

23-62-314

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

October 4, 1960.

D.R.C. FOUNDATION INVESTIGATION

W. J. 60-F-63 -- W.P. 113460.

NEW W.P. 331-63

Attention: Mr. B. McCosbie.

Re: Proposed Bridge at Jordan Harbour  
on North Side of Q.B.W., District #4.

Accompanying this memo, is our report on the  
subsoil conditions existing at the above site.

We believe that the conclusions and recommendations  
contained in this report are self-explanatory and should prove  
adequate for your future design work.

If we can be of further assistance with regard to  
this project, please do not hesitate to contact our Office.

AS/MdEF

Attach.

cc: Messrs. A. M. Foye (2)  
H. A. Iregaskes  
D. G. Ramsay  
I. Campbell  
S. R. Richardson  
T. J. Kovich  
A. Hale

L. G. Soderman,  
PRINCIPAL FOUNDATIONS ENGR.  
Per:

*Attorney*  
(A. Sternac,  
FOUNDATIONS OFFICE ENGR.)

Foundations Office ✓  
Gen. Files.

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## FOUNDATION INVESTIGATION

FOR

Proposed Bridge at Jordan  
Harbour on N. Side of Q.E.W.  
District #4, W.P. 113-60  
W.J. 60-F-63

### 1. INTRODUCTION:

This investigation was carried out in order to determine the stratification and the properties of the subsoil at the site of the proposed new service road crossing of the Twenty-Mile Creek. The proposed structure is a three span bridge which would cross the creek some 100 feet North east and parallel to the existing Q.E.W. bridge in Lot 19, Twp. of Louth (Plan E-3842-1), Station 56+20).

### 2. DESCRIPTION OF SITE AND GEOLOGY:

Twenty-Mile Creek flows in the physiographic region referred to as the "Iroquois Plain", which is situated between Lake Ontario and the Niagara Escarpment. The plain is cut by a number of small streams which flow into Lake Ontario. Most of these streams are drowned in their lower courses and usually are cut off from the lake by a barrier beach.

The waters of Lake Iroquois have leveled the undulating till terrain by eroding and by depositing the top clay. The bedrock in this area is mainly Queenston shale. The existing beach is a recent deposit of sand and gravel.

The proposed bridge will cross the waterway which connects Jordan Bay with Lake Ontario at the mouth of Twenty-Mile Creek.

### 3. FIELD AND LABORATORY WORK:

The field work was carried out by means of one skid-mounted and one raft-mounted core-drill machine both adapted for soil sampling.

3. FIELD AND LABORATORY WORK: (Cont'd.) ...

In the course of explorations six boreholes and two dynamic cone penetrations were made corresponding to each corner of the two abutments on land and the two piers in the water.

The boreholes were made by the conventional wash boring method. In the cohesive soil, samples were obtained by means of a 2" I.D. thin-walled shelly tube sampler. Also, supplementary shear measurements were obtained by means of in-situ vane tests. In non-cohesive soils sampling was done by means of a 2" O.D. split-barrelled spoon sampler. The dimensions of the spoon sampler and the energy used in driving it conform to the requirements of the Standard Penetration Test. A dynamic cone resistance profile was established by driving a 2" diameter cone from the existing ground surface to refusal depth.

The split spoon samples were visually examined and identified in the field. The Shelby samples were carefully sealed and taken to the laboratory where routine tests for index properties were carried out on selected representative samples.

Laboratory and field test results have been summarized in Table No. 1 and the location of the boreholes is shown on drawing No. 60-P-63A, under Appendix I.

4. SUBSOIL CONDITIONS:

4.1 General

The investigations at the site revealed the following subsoil stratification:

The recent deposit of silty sand and gravel deposit on the top is underlain by dark brown organic clayey silt. Underlying this material is the horizon of glacial till over shale bedrock.

4. SUBSOIL CONDITIONS: (Cont'd.) ...

4.2 Silty sand and gravel deposit:

The material forming the top layer at the site is a recent beach deposit of silty sand and gravel. The sand is well graded varying from very fine to coarse. The gravel material varied from fine to boulder size (1/4" to 5"). The gravel size was more abundant at the top of the layer changing to more sand size with depth. Occasional seams of fine silty sand were also encountered. The layer is in a submerged state and the Standard Penetration test results (5-15 blows per foot) indicate that the material is in a loose to medium state.

4.3 Dark brown organic clay:

This layer was intersected in all the boreholes. At the western side of the waterway (boreholes No. 6 & 7) the stratum was found to be about 5 ft. thick, while on the eastern side (boreholes No. 1, 2, 3, 4) the thickness of the layer was about 30 ft. The material in the layer is quite uniform and about 80% passing the sieve No. 200. It contains a considerable amount of decayed organic matter. The index properties measured in the laboratory indicate that the material is organic clay of high plasticity. Its moisture content is in the range of 54%-80%, and average unit weight 96p.c.f. The laboratory and field shear strength measurements indicate that the material has medium to stiff consistency, with its shear measurements ranging from 650 - 2000 p.s.f.

4.4 Grey silty, sandy clay till:

This material overlies the bedrock shale. On the west side of the waterway (boreholes No. 6 & 7) the layer intersected, showed a thickness of about 13 ft. On the eastern side (boreholes No. 1, 2, 3, 4) the thickness of this layer was found to be only about 3 ft. The material

4. SUBSOIL CONDITIONS: (Cont'd.) ...

4.4 Grey Silty, sandy clay till:

is grey in colour and of very hard consistency being of glacial origin.

4.5 Queenston shale:

In all the boreholes the solid shale layer was contacted, drilled and core samples extracted. On the eastern side (boreholes No. 1,2,3,4) the elevation of the shale is at 190 ft., while on the west side of the waterway the shale elevation is at 197 ft. The core samples indicate that the shale has red and grey beds and is of Queenston origin.

5. GROUND WATER CONDITIONS:

The existing water level in the holes was found at elevation 246 ft. This corresponded to the water level of the creek. It can be assumed that the subsoil below this elevation is in a submerged state.

6. DISCUSSION & RECOMMENDATIONS:

It has been proposed to cross the waterway by constructing a three span bridge, similar to the one existing on Q.E.W. at the same site.

Although the subsoil conditions, i.e., the stratigraphy in general, is uniform, the variation in thickness of the different layers makes the use of shallow spread footings very questionable. The layer of organic clay is only about 5 ft. thick on the east bank while its thickness on the west bank is about 30 ft. Under the same loading conditions this material, because of the different thickness of the layers, will consolidate for different amounts, thus causing prohibitive differential settlements of the bridge footings.

6. DISCUSSION & RECOMMENDATIONS: (Cont'd.) ...

The contacted shale bedrock is about 60 ft. below the ground elevation on the eastern side of the waterway and about 53 ft. on the western side. The shale at the indicated elevations is solid bedrock and can provide adequate bearing capacity for piles driven to bedrock contact.

It is recommended to support the foundations on H-steel piles. These piles driven to shale bedrock will provide good end-bearing support for the foundations.

The proposed grade line shows the approach fill of about max. 10 ft. This will not present any embankment stability problem. However, in order to speed up the consolidation process of the organic clay, it is recommended to place this fill as soon as possible, before the construction of the proposed structure. If additional material is available a surcharge of 5 ft. should be placed on the fill and left there as long as possible.

7. SUMMARY:

The investigated site is located in the physiographic region known as the Iroquois Plain. The subsoil consists of loosely deposited beach sand and gravel underlain by dark brown compressible, highly plastic, organic clay. This compressible layer is about 30 ft. thick on the east side and some 5 ft. on the west side of the waterway. Underlying this material is a layer of grey glacial dense till about 3 ft. thick on the east and about 12 feet on the west side. Under this layer Queenston shale was encountered on both sides.

The presence of the compressible organic clay rules out shallow spread footings. It is therefore recommended that the structure be



7. SUMMARY: (Cont'd.) ...

founded on steel H piles driven down to bedrock, i.e., Queenston shales. The average length of these piles will be 55 ft. because it is not assumed that the piles will meet refusal in the till layer. These end-bearing piles can be loaded with a safe load of approx. 60 T/pile.

No stability problems are foreseen for the up to 10 ft. high embankment fill. To minimize as much as possible the inconvenience due to the settlement resulting from the consolidation of the subsoil (organic clay layer) it is recommended to build the embankment as soon as possible and if enough material is available to put a surcharge on the embankment and leave it there as long as possible.

8. MISCELLANEOUS:

The field work was carried out between July 14th and 22nd, 1960 under the supervision of Mr. Vart Korlu, Project Engineer of the Foundation Section. All the laboratory testing was done in the Materials and Research Section.

SEPTEMBER, 1960.

REPORT PREPARED BY: V. Korlu  
Project Fdn. Engineer

*V. Korlu*

REPORT APPROVED BY: A. Stermac  
Foundation Office Engr.

*A. Stermac*



APPENDIX I.

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-63

W.P. 113-60

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	S1	3'-4.5'	Brown clay sand & gravel	12	23.7	-	-	-	-	
	S2	6'-7.5'	" " " " "	13	15.8	-	-	-	-	
	S3	10'-11.5'	Grey fine to coarse sand	10	25.4	-	-	-	-	
	S4	15'-16.5'	Fine to coarse sand & gravel	7	20.4	-	-	-	-	
	S5	20'-21.5'	" " " " "	12	24.2	-	-	-	-	
	S6	25'-26.5'	" " " " "	2	66.7	-	-	-	-	
	S7	30'-31.5'	Dark brown organic clay & silt	4	82.2	-	-	-	-	
	T8	35'-36.5'	" " " " "	P	54.0	36.4	83.0	990	99	
	VANE	37.5'		-	-	-	-	1760	-	Sens: 4.9
	T9	40'-41.5'	" " " " "	P	91.8	-	-	-	-	
	VANE	42.5'		-	-	-	-	>2000	-	
	T10	45'-46.5'	" " " " "	P	63.0	51.3	99.8	1420	94	
	VANE	47.5'		-	-	-	-	1440	-	Sens: 5.2
	VANE	51.5'		-	-	-	-	1680	-	Sens: 4.7
	T11	55'-56.5'	Grey sandy silty clay till	P	55.6	-	-	-	-	
	S12	60'-60.1'	" " " " "	50-1"	-	-	-	-	-	
	RC13	60.1'-65'	Queenston shale	-	-	-	-	-	-	

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JOB 60-F-63

W.P. 113-60

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
2	S1	13'-14.5'	Silty sand and gravel	4	-	-	-	-	-	
	S2	18'-19.5'	" " "	13	-	-	-	-	-	
	S3	23'-24.5'	" " "	4	138.0	-	-	-	-	
	VANE	30.5'		-	-	-	-	1760	-	Sens: 4.0
	T4	33'-34.5'	Dark brown organic clay & silt	P	65.9	38.7 59.4	71.8 72.7	800	99	
	VANE	35.5'		-	-	-	-	1760	-	Sens: 2.8
	T5	38'-39.5'	" " " "	P	80.3	-	-	-	-	
	T6	43'-44.5'	" " " "	P	73.5	49.5 42.2	85.7 67.3	330	93	
	VANE	45.5'		-	-	-	-	1680	-	Sens: 5.3
	T7	48'-49.5'	Grey sandy silty clay till	P	63.4	-	-	-	-	
	RC8	54'-59'	Queenston shale	-	-	-	-	-	-	

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JOB 60-F-63

W.P. 113-60

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
3	S1	5'-6.5'	Brown clay sand and gravel	14	-	-	-	-	-	
	S2	10'-11.5'	" " " "	11	21.4	-	-	-	-	
	S3	15'-16.5'	Dark grey coarse silty sand	6	-	-	-	-	-	
	S4	20'-21.5'	" " " " "	16	-	-	-	-	-	
	S5	25'-26.5'	Grey fine silty sand	2	25.0	-	-	-	-	
	T6	30'-31.5'	Dark brown organic clay & silt	P	68.1	44.5 53.7	66.2 65.3	950	95	
	VANE	36'			-	-	-	1520	-	Sens: 3.2
	T7	40'-41.5'	" " " " "	P	68.6	59.0 38.5	104.6 64.2	1100	95	
	VANE	46'		-	-	-	-	2000	-	Sens: 3.6
	T8	50'-51.5'	" " " " "	P	54.4	-	-	-	-	
	T9	55'-56.5'	Grey sandy silty clay till	P	23.0	-	-	-	-	
	RC10	58.5'-63.5'	Queenston shale	-	-	-	-	-	-	Recovery 96%



JOB 60-F-63

W.P. 113-60

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
4	S1	17'-18.5'	Silty sand and gravel	12	-	-	-	-	-	
	S2	22.5'-24'	" " " "	4	-	-	-	-	-	
	T3	27.5'-29'	Dark brown organic clay & silt	P	52.3	44.5 33.0	64.0 41.6	650	103	
	VANE	30'		-	-	-	-	1520	-	Sens: 2.7
	VANE	33'		-	-	-	-	1840	-	" : 2.6
	T4	37'-38.5'	" " " "	P	79.5	-	-	-	-	
	VANE	40'		-	-	-	-	1600	-	Sens: 4.0
	VANE	43.5'		-	-	-	-	>2000	-	
	T5	47'-48.5'	" " " "	P	74.1 61.8	58.0 32.7	91.0 50.0	835	98	
	VANE	50'		-	-	-	-	1440	-	Sens: 4.0
5 cone penetration only										

# SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-63

W.P. 113-60

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
6	S1	5'-6.5'	Fine to coarse sand and gravel	6	-	-	-	-	-	
	S2	10'-11.5'	" " " "	5	-	-	-	-	-	
	S3	15'-16.5'	" " " "	7	-	-	-	-	-	
	S4	20'-21.5'	" " " "	5	-	-	-	-	-	
	S5	25'-26.5'	" " " "	4	-	-	-	-	-	
	T6	30'-31.5'	Dark brown organic clay and silt	P	14.4	-	-	780	138	
	S7	35'-35.5'	Grey sandy silty clay till	88-6"	10.7	-	-	-	-	
	RC8	35.5'-43'	(Queenston shale )	-	-	-	-	-	-	
	RC9	43'-45'	( )	-	-	-	-	-	-	



# SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-63

W.P. 113-60

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
7	S1	18'-19.5'	Fine to coarse sand and gravel	85-6"	-	-	-	-	-	
	S2	23'-24.5'	" " " "	90-6"	-	-	-	-	-	
	T2	28'-29.5'	Dark brown organic clay silt	P	61.8 61.9	39.7 32.1	65.5 44.3	167	100	
	S3	33'-34.5'	Grey sandy silty clay till	40-7"	-	-	-	-	-	
	S4	40.5'-42'	Grey sandy silty clay till	57	-	-	-	-	-	
	RC5	42'-51'	Queenston shale	-	-	-	-	-	-	
8 cone penetration only										
			S denotes split spoon sample							
			T " shelby tube "							
			RC " Rock core "							

# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 113-60

BORE HOLE NO. 1

JOB 60-F-63

STATION 56+78 (15' Lt)

DATUM 250.0'

COMPILED BY B.K.

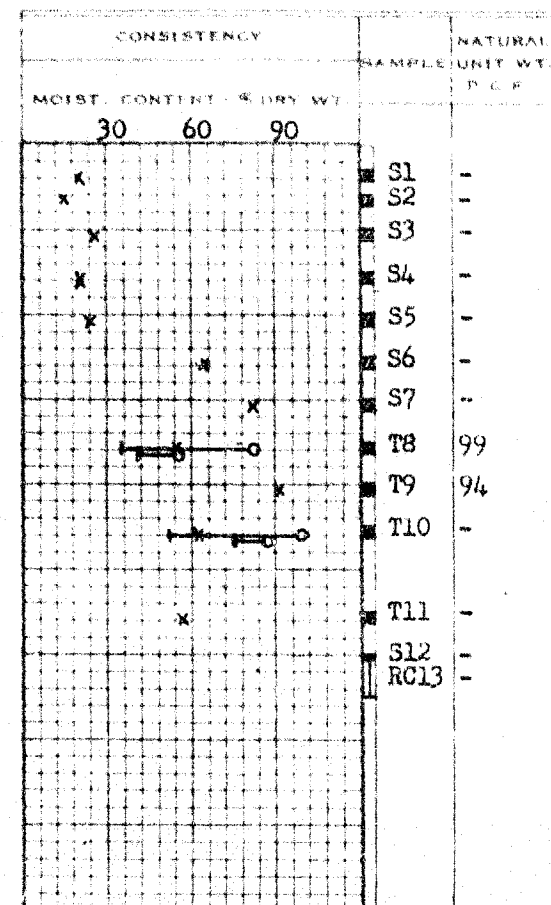
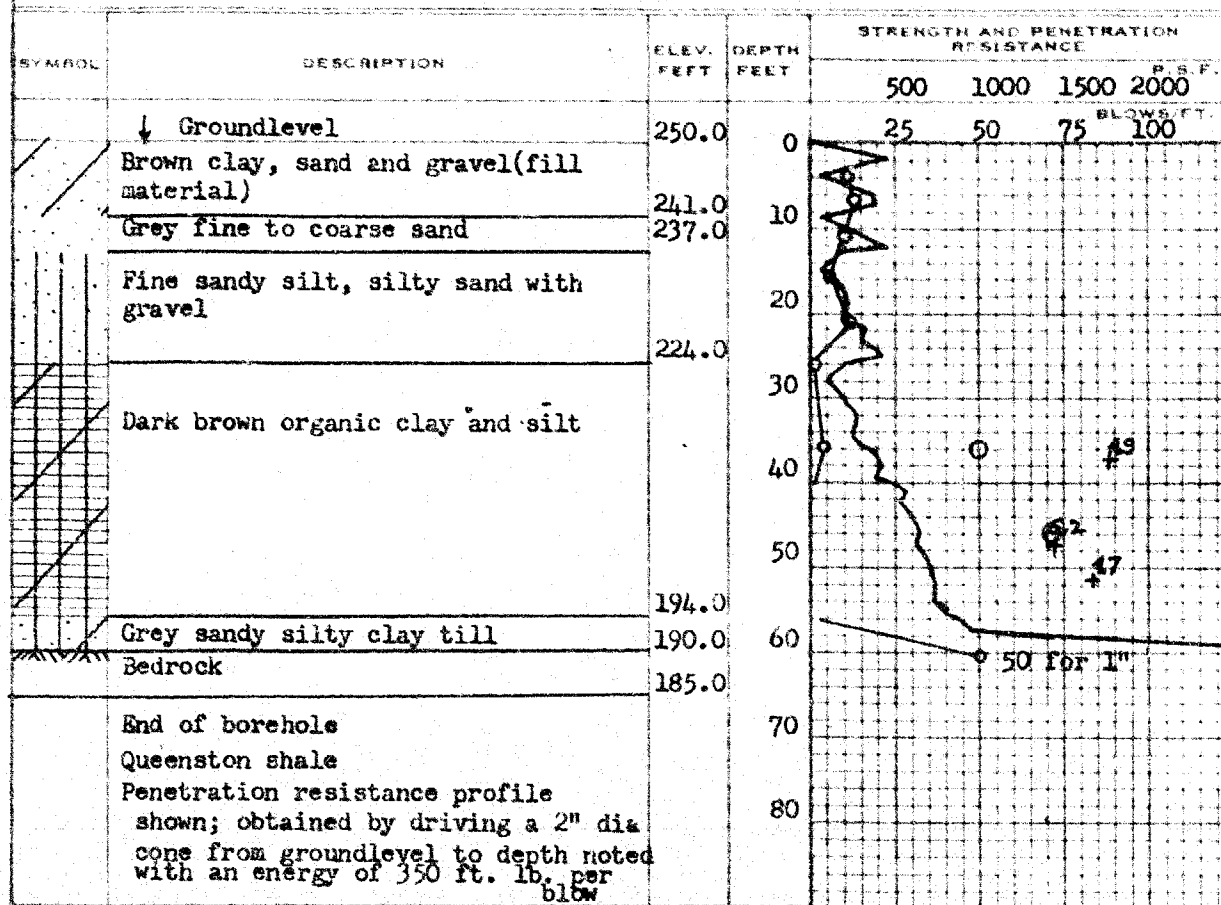
BORING DATE July 14/60

CHECKED BY V.K.

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



# DEPARTMENT OF HIGHWAYS - ONTARIO

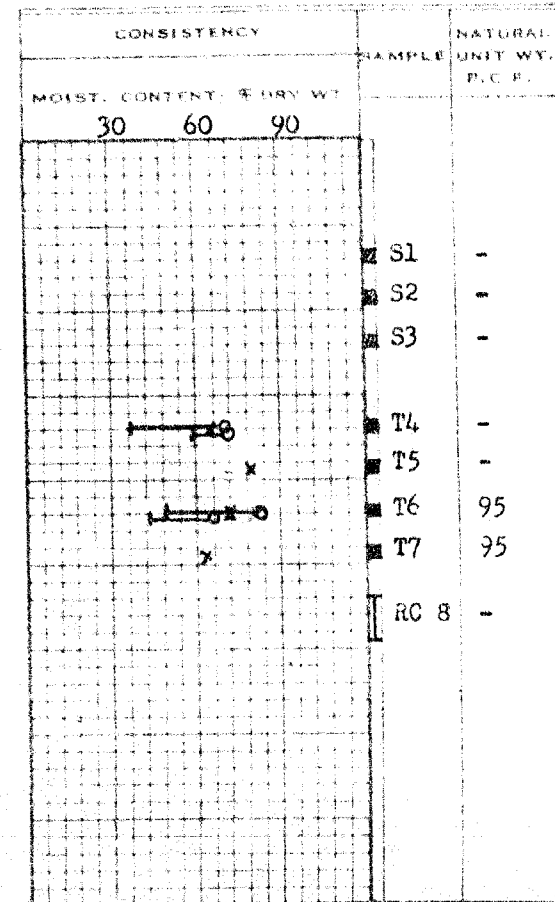
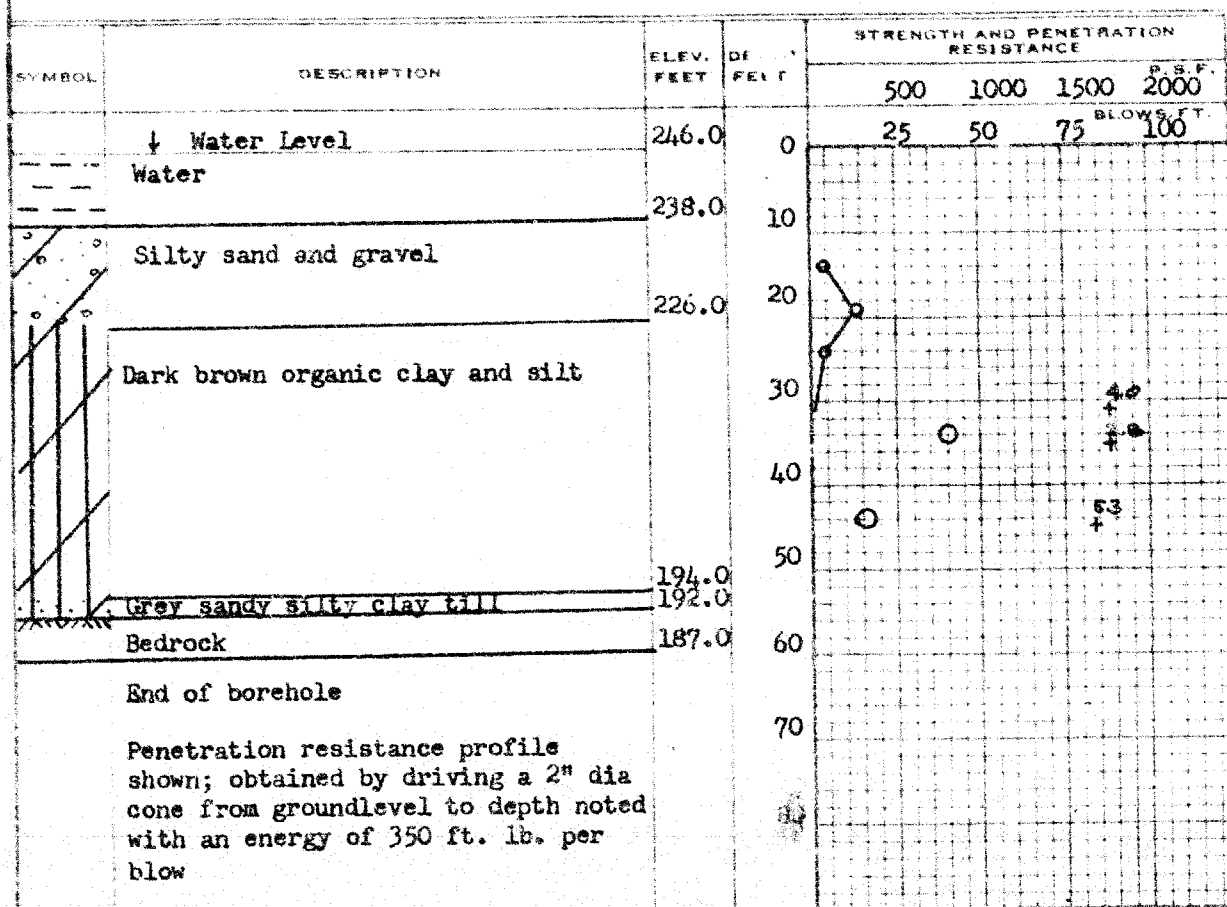
## MATERIALS AND RESEARCH SECTION

W.P. 113-60 BORE HOLE NO. 2  
 JOB 60-F-63 STATION 56+38 (15' Lt.)  
 DATUM 246.0' COMPILED BY B.K.  
 BORING DATE July 18/60 CHECKED BY V.K.

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



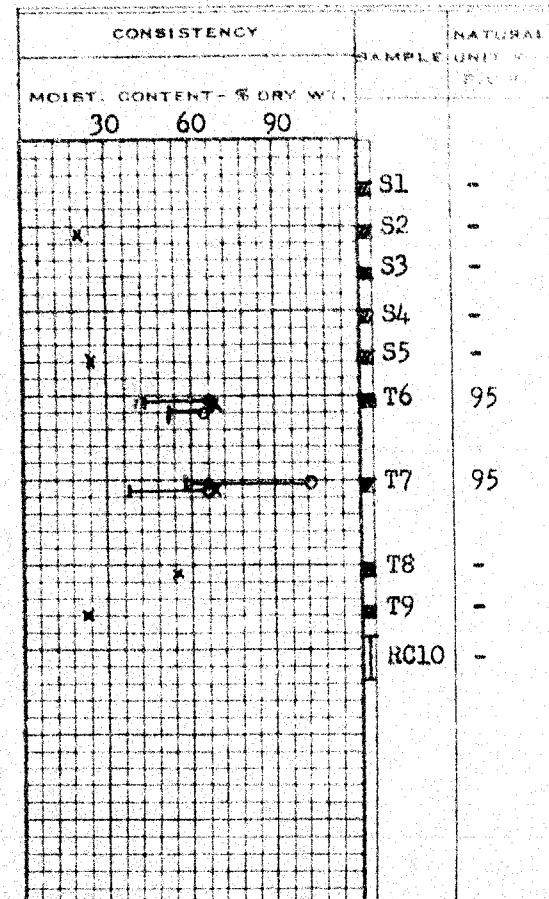
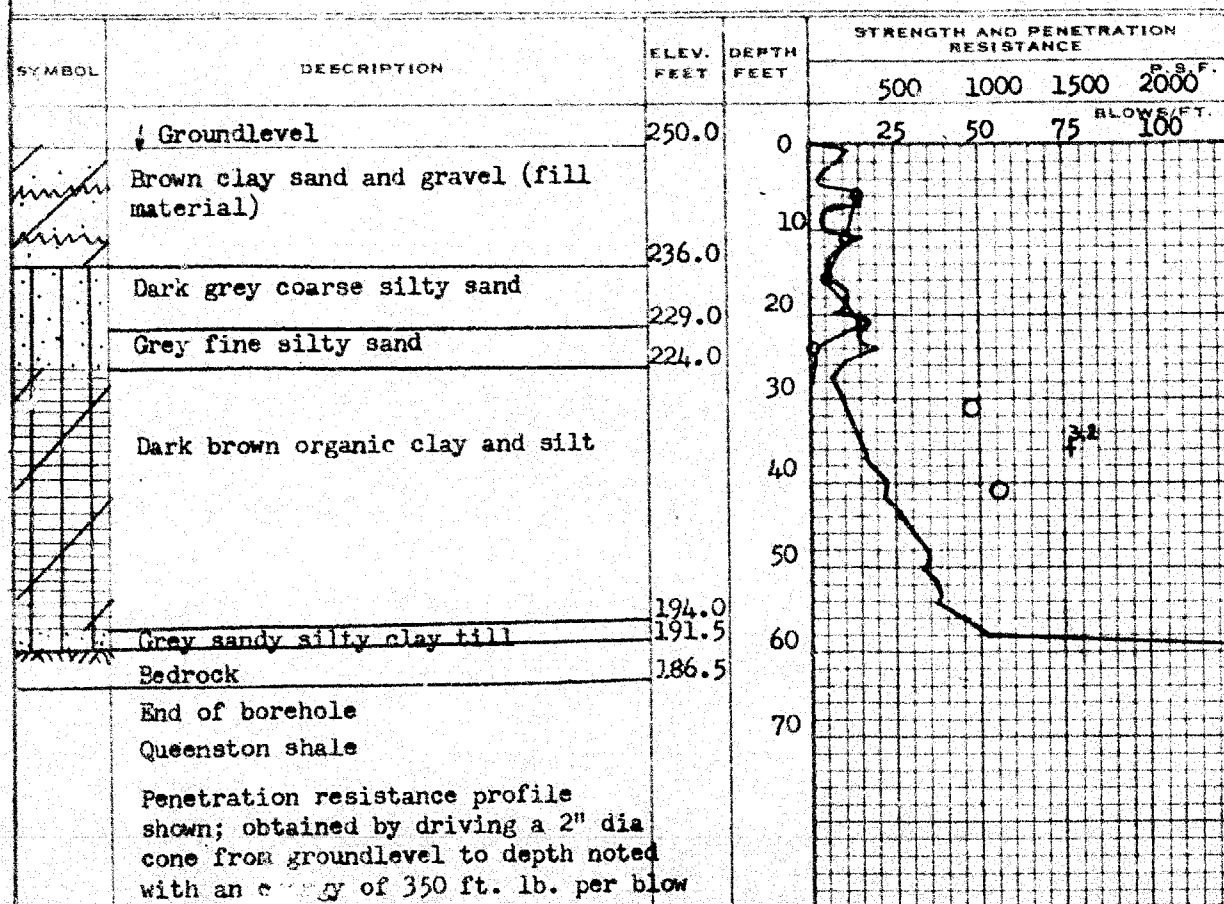
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W.P. 113-60 BORE HOLE NO. 3  
JOB 60-F-63 STATION 56+78 (15' Rt.)  
DATUM 250.0' COMPILED BY B.K.  
BORING DATE July 19/60 CHECKED BY V.K.

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

## LEGEND

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



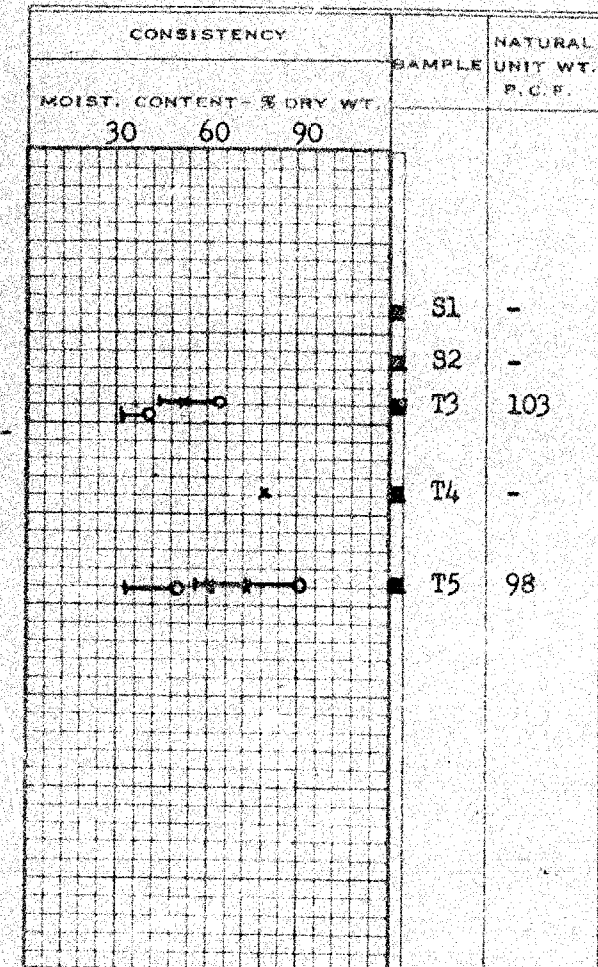
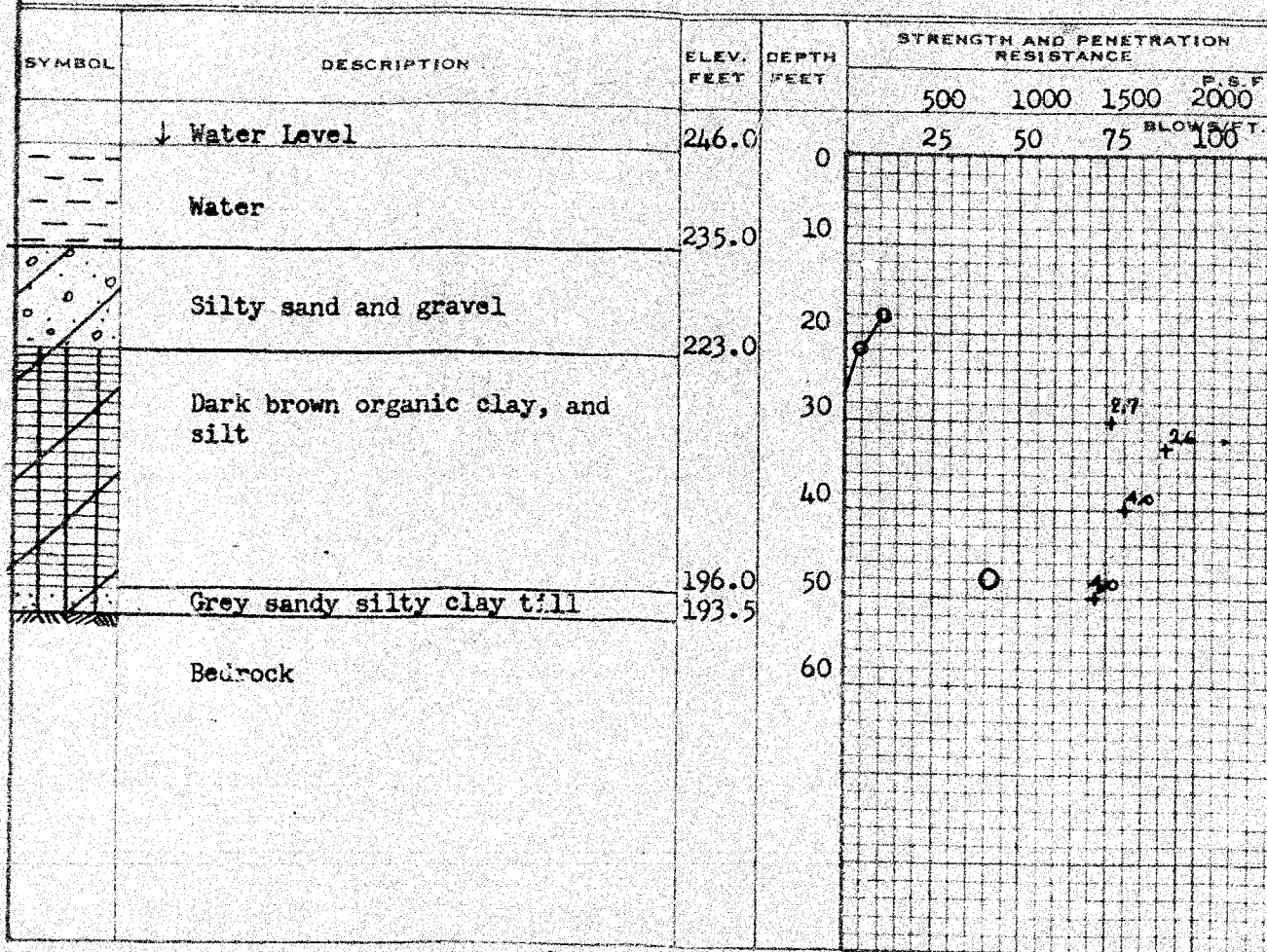
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 113-60 BORE HOLE NO. 4  
 JOB 60-P-63 STATION 56+38 (15' Rt)  
 DATUM 246.0' COMPILED BY B.K.  
 BORING DATE July 19/60 CHECKED BY V.K.

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. 113-60 \_\_\_\_\_ BORE HOLE NO. 5 \_\_\_\_\_

JOB 60-F-63 STATION 55+88 (15' Rt)

DATUM 246.0' COMPILED BY B.K.

BORING DATE July 20/60 CHECKED BY V.K.

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

## LEGEND

1/2 UNCONFINED COMPRESSION (Qu)	—	0
VANE TEST (C) AND SENSITIVITY (S)	—	+ <sup>6</sup>
NATURAL MOISTURE AND		
LIQUIDITY INDEX	—	X
LIQUID LIMIT	—	0
PLASTIC LIMIT	—	

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE		CONSISTENCY	SAMPLE	NATURAL UNIT WT. P.C.F.
				P.S.F.				
	↓ Water Level	246.0		25 50 75 100				
---	Water	238.0		BLOW/FT.				
			0					
			10					
			20					
			30					
			40					
			50					
			60					
	Penetration resistance profile shown; obtained by driving a 2" dia cone from groundlevel to depth noted with an energy of 350 ft. lb. per blow							



# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 113-60

BORE HOLE NO. 6

JOB 60-P-63

STATION 55+48 (15' Rt)

DATUM 246.5'

COMPILED BY B.K.

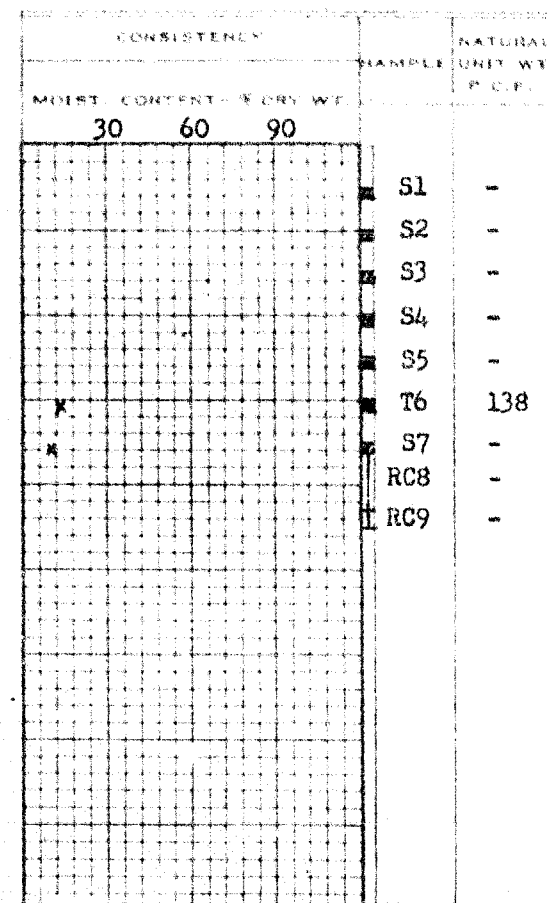
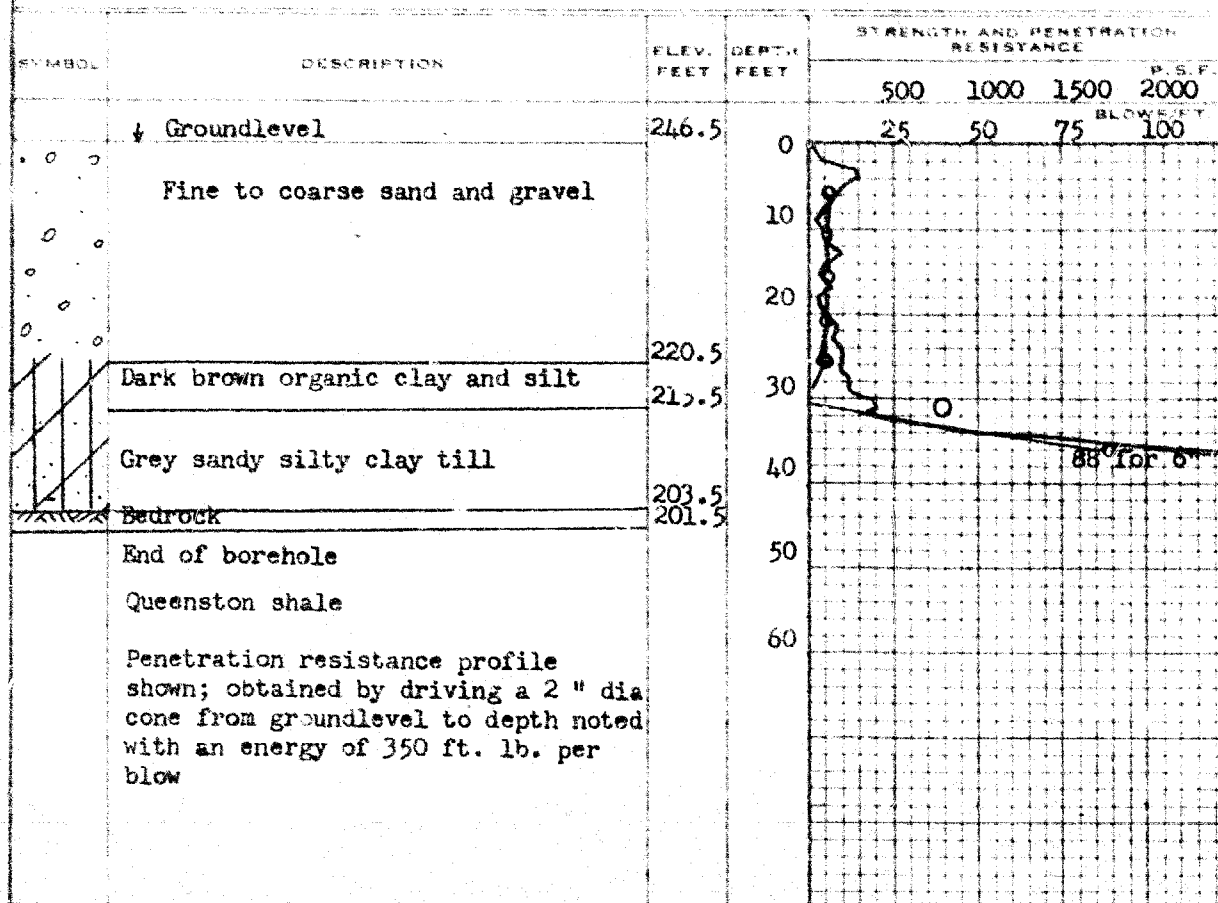
BORING DATE July 21/60

CHECKED BY V.K.

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

## LEGEND

1/2 UNCONFINED COMPRESSION (QU)  $\bigcirc$   
VANE TEST (C) AND SENSITIVITY (S)  $+$   
NATURAL MOISTURE AND LIQUIDITY INDEX  $\Delta$   
LIQUID LIMIT  $\square$   
PLASTIC LIMIT  $\times$



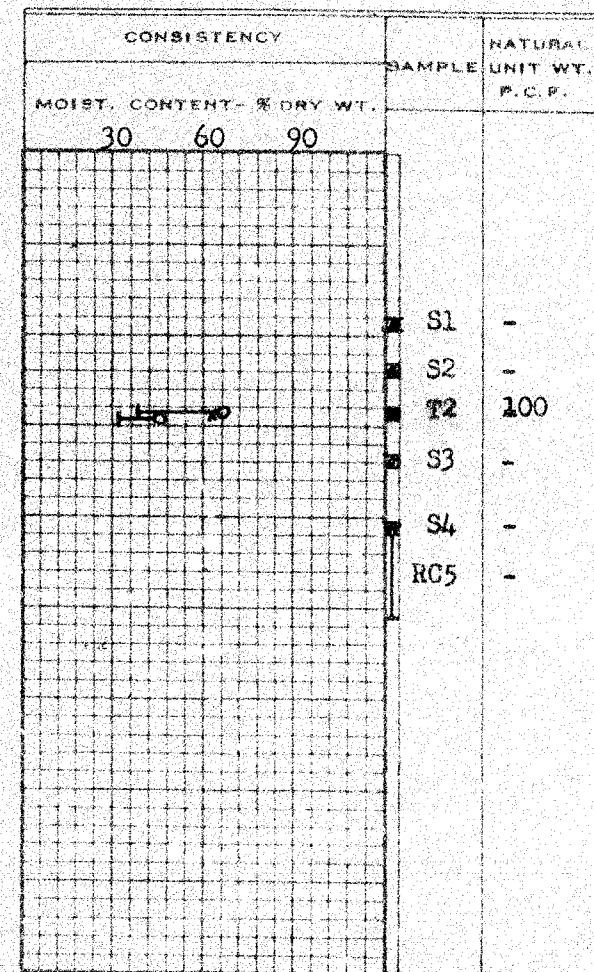
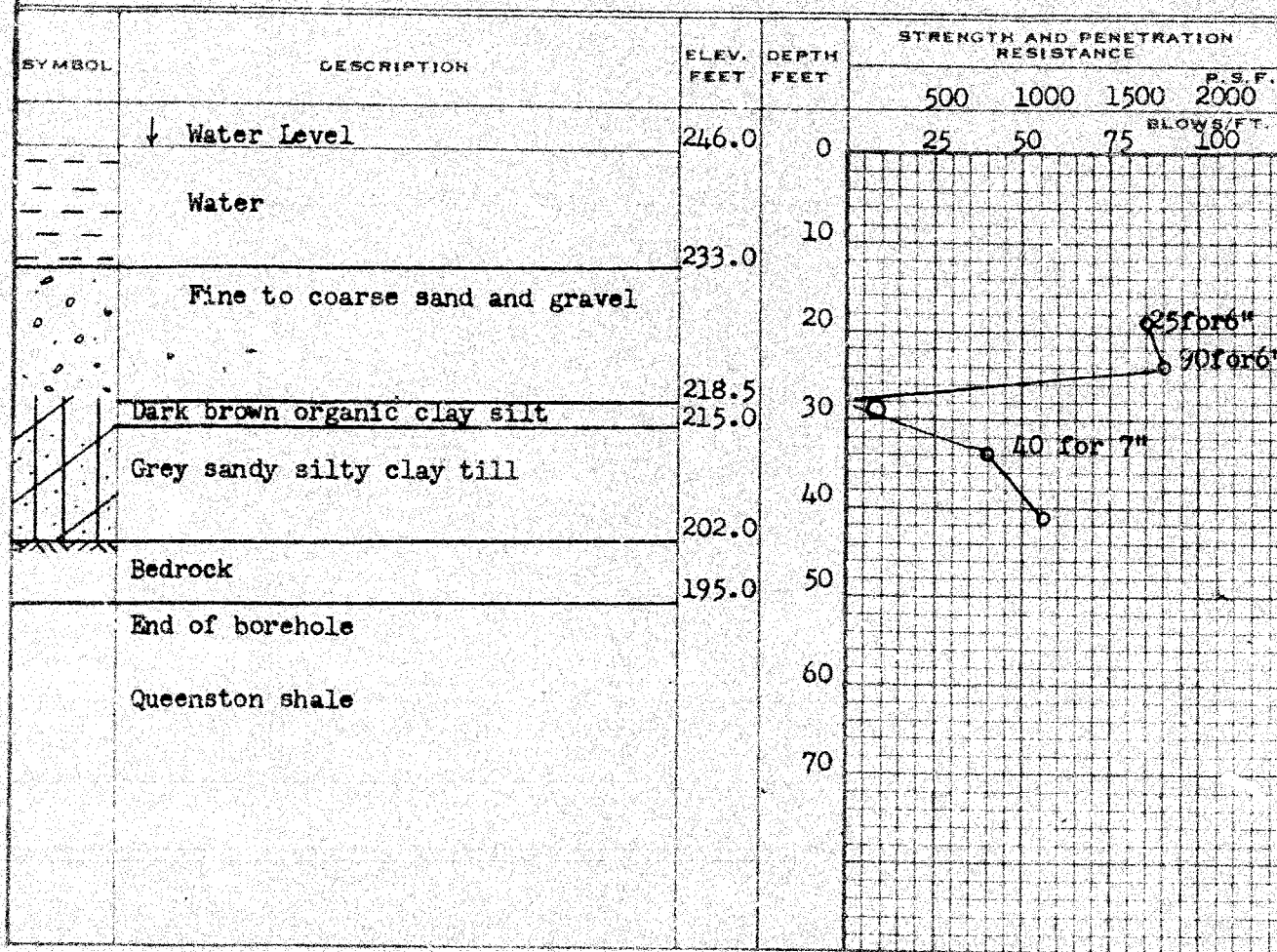
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 113-60 BORE HOLE NO. 7  
 JOB 60-F-63 STATION 55+88 (15' Lt.)  
 DATUM 246.0' COMPILED BY B.K.  
 BORING DATE July 21/60 CHECKED BY V.K.

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



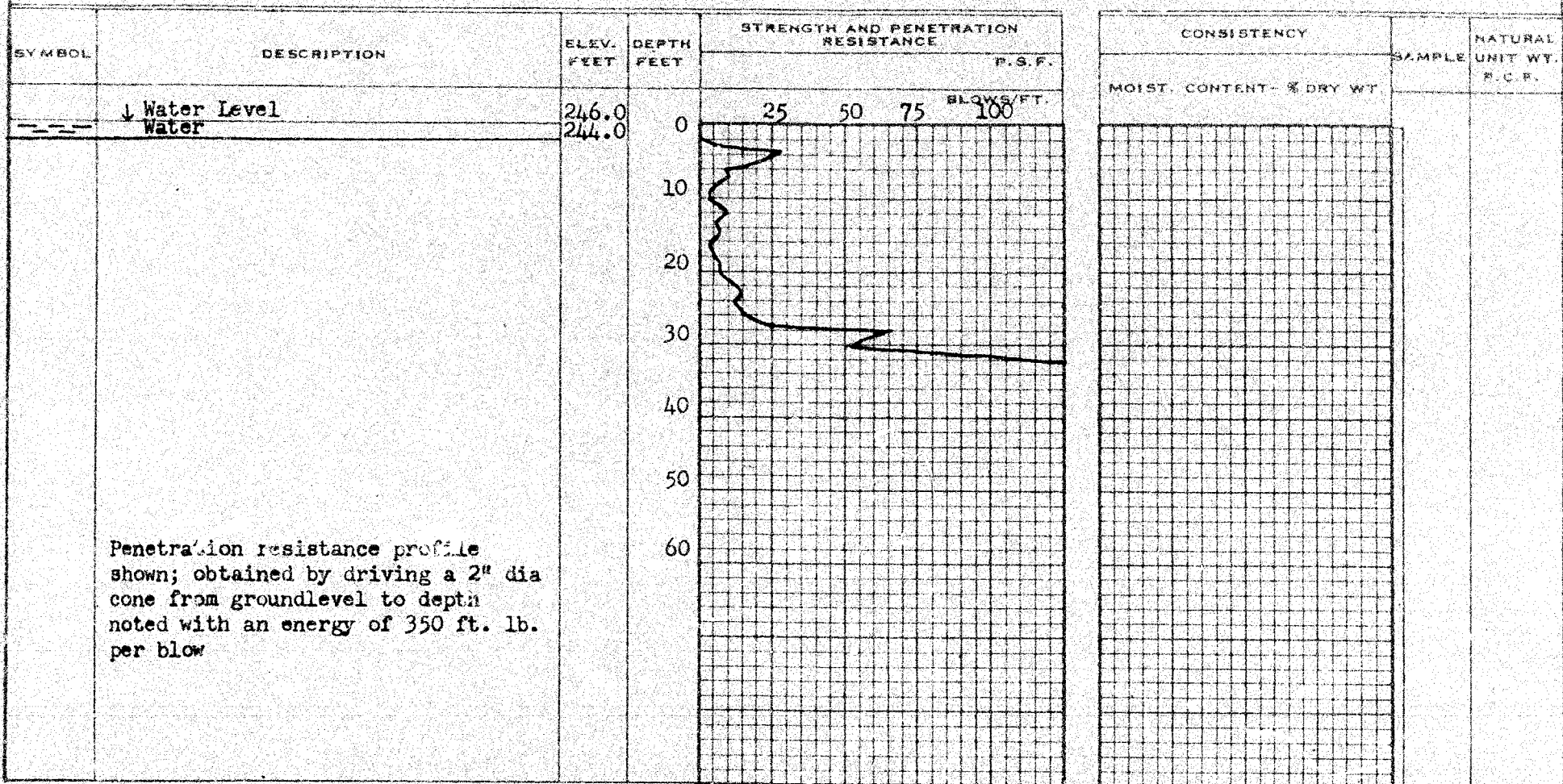
# DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

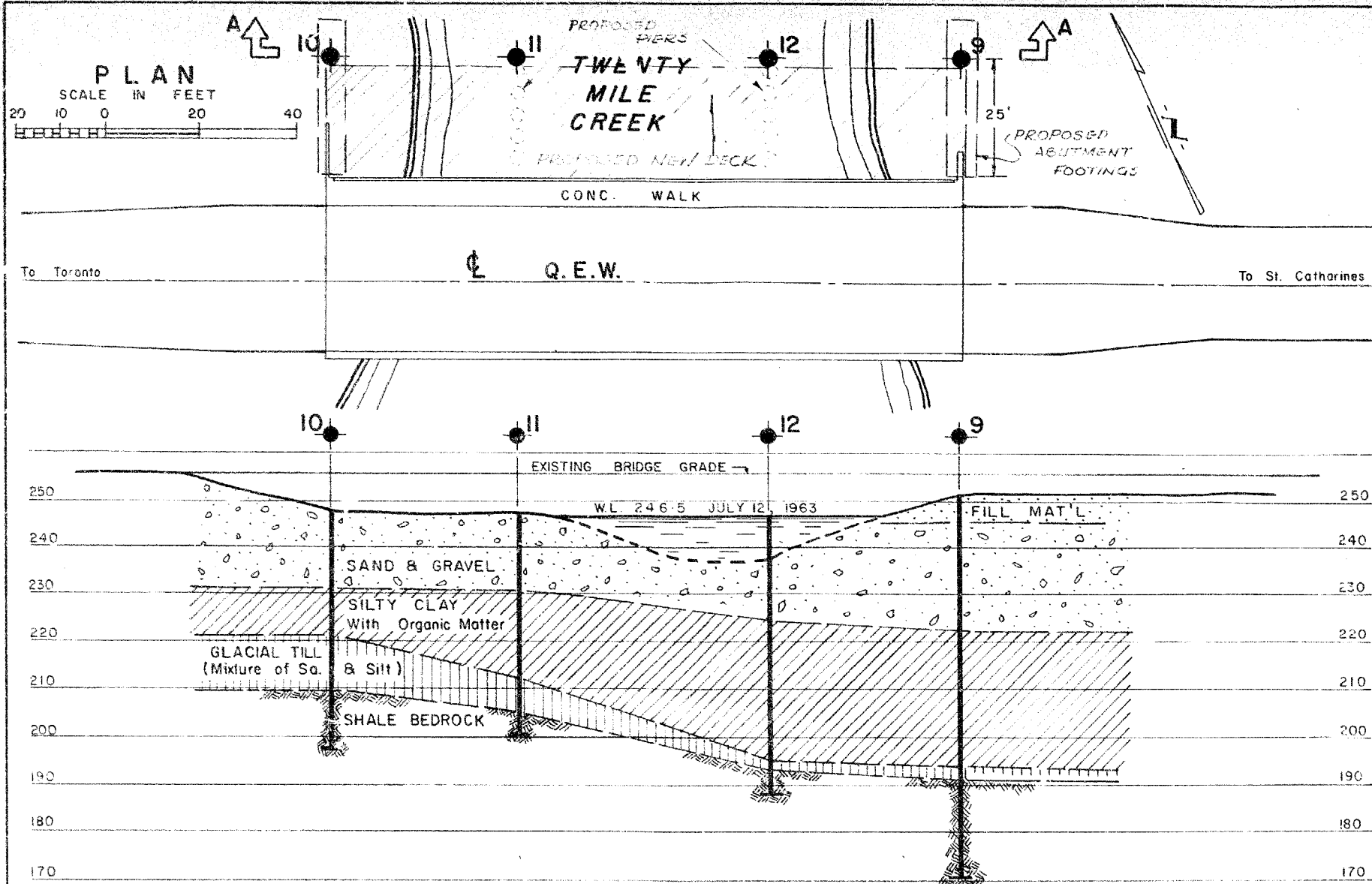
W.P. 113-60 BORE HOLE NO. 8  
 JOB 60-F-63 STATION 55+48 (15'lt)  
 DATUM 246.0' COMPILED BY B.K.  
 BORING DATE July 22/60 CHECKED BY V.K.

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





**SECTION A-A**

SCALE IN FEET  
20 10 0 20 40

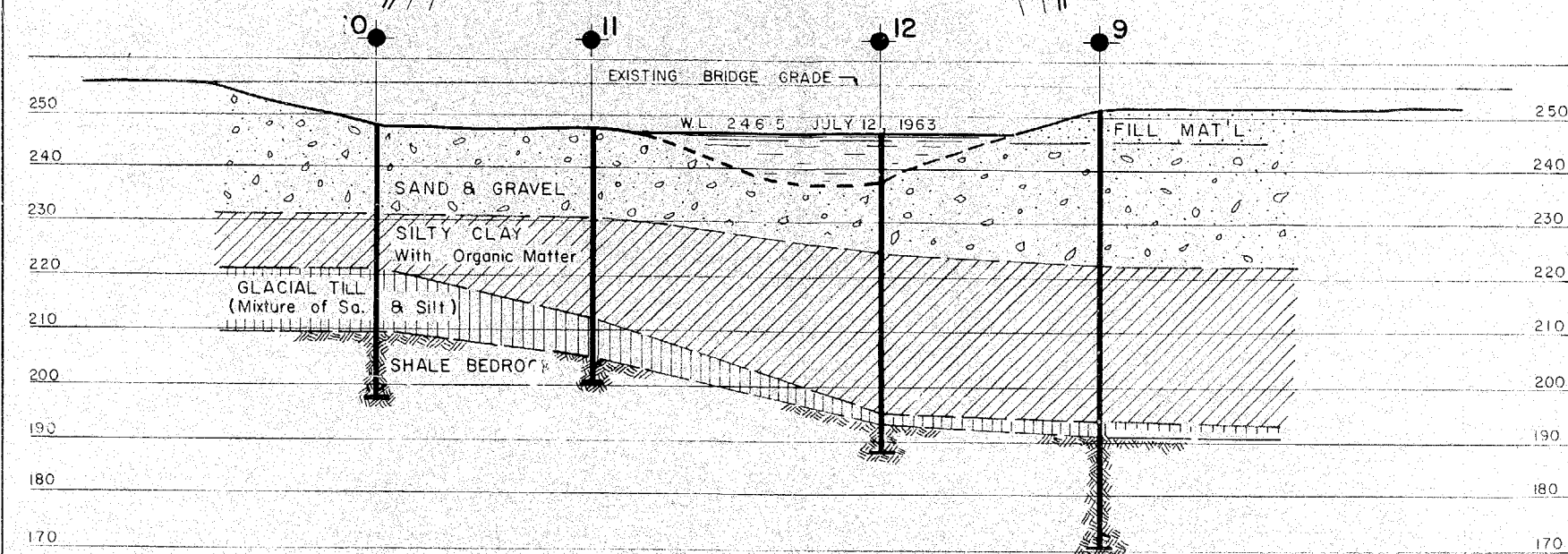
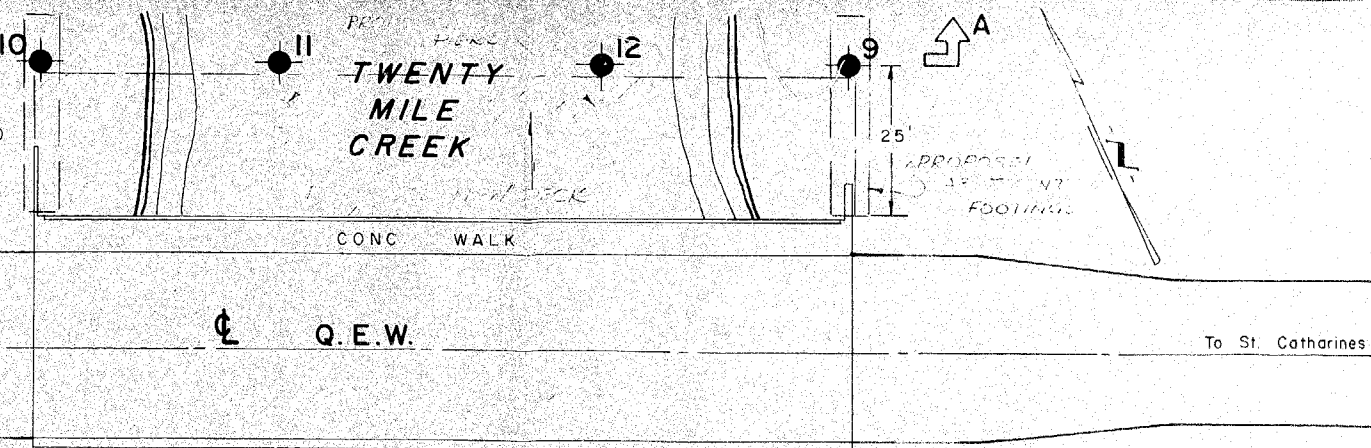
REVISED - 24 March 1964  
Bedrock depth in Borehole N9 12 corrected.

REF. NO. 60-F-63A

ORIGINATED V. KORLU  
DRAWN F. CLARK  
CHECKED *[Signature]*  
APPROVED *[Signature]*  
DATE JULY 16, 1963

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH SECTION  
**TWENTY MILE CREEK**  
AND  
**Q.E.W. BRIDGE WIDENING**

SCALE AS SHOWN  
W.P. NO. 331-63  
JOB NO. 60-F-63  
DWG. NO. 60-F-63B



REVISED - 24 March 1964  
Bedrock depth in Borehole No. 2  
Corrected

ORIGINATED V. KORLU  
DRAWN F. CLARK  
CHECKED *[Signature]*  
APPROVED *[Signature]*  
DATE JULY 16, 1963

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH SECTION  
**TWENTY MILE CREEK**  
AND  
**Q.E.W. BRIDGE WIDENING**

SCALE AS SHOWN  
W.P. NO. 331-63  
JOB NO. 60-F-63  
DWG. NO. 60-F-63B



DE LOCATION

DOWNSVIEW AVE.

ELE ST. - HIGHWAY 101

TORONTO, ONTARIO.



ONTARIO

DEPARTMENT OF HIGHWAYS

POSTAL ADDRESS

DEPARTMENT OF HIGHWAYS

PARLIAMENT BUILDINGS.

TORONTO 2, ONTARIO.

Bridge Division,  
December 27th, 1960.

MEMORANDUM TO:

Mr. L.G. Soderman,  
Principal Soils & Foundation Engineer,  
Room 107,  
Downsview, Ontario.

Attention: Mr. A. Stermac

Re: W.P. 113-60  
Twenty Mile Creek  
Q.E.W. N. Service Road  
District #4

Attached please find one print of our plan  
D 4796-P, for the above noted structure.

Since some controversy exists about the  
foundation of this structure and its approaches,  
would you please examine this print and let us have  
your comments.

FDeV/ek

F. DeVisser,  
Bridge Location Engineer.

The controversy was about the 15 Mile Creek  
Bridge. There are no comments for the above  
structure and this has been said to F. DeVisser  
over the phone on Jan. 5<sup>th</sup> 1961 by T. Soderman,  
Jan. 5, 1961.

T.S.



OFFICE LOCATION --  
DOWNSVIEW AVE.,  
KEELE ST. - HIGHWAY 401  
TORONTO, ONTARIO.



ONTARIO  
DEPARTMENT OF HIGHWAYS

POSTAL ADDRESS --  
DEPARTMENT OF HIGHWAYS  
PARLIAMENT BUILDINGS,  
TORONTO 5, ONTARIO.

Bridge Division,  
June 23, 1961.

**MEMORANDUM TO:**

Mr. L. Soderman,  
Principal Soils &  
Foundations Engineer,  
Department of Highways,  
Room 107, Lab. Bldg.,  
Downsview, Ontario.

RE: 20 Mile Creek Bridge,  
W.P. 113-60,  
Hwy. # - QEW, Dist. #4.

Note that the foundation arrangement for this bridge is similar to that of 15 Mile Creek Bridge although the soil conditions are different.

If you anticipate any problems during or after construction please make suitable suggestions as to how they may be avoided.

BSR:go

A handwritten signature in dark ink, appearing to read "B. Davis".

B. Davis,  
Bridge Design Engineer.

*Called Mr. McComb regarding the above mentioned structure.  
He told that they are considering to build a bridge and it may  
require some investigation.*

*Mr. Soderman  
July 10, 1961*

## MEMORANDUM

TO: Mr. A. Stermac  
Principal Foundations  
Engineer,  
Room 107, Lab. Bldg.

FROM: F. DeVisser,

DATE: June 21, 1963

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 331-63, Site # 19-19  
20 Mile Creek Bridge Widening  
Q.E.W., District #4

Enclosed is one (1) print of our preliminary plan D 5295-1 for the subject structure. If you have any comments please let me know.

FDeV/m

*M. Williams (Miss)*  
*fn*  
F. DeVisser,  
Bridge Location Engineer

Mr. Stermac contacted Mr. Greville regarding the above mentioned structure. The foundation investigation was carried out with the exception that a separate structure will be constructed some 100 ft. away from the existing structure. The preliminary drawing is prepared as a widening to the existing structure. Therefore it was agreed to carry out additional borings at the footing location of the proposed structure widening.

OR Devata  
July 30/63

## MEMORANDUM

TO: Mr. A. Stermac,  
Principal Foundations Engineer,  
Lab. Bldg.

FROM: C. Grebski

DATE: July 4, 1963.

OUR FILE REF.

IN REPLY TO

SUBJECT: 20 Mile Creek Widening  
W.P. 331-63, Q.E.W.  
District #4.

OLD W.P. 113-60

This will confirm our requests to have more soil information at this site to determine shale rock elevations. Presumably only penetration holes will be required.

CG:ew  
c.c. Mr. S. McCombie

  
C. Grebski  
Sr. Bridge Project Engineer.

THIS ADDITIONAL INFORMATION IS INCLUDED IN THIS  
REPORT (60-F-63) IN THE FORM OF DWG. # 60-F63B.

MEMORANDUM

To: Mr. A. Stermac,  
Principal Foundation Eng.  
Room 107,  
Lab. Bldg.

FROM: F. DeVisser

DATE: August 9, 1963.

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 331-63 Site 19-19  
Twenty Mile Creek Widening  
Q.E.W. - District 4

Enclosed is one print of the revised  
preliminary plan for the subject structure.

If you have any comments, please let me  
know.

*F. DeVisser*

FDeV/es

F. DeVisser,  
Bridge Location Engineer.

*No comment*

*Mr. Stermac*

*Aug 9/63*



Grange Rd. and Stony Creek Traffic Circle

1) Top Salt Lake { Swamp Area (150 ft. & 12th Dr. St.)  
Lake Ave. & (towards Lake Side)

2) Top of South

down the Road (at Narrows @ the Jordan)

between Vaneland and Jordan Street

(Existing; tunnel structure)

Brown Water East  
Pachman Motel West

Extensive feds on the South Side (one is a creek)

3) approximately 1 mile <sup>east</sup> (13th Street)  
Jordan Street (just east of  
narrows)

4) at 13th  
Dr 290 - 245  
a large box culvert.  
± 150 + 00 to 201'

No structure

(<sup>South</sup> ~~North~~ side to more Ore)

Extension 200 ft. & South Side.

east of  
13th Street.

## MEMORANDUM

To: Mr. E. R. Davis,  
Bridge Design Engineer,  
Bridge Division.

From: Mr. A. G. Stermac,  
Principal Foundation Engr.,  
Foundation Section,  
Materials & Research Division.  
Date: July 17, 1963.

Our File Ref.

IN REPLY TO

Subject: D.H.O. FOUNDATION INVESTIGATION --  
Twenty Mile Crk. & Q.E.W. North Service Road.  
M.J. 60-F-63 -- M.P. 331-63 -- District #4.

The original foundation investigation at the above-mentioned site was carried out with the assumption that the proposed structure would be parallel to, and some 100 ft. north of the centreline of the existing structure. The Bridge Office recently submitted the preliminary Dwg. D-5295-1 showing that an extension will be constructed at the north side of the existing structure. In our opinion that the bedrock elevation may vary considerably at the location of the proposed extension. Following a discussion with Mr. Grebski of the Bridge Office, it was decided that additional borings should be carried out to determine the elevation of bedrock at the location of the proposed extension.

We have now completed four borings at the above-mentioned site at the location of the footings for the proposed extension. A drawing #60-F-63 (B) showing the locations and elevations of boreholes together with the inferred stratigraphical profile is enclosed, so that the end bearing piles can be designed accordingly. The drawing, together with

cont'd. /2...



Mr. B. R. Davis  
Attn: Mr. C. Grebski

- 2 -

July 18, 1963.

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this memo, should be attached to foundation report J.F-63.

If you have any further queries in connection with  
this matter, please contact this Office.

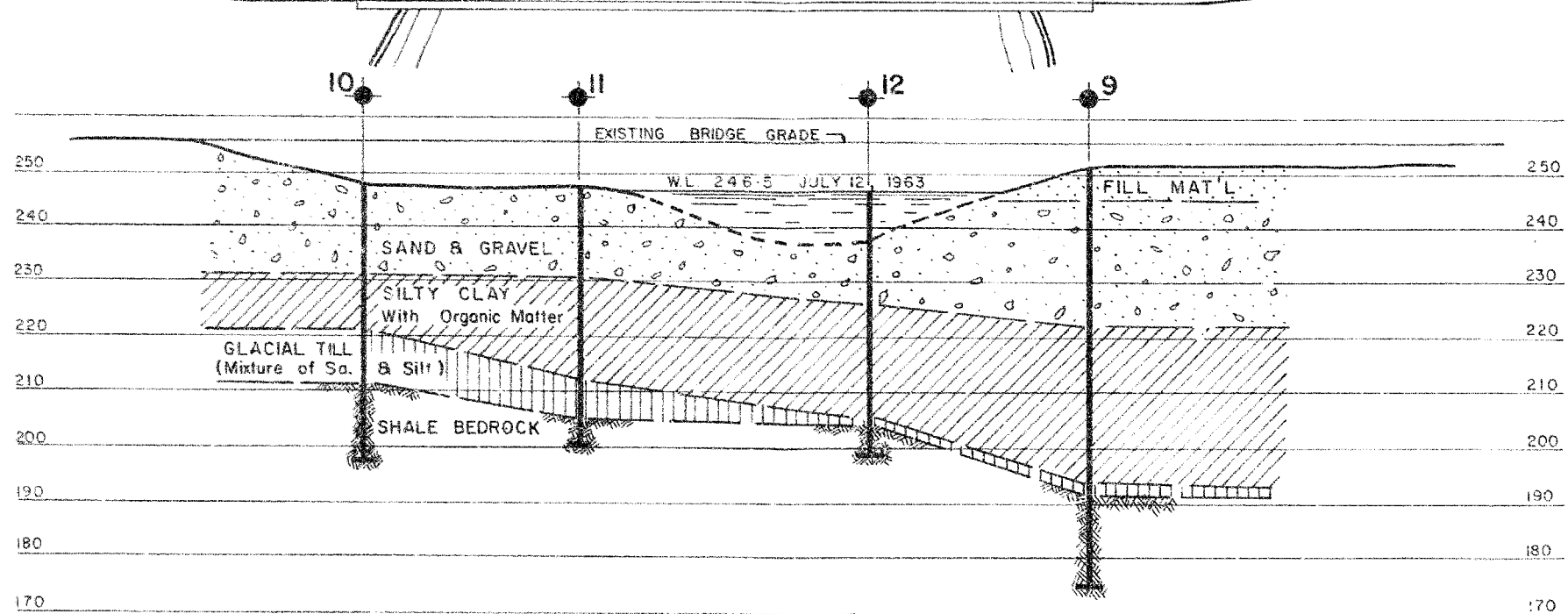
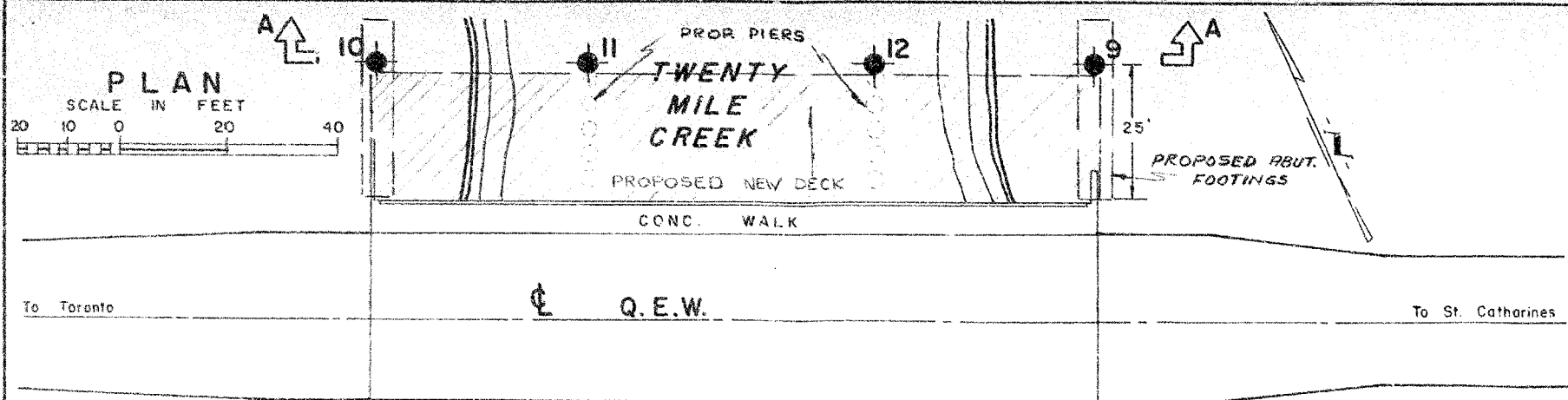
Encl.

MD/tt

cc: Messrs. B. R. Davis (2)  
H. A. Tregaskes  
H. D. McMillan  
G. K. Hunter (2)  
H. Greenland  
T. J. Kovich  
A. Watt

*MD*  
M. Devata,  
SENIOR FOUNDATION ENGR.  
For:  
A. G. Stermac,  
PRINCIPAL FOUNDATION ENGR.

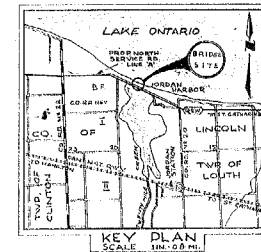
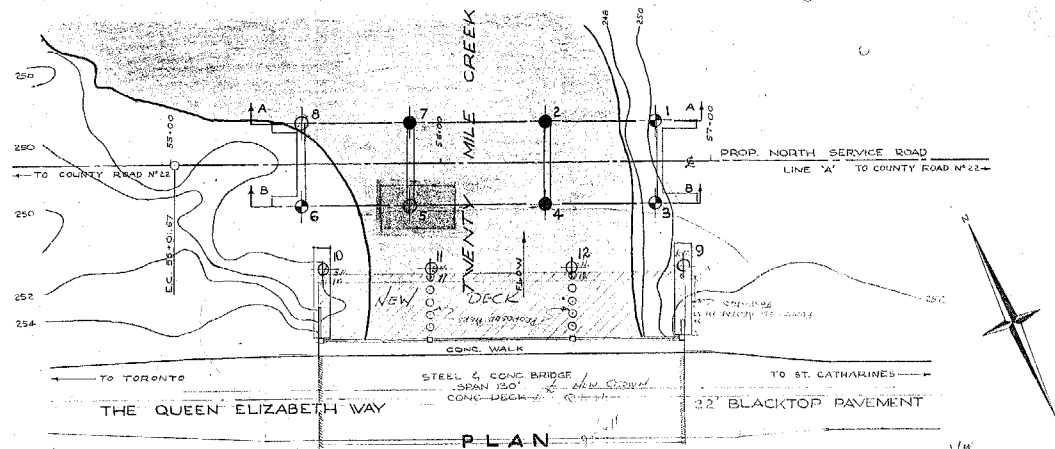
Foundations Office  
Gen. Files



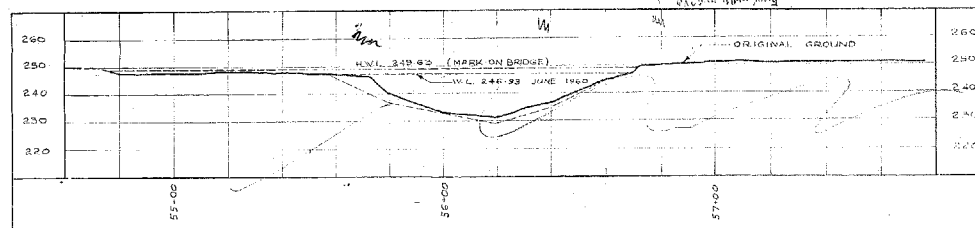
ORIGINATED V. KORLU	DEPARTMENT OF HIGHWAYS - ONTARIO	SCALE AS SHOWN
DRAWN F. CLARK	MATERIALS & RESEARCH SECTION	W.P. NO 331-63
CHECKED <i>[Signature]</i>	<b>TWENTY MILE CREEK</b>	JOB NO 60-F-63
APPROVED <i>[Signature]</i>	AND	DWG. NO 60-F-63B
DATE JULY 16, 1963	<b>Q.E.W. BRIDGE WIDENING</b>	

REF NO 60-F-63A

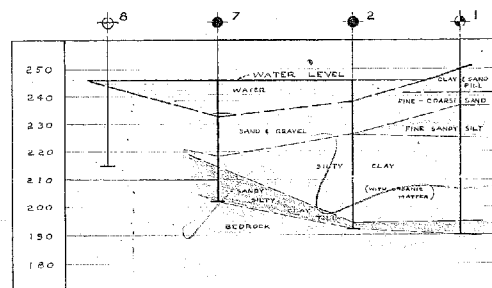
#60-F-63  
W.P.# 113-60  
NEW W.P.#331-63  
Q.E.W. - N.  
SERVICE RD.  
CROSSING  
TWENTY MILE CR.



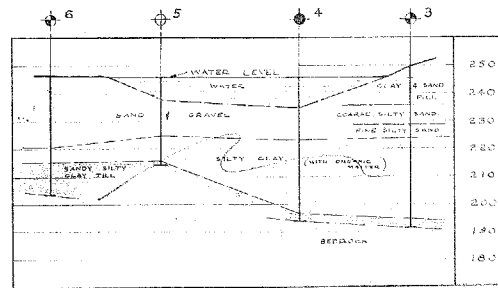
LEGEND			
BORE & PENETRATION HOLE			
BORE HOLE			
PENETRATION HOLE			
NO.	ELEVATION	STATION	DISTANCE FROM A
1	250.0	56+70	15' LT
2	246.0	56+70	15' LT
3	250.0	56+70	15' RT
4	246.0	56+70	15' RT
5	246.0	55+08	15' RT
6	246.0	55+48	15' RT
7	246.0	55+08	15' LT
8	246.0	55+48	15' LT



PROFILE



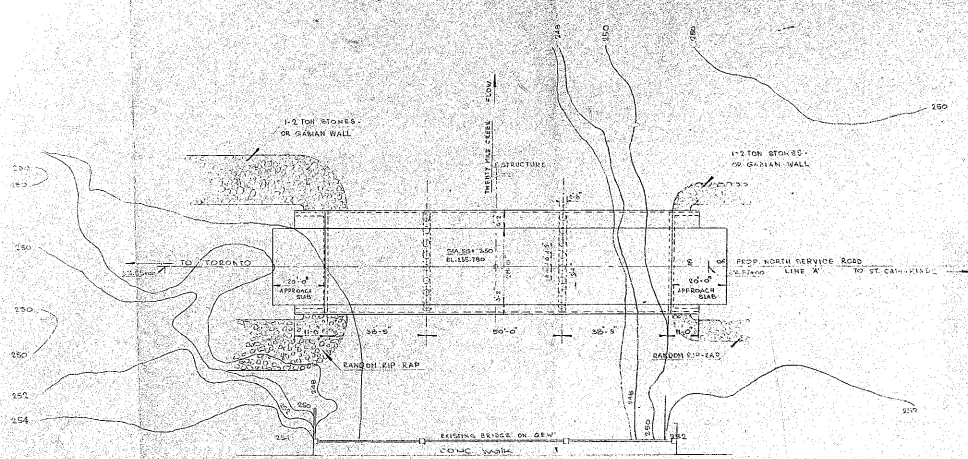
A-A



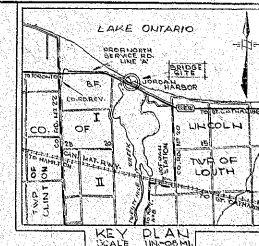
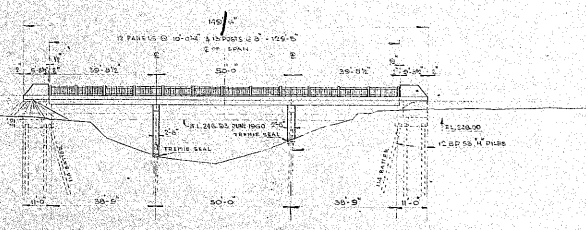
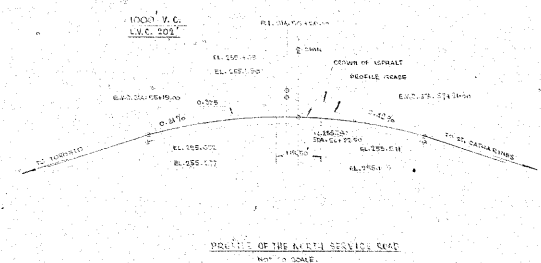
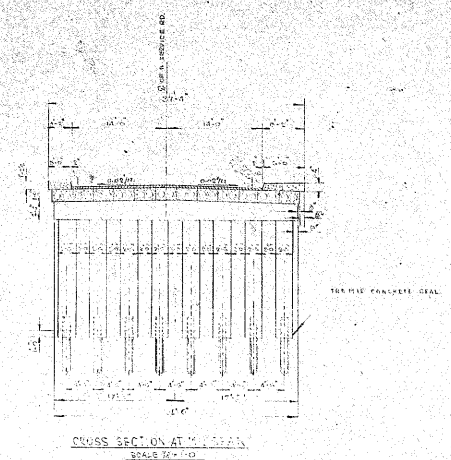
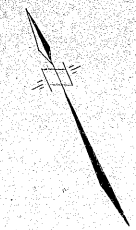
B-B

NOTE:  
THE INFORMATION CONTAINED HEREIN IS FOR INFORMATION ONLY AND IS NOT TO BE USED FOR ANY OTHER PURPOSE. THE INFORMATION IS NOT TO BE USED FOR ANY OTHER PURPOSE.

DEPARTMENT OF HIGHWAYS - ONTARIO  
 TWENTY MILE CREEK  
 PROP. NORTH SERVICE ROAD- LINE 'A'  
 APPROVED BY: A. E. L. (10/1/60)  
 DATE: 10/1/60  
 DRAWN BY: J. H. (10/1/60)  
 DATE: 10/1/60  
 SCALE: 1" = 100'



PLAN OF BRIDGE  
SCALE 1" = 20'-0"



WP 113-60

DEPARTMENT OF HIGHWAYS-ONTARIO  
BRIDGE OFFICE-TORONTO

TWENTY MILE CREEK BRIDGE

THE KING'S HIGHWAY NO. 6 & W. R. DUFFIN RD. DIST. NO. 4

CO. OF LINCOLN TWP. OF LOUTH LOT 19 CON. S.E.

PRELIMINARY PLAN

APPROVED

BRIDGE ENGINEER

DESIGN ENGINEER

REVISION	DATE	BY	DESCRIPTION

DATE DEC. 1950

DESIGN NO. 4795-P1