#58-F-13

W.P. #34-58

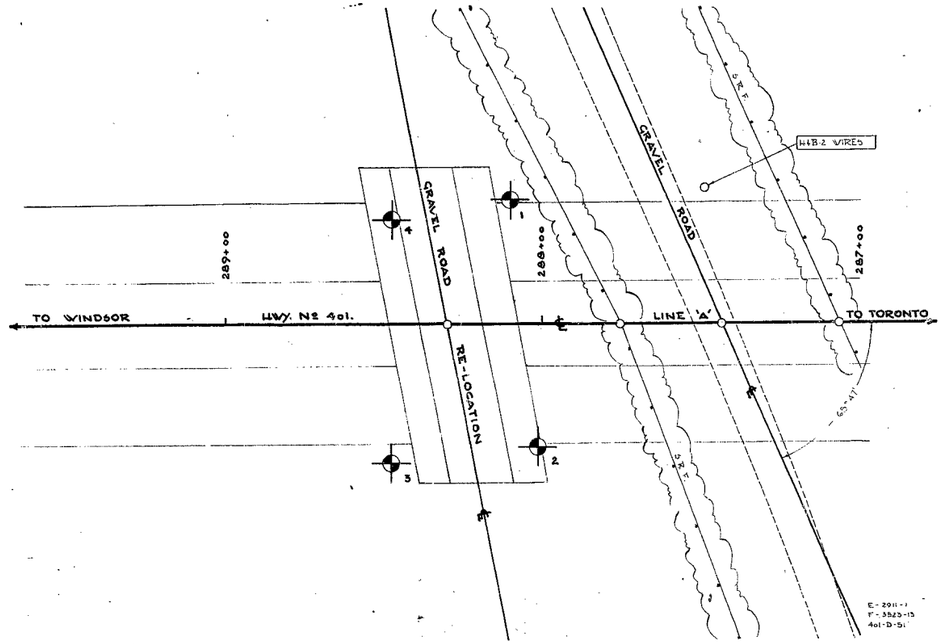
Hwy #401

GRAVEL RD. REVISION

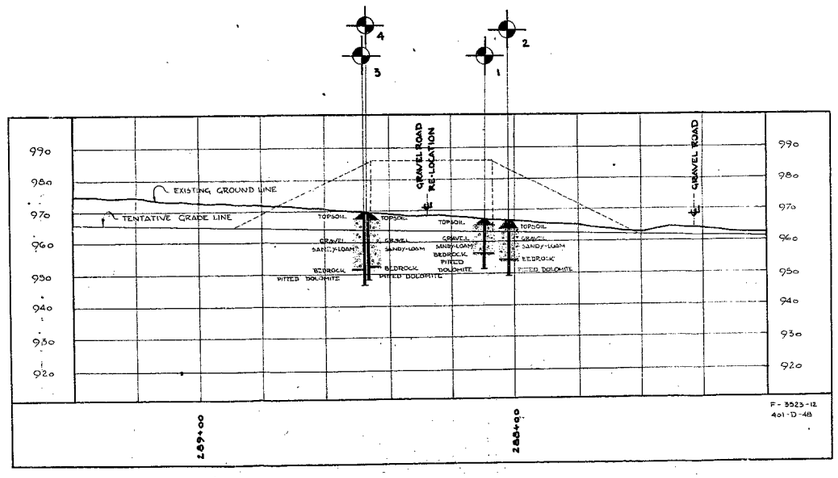
2 MI. W. OF

CAMPBELLVILLE

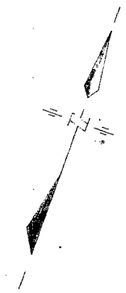
NASSAGAWEYA



PLAN



PROFILE



LEGEND

- AUGER HOLE
- BORE HOLE
- PENETRATION HOLE
- BORE & PENETRATION HOLE

HOLE Nº	ELEVATION	STATION	DISTANCE FROM ℄
1	967.57'	288+10	39' RT.
2	966.45'	288+02	39' LT.
3	960.87'	288+48	44' LT.
4	969.13'	288+47	39' 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 - DOWNSVIEW.

GRAVEL ROAD PROPOSED CROSSING 2 MILES W. OF CAMPBELLVILLE.

SHOWING POSITION & ELEVATION OF HOLES.

HWY. Nº 401	W.P. 34-58.	DIV. Nº 4.
CO. HALTON.		
TWP. NASSAGAWEYA.	LOT-8 & 9	CONS. I & II.
SCALE 1 IN = 20 FT.	SUBMITTED BY	DATE 14 MAY 1958.
DRAWN BY A. B.	APPROVED BY	DRAWING Nº F-58-13 A.

FOUNDATION REPORT

ON

NEW BRIDGE AT HIGHWAY 401 AND

GRAVEL ROAD REVISION CROSSING, 2

MILES WEST OF CAMPBELLVILLE (CON.I&II)

TOWNSHIP OF NASSAGAWEYA

Plan No. F-3523d13

Station No:288/30

Distribution:

Mr. A. Toye,
Bridge Engineer (2)

Mr. H. Tregaskes
Construction Engineer (1)

Mr. D. G. Ramsay
Design Engineer (1)

Mr. R. E. Richardson
Dist.Eng.Hamilton (1)

Mr. A. Watt
Water Resources Commission (1)

Dr. P. Karrow
Department of Mines (1)

Foundation Section (1)

File (1)

W.F. [illegible]58

W.O. F-[illegible]3

INTRODUCTION:

A subsoil investigation was carried out to determine the bearing values of the subsoil layers for supporting the foundations of the proposed structure.

The site is located at about 2 miles west of Campbellville where the new highway no. 401 underpasses the proposed gravel road Revision between con. I & II in the Township of Nassagaweya. (station 268/30, profile No. F-3523-12).

The job started on April 25, 1958 and was completed on May 2, 1958.

DESCRIPTION OF SITE AND FIELD WORK:

The site is located 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 characterised by scattered drumlins, wooded swamps, and spots of limestone outcrop. (One such outcrop exists some 200 ft. west of the investigation site).

The subsoil investigation was 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. During this operation samples were extracted and standard penetration resistence 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 bedrock was encountered at depths shown on log sheets.

The locations of the boreholes is shown on drawing no. F-58-13A 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 down to bedrock it is one layer of gravel and sandy loam spotted with various sizes of boulders. Underlying this layer is bedrock which was encountered in all four boreholes. The bedrock was drilled by means of AXT diamond bit and core samples were 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:

	Binder	Fine Agg.	Coarse Agg.
B. H. No. 1	30%	39%	31%
2	19%	23%	58%
3	30%	30%	40%
4	20%	33%	47%

The natural moisture of the layer was measured to be 8%. 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 proposed

gravel road R vision at this crossing. According to the new grade line the surface elevation of the new highway will be lowered to elevation 964 ft. It is presumed that the new structure will be supported on 7 ft. wide continuous footings and that these footings will be placed at about elevation 958 ft. (allowing some 6 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 (958 ft.) and the elevation at a depth of twice the width of the footing (944 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 the proposed elevation for placing the footings is some 2 to 6 ft. above the encountered bedrock. 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 gravel and sandy loam, spotted with various sizes of boulders.

2. The layer is considered to be made up of nonplastic, granular material. The bearing values were derived from standard penetration test results.

3. It would possibly be desirable to place the footings at elevation 958 ft. in which case the bearing value of 3 T.s.f. for one inch settlement could be used. However, in view of the proximity of the bedrock, it would appear more appropriate to place the footings on the bedrock where ample bearing value will be available.

4. The approach fills to the new structure do not present any stability problem.

V. Korlu,
Foundation Engineer.

APPENDIX I.

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION -, DOWNSVIEW

OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG 54-5 OPERATION BORE & PENETN JOB T-58-13 WP 34-58 BORING 1 STA. 288+16 (32 RT)

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 A.L. DATE BORING 25 APRIL 1958

ABBREVIATIONS

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

SAMPLE TYPES

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

SAMPLE CONDITION

- DISTURBED
- FAIR
- GOOD
- LOST

ELEVATION DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE
967.87'		GROUND LEVEL		
2.0 963.87'	NO SIGN OF GROUND WATER DURING INVESTIGATION	TOPSOIL		
		GRAVEL - SANDY LOAM		965
				960
10.7' 956.87'		BEDROCK		
		PITTED DOLOMITE		955
15.7' 951.87'		END OF BOREHOLE		
				950

WATER CONTENT W % 10 20 30 40 ○ - NAT. □ - P.W. △ - L.W.

PENETRATION TEST RESISTANCE BLOWS PER FOOT AT STANDARD ENERGY (4200 IN. LBS. PER BLOW)

D CONE PEN. X------X------X 50 100 150 200 STAND. PEN. ●——○——● 100 200

REFUSAL AT ELEV. 959.87'

END OF CASING AT ELEV. 956.87'

CASING BLOWS (ACTUAL)	OTHER TESTS	CONDITION	TYPE	NO.	PENETRATION RESISTANCE	ELEV. RECOV. %
						967.87
4						
3						
6						
9						
22						962.87
8	T 1162 lbs.		S.S.	1	27	61
22						
46						
97						
82						957.87
38			D.O.	2		75
			AXT. R.C.	3		100

FORM OB-ML-126

M.D.R.

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW

OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG 54-5 OPERATION BORE & PENET'N JOB F-58-13 WP 34-58 BORING 2 STA. 266+92 (32 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 W.G. CHECKED BY A.L. DATE BORING 29 APR. 1958

ABBREVIATIONS

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

SAMPLE TYPES

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

SAMPLE CONDITION

- DISTURBED
- FAIR
- GOOD
- LOST

SOIL PROFILE

ELEVATION DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE
966.48'		GROUND LEVEL		
1.5 / 964.45' 2.0'	NO SIGN OF GROUND WATER DURING INVESTIGATION	TOPSOIL		965
6.5		GRAVEL-SANDY-LOAM		960
11.5 / 954.75' 11.7'		BEDROCK PITTED DOLOMITE		955
16.5 / 949.78' 16.7'		END OF BOREHOLE		950
21.5				945

WATER CONTENT W % — 10 — 20 — ○ - NAT. — 30 — □ - P.W. — 40 — △ - L.W.

PENETRATION TEST RESISTANCE BLOWS PER FOOT AT STANDARD ENERGY (4200 IN. LBS. PER BLOW)

D. CONE PEN. X-------X-------X 50 100 150 STAND. PEN. ●——●——● 200

ABSOLUTE REFUSAL AT ELEV 955.75'

CASING BLOWS (ACTUAL)
4
6
13
16
18
38
54
22
7
75
29

END OF CASING AT ELEV 954.75'

SAMPLES

OTHER TESTS	CONDITION	TYPE	NO.	PENETRATION RESISTANCE	ELEV. RECOV. %
					966.48
					961.48
	X	S.S.	1	24	POOR
					954.75
		AXT. R.C.	2		80

FORM OB-ML-126 H.D.R.

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW

OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG 54-5 OPERATION BORE & PENET'N JOB F-58-13 W.P. 34-58 BORING 3 STA. 288+48 (44' LT

CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT MAY 1958

SAMPLER HAMMER WT. 280 LBS. DROP 18 INCHES COMPILED BY H.G. CHECKED BY A.L. DATE BORING 30 APR. 1958

ABBREVIATIONS

V - INSITU VANE SHEAR TEST; M - MECHANICAL ANALYSIS; U - UNCONFINED COMPRESSION; Q_C - TRIAXIAL CONSOLIDATED QUICK; Q - TRIAXIAL QUICK; S - TRIAXIAL SLOW; W.L - WATER LEVEL IN CASING; W.T. - WATER TABLE IN SOIL; K - PERMIABILITY; C - CONSOLIDATION; CA. - CASING; γ - UNIT WEIGHT

SAMPLE TYPES

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

SAMPLE CONDITION

- DISTURBED
- FAIR
- GOOD
- LOST

ELEVATION DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE
968.87'		GROUND LEVEL		
967.87' 1.0'	NO SIGN OF GROUND WATER DURING INVESTIGATION.	TOPSOIL		
		GRAVEL SANDY LOAM		965
				960
				955
951.87' 17.0'		BEDROCK PITTED DOLOMITE		950
946.87' 22.0'		END OF BOREHOLE		945

WATER CONTENT W % — ○ - NAT. □ - P.W. △ - L.W.

PENETRATION TEST RESISTANCE BLOWS PER FOOT AT STANDARD ENERGY (4200 IN. LBS. PER BLOW)

D. CONE PEN. X-------X-------X STAND. PEN. ●——●——● 50 100 150 200

CASING BLOWS (ACTUAL)

ABSOLUTE REFUSAL AT ELEV. 952.17'

END OF CASING AT EL. 951.87'

SAMPLES	OTHER TESTS	CONDITION	TYPE	NO.	PENETRATION RESISTANCE	ELEV. RECOV. %
						968.87
		X	D.O.	1	16	44
						963.87
			DRILLED			
			V.S.			953.87
			AXT. R.C.	2		95

FORM OB-ML-126 H.D.R.

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW

OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG 54-5 OPERATION BORE & PENET'N JOB F-58-13 W.P. 34-58 BORING 4 STA. 288+47 (33' RT.)

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 A.L. DATE BORING 1 MAY 1958

ABBREVIATIONS

V - INSITU VANE SHEAR TEST
M - MECHANICAL ANALYSIS
U - UNCONFINED COMPRESSION
Q_C - TRIAXIAL CONSOLIDATED QUICK
Q - TRIAXIAL QUICK
S - TRIAXIAL SLOW
WL - WATER LEVEL IN CASING
WT. - WATER TABLE IN SOIL
K - PERMIABILITY
C - CONSOLIDATION
CA. - CASING
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SAMPLE TYPES

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

SAMPLE CONDITION

- DISTURBED
- FAIR
- GOOD
- LOST

SOIL PROFILE								SAMPLES					
ELEVATION / DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE	WATER CONTENT W% (10, 20, 30, 40) O - NAT. □ - P.W. Δ - L.W.	CASING BLOWS (ACTUAL)	OTHER TESTS	CONDITION	TYPE	NO.	PENETRATION RESISTANCE	ELEV. RECOV. %
PENETRATION TEST RESISTANCE BLOWS PER FOOT AT STANDARD ENERGY (4200 IN. LBS. PER BLOW) D. CONE PEN. X-------X-------X STAND. PEN. •——•——• (50, 100, 150, 200)													
969.13'		GROUND LEVEL											969.13
967.63' / 1.5'	NO SIGN OF GROUND WATER DURING INVESTIGATION	TOP SOIL				5							
		GRAVEL - SANDY LOAM		965		2							
						14							
						9							
						10							964.13
						70		X	D.O.	1	18	67	
						21							
				960	REFUSAL AT ELEV. 960.03'	29							
						62							
						100							959.43
						113		X	D.O.	2			
						98							
						176							
				955		124							
						116							
						166 / 50							952.63
952.63' / 16.3'		BEDROCK							AXT. R.C.	3		100	
		DITTED DOLOMITE		950		END OF CASING AT ELEV. 952.83							
948.33' / 20.8'		END OF BOREHOLE											
				945									