

Mr. A. Teye,

Bridge Engineer.

F. C. Brownridge

Per: A. Rutka

April 2, 1957.

Re: Founda. n Report -
Hwy. 401 - County Rd.
between Lots 55 & 56 -
Westminster Twp. -
W.P. 708-56 W.J. P-56-

Attached herewith are two copies of the
above mentioned foundation report which is self-explan-
atory.

You will note that spread footing found-
ations with a bearing value of two tons per square foot
will be satisfactory. There is no foundation problem
with respect to the stability of the approach fills.

F. C. Brownridge
MATERIALS & RESEARCH ENGR.

per:



A. Rutka
PRINCIPAL SOILS ENGR.

AR/adeP
Attach.

cc: Messrs. H. Tregaskes
D. Ramsay
W. Fraser

Foundation Section
File

FOUNDATION REPORT

on

Highway No. 401 and Proposed Revision of
County Road 35, some 700 yards east of
Highway No. 4, South of Lambeth

Site Plan No.: 401 B-23

Station: 613/65

Distribution:

Mr. A. Toye, Bridge Engineer	(2)
Mr. H. Tregaskes, Construction Engineer	(1)
Mr. D. G. Ramsay, Design Engineer.	(1)
Mr. W. L. Fraser, District Engineer, London, Ontario.	(1)
Foundation Section	(1)
File	(1)

W. J. F-56-22

W. P. 708-56

Highway No. 401 and Proposed Revision of
County Road 35, some 700 yards east of
Highway No. 4, South of Lambeth

I. INTRODUCTION:

A subsoil investigation was made to determine the bearing values of the soil layers to support the foundations of the proposed new overpass bridge.

The location is some 700 yards to the east of the intersection of Highway No. 401 and Highway No. 4, south of Lambeth, (profile F-3529-16, station 613/65). The work started on 12 Nov. 1956 and was completed on 4 Dec. 1956.

II. PROCEDURE:

The subsoil investigation was carried out by means of a skid mounted core drill machine. Five boreholes and one dynamic cone penetration were made on either side of the Highway control line.

The locations and elevations of the boreholes are shown in Drawing No. F-56-22-A, and their logs under Appendix I.

III. SUBSOIL FINDINGS AND ANALYSIS:

The location is in Westminster Township, south of Lambeth. The terrain is identified as till-moraine.

From the findings of the borings the stratigraphy of the terrain is revealed to be stiff, grey, clayey till. The consistency is slightly variable and at different elevations some gravel was encountered.

III. SUBSOIL FINDINGS AND ANALYSIS - (cont'd.)

For foundation investigation, undisturbed samples were extracted from borsholes 2, 3, 6. From the laboratory test results, the average liquid limit is about 27%, and average plastic limit 15%. The soil is identified as stiff inorganic clay of low plasticity.

From texture analysis the soil was classified as medium clay with considerable amount of silt. The average moisture content was found to be 17%. However, the layer in general, is considered to be impervious.

Spread footing foundations will be considered. From the laboratory test the lowest average unconfined compression value is 1.4 t.s.f. The average standard penetration results obtained in the field corresponding to the above unconfined value is 37 blows per foot penetration. Accordingly, the soil can be credited with a bearing value of 2 t.s.f., with a safety factor of 3.

IV. CONCLUSIONS AND RECOMMENDATIONS:

From the above discussion it will be concluded that:

1. The stratigraphy revealed is that of clayey till, with slightly variable consistency. At different sections some gravel was encountered.
2. From the laboratory unconfined compression and field penetration ^{test} ~~results~~ results, the layer is credited with a conservative bearing value of 2 t.s.f., with a safety factor of 3.

IV. CONCLUSIONS AND RECOMMENDATIONS - (cont'd.)

3. Spread footing foundations should be placed at elevation about 828 ft. The soil at this elevation can provide a conservative bearing value of 2 t.s.f. with a safety factor of 3.
4. The approach fills are some 25' high. With 2:1 side slopes the stability of the fill is secured within accepted safety limits of 1.5-2.

V. Korlu
Foundation Engineer.

APPENDIX I

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

DRILL RIG 54-1 OPERATION BORE & PENET'N JOB F-56-22 WP 7-8-56 BORING SY 18+52 (25' L)
CASING BX (standard samplers to fit unless noted.) DATUM GEODESIC DATE REPORT FEB. 1957
SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY A.L. DATE BORING 13 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

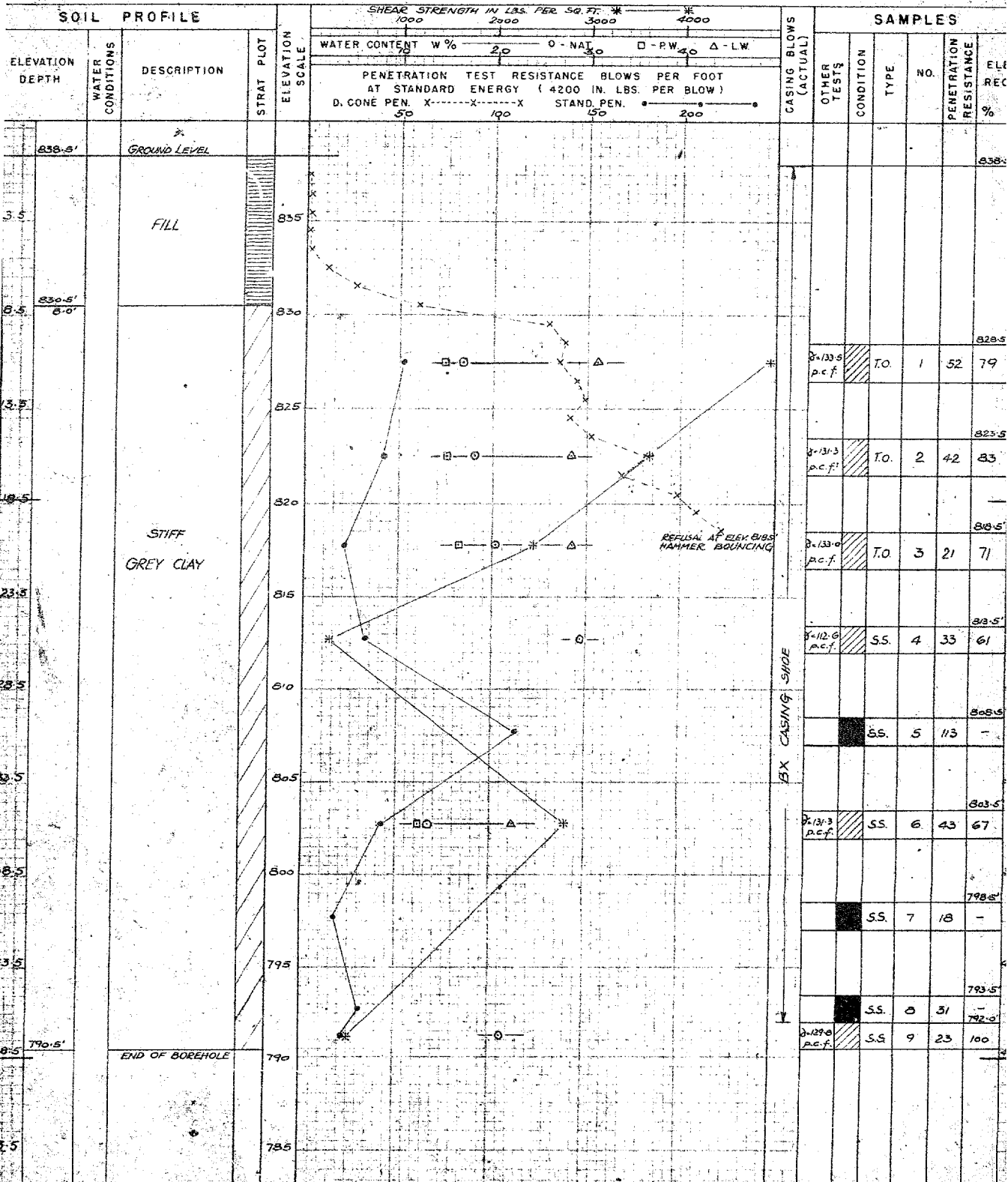
SAMPLE TYPES

CS - CHUNK S.S. - 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



DRILL RIG 54-1 OPERATION BORE & PENET JOB F-56-22 WP 708-56 BORING 4 STA. 17457.4
CASING BX (standard samplers to fit unless noted) DATUM GEODETTIC DATE REPORT FEB. 1957
SAMPLER HAMMER WT. 250 LBS. DROP 20.5 INCHES COMPILED BY U.S. CHECKED BY A.L. DATE BORING 29 NOV. 1956

BORING 4 STA. 17+57 4

DATE REPORT FEB. 1957

DATE BORING 29 NOV. 1956

SAMPLE CONDITION

S.S. - SLEEVE SAMPLE
P.S. - PISTON SAMPLE
W.S. - WASHED SAMPLE
R.C. - ROCK CORE



SAMPLES

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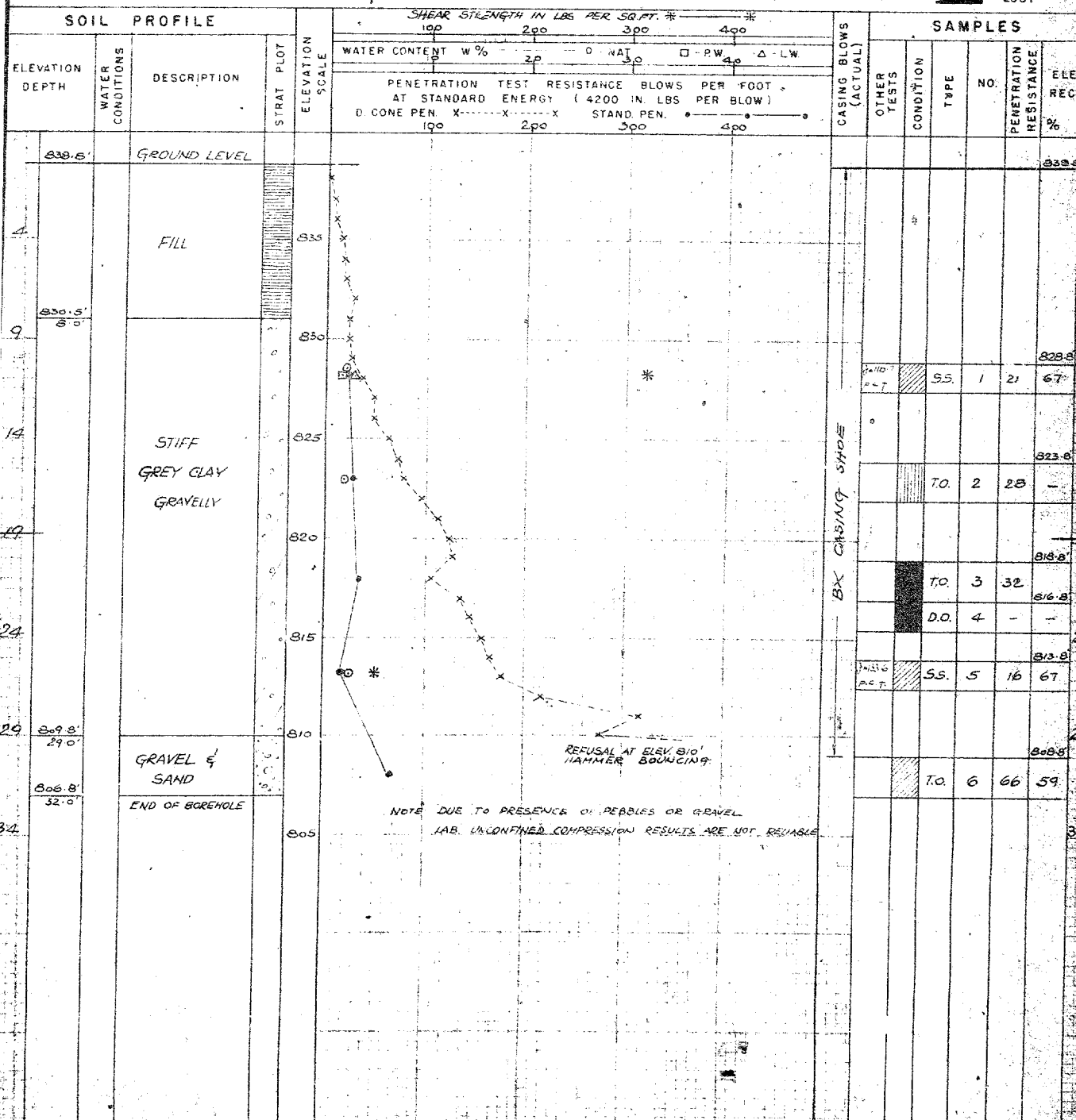
DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW
OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG 54-1 OPERATION BORE & PENET JOB F-56-22 WP 70B-56 BORING 5 STA. 19+30 (29)R
CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT FEB. 1957
SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY A.L. DATE BORING 26 NOV. 1956

ABBREVIATIONS
V - INSITU VANE SHEAR TEST Q - TRIAXIAL QUICK K - PERMIABILITY C.S. - CHUNK S.S. - SLEEVE SAMPLE
M - MECHANICAL ANALYSIS S - TRIAXIAL SLOW C - CONSOLIDATION D.O. - DRIVE OPEN PS - PISTON SAMPLE
U - UNCONFINED COMPRESSION WL - WATER LEVEL IN CASING CA - CASING D.F. - DRIVE FOOT VALVE WS - WASHED SAMPLE
Qc TRIAXIAL CONSOLIDATED QUICK WT - WATER TABLE IN SOIL γ - UNIT WEIGHT TO - THIN WALLED OPEN RC - ROCK CORE

SAMPLE TYPES
S.S. - SLEEVE SAMPLE
PS - PISTON SAMPLE
WS - WASHED SAMPLE
RC - ROCK CORE

SAMPLE CONDITION
- DISTURBED
- FAIR
- GOOD
- LOST



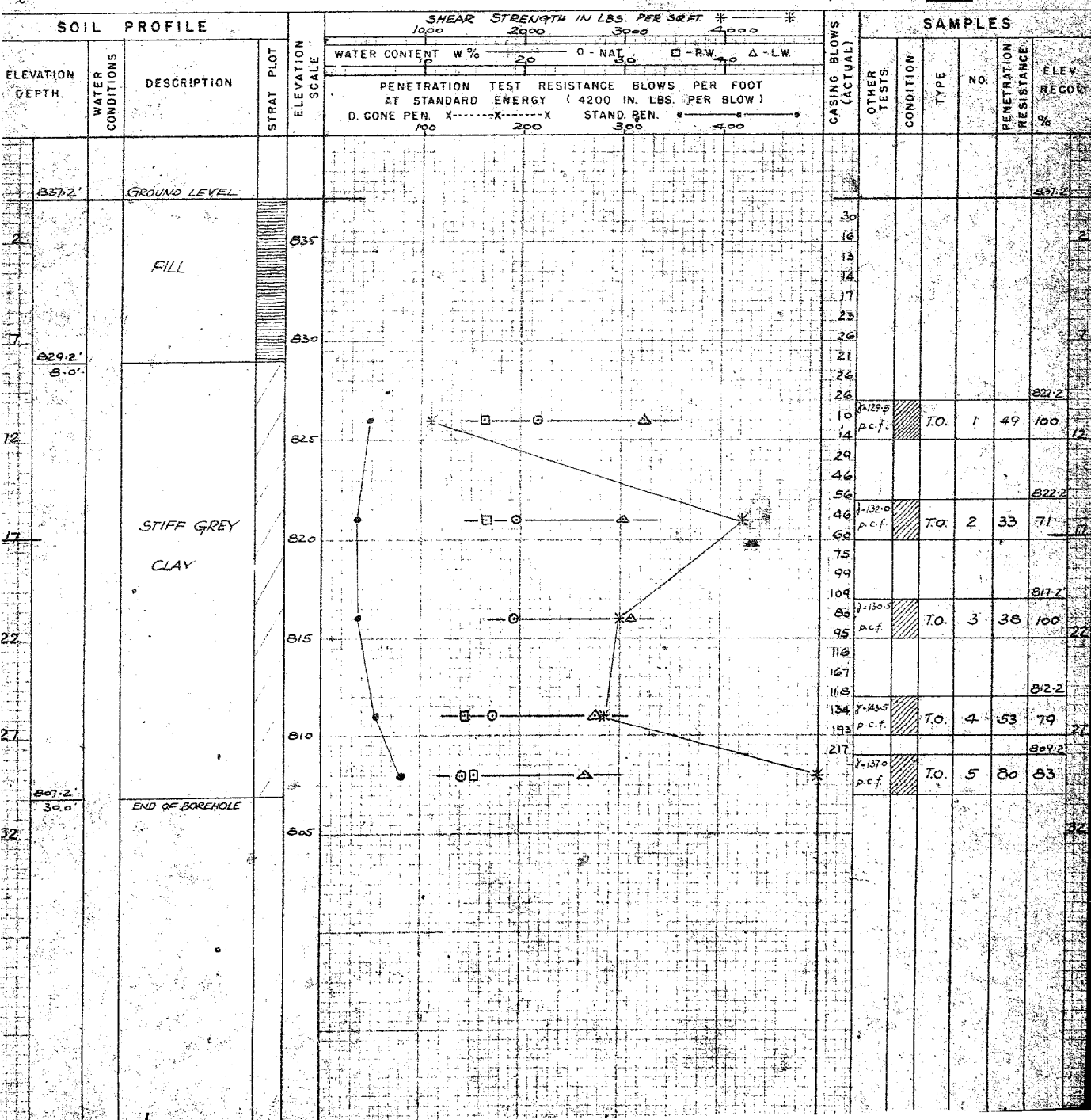
DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW
OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG 54-1 OPERATION BORE JOB F-56-22 W.P. 708-56 BORING 6 STA. 19+68 (29 LT)
CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT FEB. 1957
SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY AL DATE BORING 4 DEC. 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
T.O. - THIN WALLED OPEN


SAMPLE TYPES
SS - SLEEVE SAMPLE
PS - PISTON SAMPLE
WS - WASHED SAMPLE
RC - ROCK CORE

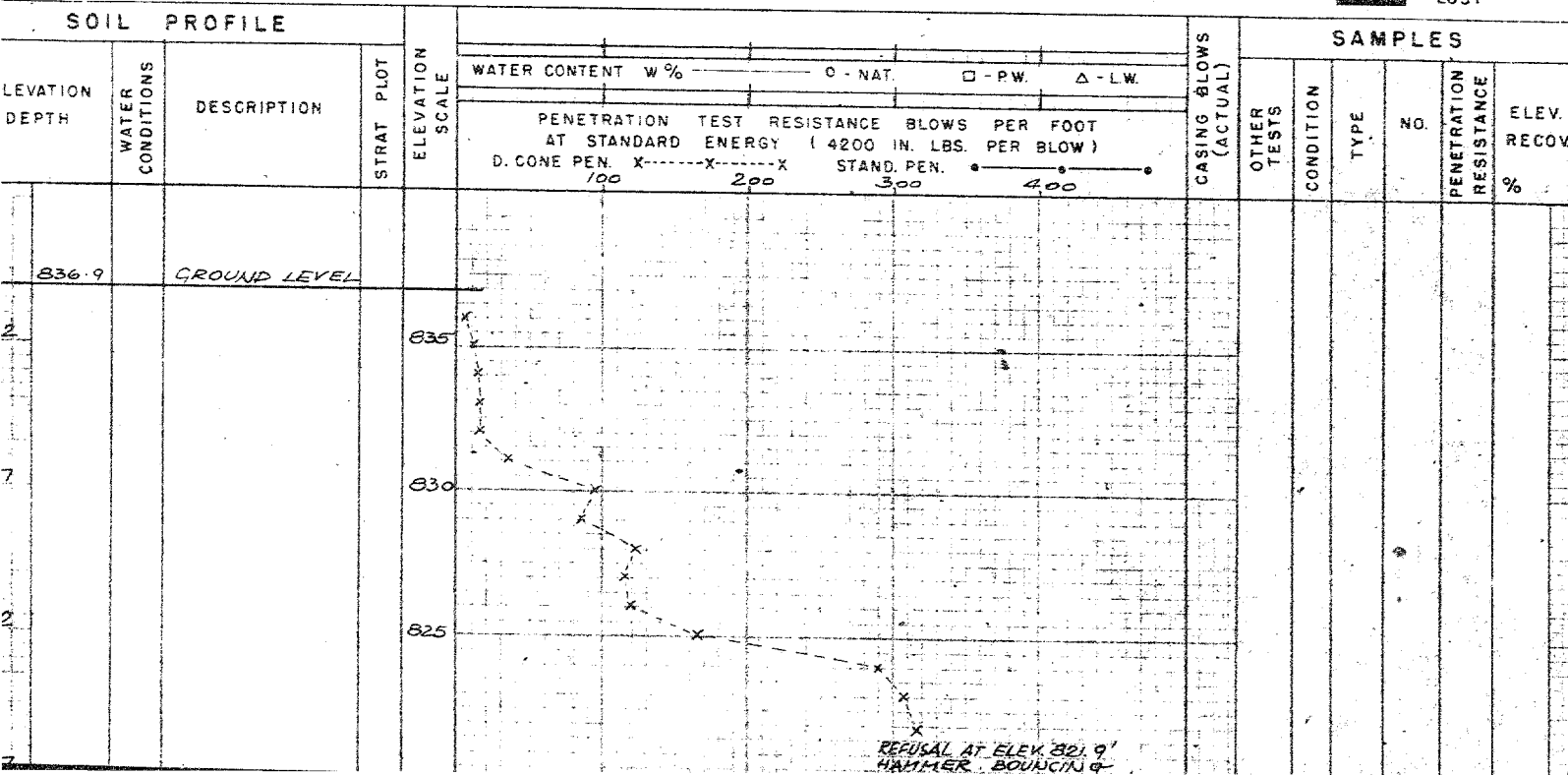
SAMPLE CONDITION
- DISTURBED
- FAIR
- GOOD
- LOST



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

DRILL RIG 54-1 OPERATION PENETRATION JOB F-56-22 W.P. 708-56 BORING 7 STA. 20+25(3/4)
 CASING Bx (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT FEB. 1957
 SAMPLER HAMMER WT. 250 LBS. DROP 20 1/2 INCHES COMPILED BY H.S. CHECKED BY AL DATE BORING 4 DEC. 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 U - UNIT WEIGHT
SAMPLE TYPES
 C.S. - CHUNK SS - SLEEVE SAMPLE
 D.O. - DRIVE OPEN PS - PISTON SAMPLE
 D.F. - DRIVE FOOT VALVE WS - WASHED SAMPLE
 T.O. - THIN WALLED OPEN RC - ROCK CORE
SAMPLE CONDITION
 - DISTURBED
 - FAIR
 - GOOD
 - LOST



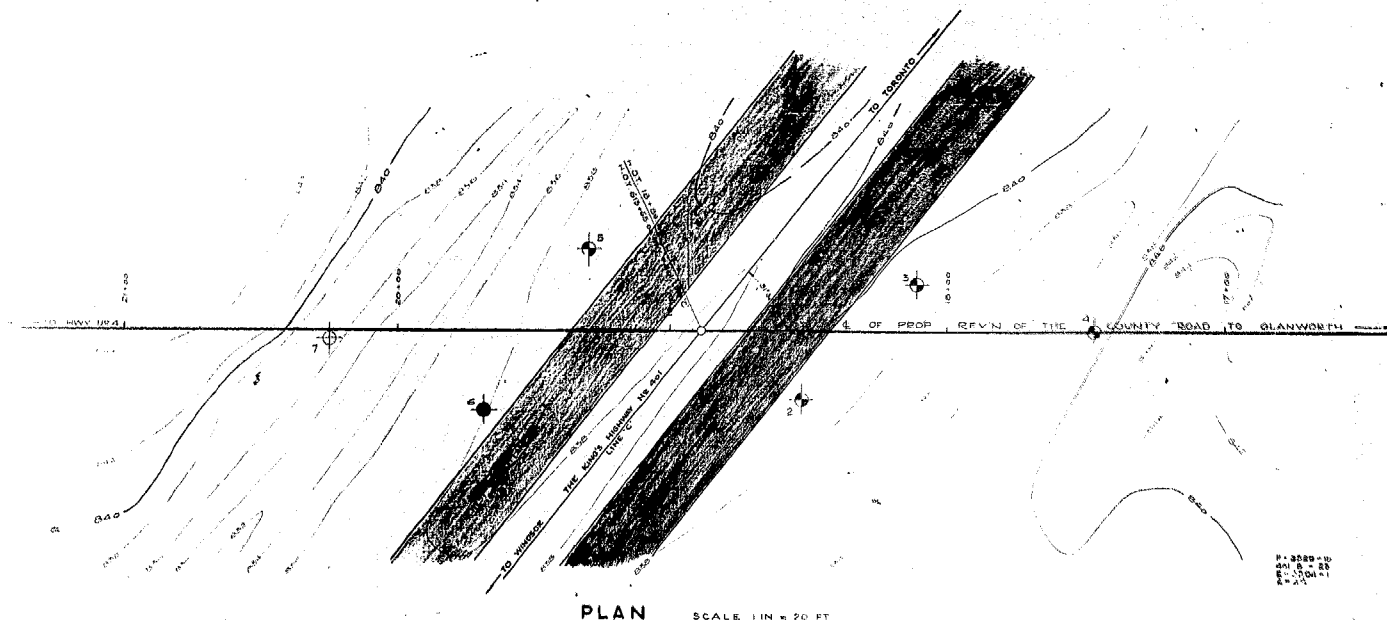
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W.P. #708-56

Hwy #401 &

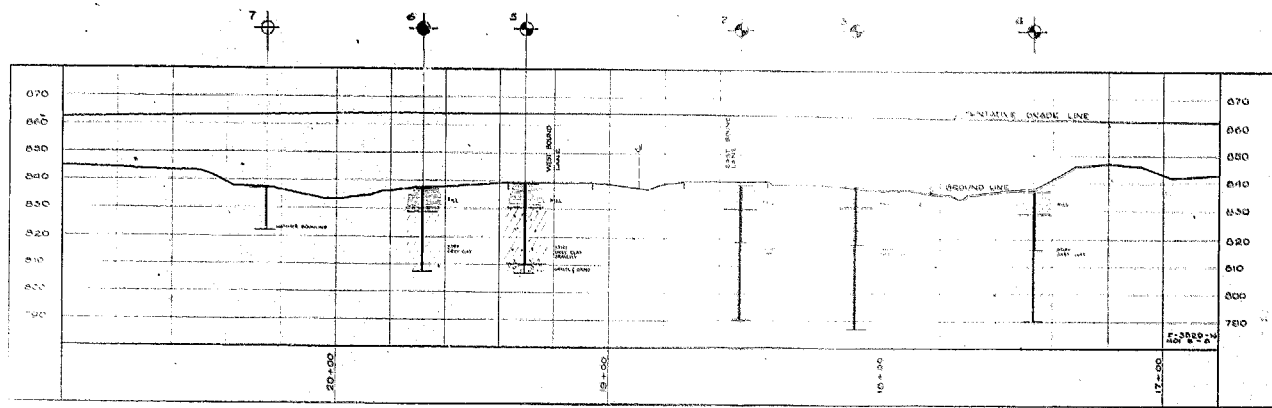
COUNTY RD #35





LEGEND			
BORE HOLE			
PENETRATION HOLE			
BORE & PENETRATION HOLE			
BORE NO.	ELEVATION	STATION	DISTANCE FROM E
2	836.8'	18+52'	28' LT
3	830.2'	18+41'	17' RT
4	837.2'	17+57'	4'
5	838.0'	18+30'	28' RT
6	837.3'	18+60'	28' LT
7	836.0'	20+25'	3' 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

LINE 'A' OF COUNTY RD. CROSSING HWY. 401 AT TEMPO

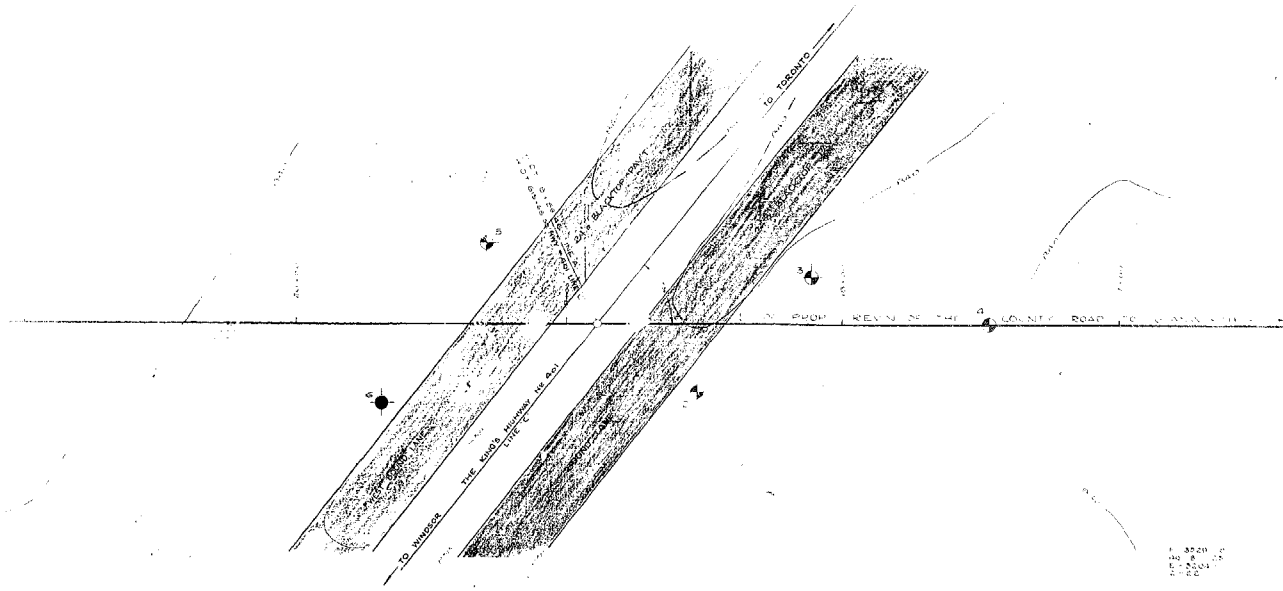
THE KING'S HIGHWAY No. 401 DIV. No. 2
TWP. MIDDLESEX LOT 56 CORN. EAST OF TALKER RD

POSITIONS & ELEVATIONS OF HOLES

APPROVED

DATE MARCH 1957

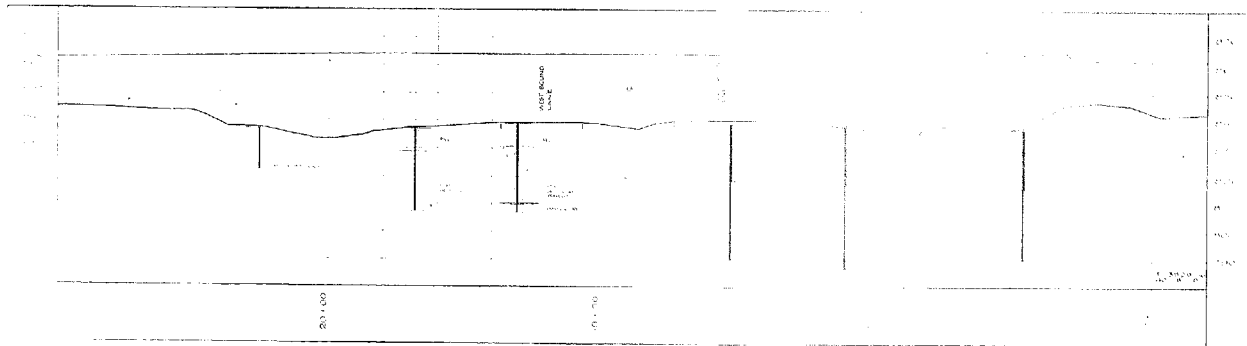
W.P. 708-56
F-56-22 A



PLAN SCALE 1 IN = 100 FT

LEGEND			
BORE HOLE			●
PENETRATION HOLE			⋈
BORE & PENETRATION HOLE			⊙
HOLE NO.	ELEVATION	STATION	DISTANCE FROM E
2	830.5	18+52	28.17
3	829.2	18+51	1.00
4	837.2	17+57	4.00
5	838.4	18+33	28.87
6	837.2	19+60	29.17
7	834.9	20+25	3.17

NOTE
THE BOUNDARIES BETWEEN THE DATA HAVE BEEN ESTABLISHED ONLY AT THE POINTS SHOWN BETWEEN BORE HOLE 1 & 7. THE DATA ARE OBTAINED FROM GEOLOGICAL EXPLORATION AND MAY BE SUBJECT TO CONSIDERABLE VARIATION.



PROFILE SCALE 1 IN = 100 FT

DEPARTMENT OF HIGHWAYS, ONTARIO			
MATERIALS & RESEARCH SECTION - DOWNSVIEW			
LINE 'A' OF COUNTY RD. CROSSING HWY. 401 AT TEMPO			
THE KING'S HIGHWAY NO. 401		PAGE NO. 2	
CITY: MIDDLESEX		EAST OF BLVD. 57	
TOWN: WESTMINSTER		EAST 56	
POSITIONS & ELEVATIONS OF HOLES			
APPROVED			
DATE: 1957			
DATE	BY	W.P.	708.36
DATE	BY	W.P.	708.36
DATE: MARCH 1 1957		DATE: 1957	

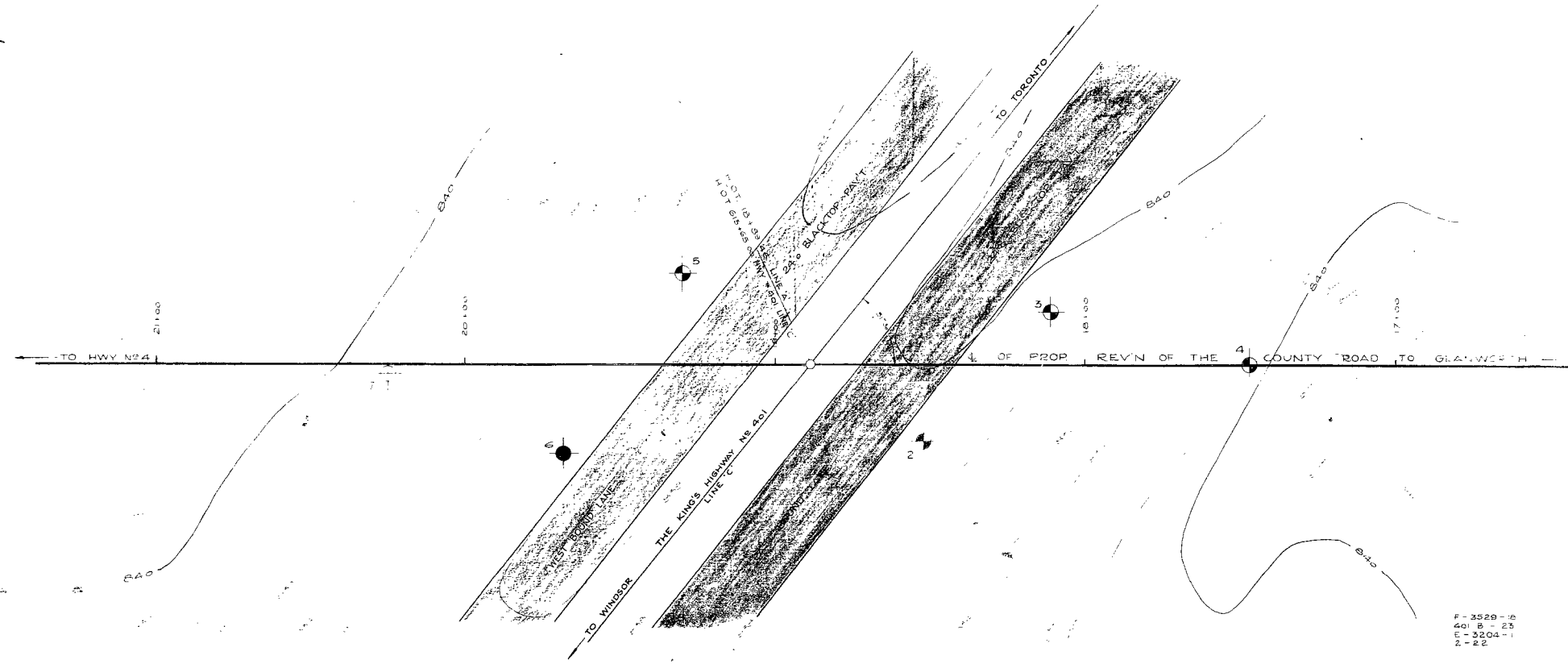
#56-F-22

W.P. #708-56

HWY #401 &

COUNTY RD #35

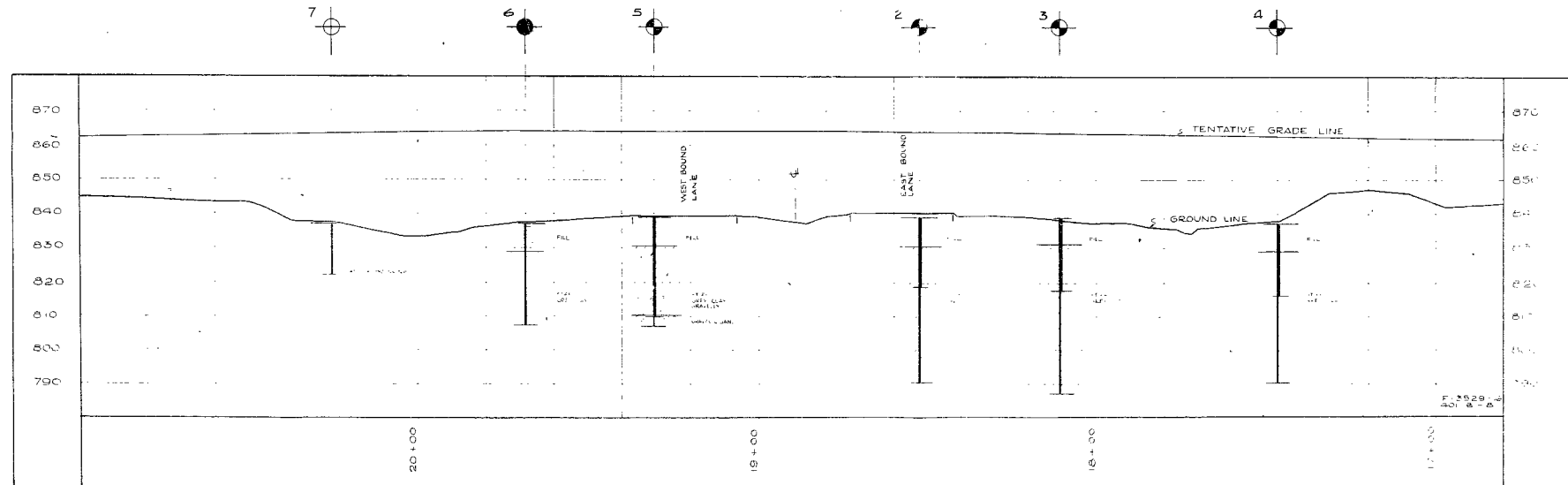




PLAN SCALE 1 IN = 20 FT

LEGEND			
BORE HOLE			
PENETRATION HOLE			
BORE & PENETRATION HOLE			
HOLE NO.	ELEVATION	STATION	DISTANCE FROM E
2	836.5	18+52	25' LT
3	839.2	19+	7' R
4	837.2	17+57	4'
5	838.8	19+30	14' RT
6	837.2	19+68	19' LT
7	836.9	20+25	3' LT

NOTE
THE BOUNDARIES BETWEEN TOWNSHIPS HAVE BEEN ESTABLISHED ONLY AT 500' INTERVALS BETWEEN BORE HOLE 23 AND BORE HOLE 1. THE DATA FROM GEOLOGICAL RECORDS AND MAY BE SUBJECT TO CONSIDERABLE ERROR.



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

DEPARTMENT OF HIGHWAYS, ONTARIO			
MATERIALS & RESEARCH SECTION - DOWNSVIEW			
LINE 'A' OF COUNTY RD. CROSSING HWY. 401 AT TEMPO			
THE KING'S HIGHWAY NO. 401		PLAN NO. 2	
CO. MIDDLESEX			
TWP. WESTMINSTER		EAST OF TWP. 2	
POSITIONS & ELEVATIONS OF HOLES			
APPROVED			
DATE		BY	
MARCH 1957		TGS-56	
		F-56-22A	