

Mr. A. Toye

July 17th, 1956.

Bridge Engineer

Re: Foundation Report Hwy #401
Road Allowance between Con. V
& VI Trafalgar Twp. plus Oakville
Creek. W.P. 564-56 W.J. P-56-5

F. G. Brownridge
Per: A. Rutka

We are forwarding herewith two copies of the
above mentioned report.

In view of the dense nature of the till in this
area, spread footings are recommended with the bearing
capacity of two tons/sq. foot.

AR:JA
Encls.

F. G. Brownridge
MATERIALS & RESEARCH ENGINEER

Per: *A. Rutka*

A. Rutka
PRINCIPAL SOILS ENGINEER

C. C. to:

Mr. H. Fregaskes
Mr. John Walter
Mr. F. Poulos
✓ Foundation Section
File

FOUNDATION REPORT

Hwy. No. 401 Road Allowance between Con V & VI
Yrfaelger Pwp. plus Oakville Creek Culverts

Dispersment:

Mr. A. Foye,
Bridge Engineer. (2)

Mr. H. Frogaskee,
Construction Engineer. (1)

Mr. J. Walter,
Design Engineer. (1)

~~Mr. J. S. Duff, F. FOUNES~~
~~List. Eng. Dept. Home.~~ (1)
TORONTO

Foundation Section (1)

File (1)

W.P. 564-56
H.J. P-55-3

INTRODUCTION

Subsoil investigation has been carried out at Trafalgar Township in connection with the construction of the following structures:

- a) An overpass for Hwy. 401 road allowance between concessions V and VI, Station 245/30.
- b) Culverts over Oakville Creek at Station 246/20.

The work started on June 4, 1956 and was completed on June 28, 1956.

PROCEDURE

The subsoil investigation was performed by a coradrill machine. Three boreholes were made. Investigation of borehole No. 1 was in connection with the culvert construction over Oakville Creek. Investigation of boreholes 2 and 3 was in connection with the construction of an overpass on the road allowance between concessions V and VI.

The two jobs are adjacent at the same site. The locations and elevations of the boreholes are shown in drawing No. F-36-5A, and their logs under Appendix I.

SUBSOIL FINDINGS AND ANALYSIS

The investigations at the site reveal the following stratigraphy.

Underneath the topsoil there is a layer of compact coarse sand about 5-6 feet deep. The underlying layer is very stiff, impervious, clayey till, extending down to the depth of 45 feet. Below this the stratum is a red and gray soft shale.

Due to the fact that the till was very dense and bouldery it was impossible to extract the necessary samples for unconfined compression tests. However, other tests performed revealed that at 10 feet depth below the surface the soil has liquid limit of 11.4, moisture content of 12.3% and density of 152 lbs/sq.ft. Also, the average standard cone penetration resistance at this depth has recorded about 100 blows per foot.

At the depth of 25 feet below the ground surface the till layer is interbedded with a very fine sand layer. This sand layer has a thickness of 3.5 feet at borehole No. 1, 4 feet at borehole No. 2, and 2 feet at borehole No. 3. It was observed that there exists free water infiltration in this sand layer with appreciable hydraulic head, and which completely saturates this sand layer.

SUBSURFACE WATER

At depths of 2 and 4 feet from the ground surface some collections of perched water were encountered.

Again at the depth of 25', coinciding with the interbedded fine soil layer, the presence of infiltration water with considerable hydraulic head was observed.

CONCLUSIONS AND RECOMMENDATIONS

It is estimated that with the above identifications the till at elevations borehole No. 1, 626 Feet, borehole No. 2, 625.5 feet, and borehole No. 3, 625 feet, is capable of carrying a load of 2 tons per sq.ft. with a safety factor of 2.5 (National Building Code of Canada gives 5 tons per sq.ft. allowable bearing value for hard glacial till).

Therefore a spread footing foundation at elevation 625 feet will be satisfactory. It is calculated that the effective pressure of the footing placed at this elevation by the time it reaches the sand layer will be small enough to be taken care by this layer. The ground situation presents no special problems for the approach fills.

The course of the Oakville Creek at this site will be diverted. The resultant stream diversion will entail the placement of the creek structure in this substantial cut. This cut material consists of dense till similar to that recorded in the borings 1, 2, 3. Consequently the same bearing values for the culvert footings will be used.

V. Korin

APPENDIX I

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

DRILL RIG 54-1 OPERATION BORE & PEN. JOB 56-5 WP 564-56 BORING 1 STA. 244+59.30 LT
CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT JUNE 1956
SAMPLER HAMMER WT. 250 LBS. DROP 23 INCHES COMPILED BY H.S. CHECKED BY AL DATE BORING 5 JUNE 1956

ABBREVIATIONS

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

SAMPLE TYPES

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

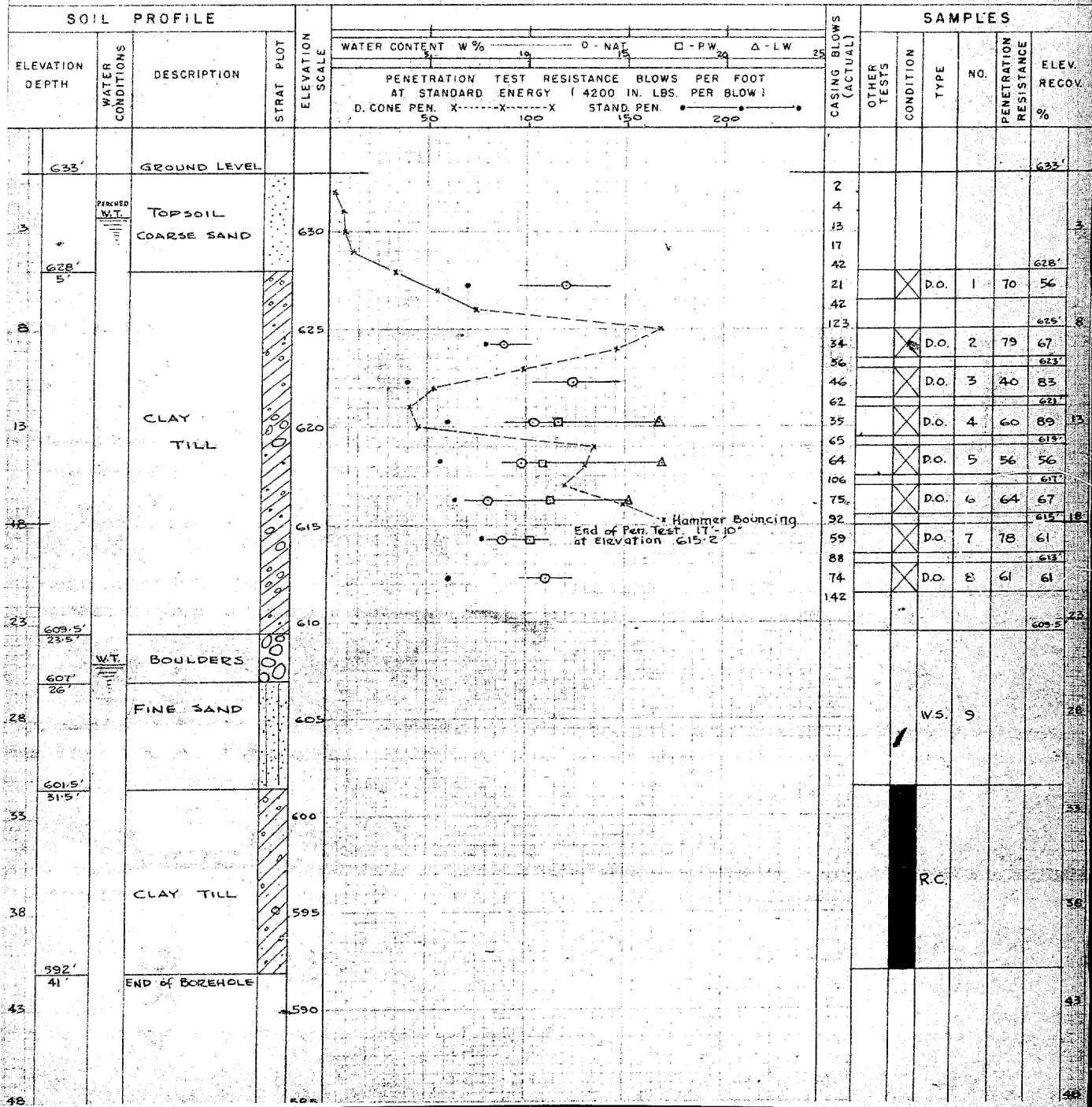
SAMPLE CONDITION



- 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 & PEN. JOB E-56-S. WR 564-56 BORING 2 STA. 247+89.85
CASING 3" (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT JUNE 1956
SAMPLER HAMMER WT. 250 LBS. DROP 23 INCHES COMPILED BY H.S. CHECKED BY A.L. DATE BORING 11 JUNE 1956

ABBREVIATIONS

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

SAMPLE TYPES

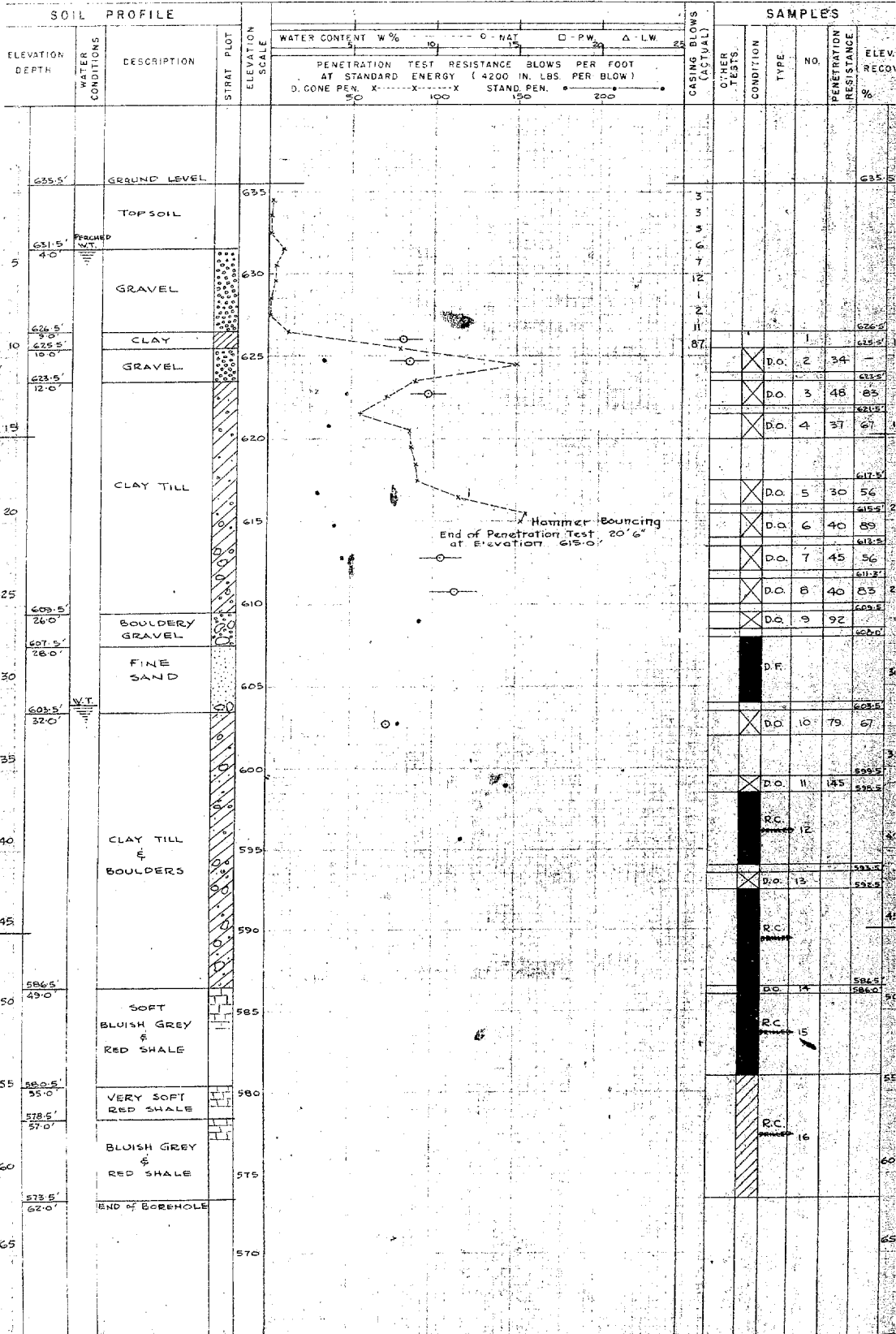
CS - CHUNK
CO - DRIVE OPEN
DF - DRIVE FOOT VALVE
TC - THIN WALLED OPEN
SS - SLEEVE SAMPLE
PS - PISTON SAMPLE
WS - WASHED SAMPLE
RC - ROCK CORE

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 54-1 OPERATION BORE & PEN. JOB F-56-5 WP 564-56 BORING 3 STA. 248+89 6'ET.
CASING B X (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT JULY 1956
SAMPLER HAMMER WT. 250 LBS. DROP 23 INCHES COMPILED BY H.S. CHECKED BY AL DATE BORING 21 JULY 1956

ABBREVIATIONS

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

SAMPLE TYPES

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

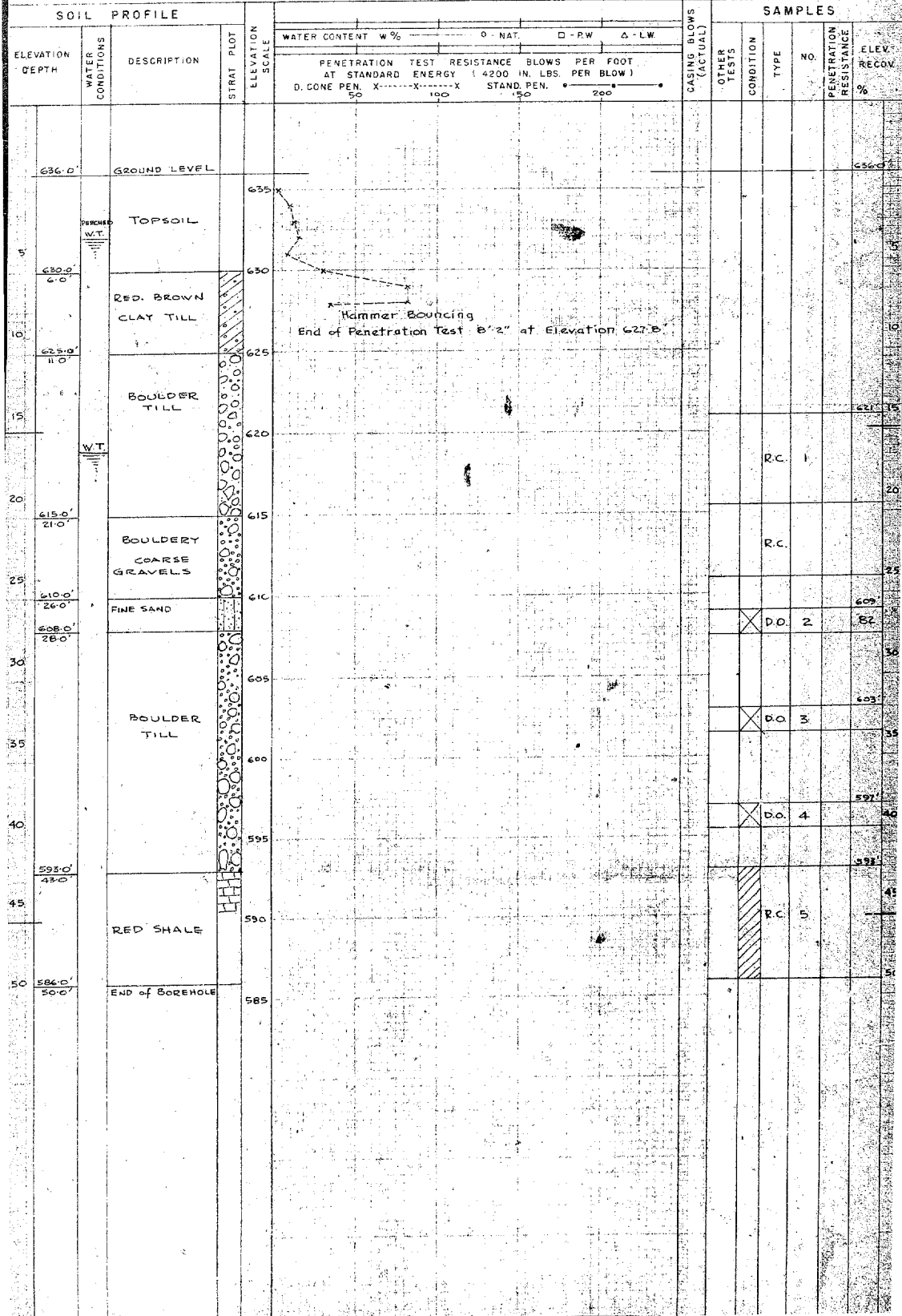
SAMPLE CONDITION



- DISTURBED
- FAIR
- GOOD
- LOST

SOIL PROFILE

SAMPLES



#56-F-5

W.P. #564-56

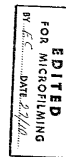
HWY 401 BETWEEN

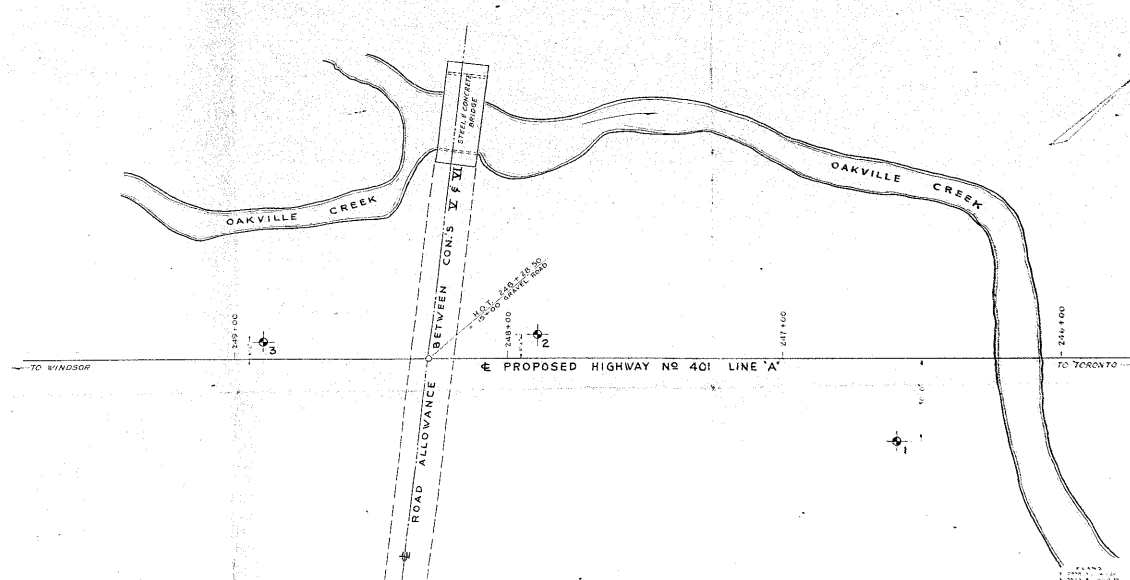
CON V & VI

TRAFALGAR

TWP. PLUS

OAKVILLE CREEK



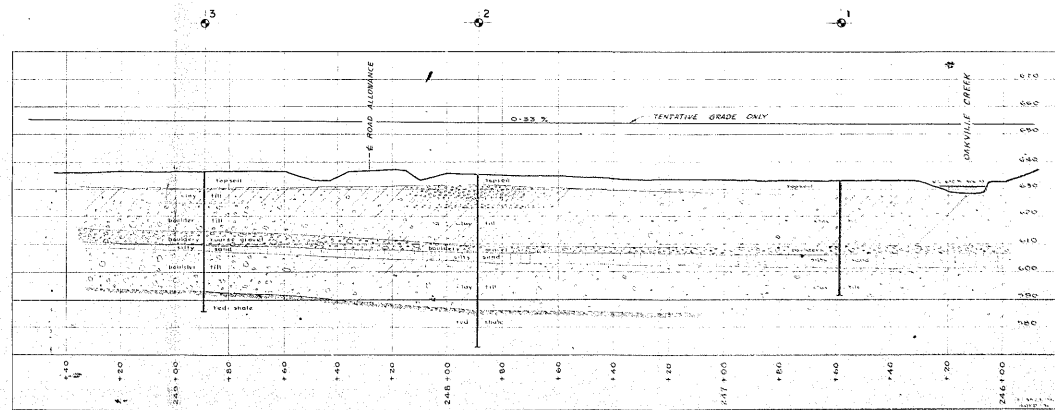


PLAN
Scale - 1 inch = 20 feet

LEGEND		
Bore Hole		
Penetration Hole		
Bore & Penetration Hole		

HOLE NO.	ELEVATION	STATION
1	635.0	246+50
2	635.5	247+50
3	636.0	248+80

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 - 1 inch = 20 feet

DEPARTMENT OF HIGHWAYS, ONTARIO			
MATERIALS & RESEARCH BRANCH - DOWNSVIEW			
PROPOSED CROSSING AT OAKVILLE CREEK			
& ROAD ALLOWANCE BETWEEN CON'S V & VI			
THE KING'S HIGHWAY NO. 401 LINE 'A'		D.W. NO. 4	
CO. HALTON	LOT. 15	CON. V & VI	
POSITIONS & ELEVATIONS OF HOLES			
APPROVED			
H.D.R.		W.R. 564-56	
9 JULY 1956		F-56-5 A	