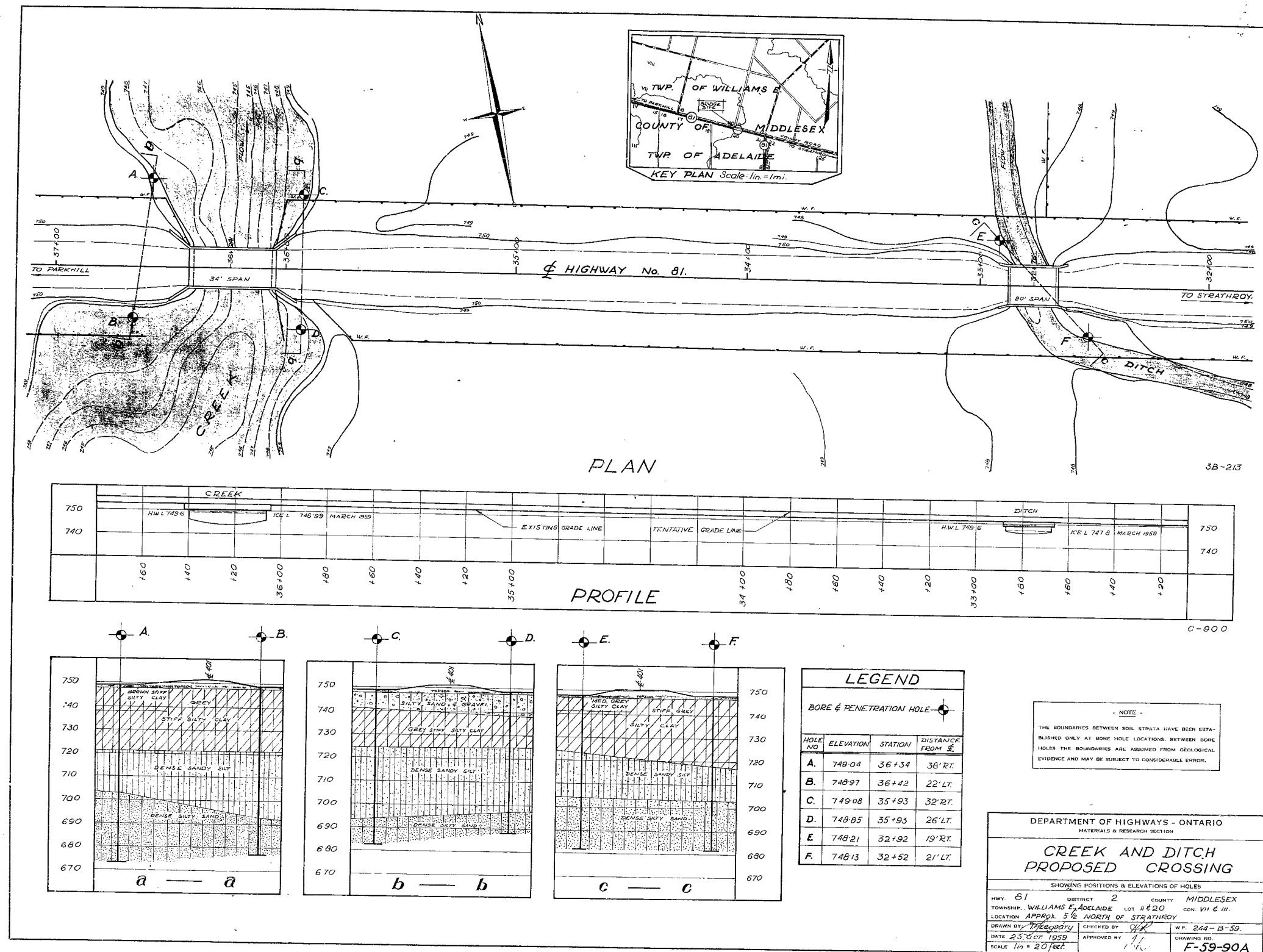


#59-F-90  
W.P.#244-B-59  
Hwy. #81  
PROP. CREEK!  
DITCH CROSSING  
5½ MILES N. OF  
STRATHROY



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

October 28, 1959.

FOUNDATION REPORT - D.H.O.

W.J. F-59-90 -- W.P. 244-B-59.

Attention: Mr. . McCombie.

Re: Hwy. 81 and Creek & Ditch Crossing,  
Lot 11, Con. VII & Lot 20, Con. III,  
Township of Williams E. Adelaide, -  
Approx.  $5\frac{1}{2}$  Miles N. of Strathroy.

This memo accompanies our Foundation Report on the subsoil conditions existing at the above noted site. Reference to the contents of the report shows that the subsoil at both structure locations (creek & ditch crossing at Sta. 36+00 and Sta. 32+71, respectively) consists, in general, of a stratum of stiff silty clay underlain by a thick stratum of dense sandy silt and silty sand.

Recommendations pertinent to the foundation design are as follows:-

1. Simple spread footings founded in the stiff clay stratum are recommended. For footings typically 5' to 10' wide, an allowable footing pressure of 3 1/2 t.s.f. can be used for design. Settlements resulting from the application of this bearing pressure will be within tolerable limits.  
Footings are recommended to be placed at Elev. 737' (approximately 8 ft. below stream-bed elevation) or below. Because of uncertainties of scouring under the stream beds and possible future deepening of the channels, the recommended footing elevation of 737' should be verified by the Hydrology report of this site under consideration.
2. As indicated in the report, depending on the ground water conditions during construction, ground water control might be necessary during footing excavations.

cont'd. /2 ...

3. No approach fill stability problems are anticipated. Bank slopes on the upstream side of the structure at the creek crossing should be protected by rip-rap.

If there are any queries regarding the contents of this report, please do not hesitate to contact our office.

L. G. Soderman,  
PRINCIPAL SOILS & FOUNDATIONS ENGR.  
per:

*K. Becker*

AKL/MdeF  
Encl.

*for* (A. K. Loh,  
Project Foundation Engineer.)

cc: Messrs. A. M. Toye ✓  
H. A. Tregaskes  
D. G. Ramsay  
A. Gater  
W. L. Fraser  
J. Roy  
A. Watt  
Foundation Section  
Gen. Files.

# FOUNDATION REPORT

on

Hwy. 81 and Creek & Ditch Crossing,  
Lot 11, Con. VII & Lot 20, Con. III,  
Township of Williams E. Adelaide, -  
Approx. 5½ Miles W. of Strathroy.

Plan No: 3-B-213

Profile No: C-900

Site Plan: E-3644-1 & E-3645-1

Chainage: Sta. 36+00 at Creek.  
Sta. 32+71 at Ditch.

## Distribution:

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

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

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

Mr. A. Gater,  
Sr. Project Design Engr. (1)

Mr. W. L. Fraser,  
District Engr., LONDON. (1)

Mr. J. Roy,  
Regional Soils Engr. (1)

Mr. A. Watt,  
Ontario Water Resources Comm. (1)

Foundation Section. (1)

Gen. Files. (1)

W.J. F-59-90

W.P. 244-B-59

## INTRODUCTION:

Presented in this report are the results of a subsoil investigation carried out at a structure location approximately 5 1/2 miles North of Strathroy where existing Hwy. 81 crosses a creek and a ditch approximately 300 ft. apart, in Lot 11, Con. VII and Lot 20, Con. III, Twp. of Williams E. Adelaide - (Creek Crossing at Sta. 36+00, and Ditch Crossing at Sta. 32+71, Profile No. C-900). This report contains the detailed field and laboratory findings and recommendations for the foundation of the structures.

The field work commenced on Sept. 1, 1959 and was completed on Sept. 11, 1959.

## DESCRIPTION OF THE SITE & GEOLOGY:

The site and its surrounding areas are generally flat farmlands; the areas on both sides of the existing Hwy. 81 are presently in pasture. At the time of the investigation, little flow of water was noted through either the creek or the ditch.

The site under consideration is located between the Ekfrid Clay Plain and St. Clair Clay Plain. According to available geological information, these plains are covered by a deep deposit of clay underlain by dense fine sand and/or shale or limestone bedrock at greater depths. At this site, the clay stratum was found to be underlain by a stratum of dense sandy silt and silty sand.

## DESCRIPTION OF FIELD & LABORATORY WORK:

Field work consisted of six sampled boreholes with dynamic cone penetration test adjacent to each hole. The investigation was carried out by a standard diamond drill, adapted for

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

soil sampling. Four boreholes at the creek crossing and two boreholes at the ditch crossing were made. Conventional wash boring procedures were followed and samples were recovered at depths required. Samples were obtained by means of 2" I.D. thin-walled Shelby samplers or a 2" O.D. split-spoon sampler. The dimension of this spoon sampler and the energy used in driving it, conform to the requirements of the Standard Penetration Test.

Upon receipt in the laboratory, samples were visually examined and identified. Routine index tests were performed on selected, representative samples. Field and laboratory test results have been presented in the borehole logs and detailed in Table No. 1, under Appendix I. The location plan and subsoil profile are presented in Drawing No. F-59-90A.

SUBSOIL CONDITIONS:

The site, in general, is underlain by a stratum of stiff silty clay followed by a thick stratum of dense sandy silt and silty sand. At the location of Borings C & D, a layer of silty sand and gravel, believed to be stream-bed deposits, was intersected underneath the topsoil before the stiff silty clay stratum was encountered.

In each of the sampled boreholes - with the exception of Borings C & D, the topsoil was found to be underlain by the stiff silty clay stratum extending from Elevation 748' to 724'-718'. The upper portion of the clay stratum has been subjected to oxidation and resulted in its present brownish colour. Below the oxidized zone, the colour is predominantly grey. Underneath the clay stratum,

cont'd. /3 ...

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

a stratum of dense sandy silt was encountered at Elev. 724'-718'. This stratum of dense sandy silt, which grades into a silty sand below Elev. 703'-693', was explored to a depth of 75 ft. (i.e. - Elev. 673.5') during the exploration programme.

In Borings C & D, underneath the topsoil, a layer of silty sand and gravel, 7' to 9' in thickness, was intersected before the stratum of stiff silty clay was encountered. The stiff silty clay and the underlying dense sandy silt encountered in these 2 borings are of similar deposits and formation, as in the other 4 borings.

In the order of stratigraphic succession, the following soil types are defined:-

1. Silty Sand & Gravel:

This layer of silt sand and gravel, believed to be stream-bed deposits, was encountered in Borings C & D, only. It is in a medium to dense state of packing with 'N' value - (standard penetration resistance expressed in number of blows per foot) varying from 15 to 41 registered during the sampling operations. Moisture content averaged 9%. It's thickness ranges from 7' to 9'.

2. Stiff Silty Clay:

This stratum of silty clay was encountered immediately underneath the topsoil in each of the sampled boreholes, with the exception of Borings C & D. The clay exists in a stiff condition with 'N' value well in excess of 30 registered during

cont'd. /4 ...



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

2. Stiff Silty Clay: (cont'd.) ...

the sampling operations. The upper zone of the clay has been subjected to oxidation, resulting in its present brownish colour. Below the oxidized zone, the colour is predominantly grey. The material contains approximately 30% silt and 6% sand throughout.

Average unit weight and moisture content were found to be 133 p.c.f. and 19%, respectively. Liquid and plastic limits averaged 33% and 18%, respectively. Laboratory shear strength tests show an average of 3400 p.s.f. to be representative for the stratum. Its thickness ranged from 14 ft. in Boring D to 29 ft. in Boring F. Consolidation test results show that the silty clay is saturated and preconsolidated.

3. Sandy Silt & Silty Sand:

This stratum of sandy silt and silty sand was encountered immediately underneath the stiff silty clay stratum. Above elevation 703'-693', the material contains predominantly silt and approximately 26% sand, and below elevation 703'-693', the material contains predominantly sand and approximately 40% silt. Moisture content of both the sandy silt and silty sand averaged 20%. It exists in a very dense state of packing with 'N' value in excess of 70 registered during the sampling operations.

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

cont'd. /5 ...

WATER CONDITIONS:

The water level at both the creek and the ditch was found to be at approximately Elev. 747'. During the period of this investigation, there was no appreciable flow in either of the streams.

During boring operations, artesian water conditions were noted at approx. Elev. 709' (40 ft. depth below existing ground surface) in Boring A. The excess hydrostatic head reached Elev. 749.5'. The critical depth below which "piping" will occur during excavations or dewatering, has been estimated to be at Elev. 721'.

In view of the presence of silty sand and gravel at the stream-bed elevations at both the creek and the ditch, especially at the location of Borings C & D (East abutment of Creek Crossing) where a layer of silty sand and gravel was encountered immediately below the ground surface, depending on the ground water table conditions during construction, it appears that ground water control might be necessary during footing excavations.

FOUNDATION CONSIDERATIONS:

The stiff silty clay stratum is competent to provide adequate foundation support for the structure at the creek or the ditch crossing. Strength and compressibility characteristics are such that spread footing support can be obtained in the stiff clay

cont'd. /6 ...

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

at Elev. 737' or below. At this elevation or below, for footings of 5 to 10 ft. in width, a bearing pressure of 3 1/2 t.s.f., incorporating a safety factor of 3 can be used for spread footing design. Settlements resulting from the application of a bearing pressure of 3 1/2 t.s.f., as recommended, will be within tolerable limits. Consideration should be given to founding footings below the stream-bed elevation in order to avoid undermining of the footings due to stream erosion and scour. Footings founded at Elev. 737' (approx. 8 ft. below stream-bed, assuming stream-bed elevation at approx. Elev. 745') are believed to have adequate protection from stream erosion and scour, and to allow for future deepening of the channels.

Depending on the ground water conditions during construction, ground water control might be necessary during footing excavations.

The tentative grade line of Hwy. 81 does not present any approach fill stability problems. Bank slopes on the upstream side of the structure at the creek crossing, should be protected by rip-rap.

cont'd. /7 ...

CONCLUSIONS & RECOMMENDATIONS:

- (1) The site, in general, is underlain by a stratum of stiff silty clay followed by a thick stratum of dense sandy silt and silty sand.
- (2) Subsoil conditions are such that for the structure at the creek or the ditch, spread footing support can be obtained in the stiff clay at Elev. 737' or below. At this elevation or below, for footings typically 5' to 10' in width, an allowable bearing pressure of 3 1/2 t.s.f. can be used for spread footing design. Settlement consequent upon application of this bearing pressure, will be within tolerable limits. Footings founded at Elev. 737' (approx. 8 ft. below stream-bed assuming stream-bed elevation at approx. 745') are believed to have adequate protection from stream erosion and scour, and to allow for future deepening of the channels.
- (3) Depending on the ground water conditions during construction, ground water control might be necessary during footing excavations.
- (4) No approach fill stability problems are anticipated. Bank slopes on the upstream side of the structure at the creek crossing should be protected by rip-rap.

*for* *AKH*  
B. M. Ghadiali,  
Project Foundation Engr.

APPENDIX I.

# SUMMARY OF FIELD & LABORATORY TESTS

JOB F 59-90

W.P. 244-B-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
A	T1	5'-6.5'	Brown silty clay, Stiff	36	18.9	19.5	33.2	5240	133.0	
	T2	10'-11.5'	"	70	-	-	-	-	-	
	T3	13'-14.5'	Grey silty clay, stiff	55	19.0	17.7	31.8	4130	131.8	
	T4	17'-18.5'	Silty clay, grey and stiff	31	18.4	-	-	3060	133.2	
	T5	20'-21.5'	Silty clay, stiff	54	17.2	15.9	30.4	3620	135.0	
	T6	25'-26.5'	"	79	13.9	-	-	-	144.3	
	S7	30'-31.5'	Sandy silt, dense	67	-	-	-	-	-	
	S8	35'-36.5'	Sandy silt, dense	101	-	-	-	-	-	
	S9	40'-41.5'	Sandy silt, dense	79	-	-	-	-	-	
	S10	45'-46.5'	Sandy silt, dense	117	-	-	-	-	-	
	S11	55'-56.5'	Silty sand, dense	100	-	-	-	-	-	
	S12	70'-71.5'	Silty sand, dense	217	-	-	-	-	-	
	S13	75'-76.5'	Silty sand, dense	129	-	-	-	-	-	
B	T1	5'-7'	Gravel and grey silty clay	16	18.2	19.9	36.4	-	-	
	T2	10'-11.5'	"	59	-	-	-	-	-	
	T3	12'-13'	Grey silty clay	48	17.6	-	-	6510	135.0	
	S4	20'-21.5'	Grey silty clay, stiff	31	-	-	-	-	-	
	T5	25'-26.5'	"	37	20.0	18.2	36.0	2755	131.1	
	S6	30'-31.5'	Sandy silt, dense	125	-	-	-	-	-	
	S7	35'-36.5'	Sandy silt, dense	83	-	-	-	-	-	
	S8	40'-41.5'	Sandy silt, dense	71	-	-	-	-	-	
	S9	45'-46.5'	Sandy silt, dense	57	-	-	-	-	-	
	S10	55'-56'	Sandy silt, dense	166	-	-	-	-	-	
	S11	70'-71.5'	Silty sand, dense	156	-	-	-	-	-	
C	T1	3'-4.5'	Silty sand and gravel	23	9.2	-	-	-	-	
	T2	6'-7.5'	Stiff grey silty clay	53	17.8	19.0	32.0	-	133.0	
	T3	10'-11.5'	"	66	18.9	19.9	30.9	4210	133.6	
	T4	15'-16.5'	"	65	20.0	-	-	-	135.0	
	T5	20'-21.5'	"	84	16.8	-	-	3440	136.5	
	T6	25'-26.5'	Stiff grey silty clay	55	18.0	-	-	3040	135.0	
	S7	30'-31.5'	Dense sandy silt	120	16.3	-	-	-	-	
	S8	35.5'-36.5'	"	80	-	-	-	-	-	
	S9	45'-46.5'	Dense sandy silt	120	19.4	-	-	-	-	
	S10	55'-56.5'	Dense silty sand	60	21.2	-	-	-	-	
	S11	65'-66.5'	Dense silty sand	134	19.8	-	-	-	-	

# SUMMARY OF FIELD & LABORATORY TESTS

JOB F59-90

W.P. 244-B-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
D	T1	3'-4.5'	Silty sand & Gravel	15	10.3	-	-	-	-	
	T2	6'-7.5'	Silty sand & Gravel	41	6.1	-	-	-	-	
	T3	9'-10.5'	Stiff grey silty clay	65	17.7	-	-	-	135.0	
	T4	15'-16.5'	"	52	20.2	-	-	3930	132.0	
	T5	20'-21.5'	"	57	-	-	-	-	-	
	T6	25'-26.5'	Stiff grey silty clay	93	13.3	-	-	-	-	
	S7	30'-31.5'	Dense sandy silt	112	17.6	-	-	-	-	
	S8	40'-41.5'	"	65	18.9	-	-	-	-	
	S9	50'-51.5'	"	67	19.6	-	-	-	-	
	S10	60'-60.9'	Dense silty sand	206-11	20.6	-	-	-	-	
E	T1	3'-4.5'	Medium grey silty clay	7	47.0	-	-	-	107.0	
	van 5'		Medium grey silty clay	-	-	-	-	1000	-	Sens: 3.3
	T2	6'-7.5'	Medium grey silty clay	16	8.3	-	-	-	-	
	T2A	10'-11.5'	Medium stiff grey silty clay	29	-	-	-	-	-	
	T3	13'-14.5'	"	28	22.5	-	-	1860	130.5	
	S4	20'-21.5'	"	33	-	-	-	-	-	
	T5	25'-26'	Stiff grey silty clay	78	-	-	-	-	-	
	S6	30'-31.5'	Dense sandy silt	93	19.3	-	-	-	-	
	S7	35'-36.5'	"	149	18.3	-	-	-	-	
	S8	45'-46'	"	98	21.2	-	-	-	-	
F	S9	55'-56.5'	Dense silty sand	77	21.8	-	-	-	-	
	S10	65'-66.5'	"	33	22.8	-	-	-	-	
	T1	3'-5'	Medium silty clay	12	25.4	-	-	-	126.0	
	T2	6'-7.6'	Medium stiff grey silty clay	44	22.7	-	-	3660	130.0	
	T3	9'-10.5'	"	38	20.5	-	-	3540	133.0	
	T4	15'-16.5'	"	20	22.4	-	-	-	129.5	
	T5	20'-21.5'	"	28	18.6	-	-	2520	136.0	
	T6	25'-26.5'	"	54	22.9	-	-	4570	139.0	
	T7	30'-31.5'	Dense sandy silt	42	-	-	-	-	-	
	S8	35'-36.5'	"	88	17.8	-	-	-	-	
	S9	45'-46.5'	"	49	20.4	-	-	-	-	S Denotes Split Spoon Sample
	S10	55'-56.5'	Dense silty sand	33	23.9	-	-	-	-	T Denotes Thin-walled shelby tube
	S11	65'-66.5'	"	85	20.6	-	-	-	-	

# DEPARTMENT OF HIGHWAYS - ONTARIO

## MATERIALS AND RESEARCH SECTION

W.P. 244 - B - 59 BORE HOLE NO. A

JOB F 59 - 90 STATION 36+34 (38' RT)

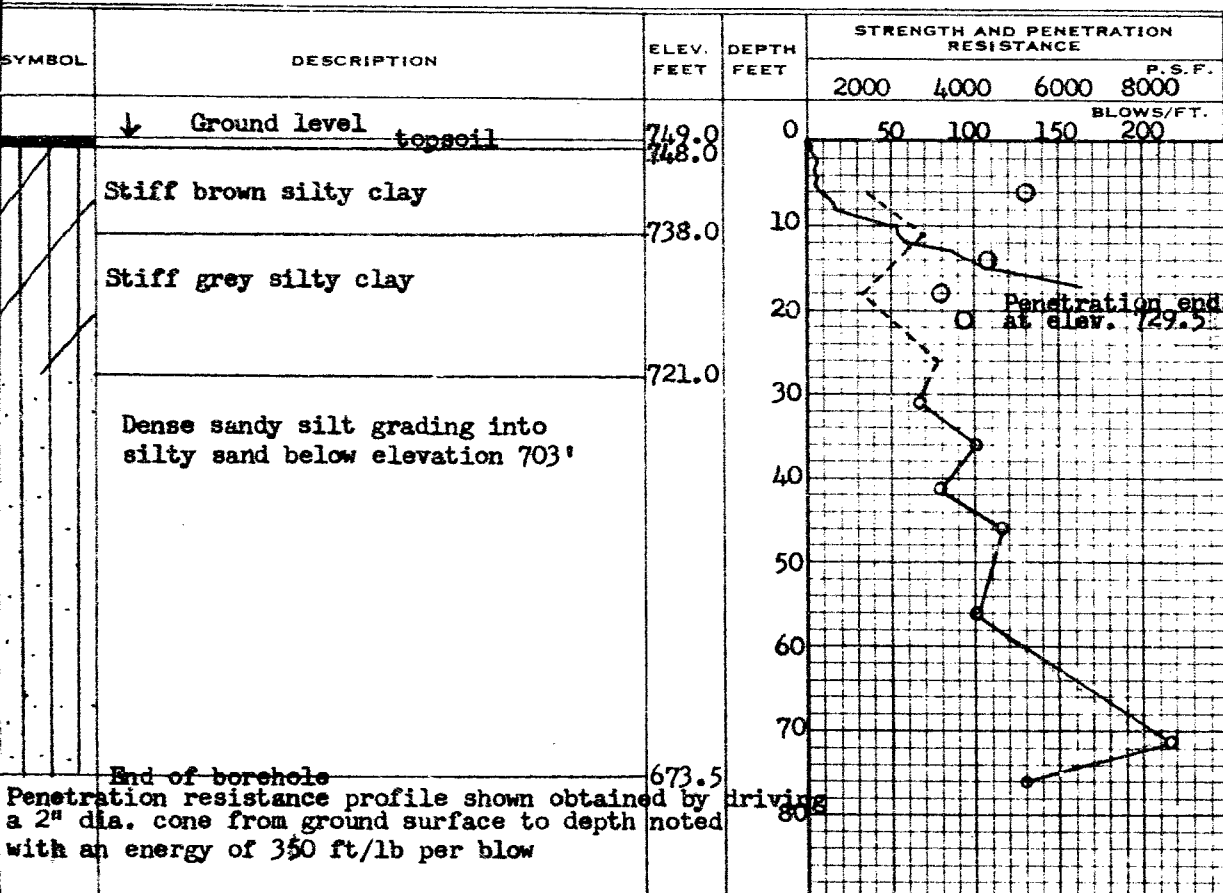
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












BORING DATE Sept. 2/59 CHECKED BY A.L.

2" DIA. SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONE  
2" SHELBY  
CASING

### LEGEND

1/2 UNCONFINED COMPRESSION (Qu) O  
VANE TEST (C) AND SENSITIVITY (S) +  
NATURAL MOISTURE AND LIQUIDITY INDEX LI  
LIQUID LIMIT X  
PLASTIC LIMIT —



CONSISTENCY			SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.				
20	40	60		
			T1	133.0
			T2	-
			T3	131.8
			T4	133.2
			T5	135.0
			T6	144.3
			S7	-
			S8	-
			S9	-
			S10	-
			S11	-
			S12	-
			S13	-



# DEPARTMENT OF HIGHWAYS - ONTARIO

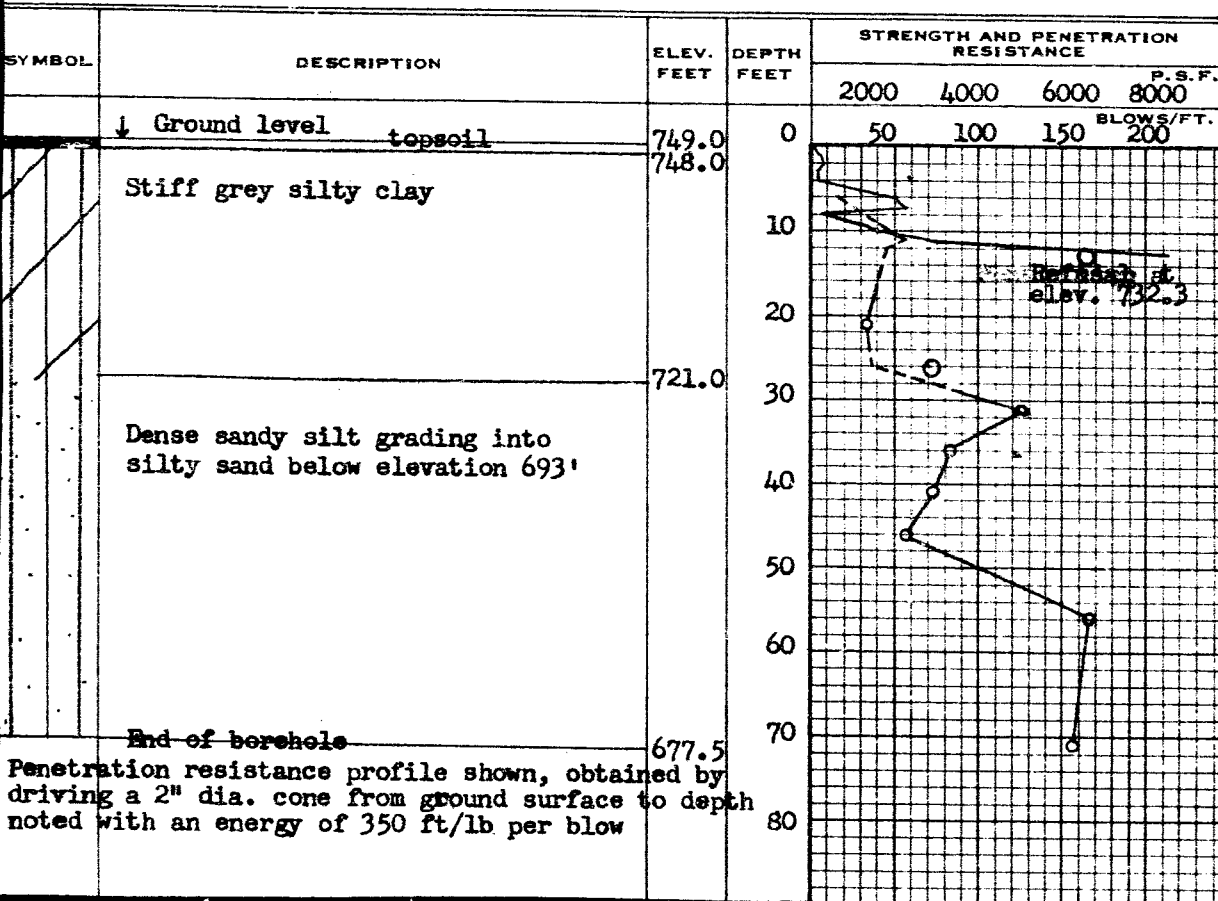
## MATERIALS AND RESEARCH SECTION

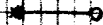


W.P. 244 - B - 59 BORE HOLE NO. B  
 JOB F 59 - 90 STATION 36+42 (22' ST)  
 DATUM 749.0' COMPILED BY B.K.  
 BORING DATE Sept. 2/59 CHECKED BY A.L.

2" DIA. SPLIT TUBE \_\_\_\_\_  
 2" SHELBY TUBE \_\_\_\_\_  
 2" SPLIT TUBE \_\_\_\_\_  
 2" DIA. CONE \_\_\_\_\_  
 2" SHELBY \_\_\_\_\_  
 CASING \_\_\_\_\_

### LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ ) \_\_\_\_\_ O  
 VANE TEST (C) AND SENSITIVITY (S) \_\_\_\_\_ +  
 NATURAL MOISTURE AND LIQUIDITY INDEX \_\_\_\_\_ X  
 LIQUID LIMIT \_\_\_\_\_  
 PLASTIC LIMIT \_\_\_\_\_



CONSISTENCY			SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.				
20	40	60		
			T1	-
			T2	-
			T3	135.0
			S4	-
			T5	131.1
			S6	-
			S7	-
			S8	-
			S9	-
			S10	-
			S11	-

# DEPARTMENT OF HIGHWAYS - ONTARIO

## MATERIALS AND RESEARCH SECTION

W.P. 244 - B - 59 BORE HOLE NO. C  
 JOB F 59 - 90 STATION 35+93 (32' RT)  
 DATUM 749.1' COMPILED BY B.K.  
 BORING DATE Sept. 8/59 CHECKED BY A.L.

2" DIA. SPLIT TUBE [Symbol]  
 2" SHELBY TUBE [Symbol]  
 2" SPLIT TUBE [Symbol]  
 2" DIA. CONE [Symbol]  
 2" SHELBY [Symbol]  
 CASING [Symbol]

### LEGEND

1/2 UNCONFINED COMPRESSION (Qu) [Symbol]  
 VANE TEST (C) AND SENSITIVITY (S) [Symbol]  
 NATURAL MOISTURE AND LIQUIDITY INDEX [Symbol]  
 LIQUID LIMIT [Symbol]  
 PLASTIC LIMIT [Symbol]

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				2000	4000	6000	8000 P.S.F.
	↓ Ground level	749.1	0				
	topsoil	748.1					
	Silty sand and gravel	741.1	10				
	Stiff grey silty clay	724.1	20				
	Dense sandy silt grading into silty sand below elev. 694.0'		30				
	End of Borehole	682.6	70				
	Penetration resistance profile shown; obtained by driving a 2" dia. cone from ground surface to depth indicated with an energy of 350 ft/lb per blow						

CONSISTENCY		SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT- % DRY WT.			
20	40	60	

# DEPARTMENT OF HIGHWAYS - ONTARIO

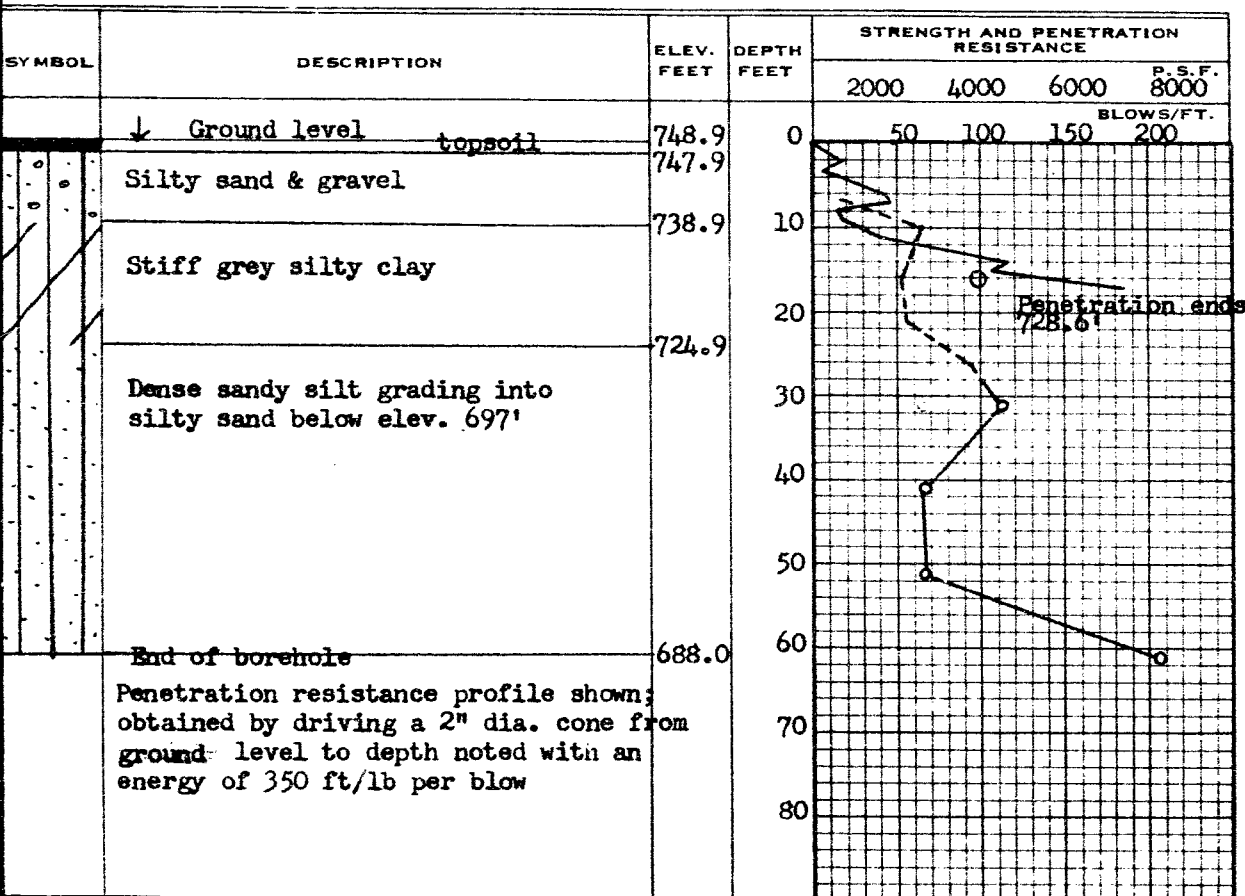
## MATERIALS AND RESEARCH SECTION

W.P. 244 - B - 59 BORE HOLE NO. D  
 JOB F 59 - 90 STATION 35+93 (26' IT)  
 DATUM 748.9' COMPILED BY B.K.  
 BORING DATE Sept. 9/59 CHECKED BY A.L.

2" DIA. SPLIT TUBE  
 2" SHELBY TUBE  
 2" SPLIT TUBE  
 2" DIA. CONE  
 2" SHELBY  
 CASING

### LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ )  
 VANE TEST (C) AND SENSITIVITY (S)  
 NATURAL MOISTURE AND LIQUIDITY INDEX  
 LIQUID LIMIT  
 PLASTIC LIMIT



CONSISTENCY		SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.			
20	40	60	
			T1 -
			T2 -
			T3 135.0
			T4 132.0
			T5 -
			T6 -
			S7 -
			S8 -
			S9 -
			S10 -

# DEPARTMENT OF HIGHWAYS - ONTARIO

## MATERIALS AND RESEARCH SECTION

W.P. 244 - B - 59 BORE HOLE NO. E

JOB E 59 - 90 STATION 32+92 (19' RT)

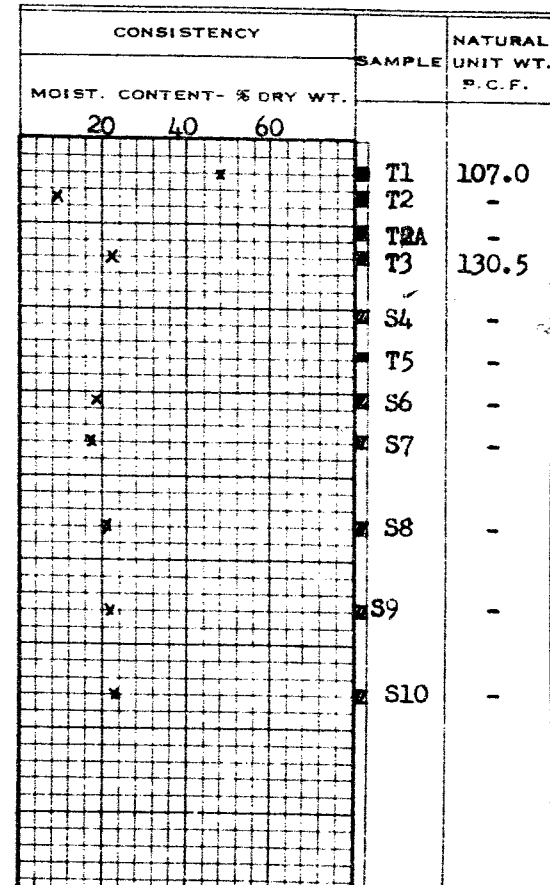
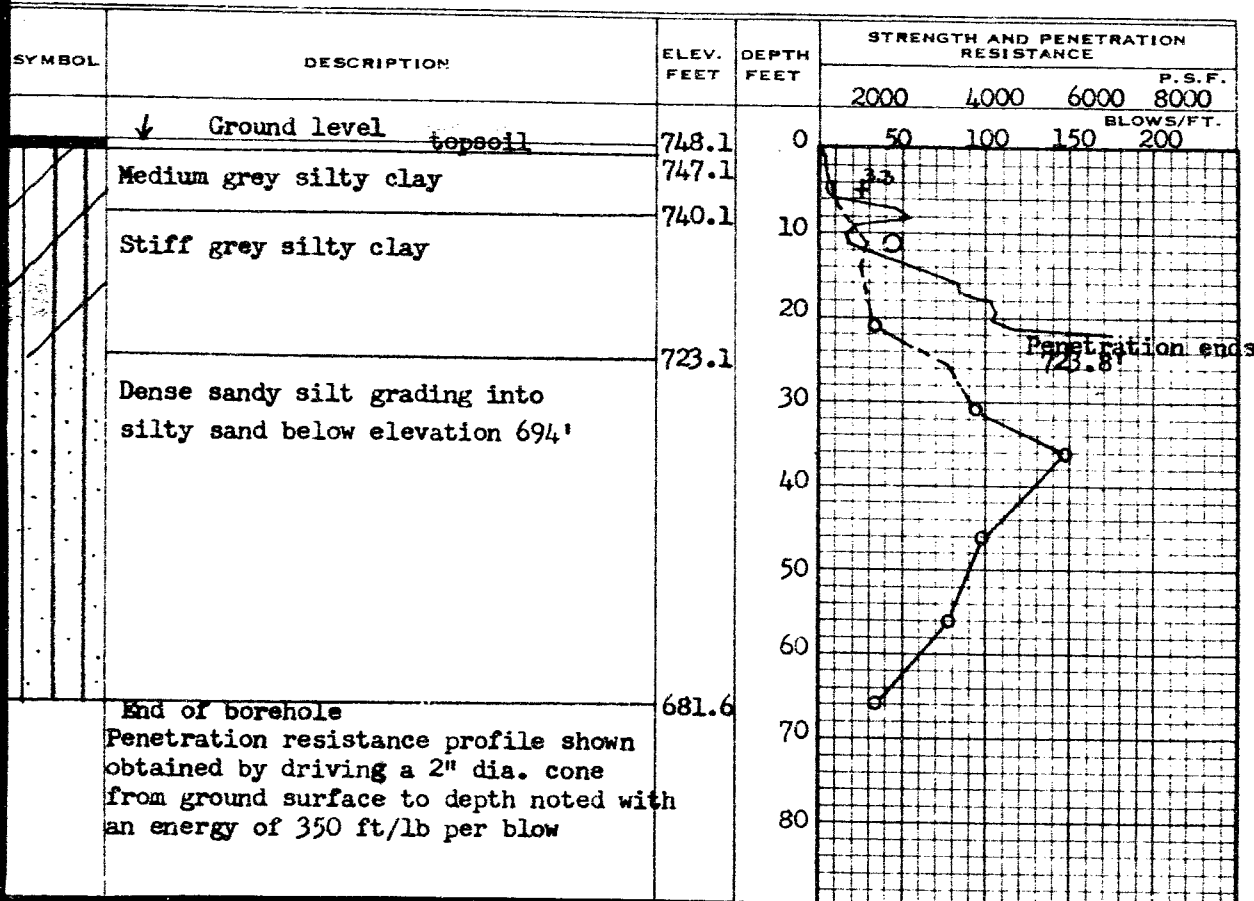
DATUM 748.1' COMPILED BY B.K.

BORING DATE Sept. 10/59 CHECKED BY A.L.

2" DIA. SPLIT TUBE  
2" SHELBY TUBE  
2" SPLIT TUBE  
2" DIA. CONE  
2" SHELBY  
CASING

### LEGEND

1/2 UNCONFINED COMPRESSION (Qu) O  
VANE TEST (C) AND SENSITIVITY (S) +  
NATURAL MOISTURE AND LIQUIDITY INDEX X  
LIQUID LIMIT  
PLASTIC LIMIT



# DEPARTMENT OF HIGHWAYS - ONTARIO

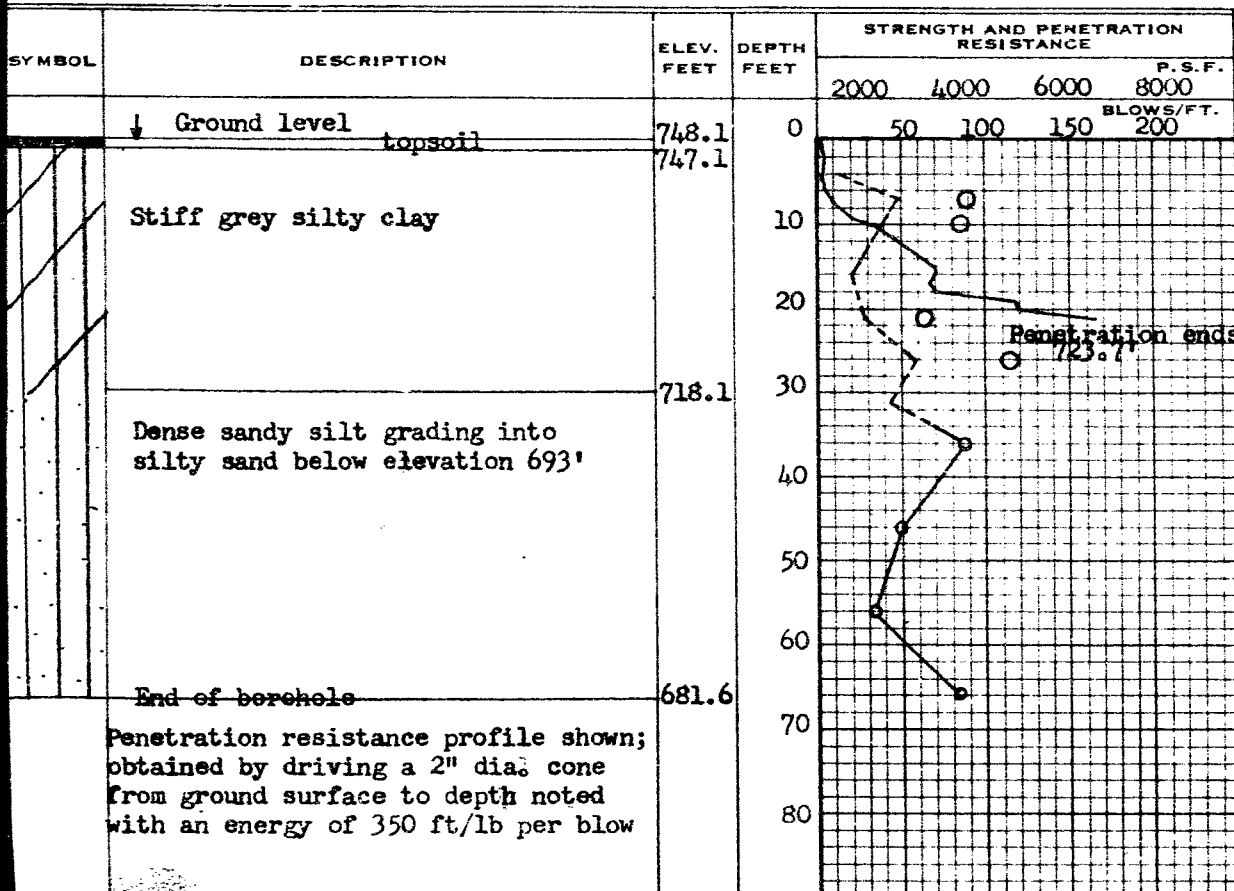
## MATERIALS AND RESEARCH SECTION

W.P. 244 - B - 59 BORE HOLE NO. F  
 JOB F 59 - 90 STATION 32452 (21' LT)  
 DATUM 748.1' COMPILED BY B.K.  
 BORING DATE Sept. 10/59 CHECKED BY A.L.

2" DIA. SPLIT TUBE  
 2" SHELBY TUBE  
 2" SPLIT TUBE  
 2" DIA. CONE  
 2" SHELBY  
 CASING

### LEGEND

1/2 UNCONFINED COMPRESSION ( $Q_u$ )  
 VANE TEST (C) AND SENSITIVITY (S)  
 NATURAL MOISTURE AND LIQUIDITY INDEX  
 LIQUID LIMIT  
 PLASTIC LIMIT



CONSISTENCY		SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.			
20 40 60			
		T1	126.0
		T2	130.0
		T3	133.0
		T4	129.5
		T5	136.0
		T6	139.0
		T7	-
		S8	-
		S9	-
		S10	-
		S11	-