

SUPPLEMENTARY
FOUNDATION INVESTIGATION REPORT
For

E.S.4. and Hwy. #27 Interchange,
Twp. of Etobicoke, County of York,
District #6 (Toronto).
W.P. 275-64-1 and W.P. 275-64-4
N.J. 65-P-104

INTRODUCTION:

Since the original foundation investigation report for the above mentioned interchange was prepared, we have received the preliminary plans for the individual structures involved which show the exact locations of each. We have reviewed these plans with respect to the available soil information, and as a result of this review, we arranged for more borings to be carried out in the field to obtain additional information.

Field work, laboratory work, and the preparation of the Record of Borehole sheets, for the additional borings, were undertaken by Dominion Soil Investigation Ltd. at our request and according to a program decided upon by us.

The following pages contain a description of the subsoil conditions prevailing at each structure location, together with our final recommendations for the structure foundations.

This report was prepared by Mr. A. Barsvary, Senior Foundation Engineer, under the general supervision of Mr. K. G. Selby, Supervising Foundation Engineer.

cont'd. /2 ...

STRUCTURE #2 - W.P. 238-61-1 -

1. Soil Conditions:

The foundation investigation for the structure was based upon 6 borings, located in the vicinity of the proposed abutments and pier. The boreholes were numbered: 8, 88, 89, 90, 115, and 119.

Beneath the existing ground elevation, heterogeneous fill materials were found at the location of the proposed west abutment and the pier. The fill contains sands, silty sands and clayey silts. Underlying the fill, a layer of silty fine sand was observed, having compact to dense relative density. The same sand stratum lies right below ground level at the location of the proposed east abutment. The sand is followed at approx. el. 361 - 364 ft. by a sandy silt glacial till with some gravel and fragments of shale. The relative density of the till is very dense, indicated by the high 'N' values of the standard penetration tests. The glacial deposit is underlain by shale bedrock, the upper surface of which lies between el. 353 and 357 ft. The uppermost 10 - 12 ft. thick zone of the rock is weathered, especially at the location of Borehole #115.

Groundwater level was established within the silty sand stratum around el. 364 ft.

The locations and elevations of the boreholes as well as the estimated soil profile and cross sections, are presented on the attached Drawing #65-F-104R.

2. Recommendations:

According to the preliminary plan, the bridge is proposed to be a two-span structure. The design grade of Hwy. #27 will be lowered to approx. el. 343 - 348 ft.; consequently, the footings will be supported on bedrock.

cont'd. /27...

STRUCTURE #2 - W.P. 238-61-1 - (cont'd.) ...

2. Recommendations: (cont'd.) ...

It is recommended that the spread footings of the pier be placed at or below el. 340 ft. on sound bedrock. A 10 t.s.f. safe design load may be employed on the footings, provided a four-ft. cover is ascertained for frost protection.

The abutments may be supported anywhere below the surface of the shale bedrock, also on spread footings. The elevation of the rock at the east abutment is assumed to be around 355 - 356 ft., while at the west abutment, between el. 353 and 356 ft.

Recommendations given for the pier as to the design load and frost protection, are valid for the foundations of the abutments as well.

No major dewatering problems are anticipated.

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 3

FOUNDATION SECTION

JOB 65-F-104

LOCATION 178,658 N 209,540 E

ORIGINATED BY F.Mc

W.P. 275-64-1

BORING DATE Oct. 1, 1965

COMPILED BY H.S.

DATUM G.S.C.

BOREHOLE TYPE Washboring - BX Casing.

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT ——— WL			BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT	25	50	75	100	125	PLASTIC LIMIT ——— WP	WATER CONTENT ——— W		
369.0	Ground level						SHEAR STRENGTH P.S.F.					WP ——— WL				
0.0	Silty sand. Loose.		1	SS	5		Refusal at 5.4'					WATER CONTENT %				
5.0	Clayey silt with some sand & gravel. (Glacial Till) Very dense.		2	SS	88 for 9"							20	40	60		
356.0			3	SS	50 for 3"	360										
13.0	Shaley limestone with intermittent limestone.		4	RC	59											
			5	RC	94											
349.0						350										
20.0	End of borehole.															

Blocked dry
L.O.

DOMINION SOIL INVESTIGATION LIMITED

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

BRANCH
369 QUEENS AVENUE
LONDON, ONTARIO
TELEPHONE GE. 9-3571



FOUNDATION ENGINEERS

ASSOCIATED COMPANY
SOIL TESTING AND ENGINEERING LTD.
34 BRENTFORD ROAD,
KINGSTON 5, JAMAICA, WEST INDIES
TELEPHONE: 66686

Our Ref. No: 6-6-13
Your Ref: W.P. 238-61-1

5th October 1966.

Mr. A.G. Stermac,
Principal Foundation Engineer,
Materials and Testing Division,
Department of Highways,
Downsview Avenue,
Downsview, Ontario.

Attention: Mr. K. Selby P.Eng.

Re: Soil Investigation for Q.E.W. and Hwy. No. 27
Interchange. Bridge No. 2.


Dear Sirs,

This letter accompanies eleven copies of the records of
Boreholes No. 88, 115 and 119 put down in connection with the above
structure.

We trust that you will find the records to your satisfaction.

Yours very truly,

DOMINION SOIL INVESTIGATION LIMITED


I.P. Lieszkowszky P.Eng.
Chief Engineer.

IPL/me
Enclosures

GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 88 . .

OUR REFERENCE NO. 6-6-13

CLIENT: D.H.O.

PROJECT: Q.E.W. B HWY. 27 INTERCHANGE, BRIDGE No 2

LOCATION: 178,488 N 209,594 E

DATUM ELEVATION: G.S.C.

METHOD OF BORING AUGERING & WASHBORING

DIAMETER OF BOREHOLE 4 1/2" - 2 3/8"

DATE: JULY 5, 1966

W.P. 238-61-1

ENCLOSURE NO

ELEVATION ft.	DEPTH ft.	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot		CONSISTENCY water content %		REMARKS
				NUMBER	TYPE	Advancement of Sampler	20	40	60	80	
367.3	0	GROUND SURFACE									
365.8	1.5	TOPSOIL & FILL									
365.0		Compact to Dense Brown FINE SAND		1	AS	-					
361.7	5.6	Very Dense Grey SANDY SILT with some gravel and shale fragments (GLACIAL TILL)		2	A B	SS	71	77			
360.0				3	SS	74	97				
355.0				4	R.C.	44 %					
354.5	13.0	Grey SHALE with bands of limestone		5	R.C.	43 %					
350.0		BEDROCK		6	R.C.	80 %					
345.0											
340.0		END OF BOREHOLE									
	30										

W.L. El. 364.8 ft.
July 6, 1966

VERTICAL SCALE: 1 IN TO 5 FT.

DOMINION SOIL INVESTIGATION LIMITED

MADE: C.K. CHD:

OUR REFERENCE NO. 6-6-16

GEOTECHNICAL DATA SHEET FOR BOREHOLE . . . 89 . . .

CLIENT: D.H.O.
 PROJECT: BRIDGE No. 5, Q.E.W. & HWY. 27.
 LOCATION: 178,446 N ; 209,348 E
 DATUM ELEVATION: G.S.C.

METHOD OF BORING: WASHBORING
 DIAMETER OF BOREHOLE: 2 3/8"
 DATE: JUNE 30, 1966.
 W.P. 238-61-4

ENCLOSURE NO.

ELEVATION ft	DEPTH ft	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE		CONSISTENCY water content % PL W LI	REMARKS
				NUMBER	TYPE	N- or Advancement of Sampler	blows per foot	SHEAR STRENGTH lbs/sq ft		
368.9	0	GROUND SURFACE								
		Brown SAND (FILL)								
367.4	1.5	Dark Brown CLAYEY SILT with a trace of SAND and GRAVEL (FILL)								
365.0	5	Organic TOPSOIL								
363.9	5.9	Dense FINE SAND with some SILT		1	A	SS	55			
361.4	7.5	Very Dense Grey SAND and SILT with numerous SHALE fragment and a trace of embedded fine GRAVEL (GLACIAL TILL)		2		SS	50/4"			
360.0	10			3		SS	65/4"			
				4		SS	100/1"			
355.0	15			5		SS	100/NR			
353.9		Grey SHALE BEDROCK		6		RC	89 %			
350.0	20	END OF BOREHOLE								
348.9										

W.L. 364.6 Ft.
 JULY 6, 1966.
 Sa. - 83% ; Si. - 17%
 Sa. - 56% ; Si. - 44%

GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 90 . .

OUR REFERENCE NO. 6-6-14

CLIENT: D. H. O.
 PROJECT: BRIDGE No. 3. Q.E.W. & HWY. 27.
 LOCATION: 178,590 N ; 209,356 E
 DATUM ELEVATION: G. S. C.

METHOD OF BORING: AUGERING
 DIAMETER OF BOREHOLE: 4"
 DATE: JUNE 30, 1966.
 W.P. 238-61-2

ENCLOSURE NO.

ELEVATION ft.	DEPTH ft.	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE		CONSISTENCY water content % PL W LI	REMARKS
				NUMBER	TYPE	N ₆₀ or Advancement of Sampler	blows per foot	SHEAR STRENGTH lbs/sq ft		
369.7	0	GROUND SURFACE								
		Compact to Dense Brown SILTY FINE SAND with a trace of CLAY	[Symbol]	1	AS					Sa. 67 % Si. 30 % ; Cl. -3 % W.L. 365.2 Ft. JULY 6, 1966.
365.0	5			2	SS	39				
363.7	6.0	Very Dense Grey SILTY SAND with a trace of GRAVEL and CLAY	[Symbol]	3	SS	71/5"				Gr. 8 % ; Sa. 59 % Si. 25 % ; Cl. 8 %
360.0	10			4	SS	75/3"				
357.2	12.5	Grey SHALE with intermittent layers of LIMESTONE BEDROCK	[Symbol]	5	RC	58 %				
355.0	15			6	RC	40 %				
350.0	20			7	RC	18 %				
345.0	25			8	RC	78 %				
340.0	30	END OF BOREHOLE								
335.0	35									

VERTICAL SCALE: 1 IN TO 5 FT.

DOMINION SOIL INVESTIGATION LIMITED

MADE: V. G. H. CH'D.

GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 115.

OUR REFERENCE NO. 6-6-13

CLIENT: D.H.O.

PROJECT: Q.E.W. & HWY. No. 27 INTERCHANGE, BRIDGE No. 2

METHOD OF BORING: WASHBORING.

ENCLOSURE NO.

LOCATION: 178,488 N 209,454 E

DIAMETER OF BOREHOLE: 3 1/2"
DATE: JUNE 30 - JULY 5, 1966

DATUM ELEVATION: G.S.C.

W.P. 238-61-1

ELEVATION ft.	DEPTH ft.	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot		CONSISTENCY water content %		REMARKS
				NUMBER	TYPE	N- Advance- ment of Sampler	2.0	4.0	6.0	8.0	
367.5	0	GROUND SURFACE									
		6" TOPSOIL									
365.0		SANDY, CLAYEY SILT (FILL)									
363.5	4.0	Dense, Brown FINE SAND									
362.0	5.5	Dense, Grey SANDY SILT with some gravel (GLACIAL TILL)		1 A B	SS	60					
360.0											
357.5	10			2	SS	100/1					
355.0		Grey EXTREMELY WEATHERED SHALE		3	R.C.	50 %					
350.0	15			4	SS	100/3					
				5	R.C.	30 %					
345.0	20	BEDROCK		6	SS	100/2					
				7	R.C.	10 %					
340.0	25			8	R.C.	0 %					
		Sound		9	R.C.	99 %					
335.0	30										
330.0	35										

W.L. El. 364.2 ft.
July 6, 1966

VERTICAL SCALE: 1 IN TO 5 FT

DOMINION SOIL INVESTIGATION LIMITED

MADE C. K. CHD.

OUR REFERENCE NO 6-6-13

GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 119.

CLIENT: D.H.O.

PROJECT: Q.E.W. & HWY. No. 27 INTERCHANGE, BRIDGE No 2

METHOD OF BORING: WASHBORING.

ENCLOSURE NO.

LOCATION: 178,360 N 209,326 E

DATE: JULY 6, 1966

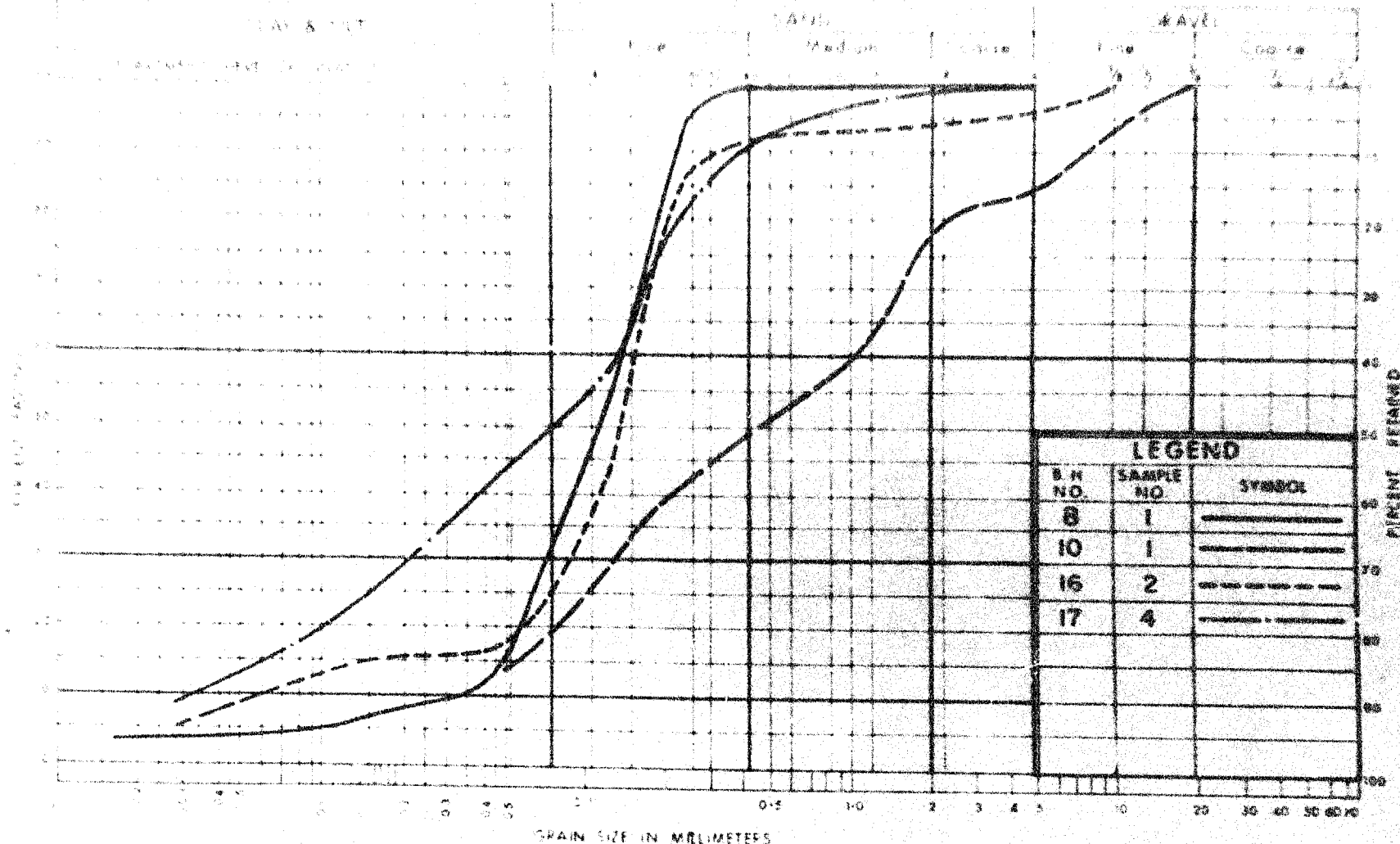
DATUM ELEVATION: G.S.C.

W.P. 238-61-1

ELEVATION ft.	DEPTH ft.	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content %			REMARKS
				NUMBER	TYPE	N ₁ or Advancement of Sampler	2.0	4.0	6.0	8.0	10.0	PL	W	LI	
368.0	0	GROUND SURFACE													
365.0		1" ASPHALT SILTY SAND with some gravel FILL													
364.0	4.0														
363.0	5	SILTY FINE SAND													
360.0	10	Hard, Grey CLAYEY SILT to SANDY SILT with some gravel and shale fragments (GLACIAL TILL)		1	SS	35									
355.0				2	SS	100/4									
353.2	14.8			3	SS	100/2									
350.0	20	Grey SHALE with layers of limestone		4	WS	-									
345.0	25	BEDROCK		5	R.C.	77 %									
				6	R.C.	80 %									
		END OF BOREHOLE													

W.L. El. 362.8 ft.
July 6, 1966

UNIFIED SOIL CLASSIFICATION SYSTEM



GRAIN SIZE DISTRIBUTION
SILTY SAND to SANDY SILT



DEPARTMENT OF HIGHWAY
MATERIALS and
TESTING
DIVISION

ONTARIO

WP No.

JOS No. 65-F-104

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

To: Mr. B. R. Davis,
Bridge Engineer,
Bridge Division.
Attention: Mr. S. McCombie

FROM: Foundation Section,
Materials & Testing Div.,
Room 107, Lab. Bldg.

DATE: November 21, 1966

Our File No.

IN REPLY TO:

SUBJECT:

FOUNDATION INVESTIGATION REPORT
For

Q.E.W. and Hwy. #27 Interchange,
Twp. of Etobicoke, County of York,
District #6 (Toronto)
W.J. 65-P-104 -- W.F. 275-64-1

Enclosed please find the results of our final
foundation investigations for Structures No's 2, 3, 8,
12, and 20.

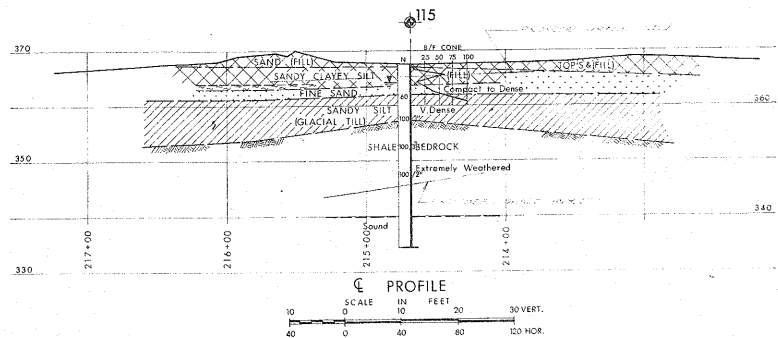
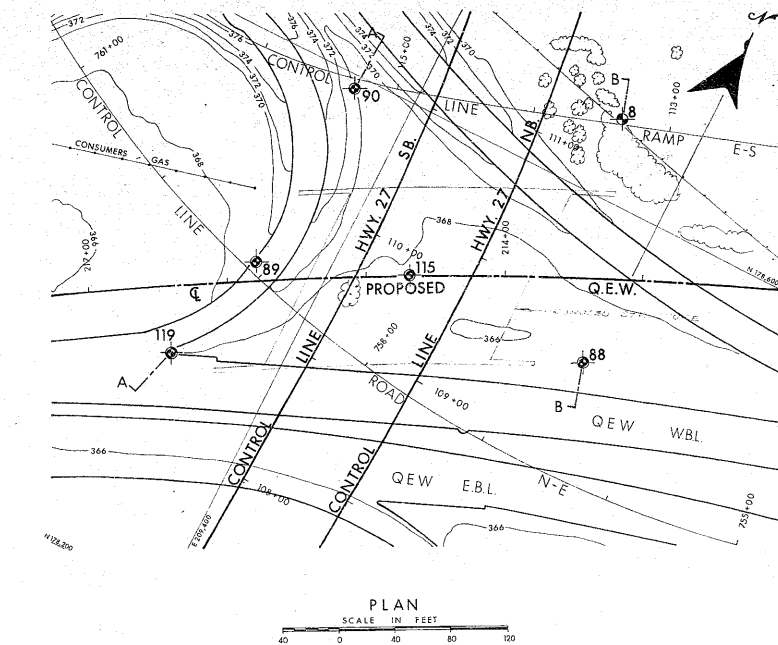
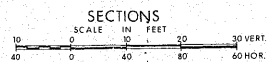
Please attach these to your copy(s) of
Foundation Report #65-P-104.

AGS/MdeP
Attach.






cc: Messrs. B. R. Davis (2)
H. A. Tregaskes
D. W. Farren
G. K. Hunter (2)
P. Allen
T. J. Kovich
A. S. Melnyshyn
A. Watt

Foundations Office
Gen. Files

Alf Sternac
A.G. Sternac,
PRINCIPAL FOUNDATION ENGINEER



LEGEND

- | | |
|---|--|
|  | Bore Hole |
|  | Cone Penetration Hole |
|  | Bore & Cone Penetration Hole |
|  | Water Levels established at time of field investigation. |
|  | Bore & Cone (Dom. Soil Ltd.) |

NO.	ELEVATION	CO-ORDINATES	
		NORTH	EAST
8	369.0	178,658	209,540
88	367.3	178,488	209,594
89	368.9	178,446	209,348
90	369.7	178,590	209,356
115	367.5	178,488	209,454
119	368.0	178,360	209,326

- NOTE -

The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence and may be subject to considerable error.

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING DIVISION - FOUNDATION SECTION


BRIDGE No. 2

Q.E.W. OVER HIGHWAY No.27

KING'S HIGHWAY NO. Q.E.W. & HWY. 27 INTER. DIST. NO. 6

CO. YORK METRO TORONTO
TWP. ETOBICOKE LOT CON.

BORE HOLE LOCATIONS & SOIL STRAT.

SUB'D K.S.	CHECKED 	W.P. NO. 238-61-1	M.&T. DRAWING NO.
------------	---	-------------------	-------------------

DRAWN (BY)	CHECKED <i>12</i>	JOB NO. 65-F-104	65-F-104
			ENGINEER DRAWING NO.

DATE 26 OCT, 1966	SITE NO	BRIDGE DRAWING NO.
APPROVED <i>J. M. [Signature]</i>	CONT NO	

PRINT RECORD		
NO.	FOR	DATE

