

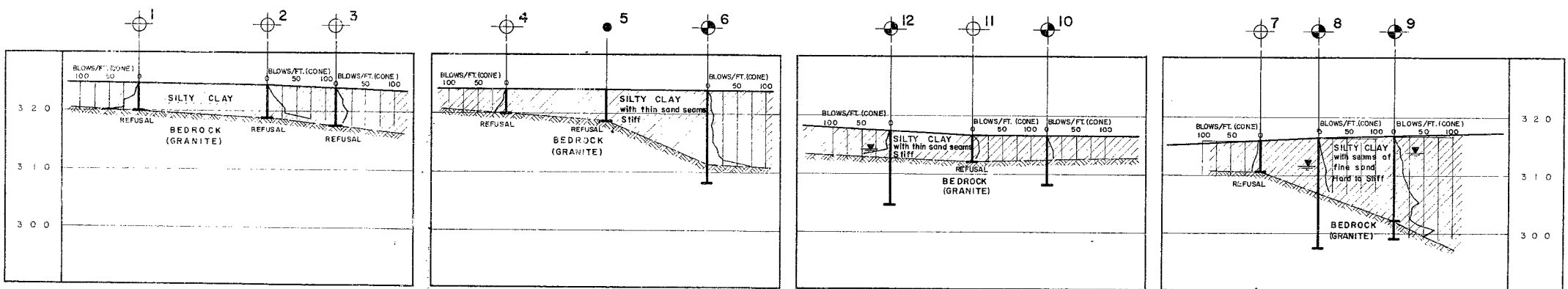
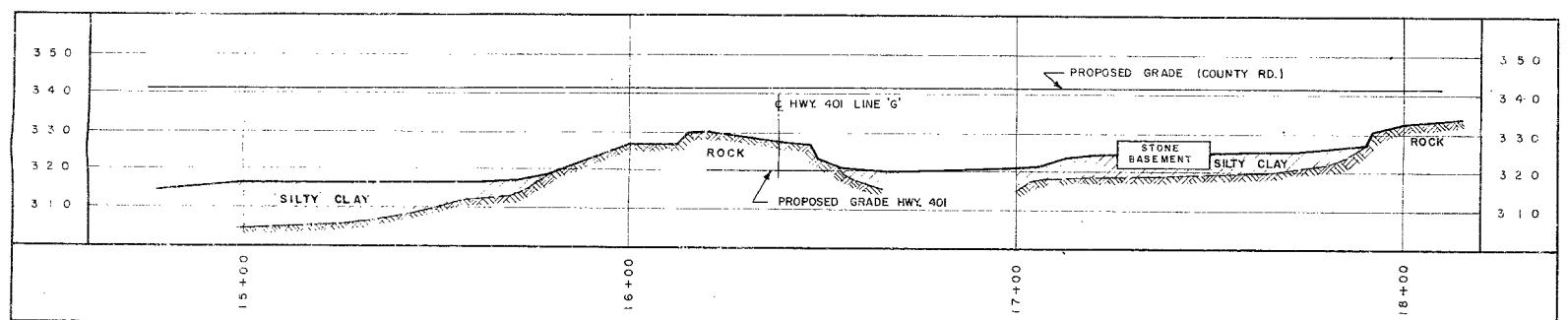
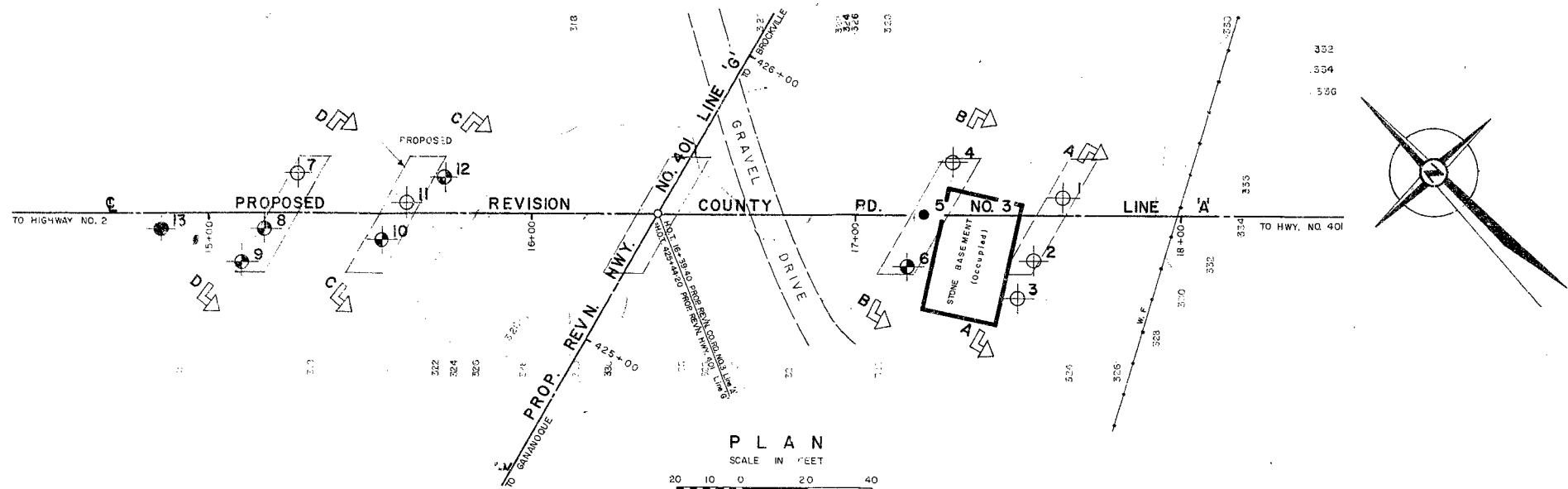
#62-F-102

W.P. #181-61

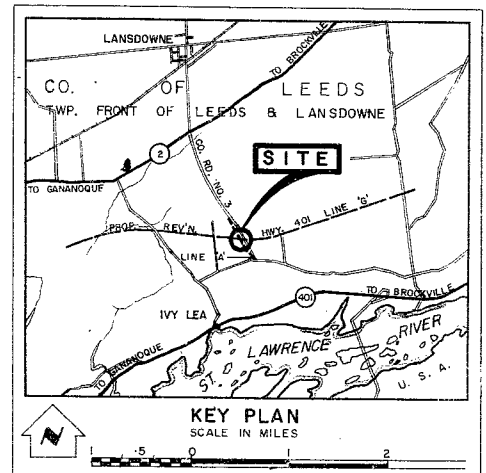
Cty. Rd. #3

CROSSING

Hwy. #401



SECTIONS
SCALE IN FEET



LEGEND

- Bore Hole
- Cone Penetration Hole
- /○ Bore & Cone Penetration Hole
- Water Levels established at time of field investigation (August 1962)
- Probe Hole

NO.	ELEVATION	STATION	OFFSET
1	324.9	17+64	5' LT.
2	324.6	17+55	14' RT.
3	324.1	17+50	26' RT.
4	324.2	17+30	16' LT.
5	324.1	17+21	Q.
6	324.0	17+16	16' RT.
7	316.2	15+28	12' LT.
8	316.6	15+18	5' RT.
9	316.9	15+11	15' RT.
10	316.6	15+54	8' RT.
11	316.9	15+62	3' LT.
12	317.5	15+74	11' LT.
13	315.5	14+86	5' RT.

— 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.

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH SECTION

COUNTY ROAD NO. 3 LINE 'A'
AND
HIGHWAY NO. 401 LINE 'G'
APPROX. 1 MILE NORTH OF IVY LEA

ORIGINATED BY: 10015	DISTRICT NO. 8	DATE 13 SEPT. 1962
DRAWN BY: MUMFORD	W.P. NO. 181-61	JOB NO. 62-F-102
CHECKED BY: [Signature]	CONTRACT NO.	DRAWING NO.
APPROVED BY: [Signature]		62-F-102A

23-65-165

Mr. A. M. Toye,
Bridge Engineer,
Bridge Division.

Attention: Mr. S. McCombie.

Mr. A. G. Stermac,
Principal Foundation Engr.,
Foundation Section,
Materials & Research Division.
September 28, 1962.

Re: D.H.O. FOUNDATION INVESTIGATION REPORT -
Proposed Flyover Where County Road #3,
Line 'A' crosses Proposed Hwy. #401,
Line 'G', 1 Mile North of Ivy Lea.
W.J. 62-F-102 - Dist. #8 - W.P. 181-61.

Attached, we are forwarding to you, our detailed
foundation investigation report dealing with existing subsoil
conditions at the above structure site.

We believe you will find the factual data and
recommendations contained therein, self-explanatory. However,
should further information be desired, please feel free to
contact our Office.

KYL/MdeF
Attach.

cc: Messrs. A. M. Toye (2)
H. A. Fogaskes
H. D. McMillan
J. F. Felt
E. A. Cash
J. A. Granger
J. Bay
T. J. Kovich
E. R. Saint
F. Norman
A. Watt
Foundations Office
Gen. Files.

KYL
K. Y. Lo,
SUPERVISING FOUNDATION ENGR.
For:

A. G. Stermac,
PRINCIPAL FOUNDATION ENGR.

TABLE OF CONTENTS

1. INTRODUCTION.
 2. DESCRIPTION OF THE SITE AND GEOLOGY.
 3. FIELD AND LABORATORY INVESTIGATION.
 4. SUBSOIL CONDITIONS.
 - 4.1 General.
 - 4.2 Silty Clay with Thin Seams of Fine Sand.
 - 4.3 Granite Bedrock.
 5. GROUND WATER CONDITIONS.
 6. DISCUSSIONS AND RECOMMENDATIONS.
 - 6.1 General.
 - 6.2 Pier Foundations.
 - 6.3 Abutment Footings.
 - 6.4 Approach Fills.
 7. SUMMARY.
 8. MISCELLANEOUS.
-

FOUNDATION INVESTIGATION

For

Proposed Flyover where County Road #3,
Line 'A' crosses proposed Hwy. #401,
Line 'G', 1 Mile North of Ivy Lea.

W.P. 181-61 -- W.J. 62-F-102.
District #8.

1. INTRODUCTION:

A request dated July 20/62 for a foundation investigation at the site of the proposed flyover where Cty. Rd. #3, Line 'A', crosses Hwy. #401 Line 'G' 1 Mile North of Ivy Lea, was received from the Bridge Location Section.

A field investigation was carried out by this Section during August 1962, to determine the subsoil conditions at the site of the proposed structure. Presented in this report are the results of this investigation, together with the recommendations pertaining to the design of the structure foundations and approach embankments.

2. DESCRIPTION OF THE SITE AND GEOLOGY:

The proposed structure site is located about 1 mile north of the Village of Ivy Lea, County of Leeds, Twp. of Front, Leeds and Lansdowne, Conc. I, Lot. 18. Physiographically the site lies in an area known as Leeds Knobs and Flats. At the site the landscape consists of bare knobs

cont'd. /2 ...

2. DESCRIPTION OF THE SITE AND GEOLOGY: (Cont'd.) ...

of granite bedrock protruding from clay flats.

3. FIELD AND LABORATORY INVESTIGATIONS:

The field work consists of five sampled boreholes and twelve dynamic cone penetration tests. The boring was carried out by means of conventional diamond drilling equipment adapted for soil sampling purposes.

Samples were recovered by means of a 2" I.D. split spoon sampler and the energy used in driving it conform to the requirements of the Standard Penetration Test. Rock core samples were obtained by means of an AXT core barrel.

The location of the boreholes together with the inferred soil stratigraphy is contained in drawing No. 62-F-102A, of this report.

All samples were visually identified in the field and then returned to the laboratory where further tests were carried out to determine the Atterberg Limits, moisture content, bulk density and grain size distribution. The results of these tests are contained in the Appendix of this report.

4. SUBSOIL CONDITIONS:

4.1 General:

The subsoil at the site consists generally of a thin layer of silty clay covering the granite bedrock.

4.2 Silty Clay with Thin Seams of Fine Sand:

This material was found in all the boreholes varying in thickness from 4 feet in B.H. #10 to 14.5 feet in B.H. #9.

4. SUBSOIL CONDITIONS: (Cont'd.) ...

4.2 Silty Clay with Thin Seams of Fine Sand:

Occasional thin seams of sand were observed in samples from this deposit and are generally less than 1/16" thick. Atterberg Limits determinations of the silt clay stratum indicate that the liquid limit ranges from 32 to 55, with an average value of 44 percent. The plastic limit varies between 19 and 28 with an overall average of 24 percent. The average moisture content is 28 percent. The results of the Atterberg Limits when plotted on a Casagrande Plasticity chart indicate the material to be a clay of intermediate to high plasticity.

The unit weight of this material varies between 119 and 128 p.c.f. with an average of 124 p.c.f. The Standard Penetration Resistances vary from 38 near the surface to 8 with depth and are generally about 12.

4.3 Granite Bedrock:

The bedrock at the site is a red granite with a very irregular surface. At the location of the centre line it protrudes 10 feet above ground level. At the locations of the other footings an attempt was made to define the rock surface accurately by driving cones and taking rock core using an AXT core barrel.

Sound granite bedrock was established in boreholes 6, 8, 10 and 12 by drilling with an AXT core barrel. In all

cont'd. /4 ...

4. SUBSOIL CONDITIONS: (Cont'd.) ...

4.3 Granite Bedrock:

the other boreholes, the rock surface was assumed to be at the refusal depth of either the dynamic cone or the BX casing.

5. GROUND WATER CONDITIONS:

The water levels in the boreholes as recorded at the time of the field investigation have been plotted on the log sheets and Drawing No. 62-F-102A of this report.

Water levels were checked several times during the field investigation and a water table elevation of 314.0 was established at boreholes 6, 8, 9 and 12. In borehole #13, water was encountered at elevation 311.5.

6. DISCUSSIONS AND RECOMMENDATIONS:

6.1 General:

It is proposed to construct a four-span structure, some 40 feet wide with two centre spans of 82 feet and two end spans of 45 feet, to carry County Road #3 (Line 'A') over Hwy. #401 (Line 'G') about 1 mile North of Ivy Lea. The exact location of proposed footings as well as the proposed grades are shown on Drawing No. 62-F-102A.

6.2 Pier Foundations:

Due to the shallow depth of the overburden it is

cont'd. /5 ...

6. DISCUSSIONS AND RECOMMENDATIONS:

6.2 Pier Foundations:

recommended that the footings for the piers be placed directly on the bedrock, if with a safe design load of 20 tons/sq. ft.

Suggested elevations for the footings are as follows:

South Pier	Elev. 311.0 or below.
Centre Pier	Elev. 320.0 or below.
North Pier	Elev. 313.0 or less.

6.3 Abutment Footings:

It is recommended that the abutments be supported on spread footings founded on sound granite bedrock with a safe design load of 20 t.s.f. Suggested elevations for the abutment footings are as follows:

South Abutment	Elev. 317.0 or below.
North Abutment	Elev. 300.0 or below.

In view of the deep excavations required for spread footings at the abutment locations, it is suggested that the abutments be supported on end-bearing piles driven to bedrock. For abutment footings it is believed that 'H' piles driven to bedrock, would be the most suitable.

Because of the sloping nature of the bedrock surface at the north abutment location, some keying of the piles to bedrock is necessary. The piles should penetrate the bedrock for a distance of about 2-3 inches. To achieve this it is

cont'd. /6 ...

6. DISCUSSIONS AND RECOMMENDATIONS: (Cont'd.) ...

6.3 Abutment Footings:

recommended that the design of pile points and driving of piles to rock should be as suggested in the Norwegian Geotechnical Institute Publication No. 23, or Geotechnique VII, Page 73, 1957.

Design loads to be used are dependent on the pile section selected and may be 75 tons in the case of 14BP72.

6.4 Approach Fills:

The proposed grade of County Road #3 (Line 'A') is of approx. elev. 342.0 in which case the maximum height of approach fills will be some 25. Stability problems are not anticipated provided the approach embankments are constructed with side slopes 2 horizontal to 1 vertical.

7. SUMMARY:

1. The subsoil at the site consists of a thin layer of silty clay covering the granite bedrock.
2. It is recommended that the structure be supported on spread footings founded on bedrock with a safe design load of 20 u.s.f. However at the abutment location an alternative utilizing piled foundations is suggested.
3. No approach fill stability problems are anticipated provided the approaches are constructed with side

cont'd. /7 ...

7. SUMMARY: (Cont'd.) ...

slopes 2 horizontal to 1 vertical.

8. MISCELLANEOUS:

The field work, performed during the period from Aug. 21 to Aug. 29, 1962, together with the preparation of this report, was undertaken by Mr. T. F. Widdis. The investigation was carried out under the general supervision of Mr. M. Devata, who also reviewed this report.

The equipment used was owned and operated by the D.H.O.

September 1962.

APPENDIX I.

ABBREVIATIONS USED IN THIS REPORT

PENETRATION RESISTANCE

STANDARD PENETRATION RESISTANCE 'N' - THE NUMBER OF BLOWS REQUIRED TO ADVANCE A STANDARD SPLIT SPOON SAMPLER 12 INCHES INTO THE SUBSOIL, DRIVEN BY MEANS OF A 140 POUND HAMMER FALLING FREELY A DISTANCE OF 30 INCHES.

DYNAMIC PENETRATION RESISTANCE :- THE NUMBER OF BLOWS REQUIRED TO ADVANCE A 2 INCH, 60 DEGREE CONE, FITTED TO THE END OF DRILL RODS, 12 INCHES INTO THE SUBSOIL, THE DRIVING ENERGY BEING 350 FOOT POUNDS PER BLOW.

DESCRIPTION OF SOIL

THE CONSISTENCY OF COHESIVE SOILS AND THE RELATIVE DENSITY OR DENSENESS OF COHESIONLESS SOILS ARE DESCRIBED IN THE FOLLOWING TERMS :-

<u>CONSISTENCY</u>	<u>'N' BLOWS / FT.</u>	<u>c LB. / SQ. FT.</u>	<u>DENSENESS</u>	<u>'N' BLOWS / FT.</u>
VERY SOFT	0 - 2	0 - 250	VERY LOOSE	0 - 4
SOFT	2 - 4	250 - 500	LOOSE	4 - 10
FIRM	4 - 8	500 - 1000	COMPACT	10 - 30
STIFF	8 - 15	1000 - 2000	DENSE	30 - 50
VERY STIFF	15 - 30	2000 - 4000	VERY DENSE	> 50
HARD	> 30	> 4000		

TYPE OF SAMPLE

S.S.	SPLIT SPOON	T.W.	THINWALL OPEN
W.S.	WASHED SAMPLE	T.P.	THINWALL PISTON
S.B.	SCRAPER BUCKET SAMPLE	O.S.	OESTERBERG SAMPLE
A.S.	AUGER SAMPLE	F.S.	FOIL SAMPLE
C.S.	CHUNK SAMPLE	R.C.	ROCK CORE
S.T.	SLOTTED TUBE SAMPLE		
	P.H. SAMPLE ADVANCED HYDRAULICALLY		
	P.M. SAMPLE ADVANCED MANUALLY		

SOIL TESTS

Qu	UNCONFINED COMPRESSION	L.V	LABORATORY VANE
Q	UNDRAINED TRIAXIAL	F.V.	FIELD VANE
Qcu	CONSOLIDATED UNDRAINED TRIAXIAL	C	CONSOLIDATION
Qd	DRAINED TRIAXIAL	S	SENSITIVITY

ABBREVIATIONS USED IN THIS REPORT

SOIL PROPERTIES

γ	UNIT WEIGHT OF SOIL (BULK DENSITY)
γ_s	UNIT WEIGHT OF SOLID PARTICLES
γ_w	UNIT WEIGHT OF WATER
γ_d	UNIT DRY WEIGHT OF SOIL (DRY DENSITY)
γ'	UNIT WEIGHT OF SUBMERGED SOIL
G	SPECIFIC GRAVITY OF SOLID PARTICLES $G = \frac{\gamma_s}{\gamma_w}$
e	VOID RATIO
n	POROSITY
w	WATER CONTENT
S_r	DEGREE OF SATURATION
w_L	LIQUID LIMIT
w_p	PLASTIC LIMIT
I_p	PLASTICITY INDEX
s	SHRINKAGE LIMIT
I_L	LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$
I_c	CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$
e_{max}	VOID RATIO IN LOOSEST STATE
e_{min}	VOID RATIO IN DENSEST STATE
I_D	DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$
	RELATIVE DENSITY D_r IS ALSO USED
h	HYDRAULIC HEAD OR POTENTIAL
q	RATE OF DISCHARGE
v	VELOCITY OF FLOW
i	HYDRAULIC GRADIENT
k	COEFFICIENT OF PERMEABILITY
j	SEEPAGE FORCE PER UNIT VOLUME
m_v	COEFFICIENT OF VOLUME CHANGE = $\frac{-\Delta e}{(1+e)\Delta\sigma}$
c_v	COEFFICIENT OF CONSOLIDATION
C_c	COMPRESSION INDEX = $\frac{\Delta e}{\Delta \log_{10} \sigma}$
T_v	TIME FACTOR = $\frac{c_v t}{d^2}$ (d, DRAINAGE PATH)
U	DEGREE OF CONSOLIDATION
τ_f	SHEAR STRENGTH
c'	EFFECTIVE COHESION
ϕ'	EFFECTIVE ANGLE OF SHEARING RESISTANCE, OR FRICTION
c_u	APPARENT COHESION
ϕ_u	APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION
μ	COEFFICIENT OF FRICTION
S_t	SENSITIVITY

GENERAL

π	= 3.1416
e	BASE OF NATURAL LOGARITHMS 2.7183
$\log_e a$ OR $\ln a$	NATURAL LOGARITHM OF a
$\log_{10} a$ OR $\log a$	LOGARITHM OF a TO BASE 10
t	TIME
g	ACCELERATION DUE TO GRAVITY
V	VOLUME
W	WEIGHT
M	MOMENT
F	FACTOR OF SAFETY

STRESS AND STRAIN

u	PORE PRESSURE
σ	NORMAL STRESS
σ'	NORMAL EFFECTIVE STRESS ($\bar{\sigma}$ IS ALSO USED)
τ	SHEAR STRESS
ϵ	LINEAR STRAIN
γ	SHEAR STRAIN
ν	POISSON'S RATIO (μ IS ALSO USED)
E	MODULUS OF LINEAR DEFORMATION (YOUNG'S MODULUS)
G	MODULUS OF SHEAR DEFORMATION
K	MODULUS OF COMPRESSIBILITY
η	COEFFICIENT OF VISCOSITY

EARTH PRESSURE

d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
δ	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
K_0	COEFFICIENT OF EARTH PRESSURE AT REST

FOUNDATIONS

B	BREADTH OF FOUNDATION
L	LENGTH OF FOUNDATION
D	DEPTH OF FOUNDATION BENEATH GROUND
N	DIMENSIONLESS COEFFICIENT USED WITH A SUFFIX APPLYING TO SPECIFIC GRAVITY, DEPTH AND COHESION ETC. IN THE FORMULA FOR BEARING CAPACITY
k_s	MODULUS OF SUBGRADE REACTION

SLOPES

H	VERTICAL HEIGHT OF SLOPE
D	DEPTH BELOW TOE OF SLOPE TO HARD STRATUM
β	ANGLE OF SLOPE TO HORIZONTAL

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS & RESEARCH DIVISION		RECORD OF BOREHOLE NO. 3		FOUNDATION SECTION	
JOB <u>62-F-102</u>	LOCATION <u>1750 26.0' Rt.</u>	ORIGINATED BY <u>T.F.W.</u>			
W.P. <u>181-61</u>	BORING DATE <u>Aug. 22, 1962.</u>	COMPILED BY <u>T.F.W.</u>			
DATUM <u>G.S.C.</u>	BOREHOLE TYPE <u>Dynamic Cone Penetration Test.</u>	CHECKED BY _____			

SOIL PROFILE			SAMPLES			ELEV SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 SHEAR STRENGTH P.S.F.	LIQUID LIMIT ——— W _L PLASTIC LIMIT ——— W _P WATER CONTENT ——— W W _P ——— W _L WATER CONTENT %	BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT					
324.6 0.0	Groundlevel									
318.1 6.5	Probable Bedrock.						Complete Refusal			

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 4

FOUNDATION SECTION

JOB 62-F-102 LOCATION 17430 16.0 Lt. ORIGINATED BY T.F.W.
W.P. 181-61 BORING DATE Aug. 23, 1962. COMPILED BY T.F.W.
DATUM G.S.C. BOREHOLE TYPE Dynamic Cone Penetration Test. CHECKED BY _____

SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — WL PLASTIC LIMIT — WP WATER CONTENT — W		BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	BLOWS / FOOT 20 40 60 80 100 SHEAR STRENGTH P.S.F.				WATER CONTENT %		
324.1 0.0	Groundlevel												
320.1 4.0	Probable Bedrock.					320		Complete Refusal					
						310							
						300							

FOUNDATION SECTION

ORIGINATED BY T.F.W.

COMPILED BY T.F.W.

CHECKED BY :

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS & RESEARCH DIVISION			RECORD OF BOREHOLE NO. 6					FOUNDATION SECTION		
JOB 62-F-102			LOCATION 17416 16.0 Rt.					ORIGINATED BY T.F.W.		
W.P. 181-61			BORING DATE Aug. 23, 1962.					COMPILED BY T.F.W.		
DATUM G.S.C.			BOREHOLE TYPE Washborings NX Casing.					CHECKED BY		

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — *L PLASTIC LIMIT — *P WATER CONTENT — *W			BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS, FOOT	ELEV. SCALE	BLOWS / FOOT 20 40 60 80 100	SHEAR STRENGTH P.S.F.		WATER CONTENT % 20 40 60					
324.0 0.0	Groundlevel														
	Grey stiff silty clay with thin seams of fine sand.					320									
			1	SS	12									119	
			2	SS	12									128	
311.0 13.00	Granite Bedrock.					310			Complete Refusal						
306.0 18.00	End of borehole.					300									

S.H. dry to 10.0' where collapsed.

RECORD OF BOREHOLE NO. 7

FOUNDATION SECTION

JOB 62-F-102 LOCATION 15/28 12.0' Lt. ORIGINATED BY T.F.W.
W. P. 181-61 BORING DATE Aug. 24, 1962. COMPILED BY T.F.W.
DATUM G.S.C. BOREHOLE TYPE Dynamic Cone Pen. Test. CHECKED BY _____

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT ——— WL		BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	BLOWS / FOOT		PLASTIC LIMIT ——— WP			
						20 40 60 80 100		WATER CONTENT ——— W			
						SHEAR STRENGTH P.S.F.		Wp ——— W ——— WL			
		WATER CONTENT %									
016.2 0.0	Groundlevel										
010.95 5.25	Probable Bedrock.					310	Complete Refusal				
						300					

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 8

FOUNDATION SECTION

JOB 62-F-102 LOCATION 15418 50' Rt. ORIGINATED BY T.F.W.
W.P. 181-61 BORING DATE Aug. 24, 1962. COMPILED BY T.F.W.
DATUM G.S.C. BOREHOLE TYPE Washboring NX Casing. CHECKED BY _____

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT ——— WL		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT	BLOWS / FOOT	BLOWS / FOOT	BLOWS / FOOT	PLASTIC LIMIT ——— WP	WATER CONTENT ——— W	WATER CONTENT %		
316.6 0.0	Grey stiff silty clay.	1	SS	31	310									<p>W.L. 5"</p>
306.1 10.5														
297.6 19.0	Granite Bedrock.				300									
	End of borehole.				290									

81-4391

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO 9

FOUNDATION SECTION

JOB 62-F-102 LOCATION 15+11 15.0' Rt. ORIGINATED BY T.F.W.
W.P. 181-61 BORING DATE Aug. 24, 1962. COMPILED BY T.F.W.
DATUM G.S.C. BOREHOLE TYPE Washboring NX Casing. CHECKED BY _____

SOIL PROFILE		SAMPLES			ELEV SCALE	DYNAMIC PENETRATION RESISTANCE	LIQUID LIMIT — WL		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT	PLASTIC LIMIT — WP	WATER CONTENT — W		
						20 40 60 80 100	WATER CONTENT %		P.C.F.	
316.90	Groundlevel									
0.0	Hard to stiff silty clay with thin seams of fine sand.	1	SS	38	310.0					w.l. 3.0
		2	SS	12						
		3	SS	8						
302.40	End of borehole. Bedrock.				300.0	Complete Refusal				Cone Hole is 2.0' away from borehole.
14.5					290.0					

FOUNDATION SECTION

308.3	
8.5	End of borehole.

Complete Refusal

320

300

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT ——— W _L		BULK DENSITY P.C.F.	REMARKS			
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV SCALE	BLOWS / FOOT	PLASTIC LIMIT ——— W _P						
							20	40	60			80	100	WATER CONTENT ——— W
							SHEAR STRENGTH P.S.F.					W _P	W	W _L
								WATER CONTENT %						
316.9	Ground level													
0.0														
312.4														
4.5	Probable Bedrock.					310								
						300								

FOUNDATION SECTION

17.5	Groundlevel	1 SS 13		
0.0	Stiff silty clay with thin seams of fine sand.			
312.5	Granite bedrock.	310	Complete refusal	
5.0				
305.2				
12.25	End of borehole.			

DEPARTMENT OF HIGHWAYS - ONTARIO
 MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 13

FOUNDATION SECTION

JOB 62-F-102 LOCATION 14/86 30' Rt. ORIGINATED BY T.F.W.
 W.P. 181-61 BORING DATE Aug. 28, 1962. COMPILED BY T.F.W.
 DATUM _____ BOREHOLE TYPE Washboring NW CHECKED BY _____

SOIL PROFILE		SAMPLES			ELEV SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT _____ % PLASTIC LIMIT _____ % WATER CONTENT _____ %		BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE		BLOWS / FOOT	SHEAR STRENGTH P.S.F.	W.P.	W.L.		
315.5	Groundlevel										
	Very stiff, silty clay with thin seams of fine sand.		1	SS		26					
9.0											
306.0	Fine to medium sand.		2	SS		70					
9.5	End of borehole.										

W.L.
4"

Mr. A. P. Watt,
Bridge Location Engr.,
Bridge Division.

Mr. A. G. Stermac,
Principal Foundation Engr.,
Foundation Section,
Materials & Research Division.

February 12, 1963

Your Memo - February 7, 1963.

W.P. 181-61, Bridge Site 17-155,
Lansdowne Road Underpass,
at the relocated County Road to Lansdowne,
Hwy. 401, District 8. (Review of Prelim. Plan.)

Bedrock at the above-mentioned site is found at different elevations. In some places - even at short horizontal distances - the depth to bedrock varies quite considerably.

The Consultant has given definite elevations for the bridge pier footings. Some of these elevations are based on the bedrock elevations obtained by interpolation between two boreholes. We consider this as only approximate, and have therefore, suggested (and the Consultant has agreed), that a special note be put on the drawing, or into the Contract. This note will emphasize the fact that bedrock might not be found at the predicted elevation and that additional excavating might therefore, be necessary.

AGS/MdeF

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

cc: Foundations Office
Gen. Files

MEMORANDUM

To: Mr. A.G. Stermac
Principal Foundations Engineer,
Room 107, Lab. Bldg.,

FROM: A.P. Watt

Bridge Division,
DATE: February 7, 1963.

OUR FILE REF.

IN REPLY TO

SUBJECT: WP #181-61, Bridge Site 17-155,
Lansdowne Rd. Underpass,
at the relocated County Road to Lansdowne,
Hwy 401, District 8.

Enclosed please find one copy of the preliminary plan for the above structure.

The designer appears to have complied with the requirements of the foundation report but we would appreciate any comments you wish to make.

APW/dm



A.P. WATT,
Bridge Location Engineer,