

Tel. 248-3282
(Area Code 416)

Materials and Testing Division

May 24, 1967

Dominion Soil Investigation Ltd.,
77 Crookford Blvd.,
Scarborough, Ontario.

Attention: Mr. I. Miszkowski

Re: Letter of Authority -- Foundation Investigation
A.I. 31-59, Bridge Site 13-262,
Grass Side Road Underpass, 6.4 Miles East of
East Jet. Hwy. 2, Highway 401,
District 1, Chatham.

Dear Sirs:

Please consider this your authority to carry out the
foundation investigation at the above mentioned site.

The scope and size of the investigation was discussed
with your representative in our office on May 18, 1967.

You are requested to submit to this Department -
(Foundation Section), only the factual information - i.e., field
borehole logs and all the samples retrieved at the site.

It is our understanding that you have a drilling rig
in the Scarba area, and that mobilization will be charged from
this point to the site and back. The same applies to your
technical representative who will be in charge of the field work.

Charges for the work will be in accordance with your
schedule of rates, effective August 1, 1966, and the invoice
should be addressed to the attention of the undersigned.

AGM/127

Yours very truly,

cc: Messrs. S. McConble
A. Cater
F. C. Brown
A. F. Watt
J. Roy
H. Lonings
Mrs. I. Steinberg
A. Crowley

H. Szymanski (2) ✓
Foundations Office A. Rutka
Gen. Files 4421 MATERIALS & TESTING ENGINEER

MEMORANDUM

Mr. A. G. Stermac
Principal Foundation Engineer
Lab Building
D O W N S V I E W

FROM: A. P. Watt

DATE: March 14, 1967

OUR FILE REF.

IN REPLY TO

SUBJECT:

W.P. 81-59, Bridge Site 13-262,
Drake Side Road Underpass,
6.4 miles east of east Jct. Hwy. 2,
Highway 401,
District 1, Chatham.

WP 81-59

Attached please find two copies of the new site plan E-4800-1 for the above noted structure showing the new alignment of Drake Side Road.

Shown in red are the probable footing location for the new alignment. Shown in blue are the footing locations of the latest design with drawing number D-4936-1 to 12 which will now be cancelled.

As there has been a foundation investigation conducted for the structure, on line C, please advise me if this investigation is applicable to the Drake Side Road Underpass in its new location. If so please supply me with a copy.

Also attached is a copy of the old site plan E-3600-2 for your use.

A. P. Watt

A. P. WATT
REGIONAL BRIDGE LOCATION ENGINEER

APW:gf
ATT'D

c.c. Mr. S. McCombie
Mr. A. Crowley
Mr. R. Forrest

ASSIGNMENT DATE APR 16/67
COMPLETION DATE JUNE 21/67

Note - This Job was given to Harrison for final inspection