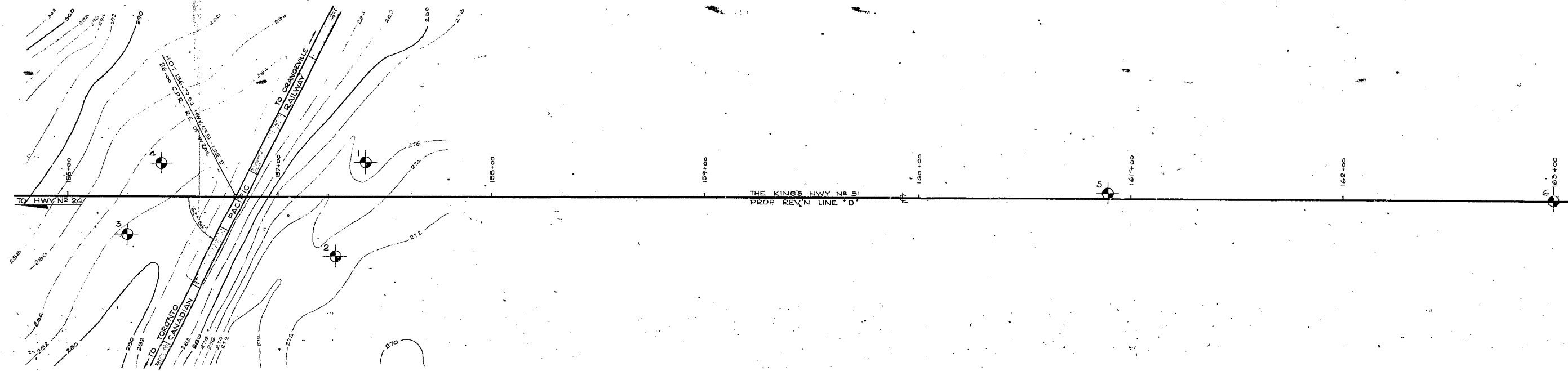


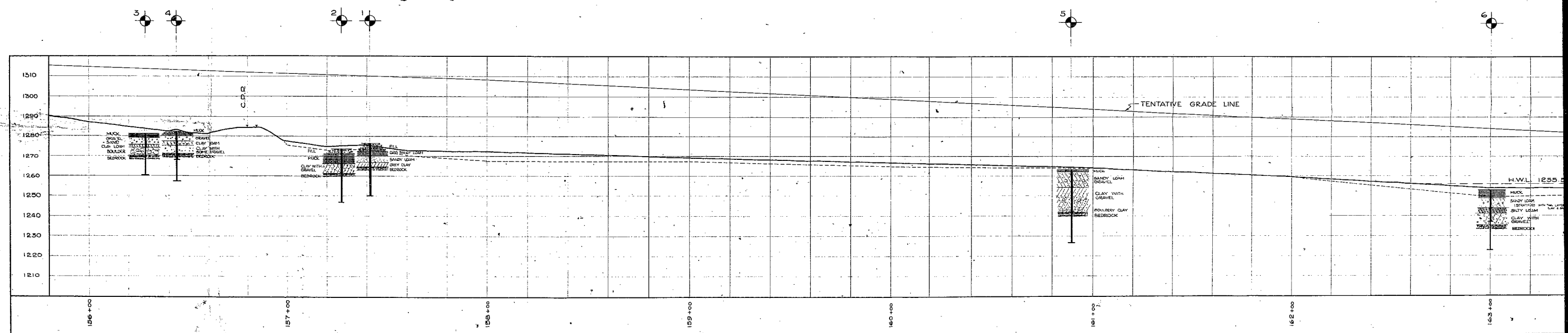
57-F-2
W.P.# 550-56
Hwy.# 51 E'
C.P.R. CROSSING
CALEDON





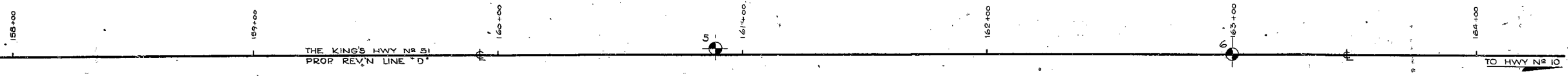
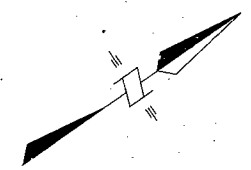
PLAN

SCALE 1 IN = 20 FT



PROFILE

SCALE = HOR. 1 IN = 20 FT
VER

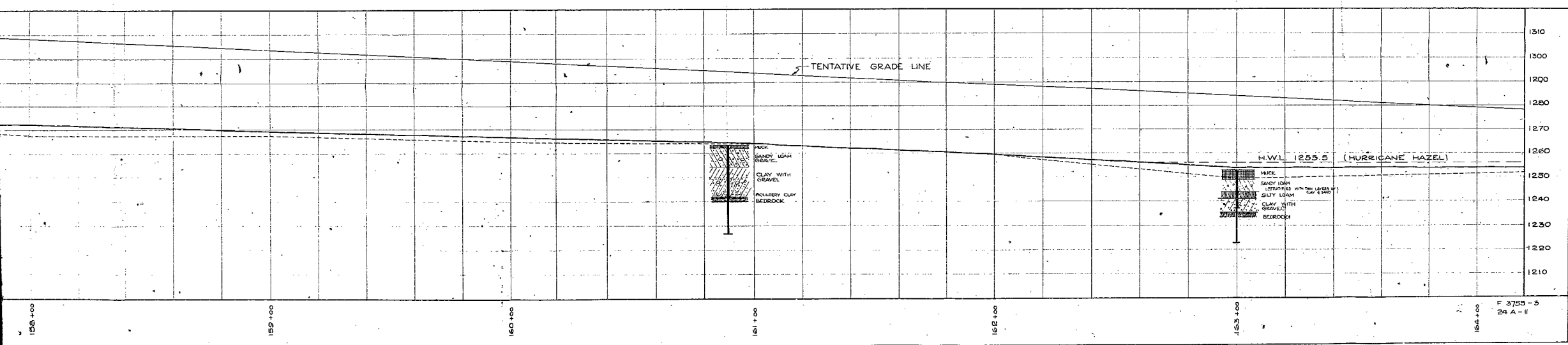


PLAN SCALE 1 IN = 20 FT

24 A - 9
3 B - 146
E 3212 - 1
5 - 9

LEGEND			
BORE HOLE			
PENETRATION HOLE			
BORE & PENETRATION HOLE			
HOLE NO.	ELEVATION	STATION	DISTANCE FROM CL
1	1276.61'	157+41'	16' LT
2	1275.45'	157+27'	28' RT
3	1281.29'	156+28'	18' RT
4	1282.14'	156+44'	15' LT
5	1263.2'	160+89'	2' LT
6	1253.2'	163+00'	CL

- 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.



PROFILE SCALE = HOR. 1 IN = 20 FT
VER.

DEPARTMENT OF HIGHWAYS-ONTARIO-			
MATERIALS & RESEARCH SECTION - DOWNSVIEW			
C.P.R. PROP. CROSSING			
1 MILE NORTH OF			
CATARACT			
THE KING'S HIGHWAY NO 51 (LINE "D") DIV. NO 5			
PEEL			
W. CALEDON 101 16			
LOCATION & ELEVATION OF HOLES			
APPROVED			
ENGINEER			
W.P. 550-56			
D.F.			
APRIL 15, 1957			
F 57-2-A			

Copy to Foundation Section.

F. A. Lyle.
Bridge Engineer.

May 23rd, 1957.

Mr. F.C. Brownridge.

Re: Foundation Report.
Hwy # 51. C.P.R. Crossing, 2
miles South West of Caledon.
E.P. 550-56. W.J.F-57-2.

Attached herewith please find two copies of the
above mentioned Report. Your attention is directed to
the fact that the sub-soil can support two tons per square
foot within a few feet of the bed rock. In view of this
it would appear desirable to place the spread footings
directly upon the bed rock and thereby achieve a much higher
bearing value.

F. C. Brownridge.
Materials & Research Engineer.

cc:

A. Luthra

A. Luthra.
Principal Soils Engineer.

WJF
Enc.

c.c. Mr. J. Trepanches.
Mr. G. Ramsay.
Mr. F.A. Whiteley.
Foundation Section.
F.C.
File.

FOUNDATION REPORT

on

New Overpass at Highway No. 51 and CPR
crossing about two miles South West of Caledon

Site plan No. E-3212-1
Station: 156+80

Distribution:

Mr. A. Toye Bridge Engineer	(2)
Mr. H. Tregaskes Construction Engineer	(1)
Mr. D.C. Ramsay Design Engineer	(1)
Mr. F.B. Whiteley, Dist. Eng. Owen Sound, Ontario.	(1)
Foundation Section	(1)
FILE	(1)

W.P. 550-56
W.J. F-57-2

INTRODUCTION

A subsoil investigation was made to evaluate the bearing value of the subsoil strata to support the foundations of the proposed bridge.

The location is some two miles south west of Caledon, where the proposed revision of Highway No. 51 crosses the Canadian Pacific Railway. (Station 156+80, profile No. F-3755-3). The work started on January 29, 1957 and was completed on February 28, 1957.

PROCEDURE

The investigation was carried out by means of a skid mounted core drill machine. Four boreholes were made for the foundation investigation, boreholes No. 1 & 2 on the east side and No. 3 & 4 on the west side of the railway track. Besides these, two more boreholes (No. 5 & 6) were made to investigate the subsoil for approach fill stability purposes.

The elevations of the layers are presented in the log sheets and the locations of borings on the site plan No. F-57-2-A, under Appendix I.

SUBSOIL FINDINGS AND ANALYSIS

The terrain is Kame Moraine spillway. The crossing is on the slope of the depression which forms the Credit River basin.

The subsoil investigations revealed the following stratigraphy:

The topsoil is loamy material mixed with decayed vegetation in the form of muck. Underneath this layer the soil is mainly alluvial material composed of clay, silt, sand, etc., down to bedrock. The bedrock elevations were found to be in borehole No. 1 at elevation 1265 ft., borehole No. 2 at elevation 1261.5 ft., borehole No. 3 at elevation 1270 ft., and in borehole No. 4 at 1271 ft. In all the holes the bedrock was drilled and core samples were extracted. These samples revealed the bedrock to be made of impure limestone with shale partings.

SUBSOIL FINDINGS AND ANALYSIS (continued)

The core samples from all the holes were quite similar in nature and composition. The subsoil is saturated but not submerged.

From the laboratory tests it was found that the soil below the muck layer is inorganic clays of low to medium plasticity. The unconfined compression tests give an average value of 0.5 T.s.f. The field standard penetration results indicate quite a contrast in consistency at different depths. The natural moisture content of the soil below the top muck layer is about 17%. From these results the soil can be credited with only a very low bearing value down to elevation 1265 ft. in boreholes No. 1 & 2, and elevation 1273 ft. in boreholes No. 3 & 4. At these elevations however the layer will provide a conservative bearing value of 2 T.s.f. with a safety factor of 3.

CONCLUSIONS AND RECOMMENDATIONS

From the above discussion it follows that:

1. The terrain is Moraine spillway, composed of alluvial material of clay, silt and sand.
2. The bedrock is impure limestone with shale partings. The layers are horizontal. However due to past water erosion they are in a graduated state, descending towards the Credit River basin. Hence presenting different elevations to the bedrock surface in the area of the structure.
3. At elevations 1265 ft. (boreholes No. 1 & 2) and 1273 ft. (boreholes No. 3 & 4) the layer can provide a conservative 2 T.s.f. bearing value to support spread footing foundations. However, if higher bearing values are desired (3 T.s.f.) spread footing foundations would be placed on bedrock.
4. There is a considerable approach fill on both sides of the structure. The greatest height is 43 ft. at borehole No. 2 (station 157+27). The following points should be given due consideration in order to obtain a desired stability

CONCLUSIONS AND RECOMMENDATIONS (continued)

with a safety factor of 1.5 - 2.0.

- a) The topsoil which is composed of muck should be removed.
- b) A granular soil ($\phi = 30^\circ$) should be used as fill material.
- c) Side slopes will be 2 : 1.

V. Korlu
Foundation Engineer

APPENDIX I

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

DRILL RIG 54-2 OPERATION BORING & PENET'N JOB F-57-2 WP 550-56 BORING 1 STA 157+41 (16' LT.)
CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT MARCH 1957
SAMPLER HAMMER WT. 250 LBS. DROP 22 INCHES COMPILED BY H.J. CHECKED BY A.L. DATE BORING 29 JAN 1957

ABBREVIATIONS

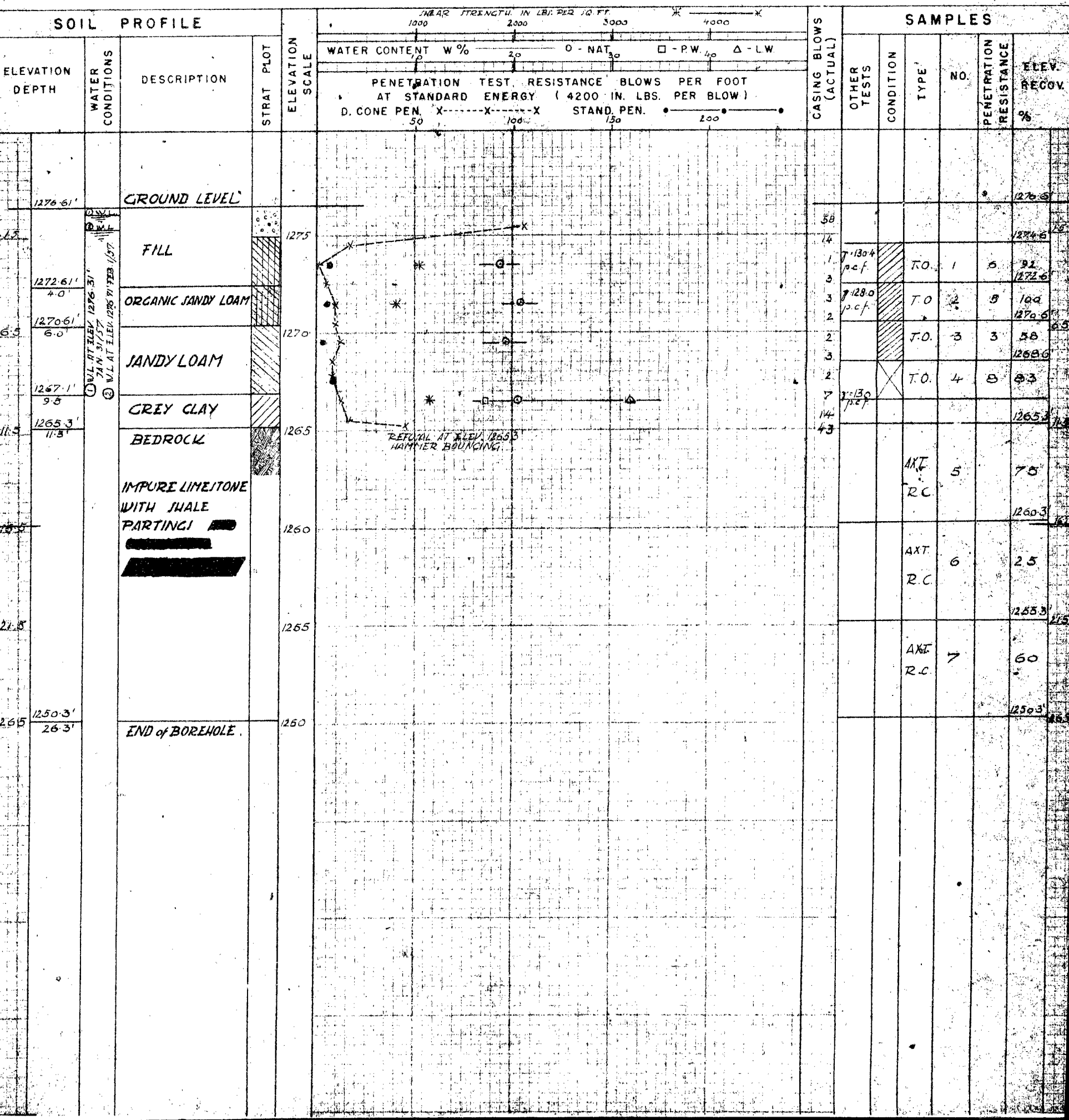
V - INSITU VANE SHEAR TEST Q - TRIAXIAL QUICK K - PERMIABILITY
M - MECHANICAL ANALYSIS S - TRIAXIAL SLOW C - CONSOLIDATION
U - UNCONFINED COMPRESSION WL - WATER LEVEL IN CASING CA - CASING
QC - TRIAXIAL CONSOLIDATED QUICK WT - WATER TABLE IN SOIL γ - UNIT WEIGHT

SAMPLE TYPES

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

SAMPLE CONDITION

 - DISTURBED
- FAIR
- GOOD
- LOST



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

DRILL RIG 54-2 OPERATION BORING & PENET'N JOB F-57-2 WP 550-56 BORING 2 STA. 157+27(28' RT.)
 CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT MARCH 1957
 SAMPLER HAMMER WT. 250 LBS. DROP 22 INCHES COMPILED BY H.J. CHECKED BY AL DATE BORING 2 FEB. 1957

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

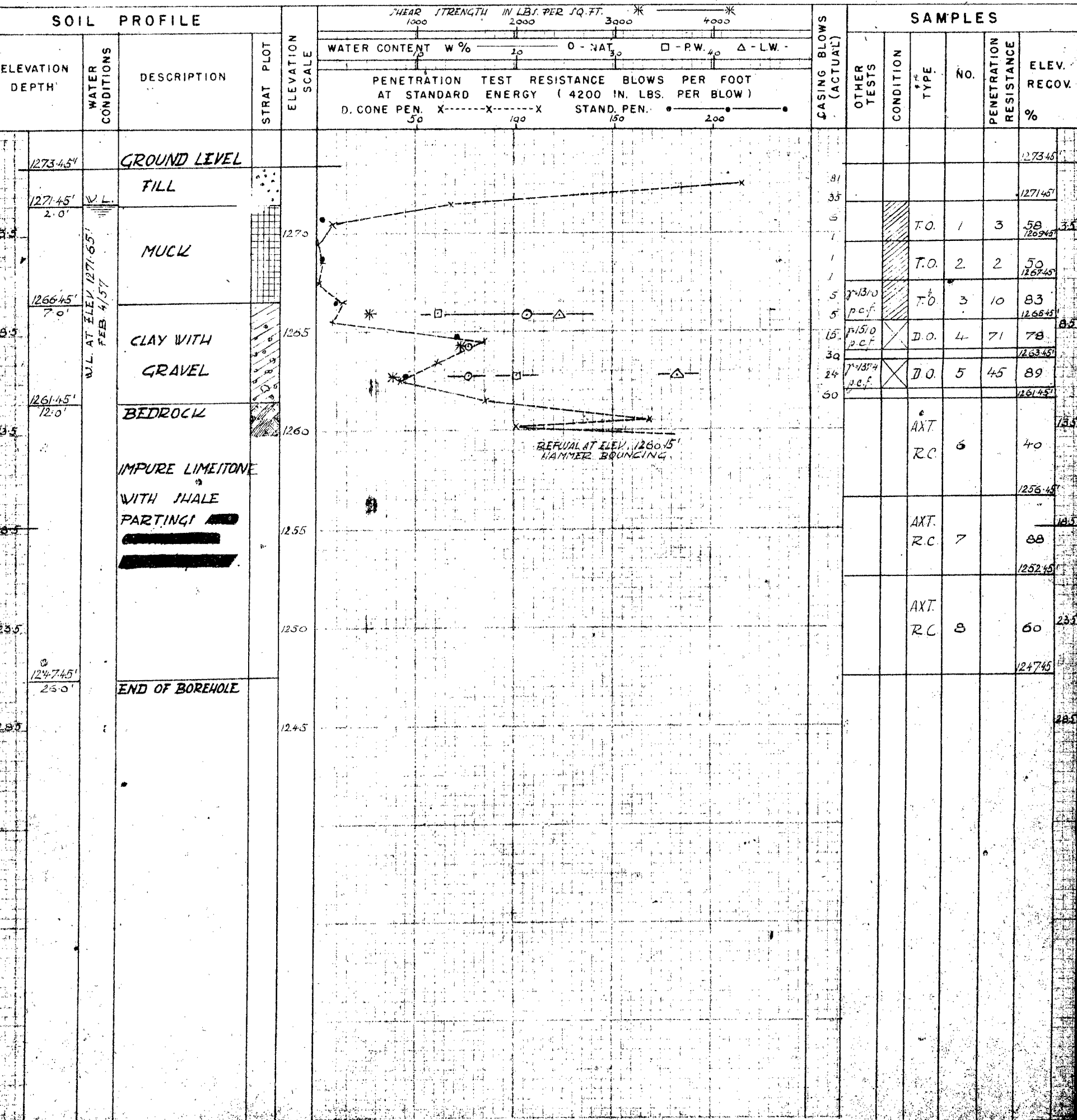
SAMPLE TYPES

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

SAMPLE CONDITION



- DISTURBED
 - FAIR
 - GOOD
 - LOST



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

DRILL RIG 54-2 OPERATION BORE & PENET'N JOB F-57-2 WP 550-56 BORING 3 STA. 156+28 (18' RT.)
 CASING BX (Standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT MARCH 1957
 SAMPLER HAMMER WT. 250 LBS. DROP 22 INCHES COMPILED BY H.S. CHECKED BY A.L. DATE BORING 5 FEB. 1957

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

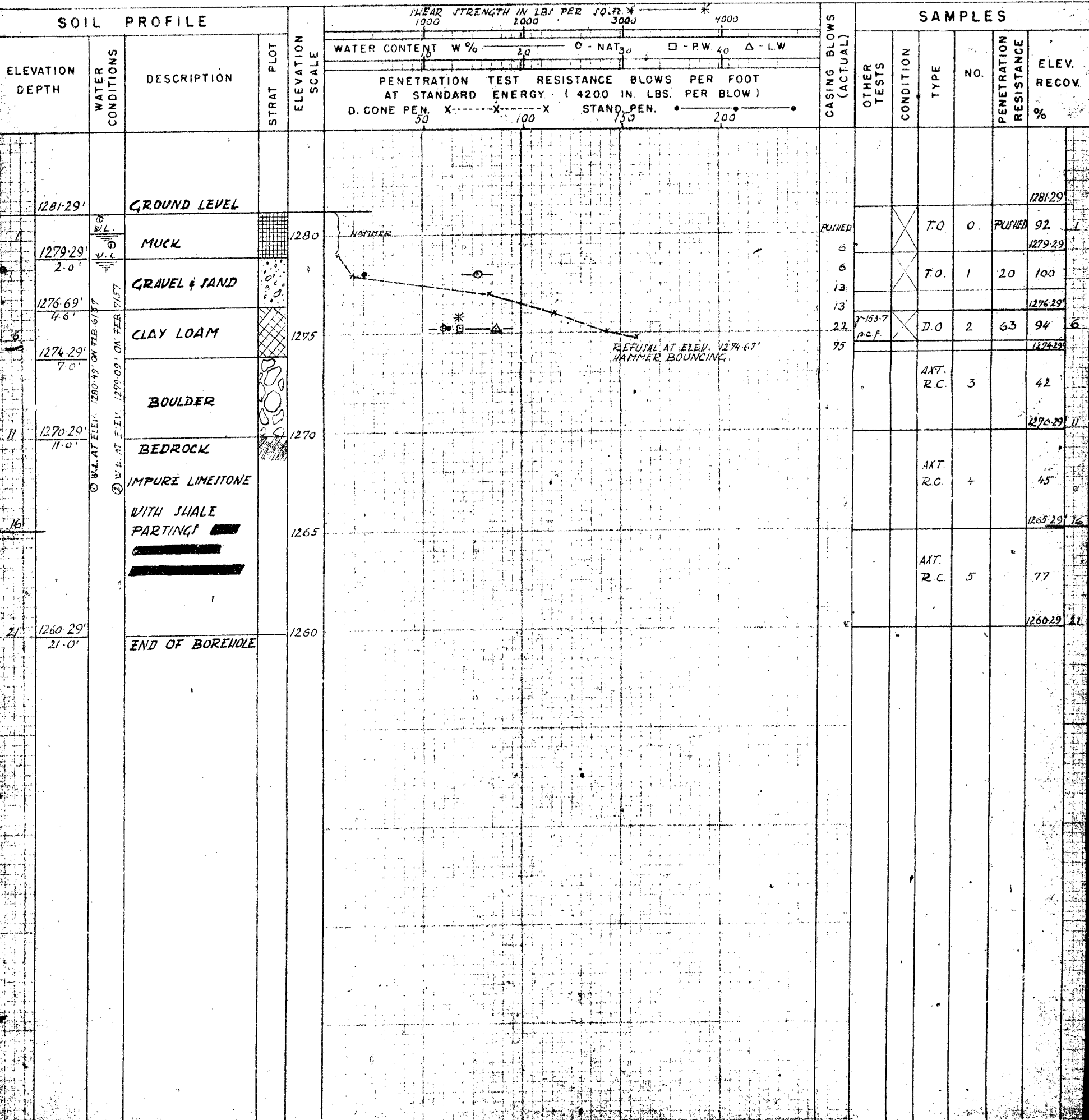
CS - CHUNK SS - SLEEVE SAMPLE
 DO - DRIVE OPEN PS - PISTON SAMPLE
 DF - DRIVE FOOT VALVE WS - WASHED SAMPLE
 TO - THIN WALLED OPEN RC - ROCK CORE

SAMPLE CONDITION



- DISTURBED
 - FAIR
 - GOOD
 - LOST

SOIL PROFILE



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

DRILL RIG 54-2 OPERATION BORE & PENET'N JOB F-57-2 WP 550-56 BORING 4 STA. 156+44 (15' LT)
CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT MARCH 1957
SAMPLER HAMMER WT. 250 LBS. DROP 22 INCHES COMPILED BY H.S. CHECKED BY A.L. DATE BORING 8 FEB. 1957

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

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

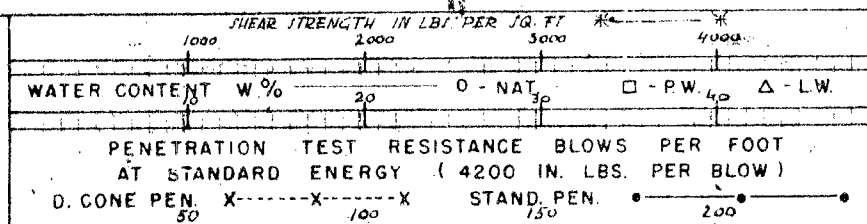
SAMPLE CONDITION



- DISTURBED
- FAIR
- GOOD
- LOST

SOIL PROFILE

ELEVATION DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT	ELEVATION SCALE
1282.14'		GROUND LEVEL		
1280.14'	W.L.	MUCK		1280
1277.64'		GRAVEL		
1275.14'		CLAY LOAM		1275
1271.14'		CLAY WITH SOME GRAVEL		
1267.14'		BEDROCK		1270
1265.14'		IMPURE LIMESTONE WITH SHALE PARTINGS		1265
1257.14'		END OF BOREHOLE		1255



CASING BLOWS
(ACTUAL)

SAMPLES

OTHER TESTS	CONDITION	TYPE	NO.	PENETRATION RESISTANCE	ELEV. RECOV.
		T.O.	0	50	1282.14'
		T.O.	1	71	1280.14'
					1277.14'
		D.O.	2	89	1275.14'
		D.O.	3	83	1273.14'
		D.O.	4	89	1271.14'
		AXT. R.C.	5	45	1268.34'
		AXT. R.C.	6	70	1266.14'
		AXT. R.C.	7	71	1261.14'

REFUSAL AT ELEV. 1268.34'
HAMMER BOUNCING

DRILL RIG 54-2 OPERATION BORE & PENET'N JOB F-57-2 W.P. 550-56 BORING 5 STA. 160+89(2'LT.)
CASING BK. (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT APRIL 1957
SAMPLER HAMMER WT. 250 LBS. DROP 22 INCHES COMPILED BY H.S. CHECKED BY A.L. DATE BORING 14 FEB. 1957

SAMPLE CONDITION

- DISTURBED
- FAIR
- GOOD
- LOST

SOIL PROFILE				ELEVATION SCALE		WATER CONTENT W %		O - NAT		□ - PW		△ - LW		CASING BLOWS (ACTUAL)	SAMPLES					
ELEVATION DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT PLOT	ELEVATION SCALE	PENETRATION TEST RESISTANCE BLOWS PER FOOT AT STANDARD ENERGY (4200 IN. LBS. PER BLOW)				D. CONE PEN. X-----X-----X				STAND. PEN.		OTHER TESTS	CONDITION	TYPE	NO.	PENETRATION RESISTANCE	ELEV. RECOV. %
1263.2'		GROUND LEVEL																	1263.2'	
1262.2'		MUCK																	1261.2'	
3		SANDY LOAM GRAVEL		1200															1258.2'	
8	W.L.			1205															1256.2'	
1254.2'	90'			1255															1254.2'	
13		CLAY WITH GRAVEL		1250															1252.2'	
19		BOULDERY CLAY		1245															1250.2'	
20.8		BEDROCK		1240															1248.2'	
23		IMPURE LIMESTONE WITH SHALE PARTINGS		1235															1246.2'	
28				1230															1244.2'	
33				1225															1242.2'	
227.0'	56.2'	END OF BOREHOLE																	1240.2'	

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

DRILL RIG 54-2 OPERATION BORE & PENET'N JOB F-57-2 WP. 550-56 BORING 6 STA. 163+00.4
CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT APRIL 1957
SAMPLER HAMMER WT. 250 LBS. DROP 22 INCHES COMPILED BY AL CHECKED BY AL DATE BORING 19 FEB. 1957

ABBREVIATIONS

SAMPLE TYPES

SAMPLE CONDITION

V - INSITU VANE SHEAR TEST Q - TRIAXIAL QUICK K - PERMIABILITY C.S. - CHUNK
M - MECHANICAL ANALYSIS S - TRIAXIAL SLOW C - CONSOLIDATION D.O. - DRIVE OPEN
U - UNCONFINED COMPRESSION WL - WATER LEVEL IN CASING CA - CASING D.F. - DRIVE FOOT VALVE
Q_c - TRIAXIAL CONSOLIDATED QUICK WT. - WATER TABLE IN SOIL γ - UNIT WEIGHT T.O. - THIN WALLED OPEN R.C. - ROCK CORE

 - DISTURBED
 - FAIR
 - GOOD
 - LOST

