

Mr. A. Teye.

May 29th, 1958.

Bridge Engineer.

W.P. 33-50

Materials & Research.

W.D. F-50-11.

Foundation Report on New Bridge
at Highway #401 and County Road
Crossing, one mile north of
Campbellville, Lot 7 (Con. III
& IV) Township of Massagawega.

We are forwarding herewith two copies of the above
mentioned Foundation Report for your information, which you
will find self-explanatory.

F. C. BROWBRIDGE.
Materials & Research Engineer.

Per:



A. BUTEA.
Principal Soils Engineer.

c.c. Mr. A. Teye.
Mr. H. Tregaskes.
Mr. D.C. Ramsay.
Mr. H.E. Richardson.
Mr. A. Watt.
Dr. P. Karrow.
Foundation Section. ✓
Files.

FOUNDATION REPORT

ON

NEW BRIDGE AT HIGHWAY 401 AND COUNTY
ROAD CROSSING, ONE MILE NORTH OF CAMPBELLVILLE,
LOT 7 (CON.III & IV) TOWNSHIP OF NASHAGAWDOGA

Plan No. F-3523-13

Station No.188/60

Distribution:

Mr. A. Toye Bridge Engineer	(2)
Mr. H. Tregaskes Construction Engineer	(1)
Mr. D. C. Ramsay Design Engineer	(1)
Mr. A. E. Richardson Dist. Engr. Hamilton	(1)
Mr. A. Watt Water Resources Commission	(1)
Dr. P. Karrow Department of Mines	(1)
Foundation Section	(1)
File	(1)

W. P. 33-58

W. J. P-58-11

INTRODUCTION:

The report covers the foundation investigations carried out to determine the bearing values of subsoil layers for supporting the foundations of the proposed bridge.

The site is located at about one mile north of Campbellville where the new highway No. 401 underpasses the existing county road, lot 7, (con. III & IV) Township of Nassagawaya, Halton County, (station 188/60, profile No. F-3523-12).

The job started on April 14, 1958, and was completed on April 24, 1958.

DESCRIPTION OF SITE AND FIELD WORK:

The site is in the area referred to as Flamborough Plain. It is basically limestone plain with bouldery glacial till or sand and gravel as overburden. The surface topography is characterized with scattered drumlins and swamps and spotted limestone outcrops.

The subsoil investigations were carried out by means of a skid mounted coredrill machine. In the course of investigations four boreholes were made. The boreholes were advanced by alternately driving and washing the BX casing. Except in borehole No. 1, where below elevation 955 ft. the casing was drilled by the use of a BX casing shoe. During this operation samples were extracted and standard penetration resistance was registered. By driving 2" diameter cone from ground surface down to refusal the dynamic cone penetration profiles were established. The boreholes were stopped after

~~For~~ bedrock was encountered at depths shown on log sheets. The location of the boreholes is shown on drawing No. F-57-50A, and their elevations on log sheets under Appendix I.

FIELD AND LABORATORY FINDINGS:

The investigations carried out at this site revealed the following subsoil stratigraphy.

Under the topsoil it is one fairly uniform layer of gravel and sandy loam. At elevation 938 ft. in borehole no. 2 some 2 ft. thick layer of 80% silty loam was encountered.

The layer is also spotted with various sizes of boulders all across the section. Underlying this layer is the bedrock which was encountered in borehole nos. 2, 3, 4 at elevations 932 ft., 934 ft., and 933 ft. respectively. The borehole no. 1 was placed on an elevated ground and after drilling the BX casing, with a BX casing shoe, down to elevation 934.5 ft. the operation was considered sufficient and stopped.

The bedrock was drilled by means of AXT diamond bit and core samples extracted. From laboratory analysis the bedrock was identified as pitted Dolomite.

The samples tested at the laboratory gave the textural composition of the subsoil encountered in the boreholes as tabulated below:

	<u>Binder</u>	<u>Fine Aggregate</u>	<u>Coarse Aggregate</u>
B.H.No. 1	13%	30%	53%
2	13%	40%	47%
3	20%	34%	46%
4	10%	28%	62%

The natural moisture content of the layer was measured to be 8% - 10%. The nature of the soil prevented the performing of any other reliable tests in the laboratory. The soil in the layer is considered to be nonplastic and inorganic.

SUPPORT OF THE ABUTMENTS:

The new highway no. 401 is underpassing the existing gravel road at this crossing. The surface elevation of the new highway will be lowered to elevation 952.5 ft. It is presumed that the bridge will be supported on 7 ft. wide continuous footings and the footings will be placed at about elevation 945 ft. (allowing some 7.5 ft. for ditching and frost). The soil in the layer is considered to be nonplastic, granular and bearing values were derived from standard penetration tests. According to the bulb pressure distribution, the stressed layer is in between the elevation where the footing will be placed (945 ft.) and the elevation at a depth of twice the width of the footing (931 ft.). The average bearing value in this depth interval, derived from standard penetration test results is more than 3 T.S.F. for one inch maximum settlement. It will be seen that if desired the footings could be placed on bedrock where ample bearing values will be available.

CONCLUSIONS AND RECOMMENDATIONS:

From the above discussion it will follow that:

1. The subsoil at this site is one layer of fairly

uniform gravel and sandy loam, spotted with various sizes of boulders. A 2 ft. thick layer of 80% silty loam was encountered at elevation 938 ft. in borehole No. 2.

2. The layer is considered to be made up of nonplastic, granular material and bearing values were derived from standard penetration test results.
3. It is assumed that the structure will be supported on continuous footings placed at about elevation 945 ft. At this elevation the layer can provide a minimum bearing value of 3 T.S.F. for one inch settlement. If desired the bedrock will provide ample bearing value.
4. The approach fills to the new structure do not present any stability problem.

V. Korlu,
Foundation Engineer.

APPENDIX I.

MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW
OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG 54-2 OPERATION BORE & PENET'N JOB F-58-11 WP 33-58 BORING STA. 188+20 (42' LT.)
CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT MAY 1958
SAMPLER HAMMER WT. 250 LBS. DROP 18 INCHES COMPILED BY H.S. CHECKED BY AL DATE BORING APRIL 15 1958

ABBREVIATIONS

ABBREVIATIONS

V - INSITU VANE SHEAR TEST	Q - TRIAXIAL QUICK	K - PERMIABILITY
M - MECHANICAL ANALYSIS	S - TRIAXIAL SLOW	C - CONSOLIDATION
U - UNCONFINED COMPRESSION	WL - WATER LEVEL IN CASING	CA - CASING
D - TRIAXIAL CONSOLIDATED QUICK	WT - WATER TABLE IN SOIL	γ - UNIT WEIGHT

SAMPLE TYPES

SAMPLE TYPES	
C.S. - CHUNK	S.S. - SLEEVE SAMPLE
D.O. - DRIVE OPEN	P.S. - PISTON SAMPLE
D.F. - DRIVE FOOT VALVE	W.S. - WASHED SAMPLE
T.O. - THIN WALLED OPEN	R.C. - ROCK CORE

SAMPLE CONDITION

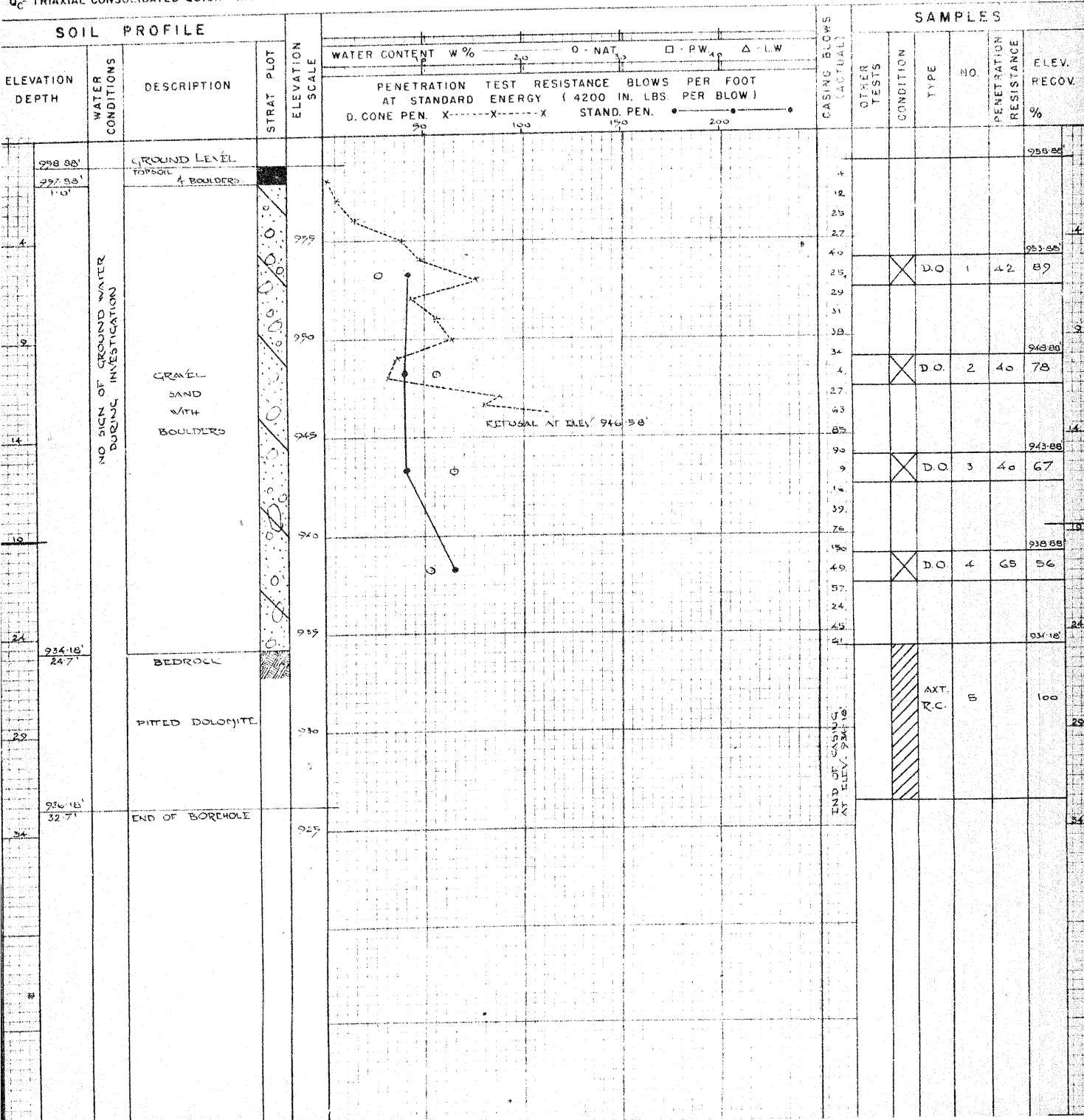
- DISTURBED
- FAIR
- GOOD
- LOST

SON PROFILE

[illegible]

DRILL RIG 54-2 OPERATION BORE & PENET'N JOB 1-58-11 W.P. 34-56 BORING 3 STA. 184+96 (45 RT)
CASING 3X (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT MAY 1958
SAMPLER HAMMER WT. 250 LBS. DROP 18 INCHES COMPILED BY H.O. CHECKED BY N.L. DATE BORING 19 APRIL 1958
SAMPLE CONDITION

ABBREVIATIONS			SAMPLE TYPES		SAMPLE CONDITION	
V - INSITU VANE SHEAR TEST	Q - TRIAXIAL QUICK	K - PERMIABILITY	C.S. - CHUNK	S.S. - SLEEVE SAMPLE		- DISTURBED
M - MECHANICAL ANALYSIS	S - TRIAXIAL SLOW	C - CONSOLIDATION	D.O. - DRIVE OPEN	P.S. - PISTON SAMPLE		- FAIR
U - UNCONFINED COMPRESSION	WL - WATER LEVEL IN CASING	CA - CASING	D.F. - DRIVE FOOT VALVE	W.S. - WASHED SAMPLE		- GOOD
Q.C. - TRIAXIAL CONSOLIDATED QUICK	WT - WATER TABLE IN SOIL	γ - UNIT WEIGHT	T.O. - THIN WALLED OPEN	R.C. - ROCK CORE		- LOST



DRILL RIG 54-2 OPERATION BORE & PENETR JOB 108-11 WP 33.55 BORING 4 STA. 189104 (45' LT)
CASING DX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT MAY 1958
SAMPLER HAMMER WT. 250 LBS. DROP 10 INCHES COMPILED BY JG CHECKED BY AL DATE BORING 23 APRIL 1958

SAMPLE TYPES

SAMPLE CONDITION

V - INSITU VANE SHEAR TEST	Q - TRIAXIAL QUICK	K - PERMIABILITY	CS - CHUNK	SS - SLEEVE SAMPLE
M - MECHANICAL ANALYSIS	S - TRIAXIAL SLOW	C - CONSOLIDATION	DO - DRIVE OPEN	PS - PISTON SAMPLE
U - UNCONFINED COMPRESSION	WL - WATER LEVEL IN CASING	CA - CASING	DF - DRIVE FOOT VALVE	WS - WASHED SAMPLE
Q - TRIAXIAL CONSOLIDATED QUICK	WT - WATER TABLE IN SOIL	γ - UNIT WEIGHT	TO - THIN WALLED OPEN	RC - ROCK CORE

- DISTURBED
- FAIR
- GOOD
- BEST

SAMPLES

[illegible]

#58-F-11

WP. #33-58

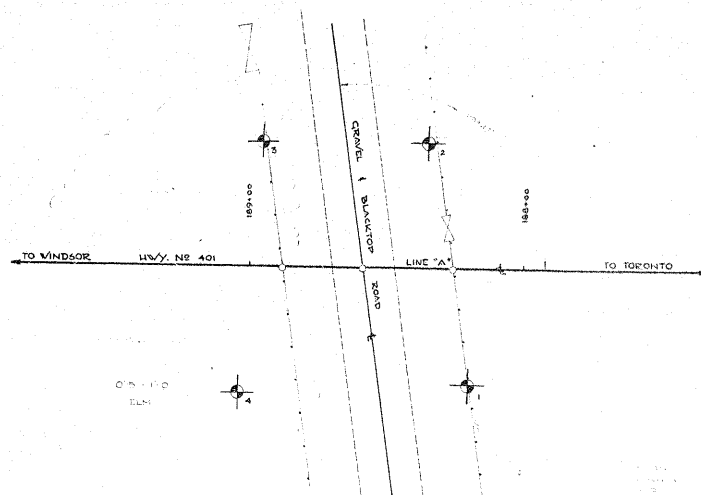
HWY. #401 &

COUNTY ROAD

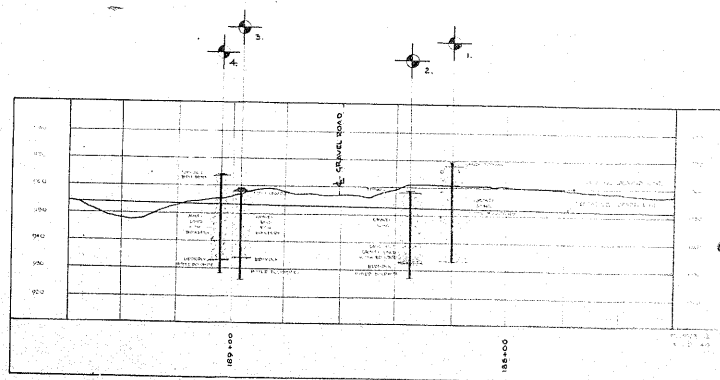
CROSSING



SOME DEFECTS IN NEGATIVE DUE
TO CONDITION OF ORIGINAL DOCUMENTS



PLAN



PROFILE

LEGEND			
EXIST. ROAD			
PROPOSED ROAD			
ROAD CROSSING			
ROAD TO GRAVEL ROAD			
1	189+00	188+00	187+00
2	188+00	187+00	186+00
3	187+00	186+00	185+00
4	186+00	185+00	184+00

THE FOUNDATION SECTION FOR GRAVEL ROAD
SHOWN ON THIS DRAWING IS BASED ON
THE DATA OBTAINED FROM THE FIELD SURVEY
AND IS NOT TO BE USED FOR ANY OTHER
PURPOSE WITHOUT THE WRITTEN CONSENT
OF THE ENGINEER.

DEPARTMENT OF HIGHWAYS - ONTARIO		
MATERIALS & RESEARCH SECTION - DOWNSVIEW		
GRAVEL ROAD PROPOSED CROSSING 3.5 MILES W. OF MILTON HEIGHTS SHOWING POSITION & ELEVATION OF HOLES		
H.W. NO. 401 CO. HALTON T.W.P. NASSAGAWATYA	V.P. 33-88 LOT - 7	DIV. NS 4 CONS. 11 & 12
SCALE 1 IN. = 20 FT.	SUBMITTED BY	DATE 12 MAY 1950
DRAWN BY A. B.	APPROVED BY	DRAWING NO. T-55-11A