

Mr. A. Toye,

January 25, 1957

Bridge Engineer.

Materials & Research Section.

RE: Foundation Report  
Hwy. #3, Stone Creek Crossing  
at Tillsonburg, W.P. 520-56,  
W.J. F - 56 - 21.

Attached herewith are two copies of the above mentioned Foundation Report which you will find self explanatory.

F. C. Brownridge,  
Materials & Research Engineer.

Per:



(A. Rutka)

AR/ad

Copies To: Mr. H. Tregaskes,  
Mr. J. Walter,  
Mr. W. L. Fraser,  
Foundation Section,  
file.

# FOUNDATION REPORT

on

Stoney Creek Crossing, Highway No. 3  
South of Tillsonburg

Site Plan No.: 7 P-123

Station: 663+50

## Distribution:

Mr. A. Teye, Bridge Engineer	(2)
Mr. H. Tregaskes, Construction Engineer	(1)
Mr. J. Walter, Design Engineer.	(1)
Mr. W. L. Fraser, District Engineer, London, Ontario.	(1)
Foundation Section	(1)
File	(1)

W. J. P-56-21

W. F. 520-56

I. INTRODUCTION:

A subsoil investigation was carried out to determine the bearing capacity of the soil layers to support the foundations of the proposed new bridge.

The location is at Tillsonburg, just south of the town where Highway No. 3 crosses the Stoney Creek, (profile C-1079-2, station 635+50). The work started on 30 October 1936 and was completed on 4 November 1936.

II. PROCEDURE:

The soil investigation was carried out by means of a skid mounted core drill machine. One borehole and two dynamic cone penetrations were made on either side of the creek.

The locations and elevations of the boreholes are shown in Drawing No. F-56-21A, and their logs under Appendix I.

III. SUBSOIL FINDINGS AND ANALYSIS:

The site is just south of the town on Highway No. 3. The surrounding country is irregularly undulating and forested. The terrain is identified as till-moraine.

The stratification revealed by subsoil investigation showed that under the topsoil, at this particular point, there exists fill material down to elevation 653.3 ft.

Below this, the layer is stiff to hard clay reaching the bedrock at elevation 632 ft.

### III. SURSOIL FINDINGS AND ANALYSIS: (cont'd.)

The samples obtained were tested in the laboratory and from the results the soil is classified as inorganic clay of low plasticity. It has an average density of 128 p.c.f. and moisture content of about 20%.

For a spread footing foundation the bearing capacity of the layer at 653 ft. the probable elevation of the footing is calculated to be about 1.5 t.s.f. with a safety factor of 3. This value is derived from the penetration resistance (average 23 blows per foot) and unconfined compression (minimum shear 2250 p.s.f.) test results.

### IV. CONCLUSIONS AND RECOMMENDATIONS:

From the above discussion it will be concluded that:

1. The soil layer at elevation 653 ft. can provide a conservative bearing capacity of 1.5 t.s.f. with a safety factor of 3.

Considering the small size of the structure needed at this crossing, spread footing foundation appears to be more economical and consequently is recommended. There is no approach fill problem.

V. Korlu

Foundation Engineer.

APPENDIX I.

# OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG 54-1 OPERATION BORE & PENET'N JOB F-56-21 WP 520-56 BORING 1 STA. 663+21  
 CASING ØX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT DEC. 1956  
 SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY \_\_\_\_\_ DATE BORING 1 Nov. 1956

## 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  
 QC - TRIAXIAL CONSOLIDATED QUICK    WT - WATER TABLE IN SOIL    γ - UNIT WEIGHT

## SAMPLE TYPES

CS - CHUNK    SS - SLEEVE SAMPLE  
 DO - DRIVE OPEN    PS - PISTON SAMPLE  
 DF - DRIVE FOOT VALVE    WS - WASHED SAMPLE  
 T.O. - THIN WALLED OPEN    RC - ROCK CORE

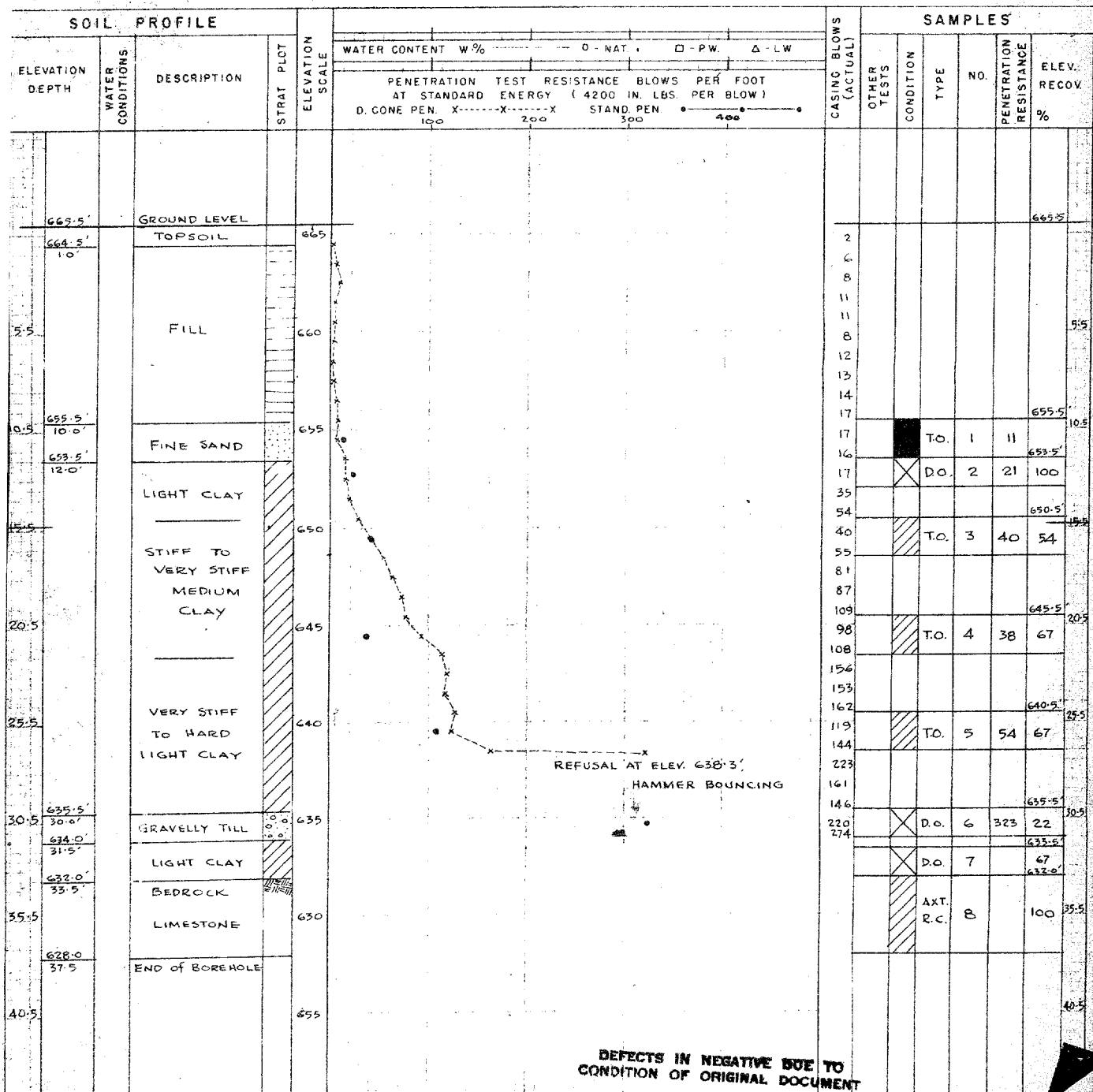
## SAMPLE CONDITION



- DISTURBED  
 - FAIR  
 - GOOD  
 - LOST

## SOIL PROFILE

## SAMPLES



DEFECTS IN NEGATIVE DUE TO  
CONDITION OF ORIGINAL DOCUMENT

DEPARTMENT OF HIGHWAYS - ONTARIO  
**OFFICE REPORT ON SOIL EXPLORATION**

DRILL RIG #1 OPERATION PENETRATION JOB F-56-21 WP 520-56 BORING 2 STA. 663+12 27' R  
 CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT DEC. 1956  
 SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY --- DATE BORING 3 NOV. 1956


**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  
 DC - TRIAXIAL CONSOLIDATED QUICK WT - WATER TABLE IN SOIL  $\gamma$  - UNIT WEIGHT

**SAMPLE TYPES**

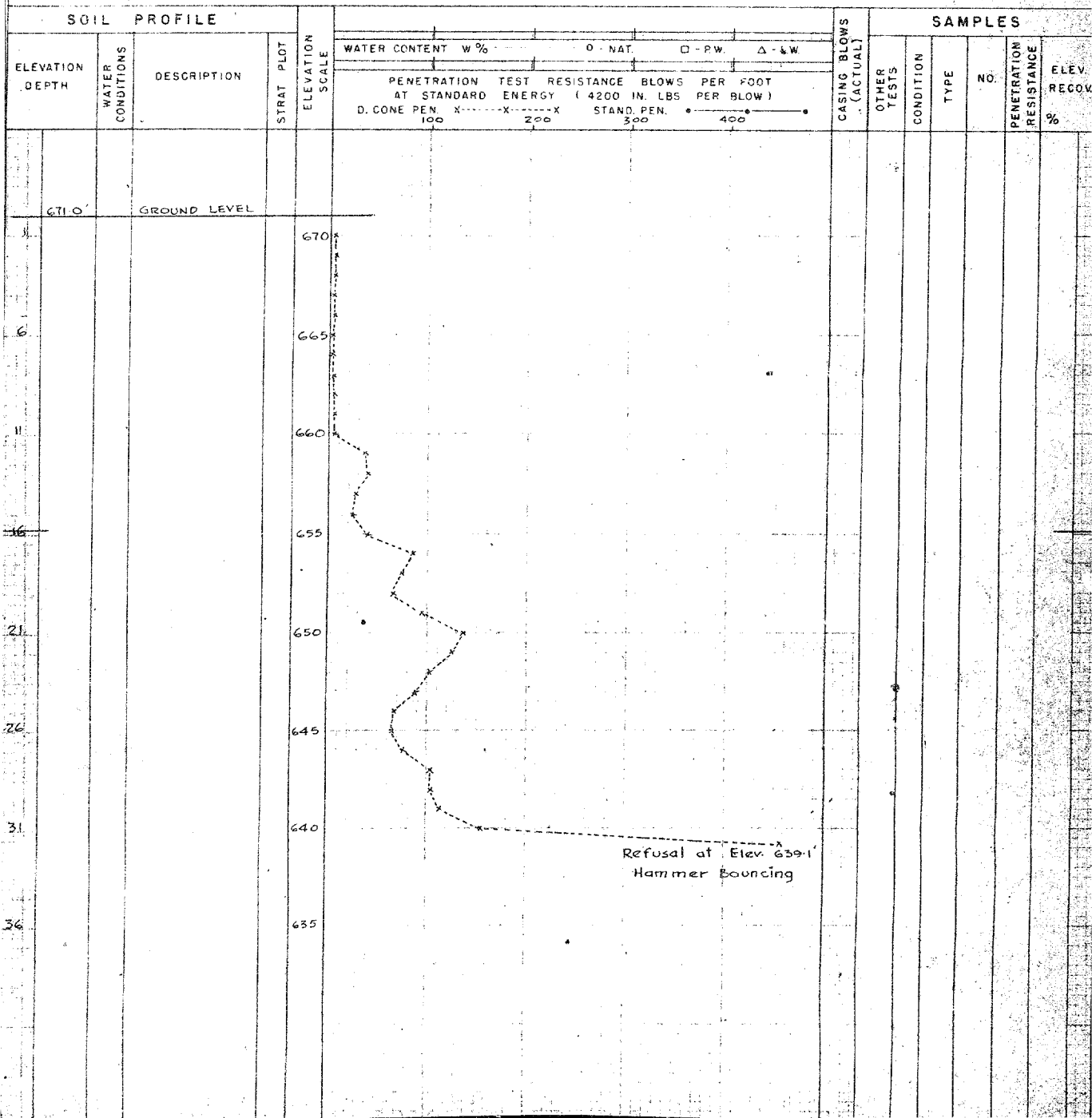
CS - CHUMK SS - SLEEVE SAMPLE  
 DO - DRIVE OPEN PS - PISTON SAMPLE  
 DF - DRIVE FOOT VALVE WS - WASHED SAMPLE  
 TO - THIN WALLED OPEN RC - ROCK CORE

**SAMPLE CONDITION**

 - DISTURBED  
 - FAIR  
 - GOOD  
 - LOST

**SOIL PROFILE**

**SAMPLES**



DEPARTMENT OF HIGHWAYS - ONTARIO  
**MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW**  
**OFFICE REPORT ON SOIL EXPLORATION**

DRILL RIG 54-1 OPERATION BORE & PENET'N JOB F-56-21 WP 520-56 BORING 3 STA. 663+87.29 FT  
 CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT DEC 1956  
 SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY     DATE BORING 5 Nov 1956

**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  
 QC - TRIAXIAL CONSOLIDATED QUICK WT - WATER TABLE IN SOIL γ - UNIT WEIGHT

**SAMPLE TYPES**

CS - CHUNK DO - DRIVE OPEN SS - SLEEVE SAMPLE  
 DF - DRIVE FOOT VALVE PS - PISTON SAMPLE  
 TO - THIN WALLED OPEN WS - WASHED SAMPLE  
 RC - ROCK CORE

**SAMPLE CONDITION**



- DISTURBED  
 - FAIR  
 - GOOD  
 - LOST

**SOIL PROFILE**

ELEVATION DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE
668.5'		GROUND LEVEL		
3.5		FILL		665
8.5				660
13.5				655
18.5				650
23.5		STIFF TO VERY STIFF MEDIUM CLAY		645
28.5		VERY STIFF TO HARD LIGHT CLAY (TILL)		640
33.5				635
38.5				630
		BEDROCK LIMESTONE		
43.5		END OF BOREHOLE		625

WATER CONTENT W% O - NAT. □ - P.W. Δ - L.W.

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

D. CONE PEN X-----X STAND. PEN -----

50 100 150 200

CASING BLOWS  
(ACTUAL)

**SAMPLES**

OTHER TESTS	CONDITION	TYPE	NO.	PENETRATION RESISTANCE %	ELEV. RECOV.
					668.5
					3.5
					4.5
					5.5
					6.5
					7.5
					8.5
					9.5
					10.5
					11.5
					12.5
					13.5
					14.5
					15.5
					16.5
					17.5
					18.5
					19.5
					20.5
					21.5
					22.5
					23.5
					24.5
					25.5
					26.5
					27.5
					28.5
					29.5
					30.5
					31.5
					32.5
					33.5
					34.5
					35.5
					36.5
					37.5
					38.5
					39.5
					40.5
					41.5
					42.5
					43.5

REFUSAL AT ELEV. 633.7  
 HAMMER BOUNCING



DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW  
**OFFICE REPORT ON SOIL EXPLORATION**

33' LT.

DRILL RIG 54-1 OPERATION PENETRATION JOB E-56-21 WR 520-56 BORING 4 STA 663+83  
CASING B-X (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT DEC 1956  
SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY DATE BORING 6 NOV. 1956

**ABBREVIATIONS**

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U - UNCONFINED COMPRESSION WL - WATER LEVEL IN CASING CA - CASING  
Qc - TRIAXIAL CONSOLIDATED QUICK WT - WATER TABLE IN SOIL γ - UNIT WEIGHT

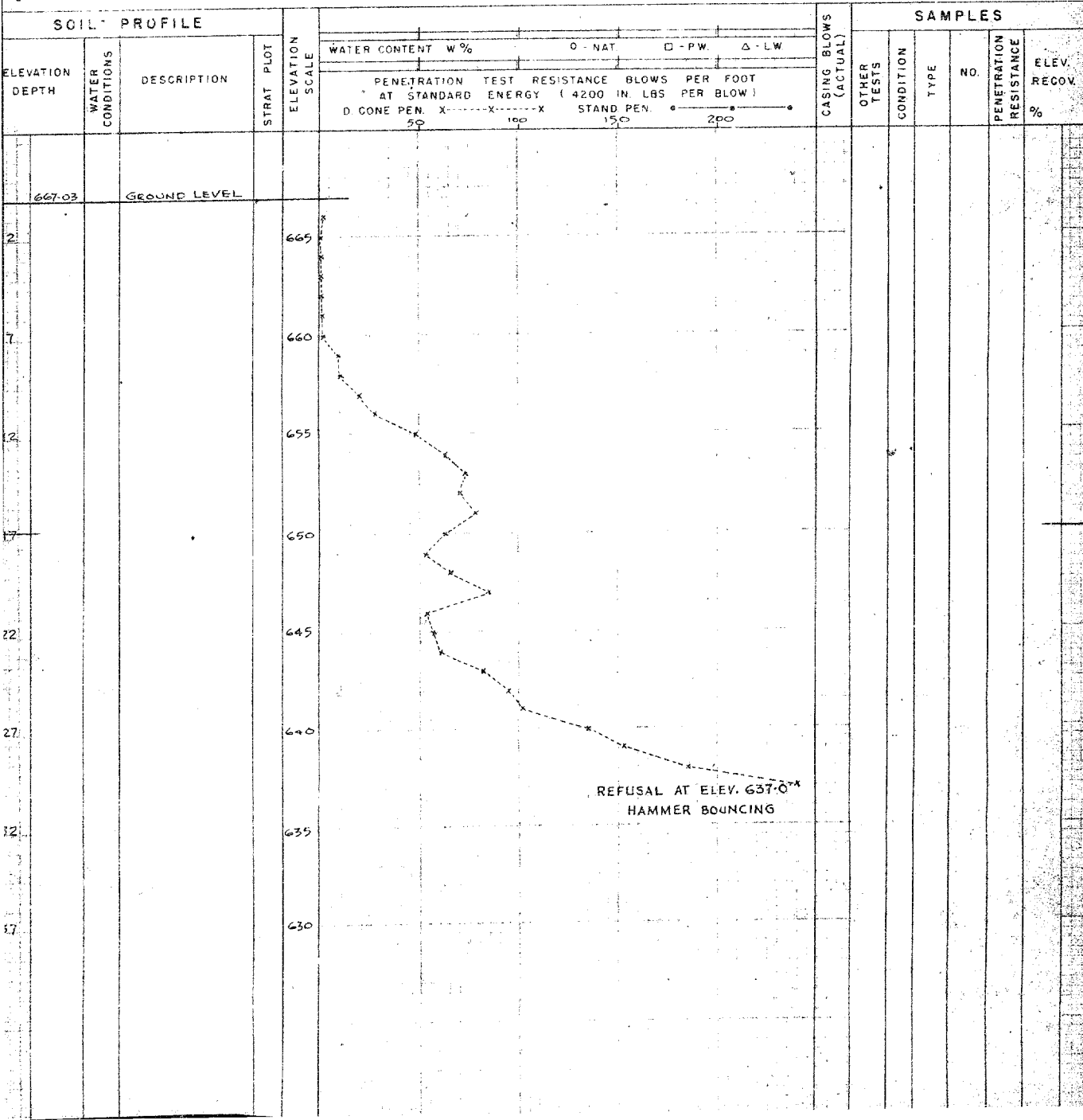
**SAMPLE TYPES**

CS - CHUNK SS - SLEEVE SAMPLE  
DO - DRIVE OPEN PS - PISTON SAMPLE  
DF - DRIVE FOOT VALVE WS - WASHED SAMPLE  
TO - THIN WALLED OPEN RC - ROCK CORE

**SAMPLE CONDITION**



- DISTURBED  
- FAIR  
- GOOD  
- LOST



#56-F-21

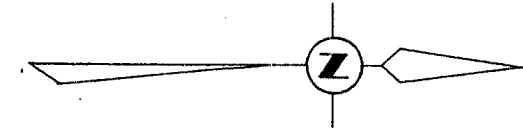
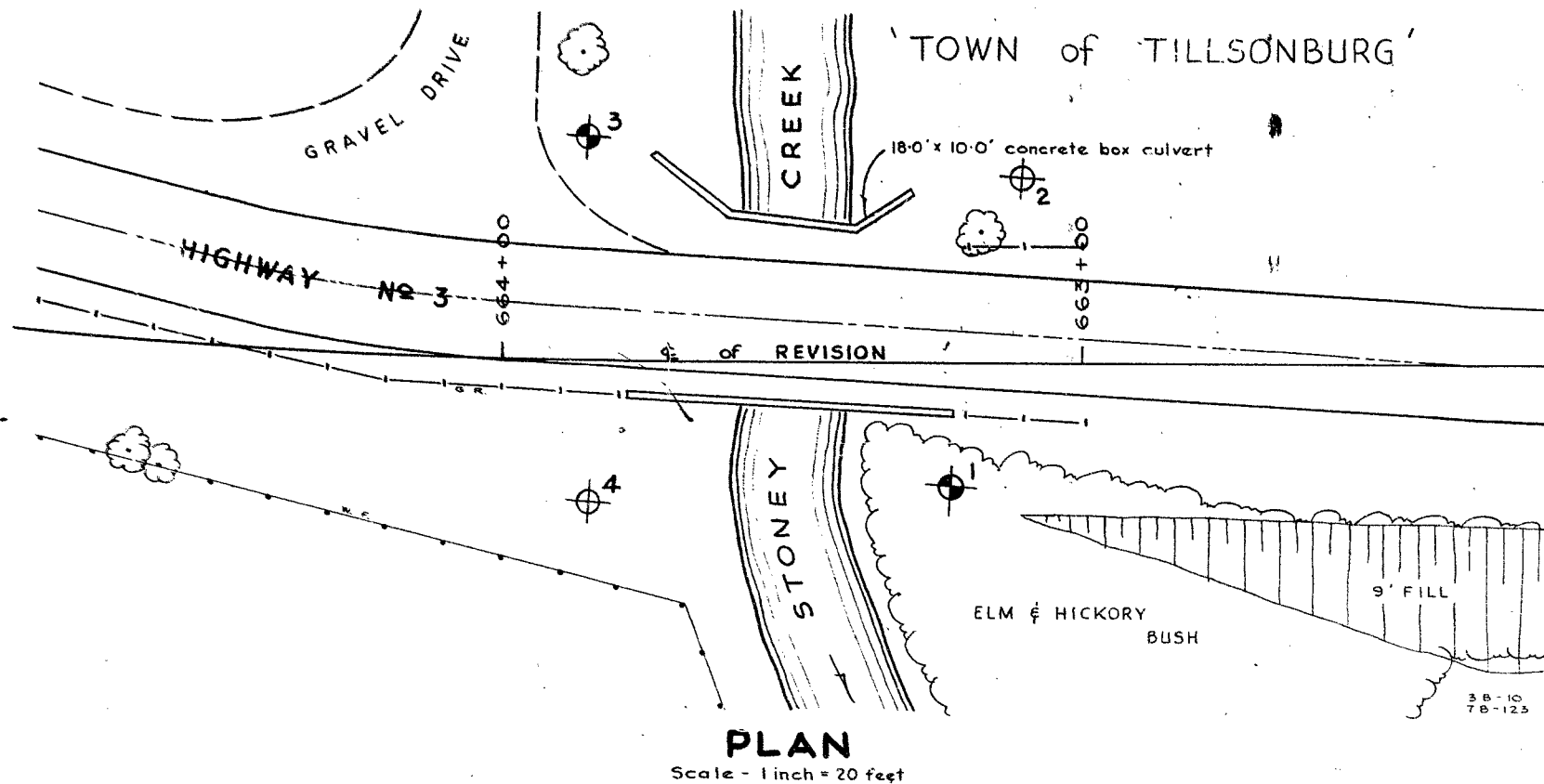
WP #520-56

HWY #3

STONEY CREEK

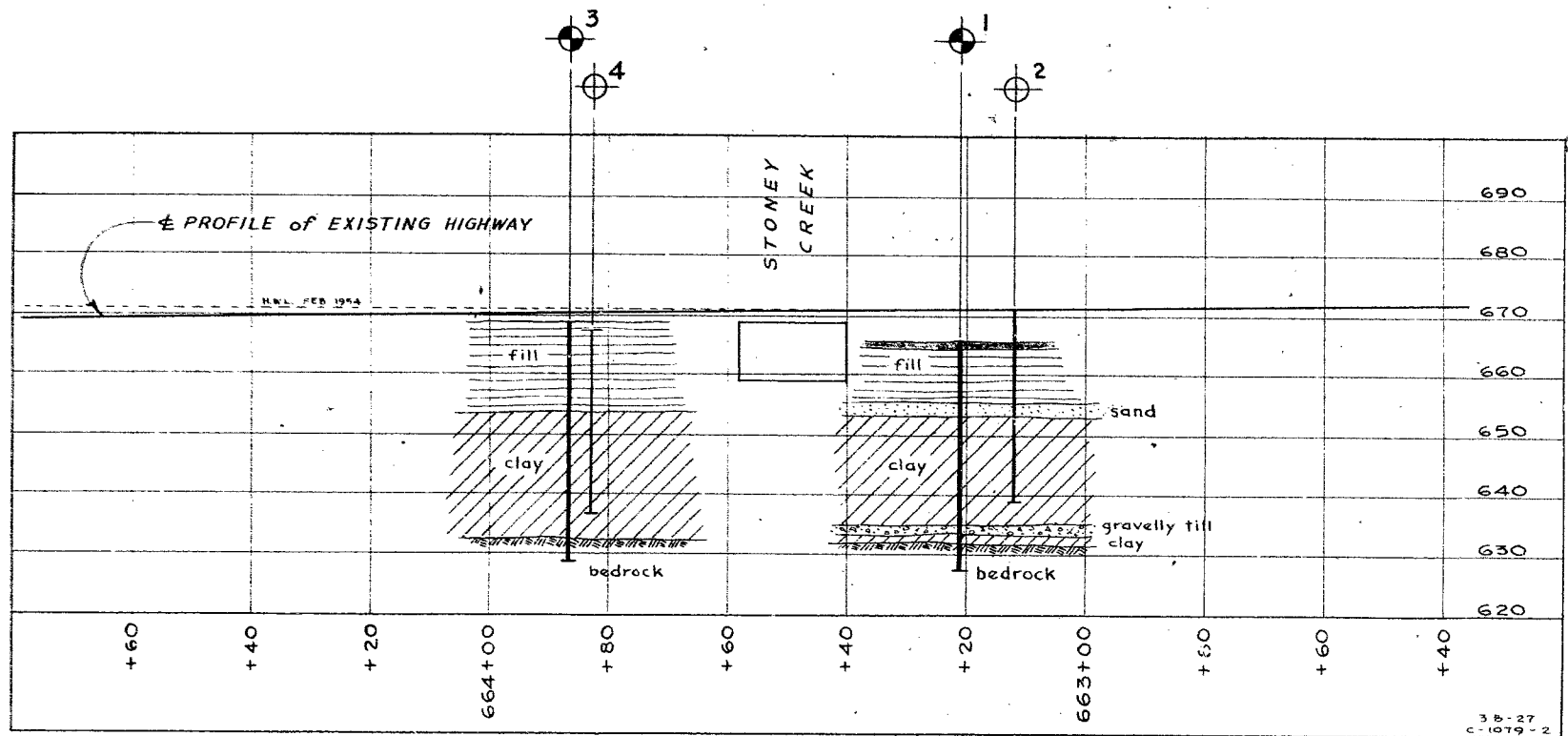
CROSSING





LEGEND			
Bore Holes			
Penetration Hole			
Bore & Penetration Hole			
HOLE NO.	ELEVATION	STATION	DISTANCE FROM EXIST. ±
1	665.5	663+21	27' LT.
2	671.0	663+12	27' RT.
3	668.5	663+87	29' RT.
4	667.03	663+83	33' LT.

— 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

**STONEY CREEK CROSSING  
AT TILLSONBURG**

THE KING'S HIGHWAY No. 3 DIV. No. 2  
CO. OXFORD  
TWP. DEREHAM LOT 4 CON. XII

POSITIONS & ELEVATIONS of HOLES

APPROVED

ENGINEER: \_\_\_\_\_ CHIEF ENGINEER: \_\_\_\_\_

DESIGN: \_\_\_\_\_ CHECK: \_\_\_\_\_ CONTRACT NUMBERS: 520-56  
DRAWING: H.D.R. CHECK: \_\_\_\_\_ LOADING: \_\_\_\_\_ DRAWING NUMBER: F-56-21A  
TRACING: \_\_\_\_\_ CHECK: \_\_\_\_\_ DATE: 12 December 1956

PRINT RECORD		
No.	FOR	DATE

REVISIONS:		
DATE	BY	DESCRIPTION