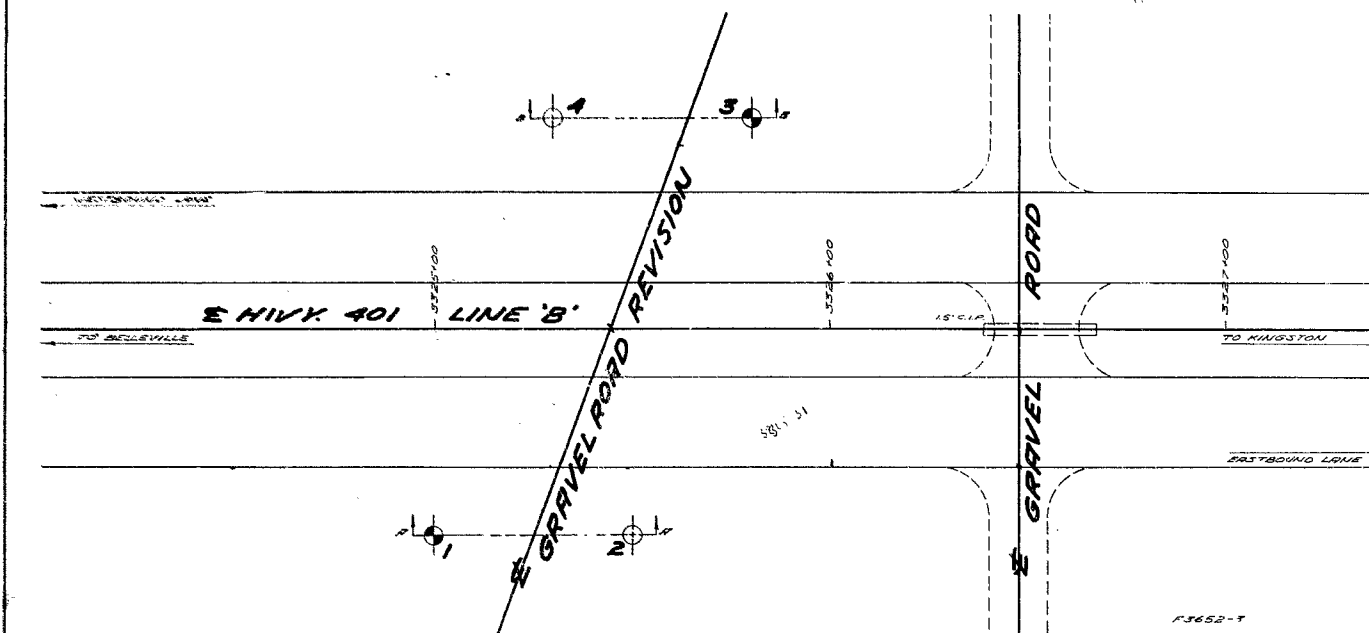
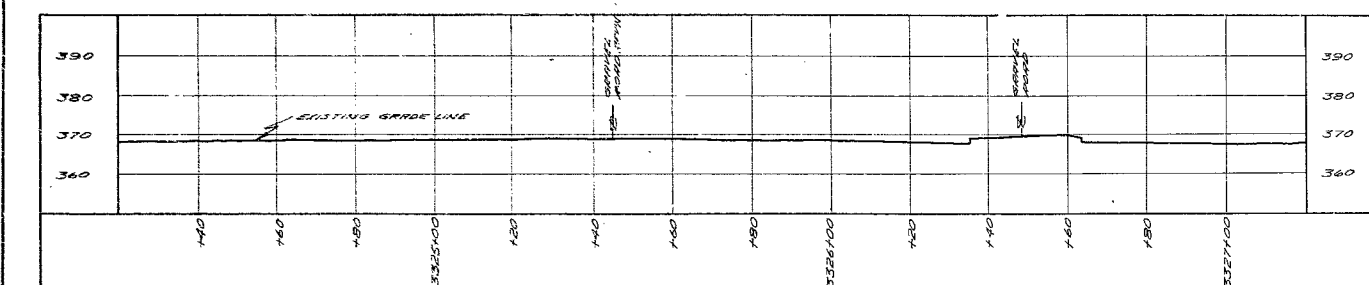


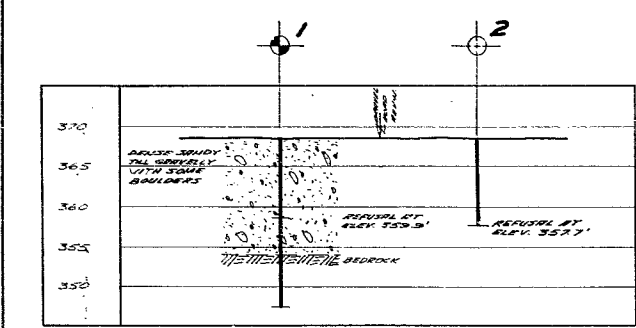
#59-F-50
W.P. # 26-59
Hwy. #401
REV. GRAVEL RD.
5 MILES N.E. OF
BELLEVILLE



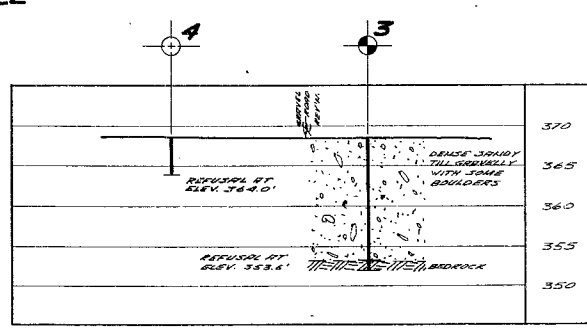
PLAN



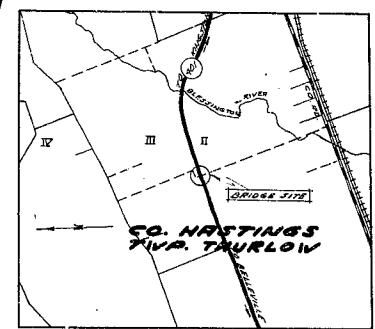
PROFILE



R-R



B-B



KEY PLAN
SCALE:
1 in. = 0.8 mi.

LEGEND			
BORE HOLE			
PENETRATION HOLE			
BORE & PENETRATION HOLE			
HOLE NO.	ELEVATION	STATION	DISTANCE FROM E
1	369.5'	3325+00	52' FT
2	369.5'	3325+60	52' FT
3	369.5'	3325+81	53' FT
4	369.5'	3325+31	53' FT

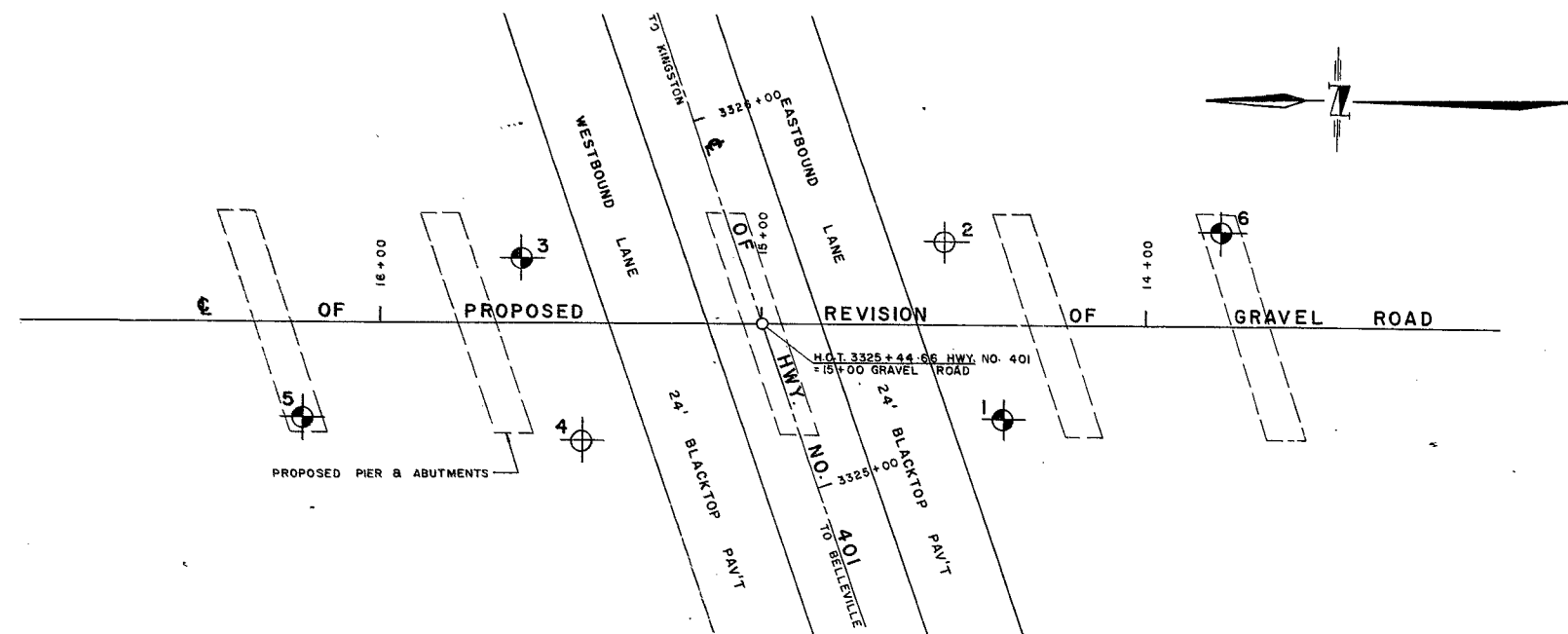
NOTE
THE BOUNDARIES BETWEEN SOIL STRATA HAVE BEEN ESTABLISHED ONLY AT BORE HOLE LOCATIONS. BETWEEN BORE HOLES THE BOUNDARIES ARE ASSUMED FROM GEOLOGICAL EVIDENCE AND MAY BE SUBJECT TO CONSIDERABLE ERROR.

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH SECTION

**GRAVEL ROAD REV'N.
PROPOSED CROSSING**

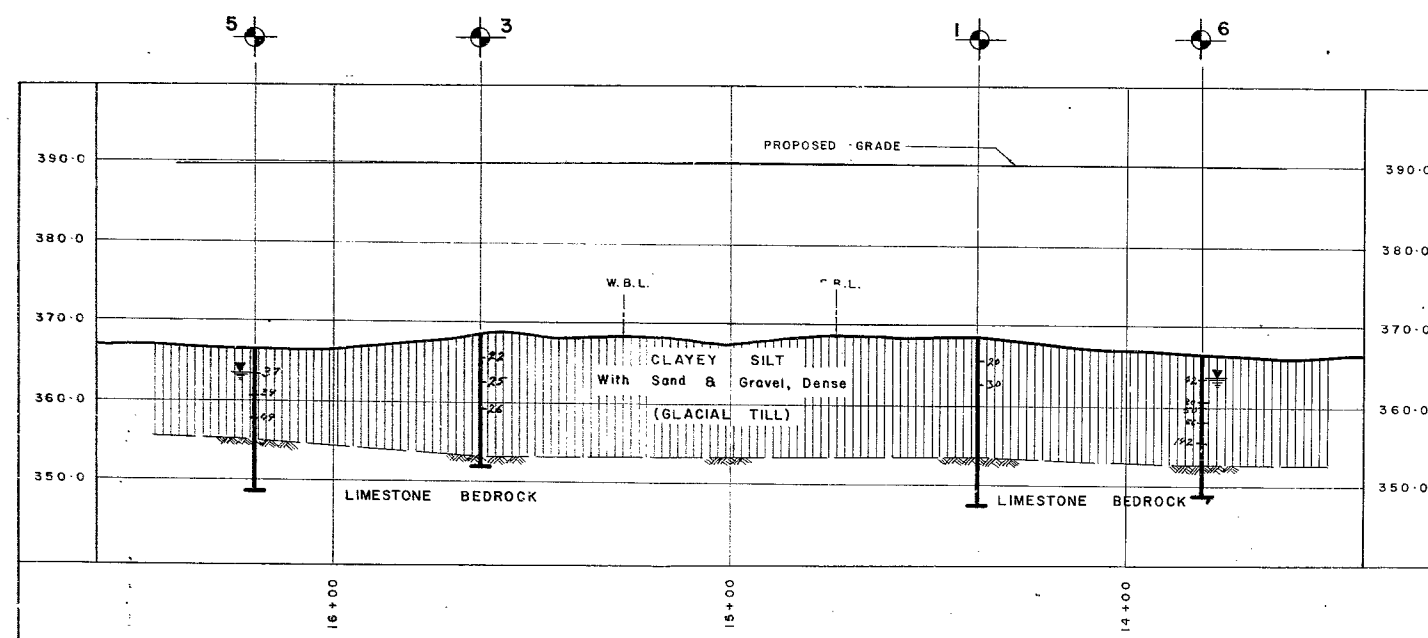
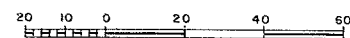
SHOWING POSITIONS & ELEVATIONS OF HOLES

HWY. 401	DISTRICT 9	COUNTY HASTINGS
TOWNSHIP THURLOW	LOT 26	CON II
LOCATION R.R. 5 MILES OF BELLEVILLE		
DRAWN BY: T. MELLORE	CHECKED BY: L. L.	W.P. 26-39
DATE: 30 OCT 59	APPROVED BY:	DRAWING NO.
SCALE: 1 IN. = 20 FT		F59-50A



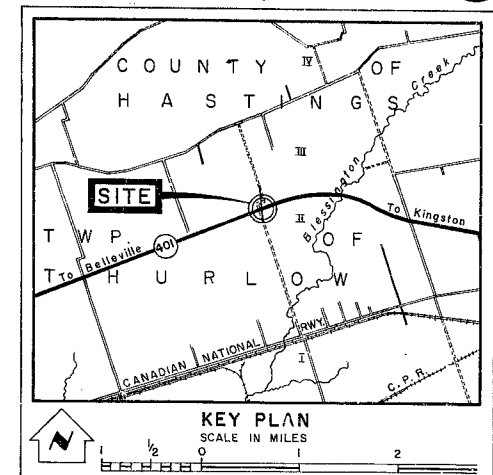
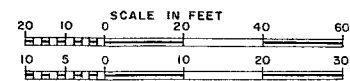
PLAN

SCALE IN FEET



PROFILE

HORIZONTAL
VERTICAL



LEGEND

- Bore Hole
- Cone Penetration Hole
- Bore & Cone Penetration Hole
- Water Levels established at time of field investigation

NOTE - HOLES NO. 1, 2, 3, & 4
DONE FOR JOB NO. 59-F-50
OCT. 30, 1959.

NO.	ELEVATION	STATION	OFFSET
1	368.5	14+37	24' LT.
2	368.5	14+53	21.5 RT.
3	368.5	15+62	27' RT.
4	368.5	15+46	30' LT.
5	368.5	16+20	25' LT.
6	368.5	13+81	24' 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 DIVISION - FOUNDATION SECTION

GRAVEL ROAD REVISION

(BETWEEN LOTS 25 & 26 TWP. OF THURLOW)

AND

HIGHWAY NO. 401

ORIGINATED T. WIDDIS	DISTRICT NO. 8	DATE MARCH 15 1962
DRAWN F. CLARK	W.P. NO. 26-59	JOB NO. 62-F-15
CHECKED <i>AP</i>	CONTRACT NO.	DRAWING NO.
APPROVED <i>M. Deva</i>		62-F-15A

REF. NO'S E-3672-1 & 59-F-50A

cc: Foundations Section.

23-67-119
W.P. 26-59.

Mr. A. M. Teye,
Bridge Engineer.
Materials & Research Section.

November 10, 1959.

FOUNDATION REPORT - D.H.C. -
W.J. F 59-50 -- W.P. 26-59.

Attention: Mr. C. McCombie.

Re: Proposed Underpass, Hwy. #401 & Gravel Rd. Rev'n.,
Lots 25 & 26, Thurlow Twp., District #8,
Approx. 5 Miles N.E. of Belleville.

Enclosed is our foundation report covering the subsoil conditions at the above site. Field work at this site indicates that a layer of dense to medium dense glacial till, approx. 15 ft. in thickness, overlies limestone bedrock.

Two alternatives for spread footings are presented in this report. One alternative is to place the spread footings at elevation 363.0'. At this elevation of 363.0' spread footings 6 ft. or more in width may be designed for a bearing pressure of 3 tons/ft.². The second alternative is to found the spread footings directly on the limestone bedrock using a bearing pressure of 15 tons/ft.².

Seepage water entering excavations for spread footings founded at elevation 363.0' should be small. Some flow of water into excavations taken to bedrock is to be expected. No settlement problems or problems associated with stability are anticipated at this site.

If any questions arise with respect to this report, please do not hesitate to call this office.

RF/VdeP

cc: Messrs. A. M. Teye

E. A. Tregaskes

D. C. Ramsay

I. Campbell

T. A. Sharpe

J. E. Gruspier

A. Watt

Foundation Section. ✓

Gen. Files.

L. C. Goderman,

PRINCIPAL SOILS & FOUNDATIONS ENGR.

per:

K. Peaker

(K. Peaker,

FOUNDATION FIELD SUPERVISING ENGR.)

FOUNDATION REPORT

on

Proposed Underpass, Hwy. #401 & Gravel Rd. Rev'n.,
Lots 25 & 26, Thurlow Twp., District #8,
Approx. 5 Miles N.E. of Belleville.

Plan No: F 3652-3

Profile No: F 3652-2

Chainage: 3325+50 (approx.)

Distribution:

Mr. A. H. Towe,
Bridge Engineer. (2)

Mr. H. A. Tregaskes,
Construction Engineer. (1)

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

Mr. I. Campbell,
Sr. Project Design Engr. (1)

Mr. T. A. Sharpe,
District Engr., Kingston. (1)

Mr. J. E. Gruspier,
Regional Soils Engineer. (1)

Mr. A. Watt,
Ont. Water Resources Commission. (1)

Foundation Section. (1)

Gen. Files. (1)

W.J. F 59-50

W.P. 26-59

INTRODUCTION:

Presented in this report are the results of a foundation investigation for the proposed underpass at Hwy. #401 and gravel road, Lots 25 & 26, Thurlow Twp. This report contains a detailed amount of field and laboratory results along with recommendations for foundation types.

Field work was carried out during the period October 19th to 21st.

DESCRIPTION OF SITE:

The topography of the site and its surrounding areas is generally level to undulating. The area in the neighbourhood of the site is farmland. Geological information for this area indicates the predominant features to be shallow glacial deposits over limestone bedrock.

FIELD AND LABORATORY RESULTS:

Two bore holes and four dynamic cone penetration tests were carried out at this site. The location of these bore holes and cone tests are indicated on Drawing No. F 59-50A. Bore holes were advanced using a standard diamond drill adapted for soil sampling. Samples were obtained at the required elevations using a split barrelled sampler. The dimensions of the sampler and the energy used in driving it, conform to the requirements of the Standard Penetration Test. Samples were visually examined in the field, then placed in moisture proof containers and shipped to the laboratory.

cont'd. /2 ...

SOIL TYPES ENCOUNTERED:

From ground surface to bedrock (approx. 15 feet) a brown sandy clayey glacial till was encountered. The glacial till is composed of gravel, sand, silt, and clay with respective representative percentages being: 18%, 42%, 28% and 12%. The deposit exists in a medium dense to a dense state, with an average 'N' value in the neighbourhood of 20 blows/ft.

Below the stratum of glacial till, limestone bedrock was encountered. The core taken from the bedrock was sound, but had numerous small seams and cracks.

No water-bearing seams were encountered in the overburden. The period of the foundation investigation was not sufficient to accurately determine the elevation of the water table; however, the water table was estimated to be at elevation 362.0'. The quantity of seepage water during footing excavations carried to elevation 362.0' should be small.

FOUNDATION CONSIDERATIONS:

Reference to the bore hole logs shows that subsoil conditions at this site consist of a shallow layer (up to 15 ft.) of glacial till overburden, overlying limestone bedrock.

Spread footings, founded either at elevation 363.0' or on bedrock, may be used to support the structure. If spread footings are founded in the glacial till at elevation 363.0', an allowable bearing pressure of 3 tons/ft.² may be used for footings no less than 6 ft. wide.

cont'd. /3 ...

FOUNDATION CONSIDERATIONS: (cont'd.) ...

In the event that spread footings are founded directly on the limestone bedrock (approx. elevation 352 to 354'), an allowable bearing pressure of 15 tons/ft.² may be used. All broken and weathered rock should be removed from the bedrock surface before placing footings.

Settlements of the footings placed in the glacial till should be small, with differential settlements less than 1 inch.

Little or no seepage water problem during footing excavations will exist if spread footings are placed in the overburden at elevation 363.0'. If spread footings are placed directly on bedrock, some infiltration of water into the excavation is to be expected. The quantity of water seeping into excavations to bedrock, should be small and easily handled by low capacity pumps.

It should be emphasized that the foundation investigation was carried out during October when the water table was low. Spring rains may cause the water table to rise resulting in some additional small water problems if excavation is undertaken at this time of year.

SUMMARY:

- (1) A shallow layer of well-graded glacial till some 15 ft. in thickness was found overlying limestone bedrock.
- (2) Spread footings founded in the glacial till overburden or on the limestone bedrock, may be used to support the structure. If spread footings are placed in the overburden at elevation 363.0', an allowable bearing pressure of 3 tons/ft.² may be used for footings of a minimum width of 6 ft.

SUMMARY: (cont'd.) ...

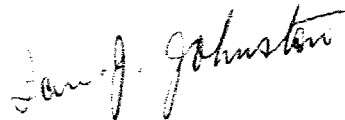
(2) (cont'd.) ...

In the event that spread footings are placed directly on the bedrock, an allowable bearing pressure of 15 T/ft.² should be used.

(3) Settlement of footings placed on the glacial till will be less than 1 inch.

(4) Seepage water in excavations should be small and easily controlled by low-capacity pumps.

(5) No approach fill stability problems are anticipated.



Ian J. Johnston,
Project Foundation Engr.

APPENDIX I.

JOB F 59-50

W.P. 26-59

S denotes split spoon sample
R C denotes rock core.

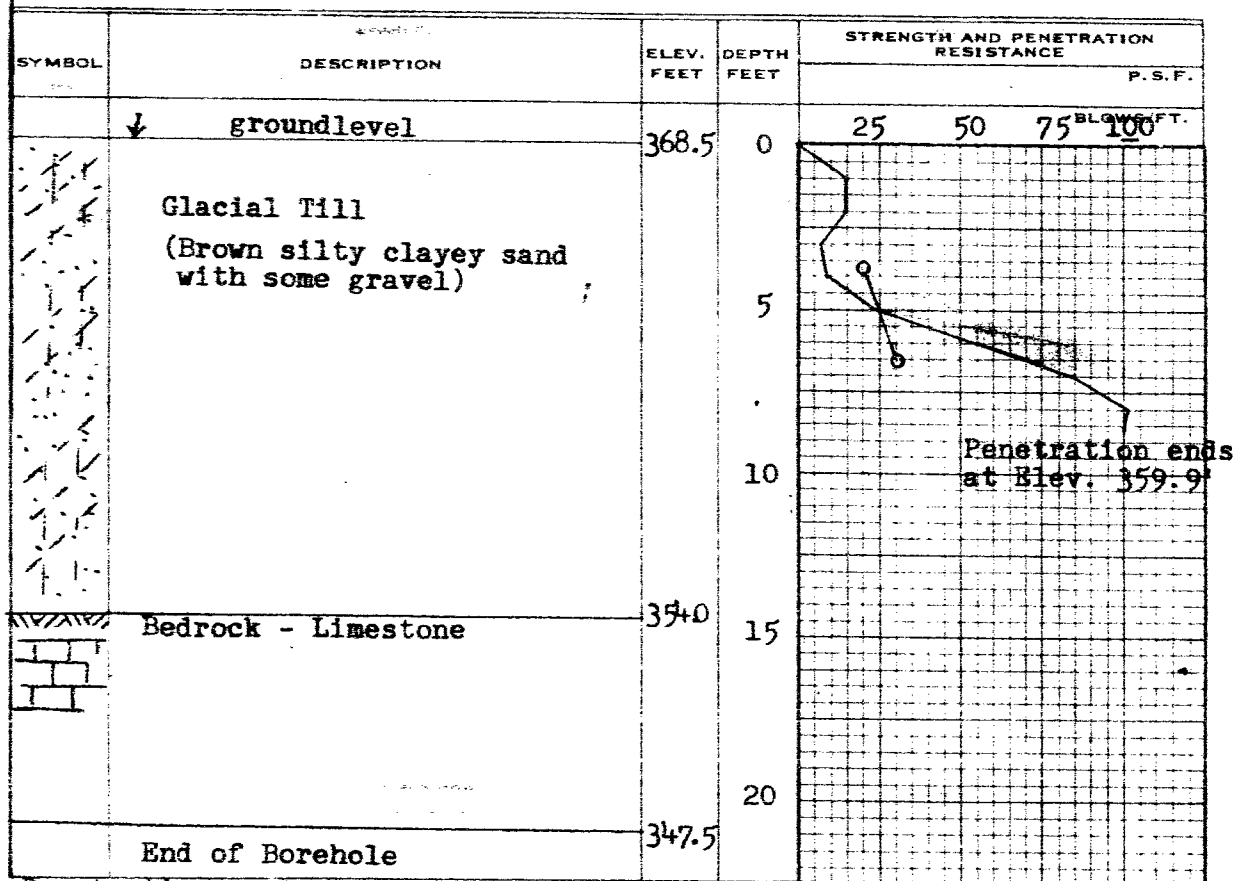
DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 26-59 BORE HOLE NO. 1
 JOB F 59-50 STATION See drawing
 DATUM 368.5' COMPILED BY B.K.
 BORING DATE Oct. 19/59 CHECKED BY K.P.

LEGEND

2" DIA. SPLIT TUBE _____
 2" SHELBY TUBE _____
 2" SPLIT TUBE _____
 2" DIA. CONE _____
 2" SHELBY _____
 CASING _____

1/2 UNCONFINED COMPRESSION (Qu) _____
 VANE TEST (C) AND SENSITIVITY (S) _____
 NATURAL MOISTURE AND LIQUIDITY INDEX _____
 LIQUID LIMIT _____
 PLASTIC LIMIT _____



CONSISTENCY	SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.		
10 20 30		
	S 1	-
	S 2	-
	RC3	-
	RC4	-

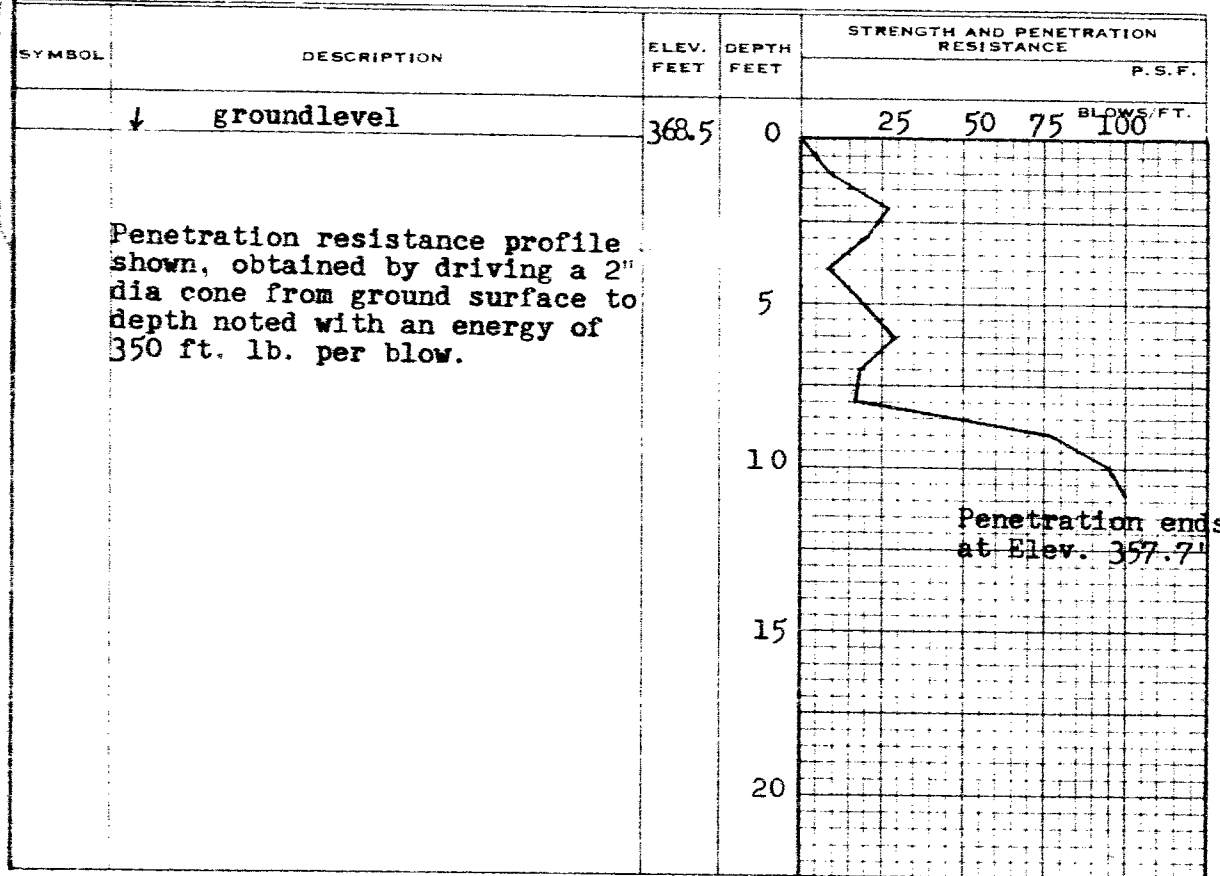
DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 26-59 ----- BORE HOLE NO. 2 -----
 JOB F 59-50 ----- STATION See drawing -----
 DATUM 368.5' ----- COMPILED BY B.K. -----
 BORING DATE Oct. 21/59 ----- CHECKED BY K.P. -----

2" DIA. SPLIT TUBE
2" SHELBY TUBE
2" SPLIT TUBE
2" DIA. CONE
2" SHELBY
CASING

LEGEND

1/2 UNCONFINED COMPRESSION (Qu) --- O
VANE TEST (C) AND SENSITIVITY (S) --- +^S
NATURAL MOISTURE AND
LIQUIDITY INDEX --- Li
LIQUID LIMIT --- X
PLASTIC LIMIT ---

[illegible]

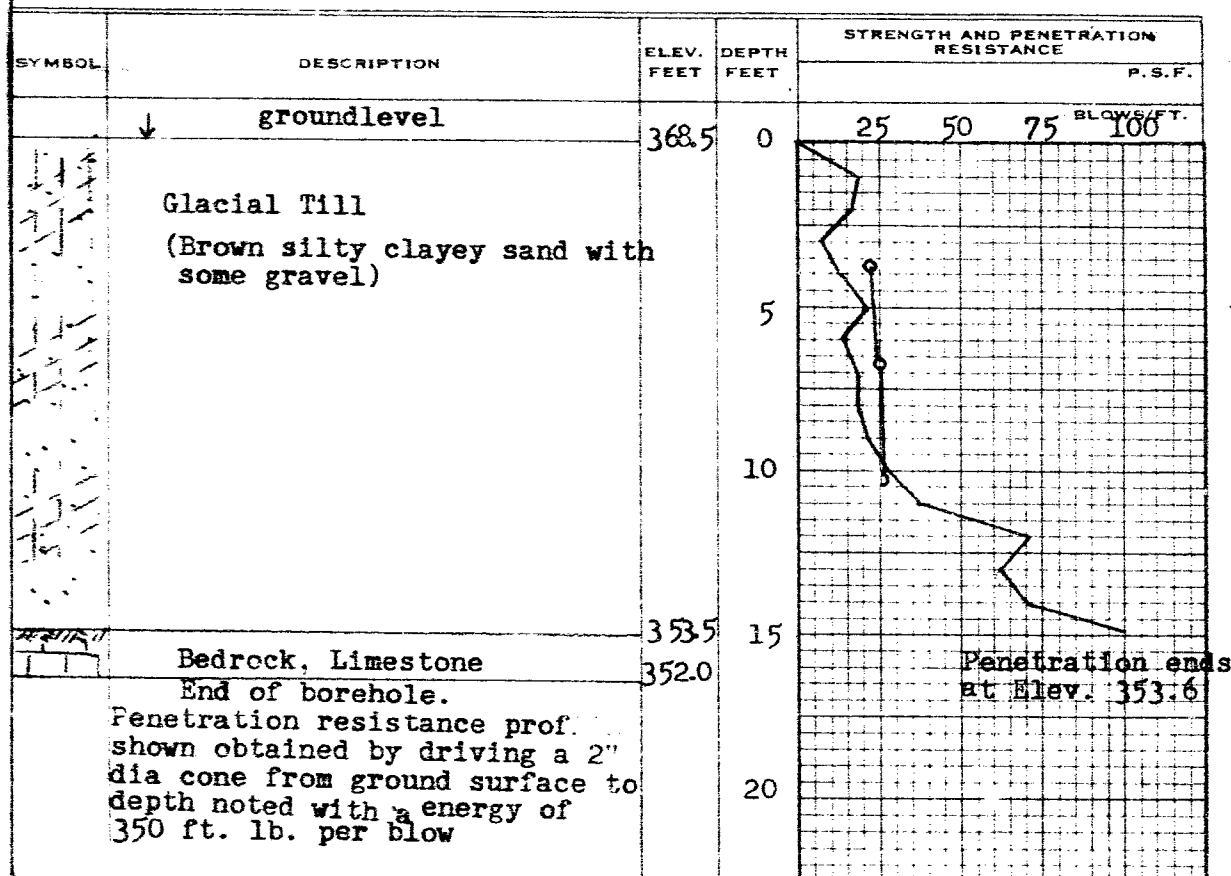
DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 26-59 _____ BORE HOLE NO. 3 _____
 JOB F 59-50 _____ STATION See drawing _____
 DATUM 368.5 _____ COMPILED BY B.K. _____
 BORING DATE Oct. 21/59 _____ CHECKED BY K.P. _____

2" DIA. SPLIT TUBE -----
2" SHELBY TUBE -----
2" SPLIT TUBE -----
2" DIA. CONE -----
2" SHELBY -----
CASING -----

LEGEND

1/2 UNCONFINED COMPRESSION (Qu) -----	O
VANE TEST (G) AND SENSITIVITY (S) -----	+ ^s
NATURAL MOISTURE AND	LI
LIQUIDITY INDEX -----	X
LIQUID LIMIT -----	→
PLASTIC LIMIT -----	

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

W.P. 26-59 _____ BORE HOLE NO. 4 _____
 JOB F 59-50 _____ STATION See drawing _____
 DATUM 368.5' _____ COMPILED BY B.K. _____
 BORING DATE Oct. 21/59 _____ CHECKED BY K.P. _____

2" DIA. SPLIT TUBE _____
2" SHELBY TUBE _____
2" SPLIT TUBE _____
2" DIA. CONE _____
2" SHELBY _____
CASING _____

LEGEND

1/2 UNCONFINED COMPRESSION (Qu) -----	O
VANE TEST (C) AND SENSITIVITY (S) -----	+ ^S
NATURAL MOISTURE AND	
LIQUIDITY INDEX -----	X
LIQUID LIMIT -----	
PLASTIC LIMIT -----	

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P.S.F. BLOWS/FT.	
↓	groundlevel	368.5	0	25	50 75 100
	Penetration resistance profile shown; obtained by driving a 2" dia cone from ground surface to depth noted with a energy of 350 ft. lb. per blow.		5	Penetration ends at Elev. 364.0'	
			10		
			15		
			20		

[illegible]