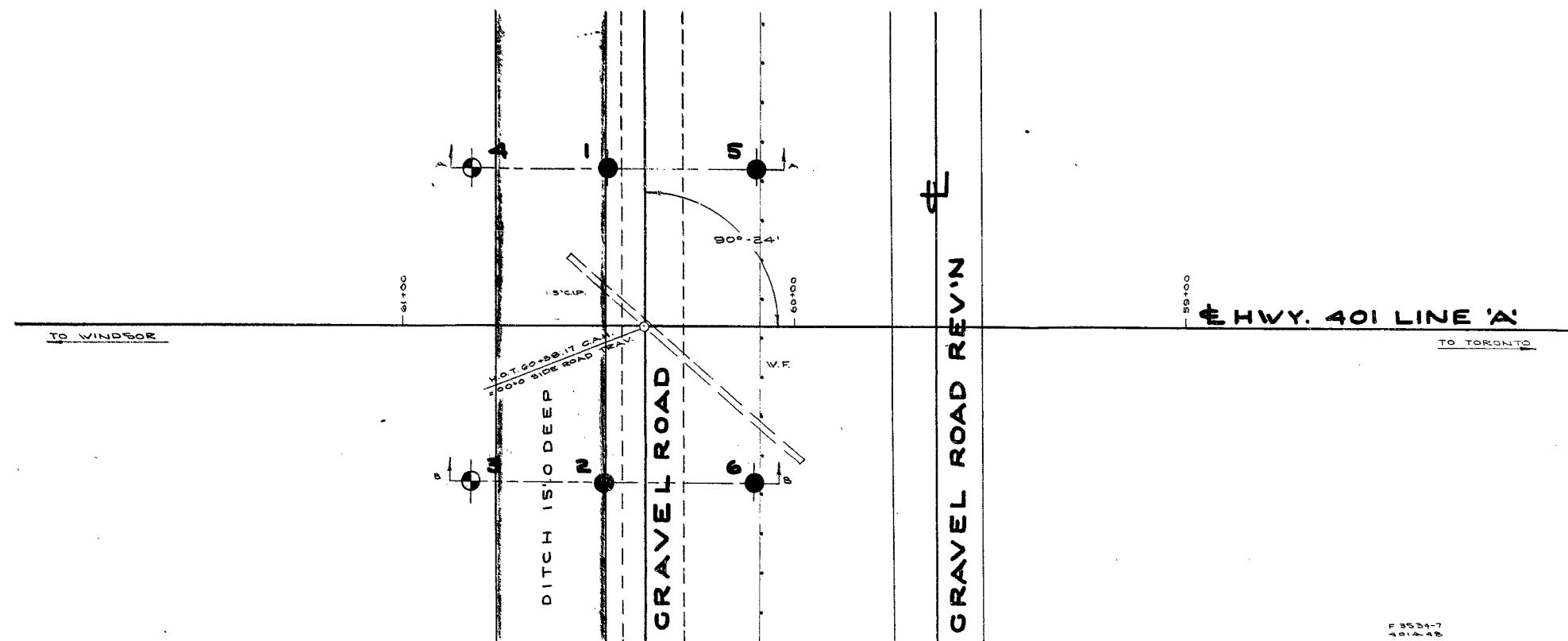
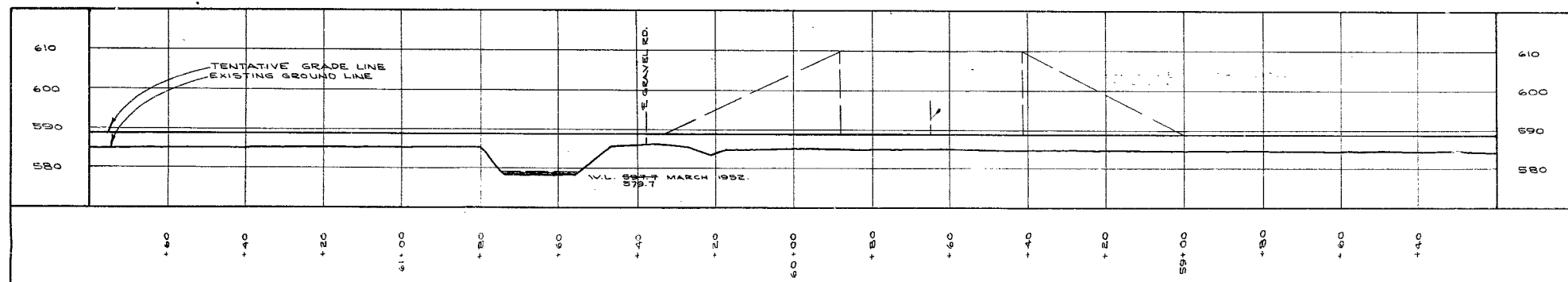


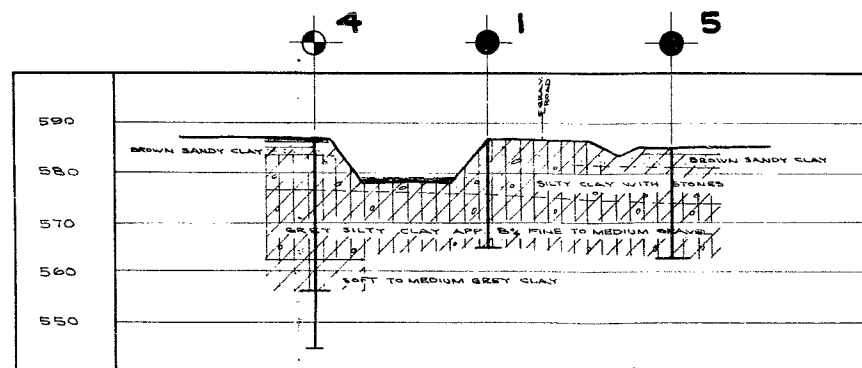
59-F-12
W.P. # 9-59
Hwy. # 401
CROSSING
GRAVEL RD.
CON. # 6
5½ MILES N.E.
OF TILBURY



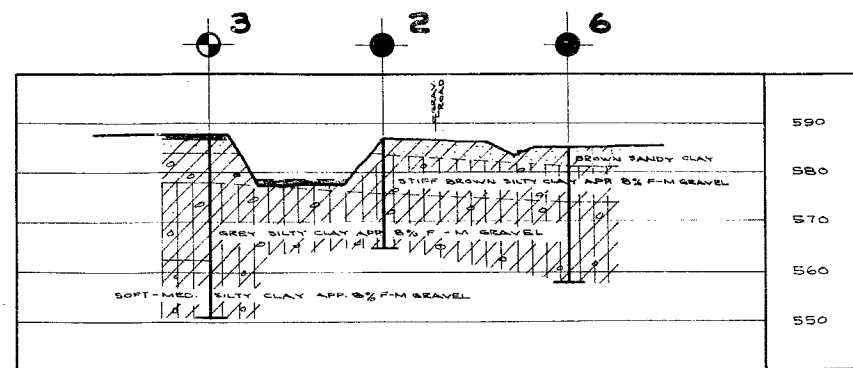
PLAN



PROFILE



A-A



B-B

LEGEND			
BORE HOLE			
PENETRATION HOLE			
BORE & PENETRATION HOLE			
HOLE NO.	ELEVATION	STATION	DISTANCE FROM E.
1	587.0	60+48	40' RT.
2	587.0	60+48	40' LT.
3	587.8	60+83	40' LT.
4	587.8	60+83	40' RT.
5	585.0	60+10	40' RT.
6	585.0	60+10	40' LT.

DEPARTMENT OF HIGHWAYS-ONTARIO MATERIALS RESEARCH SECTION			
GRAVEL ROAD PROPOSED CROSSING			
SHOWING POSITIONS & ELEVATIONS OF HOLES			
HWY. 401	DISTRICT 1	COUNTY KENT	
TOWNSHIP TILBURY EAST	LOT 4	CON. II	
LOCATION 5 1/2 MI. N.E. TILBURY			
DRAWN BY: T. MELLORS	CHECKED BY:	V.P. 9-59	
DATE MAR. 16/59	APPROVED BY:	DRAWING NO.	
SCALE 1" = 20'		F59-12A	

BW879.

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

April 23, 1959.

Re: Proposed Drain Crossing -
Hwy. #401 - District #1,
W.P. 9-59 BW 273.

Attention: Mr. S. McCombie.

We have been advised by your Mr. J. McAllister that, due to hydraulic conditions, footings for the above structure are to extend to Elevation 569. In addition, the proposed grade line is to be raised to 588.7. The foundation investigation carried out by our Section, indicated that footings should be founded at or about Elevation 576. Mr. McAllister requested that we review the subsoil conditions and comment on the effect of founding the footings at an elevation below that recommended in our report.

Our comments are as follows:-

- (1) General subsoil conditions at this site consist of an upper desiccated stiff layer of silty clay, of the order of 24 feet in thickness. The bearing capacity of footings founded at Elevation 569 will be controlled by the shear strength of the upper stiff strata. A safe allowable bearing value of 2 tons/sq.ft. can be used for spread footings founded at this elevation.
- (2) The effect of founding footings loaded with an intensity of 2 tons/sq.ft. at Elevation 569 will be to cause the seat of settlement to be located within the underlying soft, normally consolidated cohesive layer. This will give rise to settlements of the order of 4 to 6 inches.
- (3) The magnitude of total settlement indicated above, appears to be such that a simply supported structure should be designed in preference to a rigid frame.
- (4) The intended grade raise does not give rise to any approach fill stability problems.

We trust that the above comments adequately answer your queries with regard to this structure location, and if we can be of further assistance, please contact our office.

L. G. Soderman

LGS/MdeF

L. G. Soderman,
PRINCIPAL SOILS & FOUNDATION ENGINEER



ONTARIO
DEPARTMENT OF HIGHWAYS

Memo to Mr. A. M. Toye, *Date* March 24, 1959.
Bridge Engineer. *Subject* FOUNDATION REPORT -
From Materials & Research Section.

Attention: Mr. S. McCombie.

Re: Hwy. 401 and Drain & Relocated Gravel Road Crossing,
Lots 3 & 4, Concession VI, Township of Tilbury East,
5 1/2 Miles N.E. of Tilbury - District #1, W.P. 9-59.

Enclosed herewith, is our Foundation Report showing the subsoil conditions existing at the proposed structure location. Reference to the contents of this report shows that a deep deposit of silty clay underlies the site, the upper 25 feet of which has been subjected to desiccation, resulting in its stiff state.

Recommendations pertinent to the foundation design are summarized as follows:-

1. Subsoil conditions are such that the allowable bearing capacity of 2 tons per square foot can be used for spread footings, typically 7' to 10' in width, founded at or above Elevation 576'. Settlements resulting from the above load intensity, will be of the order of 3 inches.
2. The recommended minimum footing elevation of 576' will result in footings being placed approximately 2 feet below the stream bed. In view of the fact that the drainage creek is relatively inactive, footings placed at this elevation will provide adequate protection against scour and erosion. At the gravel road structure, footings should be provided with a minimum coverage of 4 to 5 feet.
3. An absolute determination of the ground water table elevation was not possible during the time at which the site work was carried out. The ground water table has been assumed at the elevation of the existing ground surface. Due to the absence of water-bearing sand seams, and due to the low permeability of the subsoil, seepage during footing excavations, should be of a minor amount.

cont'd. /2 ...

Recommendations - cont'd. ...

4. The subsoil has sufficient strength to safely support the proposed embankment loadings.

If you have any further questions regarding the foundation design of this site, please contact this office.

A. Rutka,
ACTING MAT'LS. & RESEARCH ENGR.

per:

L. G. Soderman

LGS/MdeF
Attach.

(L. G. Soderman,
PRINCIPAL SOILS & FOUNDATION ENGR.)

cc: Messrs. A. Toye
H. Tregaskes
D. Ramsay
G. Howell (Chatham)
A. Watt
Dr. P. Karrow
Foundation Section
File

FOUNDATION REPORT

on

Hwy. 401 and Drain & Relocated Gravel Road Crossing,
Lots 3 & 4, Concession VI, Township of Tilbury East,
5 1/2 Miles N.E. of Tilbury.

Plan No: F-3534 7

Profile No: F-3534-3

Distribution:

Mr. A. M. Toye,
Bridge Engineer. (2)

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

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

Mr. G. U. Howell,
District Engineer,
Chatham, Ontario. (1)

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

Dr. P. Karrow,
Department of Mines. (1)

Foundation Section. (1)

File. (1)

W.P. 9-59

W.J. F-59-12.

INTRODUCTION:

An investigation has been carried out to determine the competence of the subsoil layers for supporting the foundations of the proposed structures located some 5 1/2 miles N.E. of Tilbury, where Hwy. 401 Line "A" crosses the relocated County road and the drainage creek between Lots 3 & 4 in Con. VI, Twp. of Tilbury East (Sta. 59+65 & Sta. 60+65, Profile No. F-3534-3).

The field work commenced on February 5, 1959 and was completed on February 9, 1959.

DESCRIPTION OF THE SITE & GEOLOGY:

The site and its surrounding areas are generally flat farmlands, the area on both sides of the existing gravel road and the drain being under harvested corn crops. The drain was originally a branch of the Jeannette Creek and had been widened and dredged into a drainage channel as at present. At the time of the investigation, the area was covered by ice and snow.

Physiographically, the site under consideration, is located on the St. Clair Clay Plains, which were covered by Glacial Lakes Whittlesey and Warren before. According to available geological information, these extensive plains covering a large area of South-Western Ontario, are covered by deep deposits of clay, underlain by limestone or shale bedrock. At this site, the upper zone of the clay stratum has been desiccated and exists in a stiff condition for a depth of approximately 25 feet.

DESCRIPTION OF FIELD & LABORATORY WORK:

Field work consisted of 6 sampled boreholes, carried out by a trailer-mounted continuous flight auger adapted for soil sampling. Conventional auger boring procedures were followed and

cont'd. /2 ...

DESCRIPTION OF FIELD & LABORATORY WORK: (cont'd.) ...

samples were recovered at depths required. In the cohesive material encountered, relatively undisturbed 2" I.D. thin walled shelby tube samples were used. In the granular material, samples were recovered by means of a 2" O.D. split barrelled spoon sampler. The dimensions of this sampler and the energy used in driving it, conform to the requirements of the Standard Penetration Test. In addition, a dynamic cone penetration profile was obtained adjacent to Boring 3.

Upon receipt in the laboratory, samples were visually examined and identified. Routine index tests were performed on selected representative samples. Laboratory test results have been presented in the borehole logs and detailed in tabular form.

The location plan and subsoil profile are presented in Drawing No. F-59-12A.

SUBSOIL CONDITIONS:

The site is underlain by a stiff crust of silty clay followed by the thick stratum of soft to medium silty clay.

In each of the sampled boreholes the frozen topsoil was found to be underlain by a 24 ft. stiff crust of silty clay extending from Elevation 586.0' to 562'. Underneath the stiff crust the stratum of soft to medium silty clay was encountered. This stratum was explored to a depth of 37' below the ground surface at approximately Elev. 551'. According to available geological information, this stratum of soft to medium clay extends to a considerable depth over bedrock. In general, the soil types encountered are as follows:-

cont'd. /3 ...

SUBSOIL CONDITIONS: (cont'd.) ...

1. Stiff Silty Clay:

This stiff condition of the upper zone of clay is believed to be the result of desiccation, and has been subjected to oxidation resulting in its present brownish colour. Below the oxidized zone the colour is predominantly grey. The material contains approximately 25% silt, 20% sand and 8% fine to medium gravel in it. The average unit weight and moisture content were found to be 131 p.c.f. and 17%, respectively. Liquid and plastic limits averaged 27% and 16%. Laboratory shear strength tests show an average of 3000 p.s.f. to be representative, for the 24 ft. layer. Judging from its moisture content and Atterberg limits, the stiff silty clay appears to be saturated and preconsolidated. This is borne out by the consolidation test results.

2. Soft to Medium Silty Clay:

Underneath the stiff clay crust the thick stratum of soft to medium silty clay was encountered. The colour is predominantly grey. It contains approximately 25% silt, 20% sand and 8% fine to medium gravel. The average unit weight was found to be 125 p.c.f. Its consistency is defined by moisture content of 28%, Liquid and plastic limits of 29% and 17%, respectively. Laboratory tests show that the shear strength of the silty clay decreases with depth and reaches a constant value of 500 p.s.f. below approximately Elev. 552'. Judging from its moisture content and Atterberg limits, the soft to medium silty clay appears to be saturated and normally consolidated. This is confirmed by the consolidation test results.

cont'd. /4 ...

SUBSOIL CONDITIONS: (cont'd.) ...

Laboratory and field test results have been summarized in Table No. 1 and are included in this report under Appendix I.

WATER CONDITIONS:

No ground water was detected throughout the depths of boring during the investigation. The water level of Lake St. Clair is presently at approximately Elev. 574.

Due to the impermeable nature of the subsoil strata and absence of sand seams it was not possible to accurately establish the elevation of the ground water table during the boring program. The samples obtained were fully saturated and the ground water table has been assumed at or slightly below the existing ground surface. No artesian conditions were noted during the field work, and seepage into footing excavations will be local and of minor quantities.

FOUNDATION SUPPORT:

The stiff upper crust of silty clay is competent to provide adequate foundation support for the proposed structures. Laboratory and field test results are such that spread footing support can be obtained in the stiff crust of silty clay between Elevations 580' and 576'. Between these elevations a bearing capacity of 2 t.s.f. can be provided. This allowable bearing pressure of 2 t.s.f., incorporating a factor of safety of 3, is estimated on the basis of footing sizes of 100' to 108' long, 7' to 10' wide and not wider than 10'. While the footings may be founded between Elevations 580' and 576', they should not be founded below Elev. 576' in order to avoid overstressing of the underlying soft to medium clay. For the proposed structure at the drain, consideration should be given to

cont'd. /5 ...

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

founding the footings below the stream bed elevation in order that they are protected from stream erosion. Protective measures, such as sheet piling, may be resorted to if footings founded at the minimum elevation of 576' (approximately 2 ft. below the stream bed) are considered as providing inadequate protection against erosion. In view of the fact that the drainage creek is relatively inactive, footings placed at Elevation 576' are believed to have sufficient protection from erosion. In the contemplated structure at the re-located gravel road, footings should be founded at sufficient depth below the ground surface (4 to 5 ft.) in order to provide adequate frost protection.

No seepage problems with respect to shallow footing excavations are anticipated since no water-bearing sand seams were encountered in the upper 20 to 25' of the subsoil.

The proposed grade line does not present any approach fill stability problems.

SETTLEMENT ANALYSIS:

Settlements under the footings as a result of the application of 2 t.s.f. bearing pressure, based on footing sizes of 100' to 108' long, 7' to 10' wide and not wider than 10', have been estimated and are tabulated as follows:-

<u>Footing Elev.</u> <u>(in feet)</u>	<u>Footing Size</u>	<u>Loading Intensity</u> <u>(in t.s.f.)</u>	<u>Max. Theoretical</u> <u>Settlement Corrected</u> <u>for Rigidity and</u> <u>Depth Factors.</u>
580	100'-108' x 7	2	3.9"
576	100'-108' x 7	2	3.9"
576	100'-108' x 10	2	4.7"

Reference to the above figures shows that ultimate settlements upon application of 2 t.s.f. bearing pressure on footing sizes as

cont'd. /6 ...

SETTLEMENT ANALYSIS: (cont/d).....

shown can be as much as 5 inches. This is mainly due to the fact that the stresses caused by the applied load will influence the deep deposits of soft clay for a considerable depth. In view of the long period of years required for the estimated consolidation settlements to take place, it is suggested that a total settlement of the order of 3 inches may be anticipated for the lifetime that the structures are designed for. Differential settlements can be taken as of the order of 1" to 1 1/2".

DISCUSSION ON BEARING PRESSURE & SETTLEMENT:

From the foregoing discussion, it can be seen that, in order to avoid undesirable overstressing of the soft clay underneath, an allowable bearing pressure of not greater than 2 t.s.f. has been recommended for spread footings of 100' to 108' in length, 7' to 10' in width and not wider than 10', founded between Elevations 580' and 576', and not below 576' in the stiff crust of clay. Settlements consequent upon application of this bearing pressure of 2 t.s.f. can be as much as 5 inches. In view of the slow rate of consolidation as expected of clay, it is suggested that for design purposes, a total settlement of the order of 3 inches may be anticipated. The differential settlements can be taken as of the order of 1" to 1 1/2". The actual loading intensity is not known at the present time, but it is anticipated that a decrease in loading intensity will result in a decrease of settlements. It appears that if rigid frame structures are contemplated, they are favourable only if they can tolerate the amount of differential settlements as mentioned above. If the estimated differential settlements are not within tolerable limits, freely-supported structures appear to be necessary.

CONCLUSIONS & RECOMMENDATIONS:

1. The site is underlain by a stiff crust of silty clay, followed by a deep deposit of soft to medium silty clay.
2. Subsoil conditions are such that an allowable bearing pressure of not greater than 2 t.s.f. for spread footings of 7' to 10' wide and not wider than 10', can be obtained between Elevations 580' and 576' and not below 576'. For the proposed structure at the drain, consideration should be given to founding the footings below the stream bed elevation in order that they will be protected from stream erosion. Sheet pilings may be resorted to if footings founded at the minimum elevation of 576' (approximately 2 ft. below the stream bed) are considered as providing inadequate protection against erosion. In view of the fact that the drainage creek is relatively inactive, footings placed at Elevation 576' are believed to be deep enough to provide protection against erosion. For the contemplated structure at the relocated gravel road, footings should be founded at sufficient depth below the ground surface (4 to 5 ft.) in order to provide adequate frost protection.
3. Ultimate settlements consequent upon application of the recommended bearing pressure of 2 t.s.f. can be as much as 5 inches. However, for design purposes, as discussed under "Settlement Analysis", it has been suggested that a total settlement of the order of 3 inches may be anticipated. A decrease in loading intensity will, of course, result in a decrease of settlement. Rigid frame structures are favourable only if they can tolerate the estimated amount of settlement.

CONCLUSIONS & RECOMMENDATIONS: (cont'd.) ...

4. No seepage problems with respect to shallow footing excavations are anticipated.
5. The subsoil is competent to support the proposed embankment loadings.

Abraham Loh
A. Loh,
Foundation Engr.

APPENDIX I.

TABLE I.

SUMMARY OF FIELD & LABORATORY TESTS

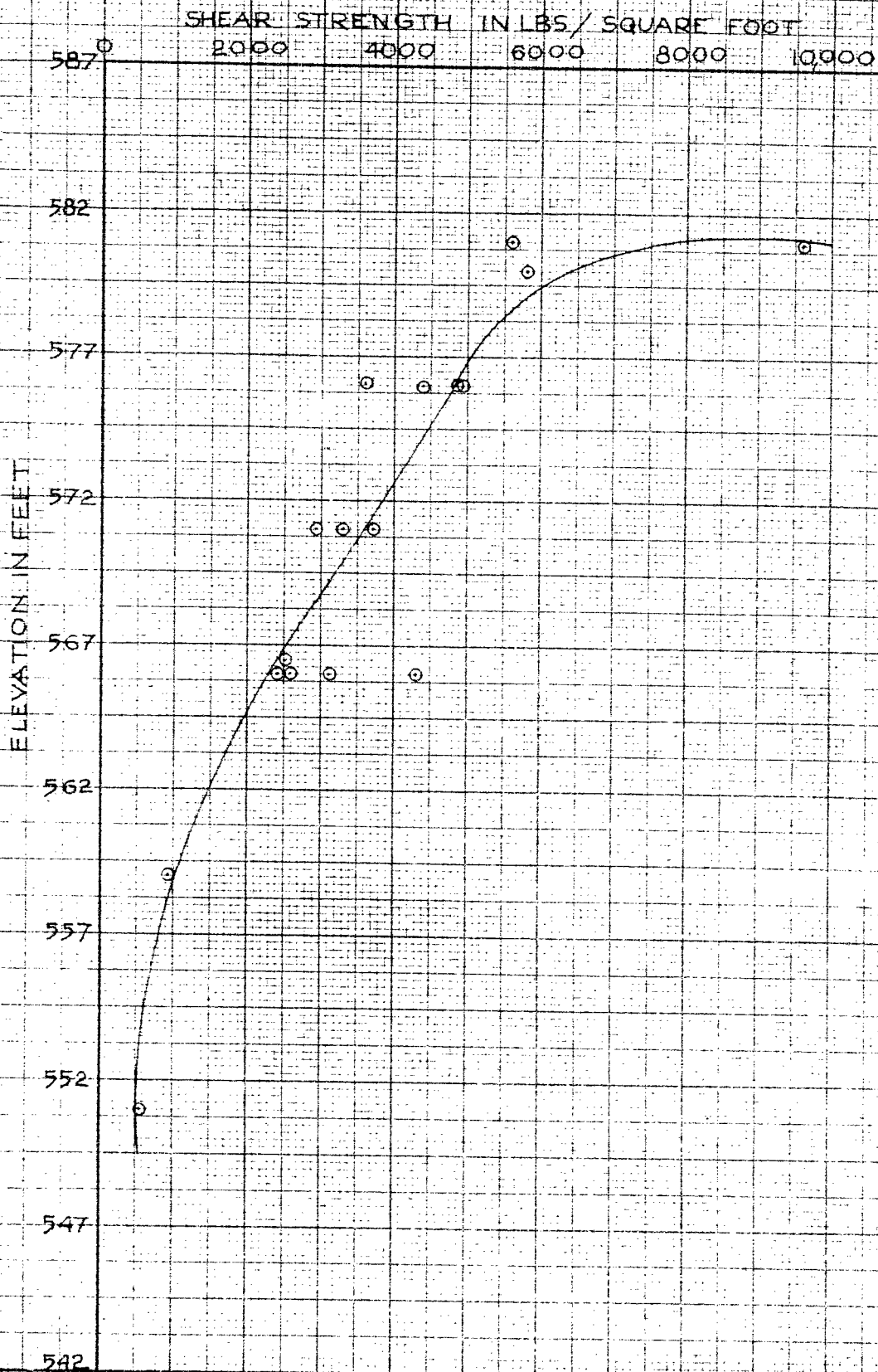
JOB F-59-12W.P. 9-59

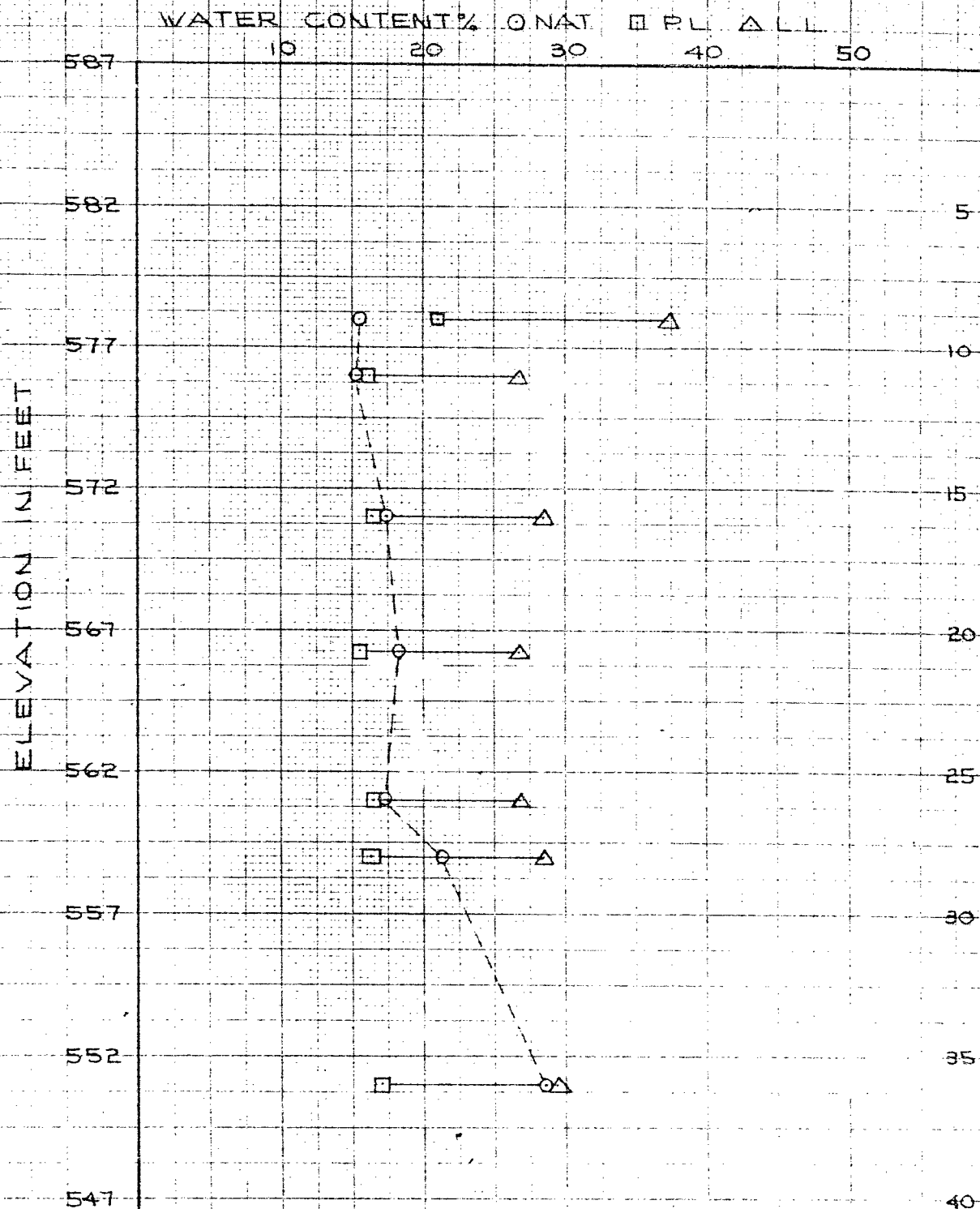
HOLE NO	SAMP. NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
1	T1	5 - 7	Stiff brown silty clay with some sand.	-	16.5	-	-	5620	132.3	Approximately 8% fine to medium gravel throughout.
	T2	10 - 12	Stiff grey silty clay.	31	15.3	-	-	-	135.2	
	T3	15 - 17	" " " "	20	16.3	-	-	2970	131.6	
	T4	20 - 22	" " " "	-	17.5	-	-	2450	131.6	
2	T1	5 - 7	Stiff brown silty clay.	28	15.1	-	-	9570	127.8	Approximately 8% fine to medium gravel throughout.
	T2	10 - 12	Stiff grey silty clay.	22	15.0	-	-	3550	133.7	
	T3	15 - 17	" " " "	19	16.7	-	-	-	130.5	
	T4	20 - 22	" " " "	-	17.1	-	-	2600	129.6	
3	S1	3 - 4½	Brown sandy clay.	13	21.3	-	-	-	123.0	Approximately 8% fine to medium gravel throughout.
	T2	6 - 8	Stiff brown silty clay.	-	15.5	21.1	37.1	5760	129.2	
	T3	10 - 12	Stiff grey silty clay.	23	15.3	15.9	26.9	4860	133.5	
	T4	15 - 17	" " " "	-	17.4	16.5	28.4	3330	132.2	
	T5	20 - 22	" " " "	-	18.2	15.5	26.8	2660	127.0	
	T6	27 - 29	Medium stiff grey silty clay.	-	21.3	16.1	28.5	937	125.5	
	T7	35 - 37	Soft " " "	-	28.9	16.9	29.3	527	121.0	
4	T1	5 - 7	Stiff brown silty clay with	12	16.2	-	-	-	124.5	Approximately 8% fine to medium gravel throughout in the grey clay.
	T2	10 - 12	Stiff brown silty clay with stones.	35	15.8	17.5	29.5	-	138.3	
	T3	15 - 17	Stiff grey silty clay.	23	16.4	16.1	27.4	3730	133.3	
	T4	20 - 22	" " " "	-	16.8	16.2	27.2	4330	133.7	
	T5	30 - 32	Soft " " "	-	18.8	-	-	-	130.0	

cont'd. /2 ...

JOB F-59-12
W.P. 9-59.

DLE NO.	SAMP. NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
5	T1	5 - 7	Stiff brown silty clay with stones.	7	-	-	-	-	-	Approximately 8% fine to medium gravel throughout in the grey clay.
	T2	10 - 12	Stiff brown silty clay.	20	15.6	16.0	26.1	4410	134.2	
	T3	15 - 17	" " " "	20	16.2	-	-	-	131.5	
	T4	20 - 22	" " " "	18	17.9	15.8	26.0	3020	134.0	
6	T1	5 - 7	Stiff brown silty clay.	-	19.0	-	-	1900	129.3	Approximately 8% fine to medium gravel throughout.
	T2	10 - 12	Stiff grey silty clay.	19	15.5	-	-	4870	131.5	
	T3	15 - 17	" " " "	23	17.2	-	-	-	132.3	
	T4	25 - 27	Med. Stiff grey silty clay.	-	17.1	16.7	26.8	-	129.3	
			T1 Denotes thin walled shelby sample. S1 Denotes split spoon sample.							
			<u>Consolidation Characteristics:</u>							
			Depth 0 - 25' - Compression Index 0.10 Coeff. of Consolidation 0.17 sq.ft./day. Preconsolidation Pressure 1 T/sq.ft.							
			Depth 25' and below. - Compression Index 0.16 Coeff. of Consolidation 0.06 sq.ft./day. Preconsolidation Pressure = Submerged Unit Weight x Depth. - (Normally consolidated.)							





DRILL RIG PENN DRILL JONSTON OPERATION BORE _____ JOB F-59-12 WP 9-59 _____ BORING 1 STA. 60+48.40 40
CASING _____ (standard samplers to fit unless noted) _____ DATUM GEODETIC _____ DATE REPORT MARCH 1959 _____
SAMPLER HAMMER WT. 140 _____ LBS. DROP 30 _____ INCHES COMPILED BY TJ CHECKED BY AL _____ DATE BORING FEBRUARY 9 1959 _____

SAMPLE CONDITION



- DISTURBED
- FAIR
- GOOD
- LOST

[illegible]

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

DRILL RIG PENN. DRILL JOHNSTON COOPERATION BORE JOB E-52-12 WP 9-59 BORING 2 STA. 60+48.40 LT.
 CASING _____ (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT MARCH 1959
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES COMPILED BY JJ CHECKED BY AL DATE BORING FEBRUARY 9, 1959

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

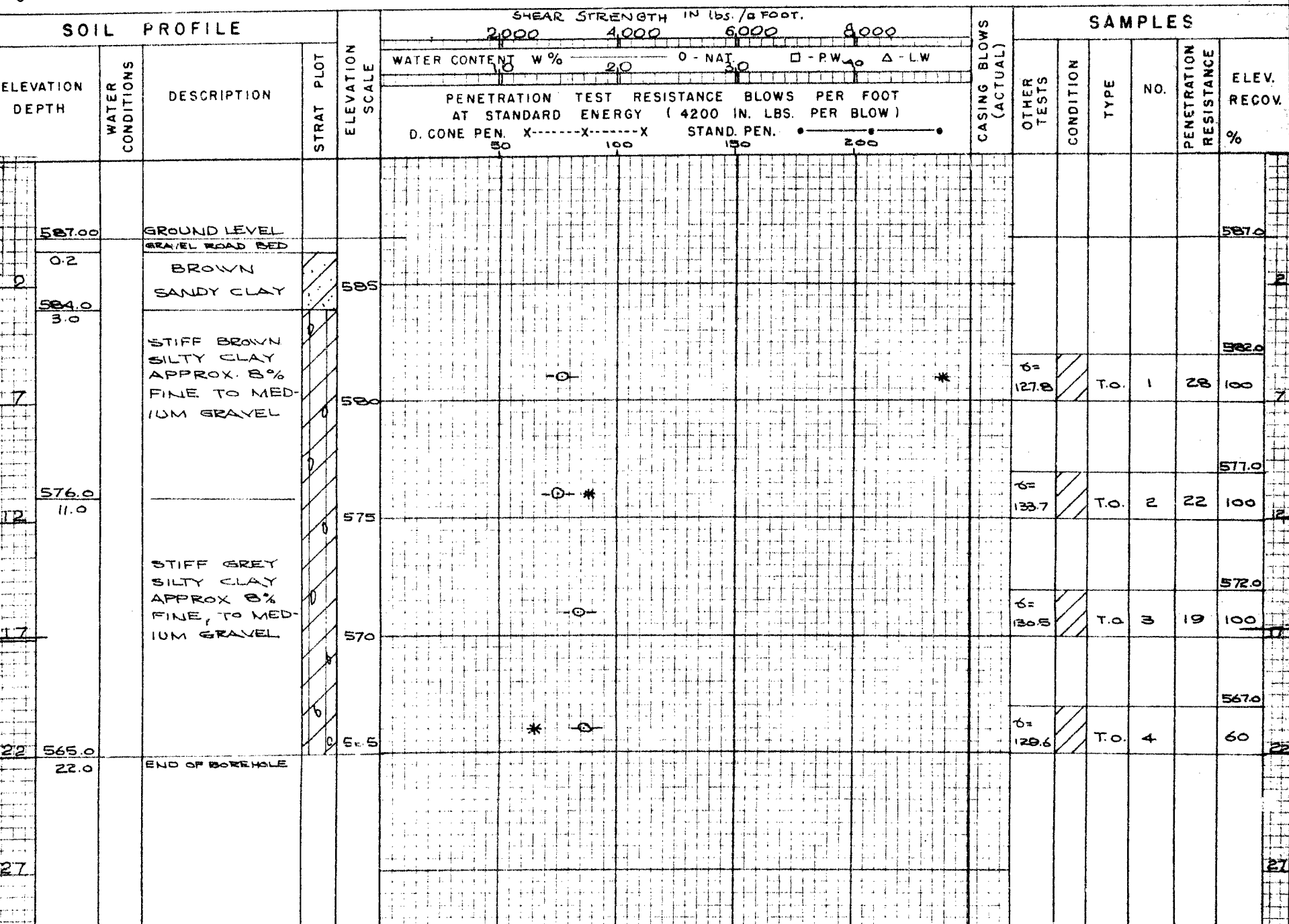
SAMPLE TYPES

C.S. - CHUNK S.S. - SLEEVE SAMPLE
 D.O. - DRIVE OPEN P.S. - PISTON SAMPLE
 D.F. - DRIVE FOOT VALVE W.S. - 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 PEN. DRILL JOHNSON OPERATION BORE PENETRATION NOBF-59-12 WP 9-59 BORING 4 STA. 60+83 (43 RT)
 CASING (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT MARCH 1959
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES COMPILED BY J.J. CHECKED BY A.L. DATE BORING FEBRUARY 6, 1959

ABBREVIATIONS

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

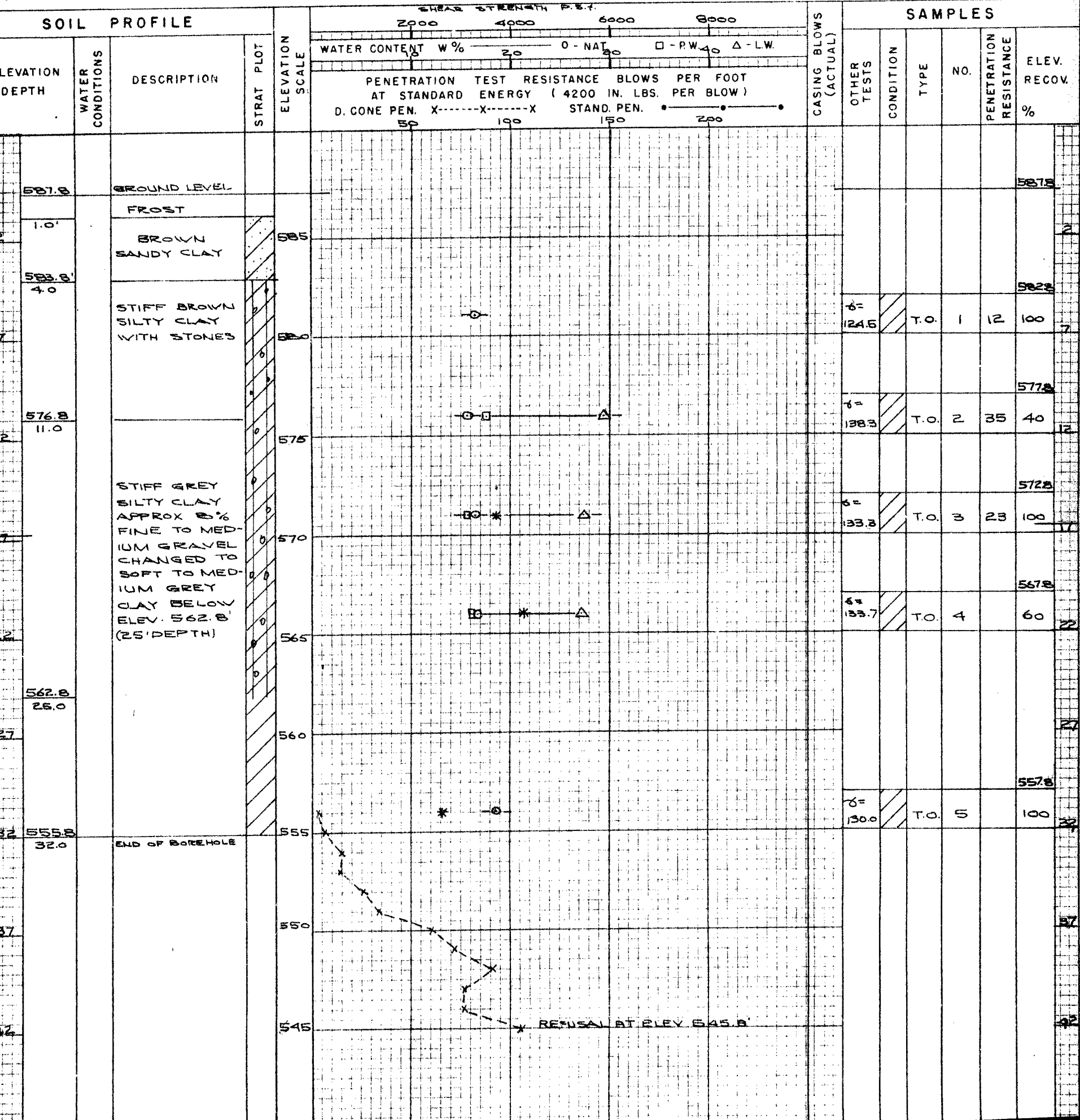
SAMPLE TYPES

C.S. - CHUNK S.S. - SLEEVE SAMPLE
 D.O. - DRIVE OPEN P.S. - PISTON SAMPLE
 D.F. - DRIVE FOOT VALVE W.S. - 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 PENN DRILL, JOHNSTON OPERATION BORE JOB F-59-12 WP 9-59 BORING 6 STA. 60+10 40' LT.
CASING --- (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT MARCH 1959
SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES COMPILED BY IJJ CHECKED BY A.L. DATE BORING FEBRUARY 9, 1959.

ABBREVIATIONS

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
Q - 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	W.S. - WASHED SAMPLE
T.O. - THIN WALLED OPEN	R.C. - ROCK CORE

SAMPLE CONDITION



- DISTURBED
- FAIR
- GOOD
- LOST

[illegible]