

SUPPLEMENTARY  
FOUNDATION INVESTIGATION REPORT  
For

R.F.W. and Hwy. #27 Interchange,  
Twp. of Stobicoke, County of York,  
District #6 (Toronto).  
M.P. 275-64-1 and M.P. 275-64-4  
N.J. 65-P-104

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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 subsail 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.

MEMORANDUM

23-68  
W.P. 275-64-1.

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

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

DATE: December 14, 1966

IN REPLY TO: **DEC 22 1966**

OUR FILE REF.

SUBJECT:

SUPPLEMENTARY  
FOUNDATION INVESTIGATION REPORT  
For  
Q.E.W. and Hwy. #27 Interchange,  
Twp. of Etobicoke, County of York,  
District #6 (Toronto).  
W.J. 65-F-104 -- W.P. 275-64-1 &  
W.P. 275-64-4

Attached, we are forwarding to you, our detailed supplementary foundation investigation report on the subsoil conditions existing at the above structure sites.

We believe that you will find the factual data and recommendations contained therein, adequate for your design requirements. Should you require additional information, please feel free to contact our Office.

AGS/MdeF  
Attach.

*afternoon*  
A. G. Stermac  
PRINCIPAL FOUNDATION ENGINEER

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

Foundations Office  
Gen. Files

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SUPPLEMENTARY  
FOUNDATION INVESTIGATION REPORT  
For  
Q.E.W. and Hwy. #27 Interchange,  
Twp. of Etobicoke, County of York.  
District #6 (Toronto).  
W.P. 275-64-1 and W.P. 275-64-4  
W.J. 65-F-104

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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.

STRUCTURE #4 - W.P. 238-61-3 -

1. Soil Conditions:

Two boreholes were drilled at the site of the proposed bridge. Borehole #4 was part of the preliminary foundation investigation by the Foundation Section; borehole #97 was carried out additionally by Dominion Soil Investigation Ltd.

A three-ft. thick layer of sand and gravel was observed below the ground surface at the location of borehole #4. This layer was missing in hole #97. In borehole #4, underlying the sand and gravel, extending downward to el. 352.5 ft., a stratum of hard clayey silt with some sand, gravel and shale fragments (glacial till) was revealed. In hole #97, ranging from ground level to el. 356.0 ft., a granular variation of the glacial deposit was observed. This material was classified to be sandy silt with some gravel and clay. The relative density of the layer increases from compact to very dense.

Underlying the glacial till, shale bedrock with intermittent bands of hard limestone was found. The upper 2 ft. of the bedrock in hole #97 was weathered.

Groundwater level in borehole #97 was established to be at el. 363.5 ft.

The locations and elevations of the boreholes, together with the estimated stratigraphical profile, are presented on Drawing #65-F-104C.

2. Recommendations:

2.1) The preliminary design of the proposed bridge calls for a four-span structure with perched abutments. The finished grade of the Q.E.W. at the crossing, will roughly be between el. 366.0 ft. and 360.0 ft.

cont'd. /3 ...

STRUCTURE #4 - W.P. 238-61-3 - (cont'd.) ...

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

2.2) Two alternative recommendations are given for the foundations of the proposed piers, as follows:

(a) Piers may be supported on spread footings within the hard and very dense glacial till. The approximate elevations of the bottom of footings are suggested to be: 356 ft. for Pier #1 (south pier); 357 ft. for Pier #2 (middle), and 358 ft. for Pier #3 (north pier). At the above elevations a bearing capacity of 4.0 t.s.f. may be utilized for design purposes.

(b) Excavations for the pier footings may extend downward in order to place the footings on relatively sound bedrock. Adopting this method, the elevations of the spread footings are estimated to be: el. 353 ft. at Pier #1; el. 354 ft. at Pier #2, and el. 355 ft. at Pier #3. For footings being supported on bedrock, 10 t.s.f. allowable pressure may be assumed.

2.3) The perched abutments should be supported on H-piles, driven to sound bedrock, or to practical refusal. It is anticipated that refusal will be achieved at or slightly below the elevations recommended for the spread footings, under paragraph (b). It is assumed that 12 BP 53 H-piles will carry 70 T/pile, provided they are driven to sound bedrock.

Due to the permeable nature of the sandy silt stratum, some dewatering problems for the excavations may be encountered, if the recommendations given under paragraph (a) are adopted.

cont'd. /<sup>h</sup> ...

CHECKED BY                     

[illegible]

## MEMORANDUM

To: Mr. K. G. Selby,  
Supervising Foundation Engr.,  
Room 107, Lab. Bldg.

FROM: Mr. K. Ingham,  
Geologist.

DATE: January 24, 1967

OUR FILE REF.

IN REPLY TO:

## SUBJECT:

Test Pits in the vicinity of the future  
Q.E.W. and Hwy. 27 Interchange System

In reply to your request for my comments on the sub-surface conditions exposed in two test holes and a sewer trench, I think the following observations should prove helpful.

The sewer trench (Contract 66-237) exposes the Dundas formation, which is the bedrock in the general area being investigated. The Dundas formation is dominantly shale with interbedded limestone and siltstone. The shale is dark grey somewhat platy bedded and weathers buff-grey, particularly when it is calcareous. Beds of fine-grained limestone and rusty-weathering siltstone range from 0.05 ft. to 1.0 ft. in thickness, but constitute only 15 to 20 percent of the total formation. The upper 6 to 8 ft. of the excavation is more or less weathered and has developed a soil profile of little more than 1.0 ft.

The first test pit, near foundation borehole No. 64, exposes 4 to 5 ft. of well sorted lacustrine beach or terrace sand overlying clay till down to a depth of 22 ft. The till matrix, which constitutes approximately 80 percent of the till, contains appreciable silt-size material but less abundant sand. Pebbles of shale, pebbles and boulders of limestone and rare igneous boulders comprise the rest of the till. Tabular boulders of limestone were commonly observed in horizontal attitudes.

The second test pit, close to foundation borehole No. 15 reportedly encountered bedrock at approximately 16 ft. The inability of the machine to penetrate the upper layers of rock would indicate either relatively unweathered material or a continuous layer of limestone at the rock surface. The stoney till immediately overlying the bedrock does not appear to contain any weathered particles and is composed of 80 to 90 percent ground-up shale pebbles, the remainder being predominantly a clay matrix with some silt and minor sand. Approximately 4 ft. of stoney till overlie the bedrock grading upwards into 8 to 9 ft. of till similar to that encountered in the first test pit. Again, the top 3 to 4 ft. are lacustrine beach on terrace sands.

K. Ingham,  
Geologist



## 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: August 15, 1966

OUR FILE REF.

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-F-104 -- W.P. 275-64-1

Enclosed, please find the results of our final  
foundation investigations for Structures No's 4, 14  
and 15.

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

AGS/MdeF  
Attach.

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

*A. G. Stermac*  
A. G. Stermac,  
PRINCIPAL FOUNDATION ENGINEER

Foundations Office  
Gen. Files

DOMINION SOIL INVESTIGATION LIMITED  
77 CROCKFORD BOULEVARD - SCARBOROUGH ONTARIO CANADA - TELEPHONE 421-2567

BRANCH  
369 QUEENS AVENUE  
LONDON, ONTARIO  
TELEPHONE GE. 3-3851



FOUNDATION ENGINEERS

ASSOCIATED COMPANY  
SOIL TESTING AND ENGINEERING LTD.  
34 BRENTFORD ROAD,  
KINGSTON 5, JAMAICA, WEST INDIES  
TELEPHONE: 66896

July 18, 1966.

Our Ref. 6-6-15

Your Ref. W. P. 238-61-3

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. #27  
Interchange Bridge No. 4.

Dear Sirs:

Attached to this letter are 11 copies of the Geotechnical Data Sheet for borehole No. 97 and of the grain size distribution curve of a representative sample recovered from this borehole.

The subsurface conditions encountered in this borehole are consistent with the stratigraphy found in borehole No. 4 during your previous investigation and therefore no additional investigation for this structure is considered to be necessary.

Yours very truly,

DOMINION SOIL INVESTIGATION LIMITED,

*I. P. Lieszkowszky*  
I. P. Lieszkowszky, P. Eng.,  
Project Engineer.

IPL/ds

# GEOTECHNICAL DATA SHEET FOR BOREHOLE . 97 . .

OUR REFERENCE NO 6-6-15

CLIENT: D. H. O.

PROJECT: Q. E. W. & HWY. No. 27. INTERCHANGE

LOCATION: 178,259 N ; 208,972 E

DATUM ELEVATION: G. S. C.

METHOD OF BORING: AUGERING

DIAMETER OF BOREHOLE: 4 1/2"

DATE: JUNE 29. 1966.

W. P. 238-61-3

ENCLOSURE NO.

ELEVATION ft.	DEPTH ft.	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES			PENETRATION RESISTANCE blows per foot					CONSISTENCY water content % PL W LI	REMARKS
				NUMBER	TYPE	N <sub>60</sub> - or Advancement of Sampler	20	40	60	80	100		
365.8	0	GROUND SURFACE											
		12" TOPSOIL											
		Greenish Brown Compact to Very Dense		1	AS								
	5	SANDY SILT											
360.0		with some GRAVEL and a trace of CLAY (GLACIAL TILL)		2	SS	27							
				3	SS	85							
356.0	10			4	SS	73/3							
355.0		Grey Soft weathered Sound		5	RC	56.1%							
	15	SHALE with intermittent bands of hard LIMESTONE BEDROCK		6	RC	90%							
350.0													
345.0	20	END OF BOREHOLE											



W.L. 363.7 Ft.  
JULY 4. 1966.

Gr. 10% ; Sa. 15 %  
Si. 65% ; Cl. 10%

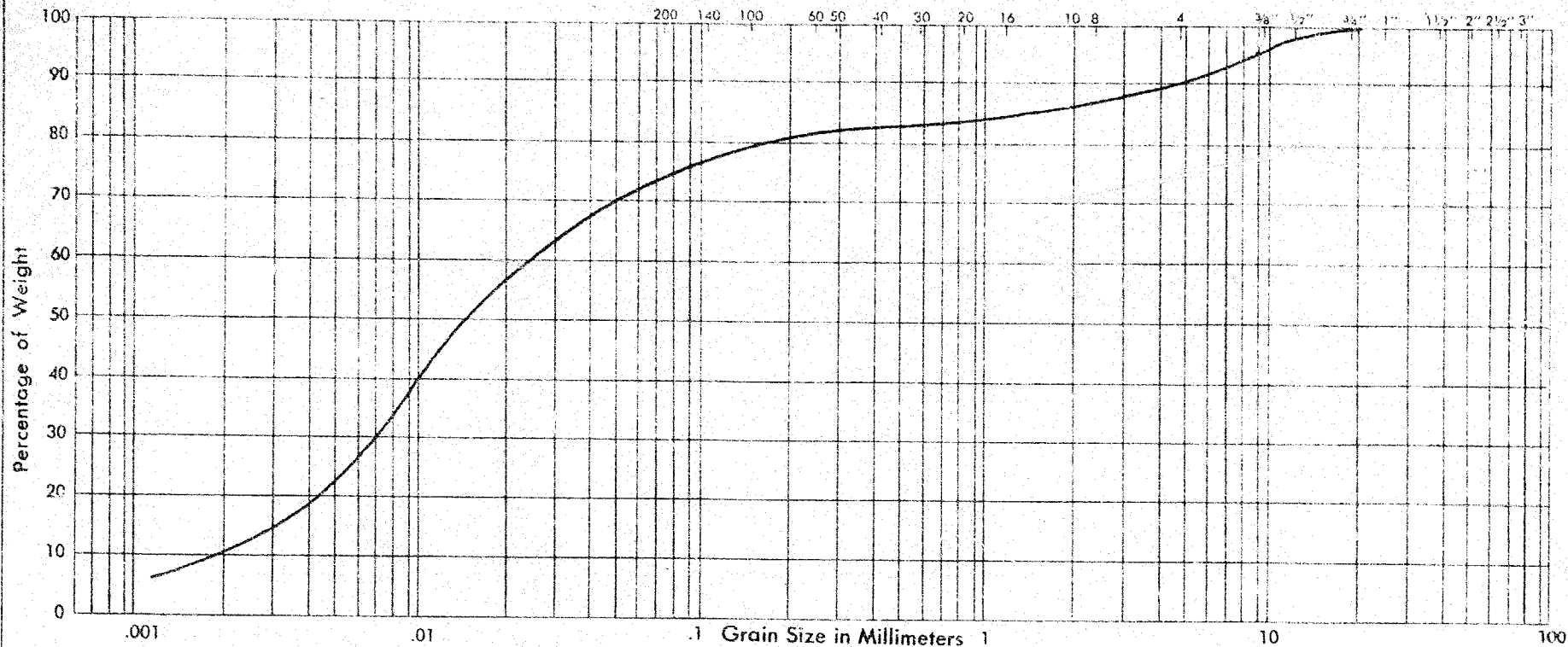
# DOMINION SOIL INVESTIGATION LIMITED

## GRAIN SIZE DISTRIBUTION

OUR REFERENCE NO. G-6-15  
YOUR REF. No. 238-61-3

UNIFIED SOIL CLASSIFICATION  
SYSTEM

SILT AND CLAY	SAND			GRAVEL	
	FINE	MEDIUM	COARSE	FINE	COARSE



PROJECT: Q.E.W. & HWY. 27, INTERCHANGE

LOCATION: BRIDGE No. 4.

BOREHOLE NO.: 97

SAMPLE NO.: 2

DEPTH OF SAMPLE:

ELEVATION OF SAMPLE:

COEFFICIENT OF UNIFORMITY

COEFFICIENT OF CURVATURE

PLASTIC PROPERTIES:

LIQUID LIMIT  $w_p =$

PLASTIC LIMIT  $w_L =$

PLASTICITY INDEX  $PI =$

MOISTURE CONTENT  $w =$

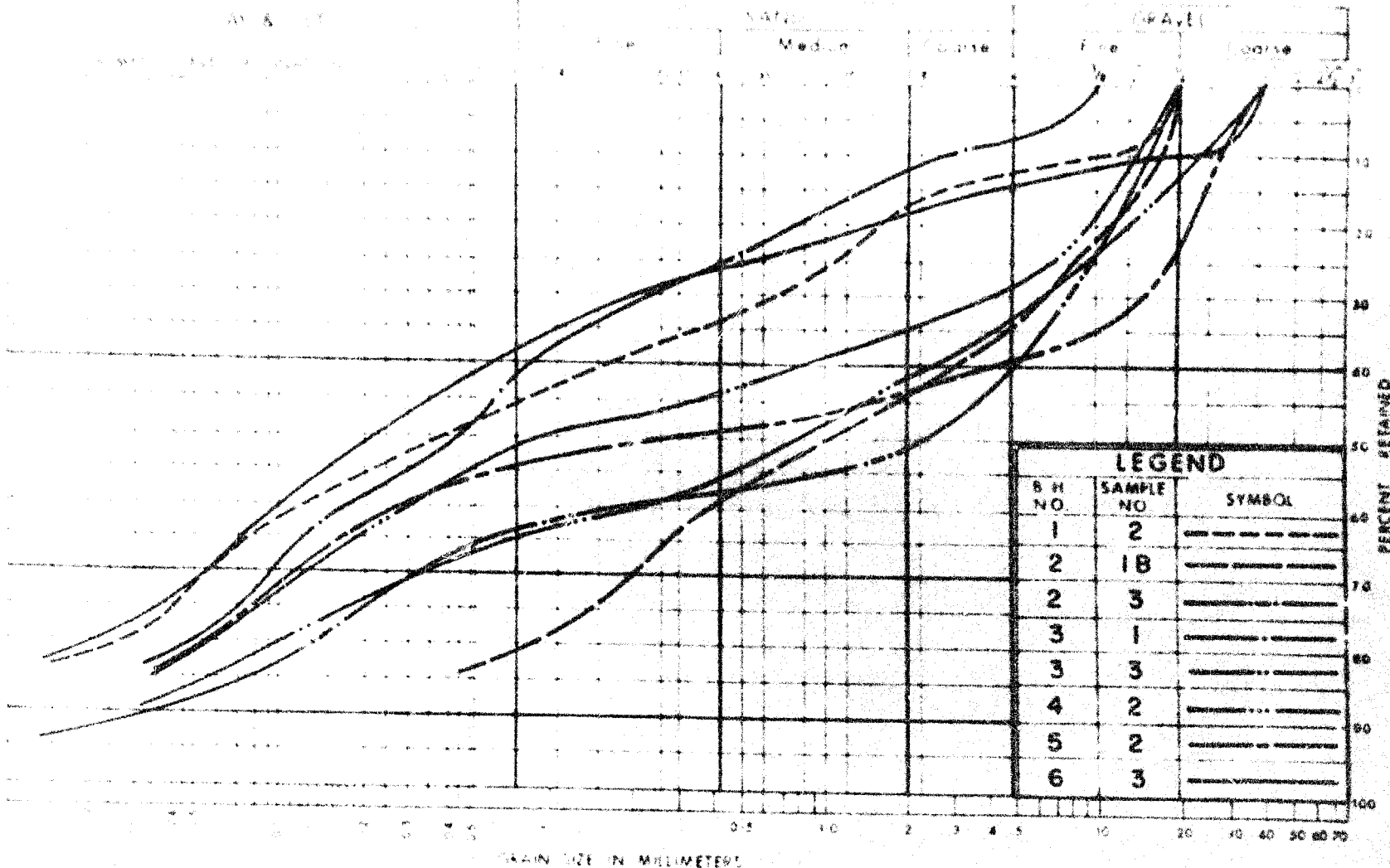
ACTIVITY  $A =$

**Classification of Sample and Group Symbol:**

**SANDY SILT with some GRAVEL  
and a trace of CLAY**

Enclosure No.

# UNIFIED SOIL CLASSIFICATION SYSTEM



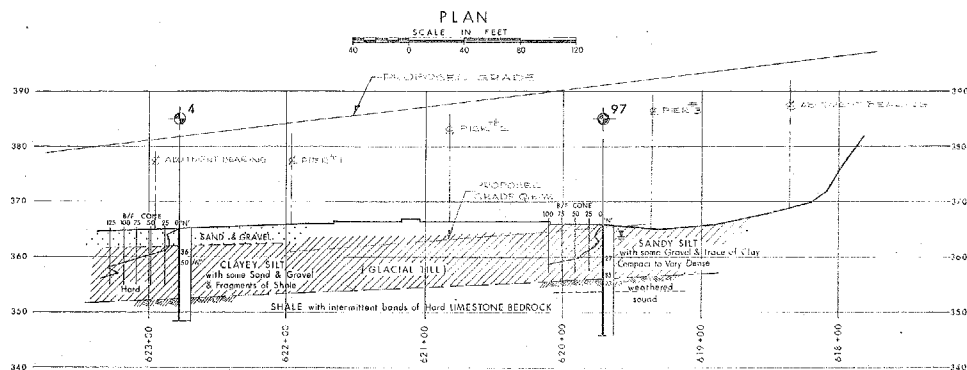
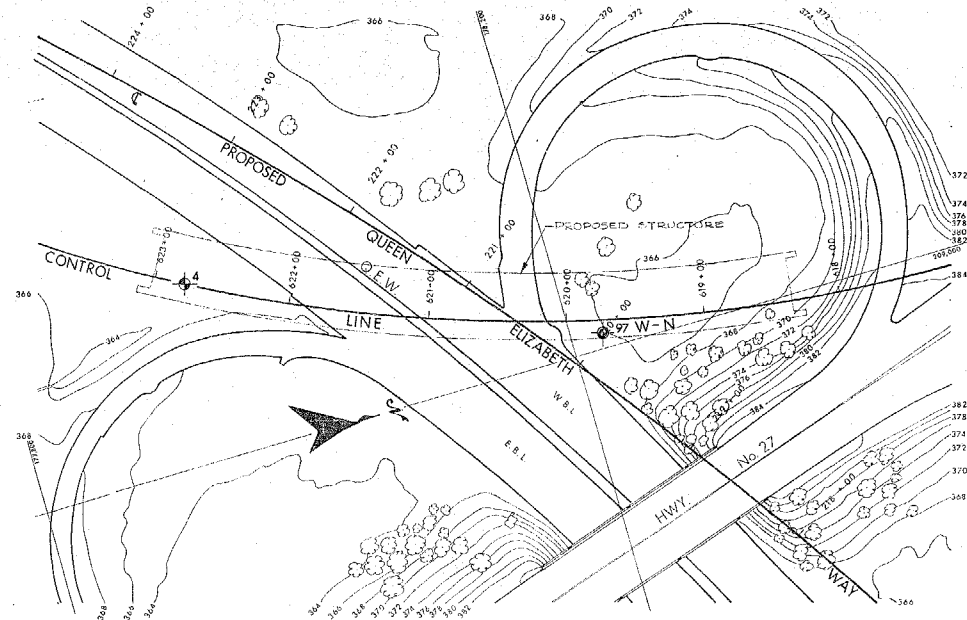
LEGEND		
B.H. NO.	SAMPLE NO.	SYMBOL
1	2	—
2	1B	—
2	3	—
3	1	—
3	3	—
4	2	—
5	2	—
6	3	—



DEPARTMENT OF HIGHWAYS  
MATERIALS AND  
TESTING  
DIVISION

GRAIN SIZE DISTRIBUTION  
CLAYEY SILT, SAND & GRAVEL  
(GLACIAL TILL)






WP No.  
JOB No. 65-F-104



SEE DRAWING No. 65-F-104A

KEY PLAN  
SCALE IN MILES

### 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
4	364.8	177.947	208.871
97	365.8	178.259	208.972

- 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.4

TURNING ROADWAY W-N OVER Q.E.W.  
KING'S HIGHWAY NO. Q.E.W. & HWY. No.27 INTER. DIST. NO. 6  
CO. YORK METRO TORONTO  
TWP. ETOBICOKE LOT CON.

BORE HOLE LOCATIONS & SOIL STRATA	
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
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89	89
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93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

SUBMD K.S.	CHECKED <i>ay</i>	W.P. NO. 238-61-3	M.B.T. DRAWING NO.
DRAWN <i>DM</i>	CHECKED <i>W.C.</i>	JOB NO. 65-F-104	<b>65-F-104C</b>
DATE 21 JULY 1966	SITE NO.	BRIDGE DRAWING NO.	
APPROVED <i>A.B. Thomas</i>	CONT. NO.		

APPROVED *A. J. [Signature]* CONT. NO.

PRINT RECORD		
NO.	FOR	DATE

[illegible]

