#62-F-35

W.P. # 271-61

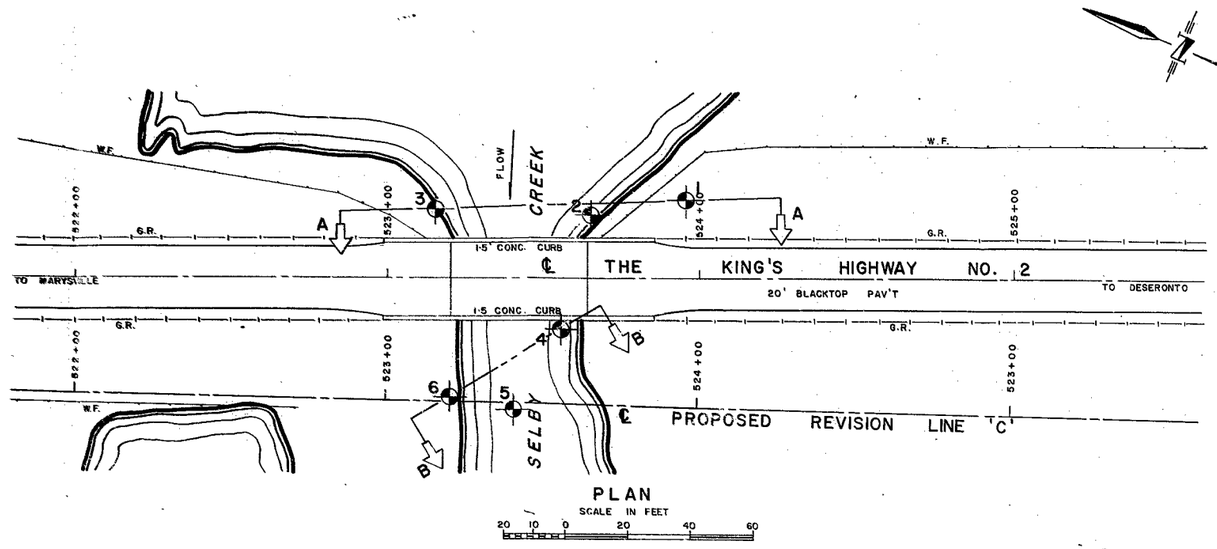
Hwy. #2 &

SELBY (SUCKER)

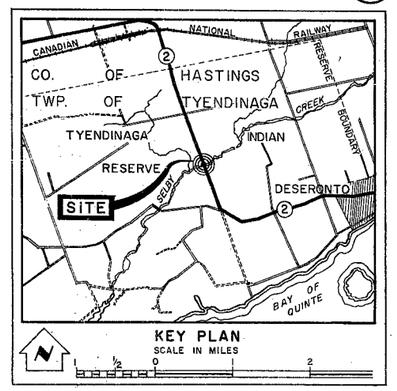
CREEK

31C3E

E. 332450
N 4891230
Z 18



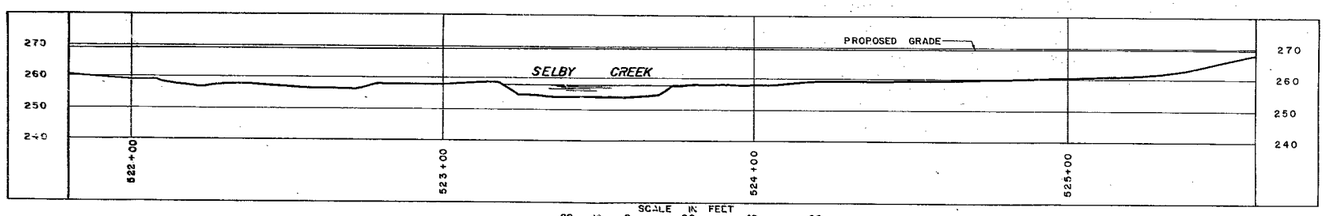
PLAN
SCALE IN FEET
20 10 0 20 40 60



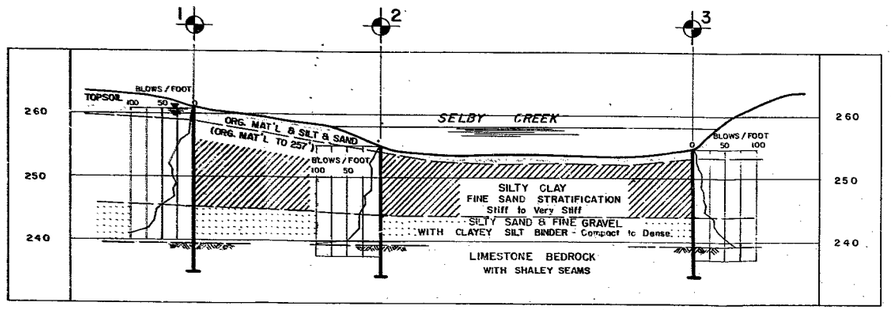
LEGEND

- Bore Hole
- Cone Penetration Hole
- Bore & Cone Penetration Hole
- Water Levels established at time of field investigation

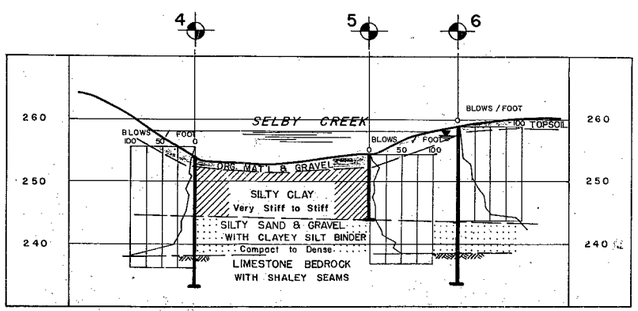
NO.	ELEVATION (GROUND)	STATION	OFFSET
1	261·0	523+95	25'LT.
2	255·0	523+65	20'LT.
3	254·7	523+15	22'LT.
4	253·5	523+55	16'RT.
5	254·25	523+40	42'RT.
6	258·5	523+20	38'RT.



PROFILE
SCALE IN FEET
20 10 0 20 40 60



A-A
SCALE IN FEET
10 5 0 10 20 30



B-B
SCALE IN FEET
10 5 0 10 20 30

- NOTE -

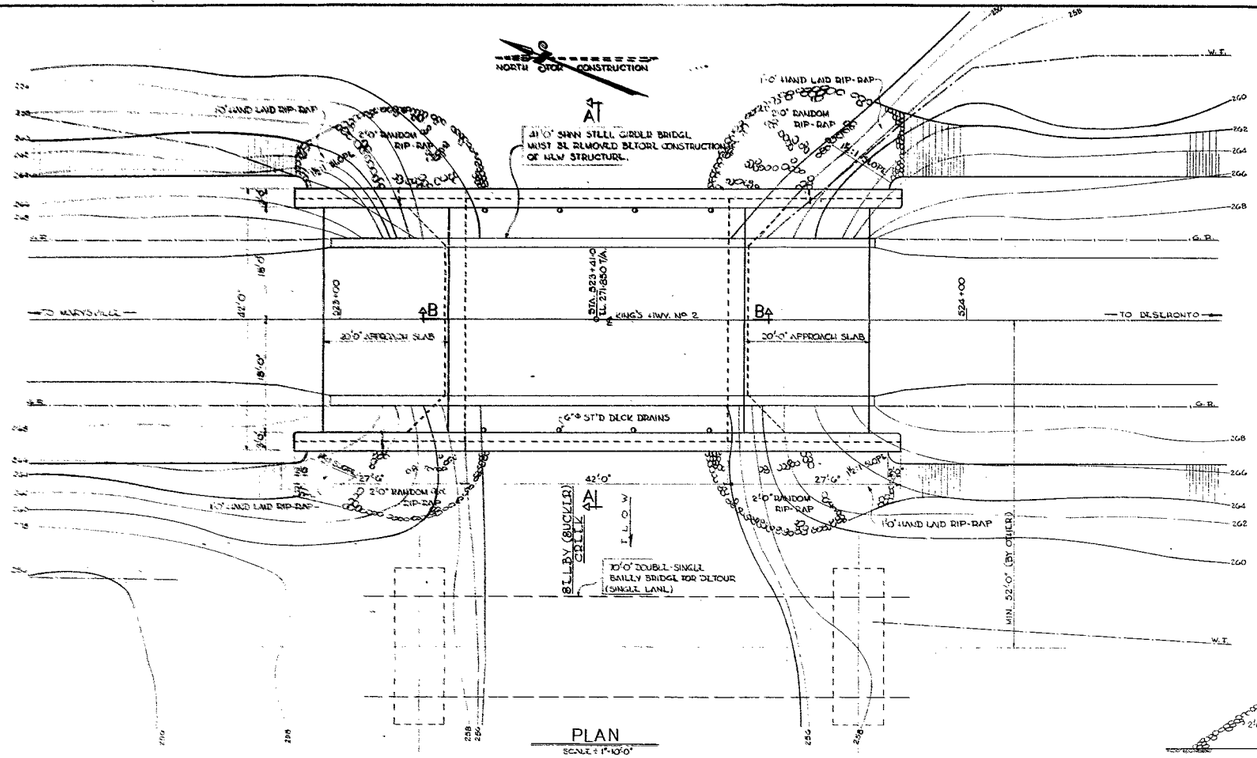
The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence and may be subject to considerable error.

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION - FOUNDATION SECTION

SELBY CREEK
AND
HIGHWAY NO. 2 REVISION
LINE 'C'

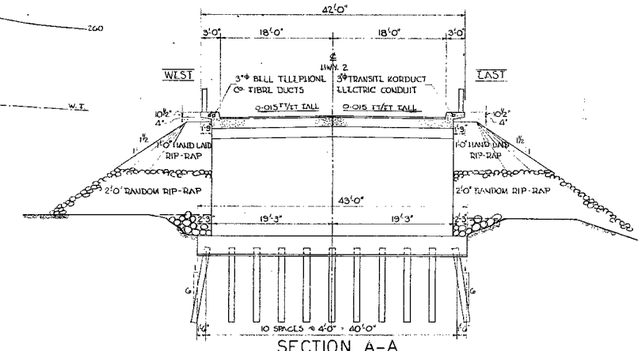
ORIGINATED B. GHADIALI	DISTRICT NO. 8	DATE APRIL 18, 1962
DRAWN F. CLARK	W.P. NO. 271-61	JOB NO. 62-F-35
CHECKED	CONTRACT NO.	DRAWING NO. 62-F-35 A
APPROVED		

REF. NO. E-4064-1



PLAN

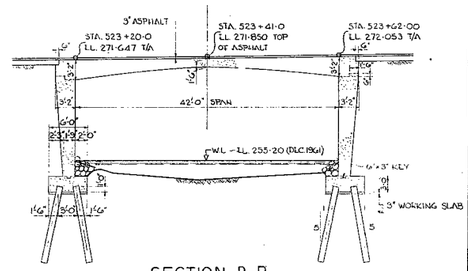
SCALE: 1"=10'0"



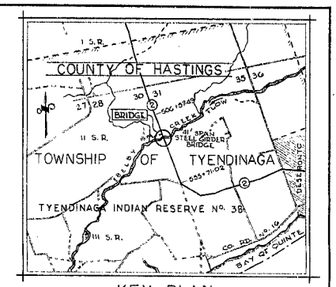
SECTION A-A

WEST ELEVATION

SCALE: 1"=10'0"



SECTION B-B



KEY PLAN

SCALE: 1 INCH = 0·8 MILE

'MARYSVILLE'
G.B.M. No. 152 ELEV. 338·909
STONE ARCH CULVERT UNDER C.N.RWY., ONE-QUARTER OF A MILE EAST OF STATION. W.LOT FACE OF COPING OF NORTH HEADWALL. BOLT SET HORIZONTALLY.
PUBLICATION 19 PAGE 182

PRINT RECORD		
No.	FOR	DATE

REVISIONS		
DATE	BY	DESCRIPTION

Fred Seal.

REFERENCE PLANS

SITE PLAN	L 40064-1
PLAN	G B 15
PROFILE	C 1364-1-A
SOILS	BA 1411

DEPARTMENT OF HIGHWAYS ONTARIO
BRIDGE DIVISION

SELBY (SUCKER) CREEK BRIDGE

APPROX. 2·0 MILES SOUTH OF MARYSVILLE

KING'S HIGHWAY No. 2 . DIST. No. 8
CO. HASTINGS . TYENDINAGA INDIAN RESERVE No. 38
TWP. TYENDINAGA . LOT 30 & 31 CON. II S.R.

PRELIMINARY PLAN

APPROVED ..... DESIGN ENGINEER				SITE No.	W.P. No. 271-61
DESIGN	A.R.B.	CHECK		CONTRACT Nos.	
DRAWING	J.H.I.	CHECK			
DATE	JUNE 1962	LOADING	H20 S16	DRAWING No.	D-5081-P

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

62-M-31

23-63-1

To: Mr. A. G. Stermac,
Principal Foundations Engr.,
Room 107, Lab. Building,
DOWNSVIEW, Ontario.

From: J. B. Curtis,
Bridge Location Engineer.

Date: July 13, 1962.

Our File Ref.

In reply to

Subject: W.P. 271-61, Hwy. #2 at Selby (Sucker) Creek
Approx. 2.0 miles S. of Marysville, Dist. #8.

Enclosed find one copy of the preliminary plan for the structure proposed at the above location.

The designer proposes steel piles as recommended in your foundation report but is using a lighter section that you mention.

J. B. Curtis,
Bridge Location Engineer.

JBC/rt

c.c. N. D. Smith

No Comments.

16-7-62.

cc: Foundations Office (Ex. 110)

Mr. A. M. Toye,

Bridge Engineer.

Materials & Research Division,

(Foundation Section)

Attention: Mr. S. McCombie.

May 11, 1962.

D.H.O. FOUNDATION INVESTIGATION REPORT.

W.J. 62-F-35 -- W.P. 271-61.

Re: Proposed New Structure over Selby (Sucker) Creek,
On Hwy. No. 2, 2 Miles South of Marysville,
Lots 30 and 31, Con. II S.R., Twp. of Tyendinaga,
District No. 8.

We are forwarding to you, our detailed foundation investigation report on subsoil conditions existing at the above structure site.

We believe you will find the data and recommendations contained therein, adequate for your future design work.

Should further information be required, please do not hesitate to contact our Office.

AGS/MdeF
Attach.
cc: Messrs. A. M. Toye (2)
H. A. Tregaskes
H. D. McMillan
J. Ford
E. A. Cash
J. E. Gruspier
T. J. Kovich
J. Roy
E. R. Saint
F. Norman
A. Watt
Foundations Office
Gen. Files.

A. G. Stermac,
PRINCIPAL FOUNDATION ENGINEER

TABLE OF CONTENTS

FOUNDATION INVESTIGATION

For

Proposed New Structure over Selby (Sucker) Creek,
On Hwy. No. 2, 2 Miles South of Marysville,
Lots 30 and 31, Con. II S.R., Twp. of Tyendinaga,
District No. 8.
W.J. 62-F-35 -- W.P. 271-61

1. INTRODUCTION:

A foundation investigation for the proposed new structure over Selby (Sucker) Creek on Hwy. 2 (Station 524+00), was requested by the Bridge Location Engineer in a memorandum dated March 15, 1962. An investigation was carried out at the site of this structure on March 28, 1962.

This report contains the field and laboratory findings, together with the recommendations for the foundations of the proposed new structure.

2. DESCRIPTION OF SITE AND GEOLOGY:

The area on either side of Hwy. No. 2 is generally undulating and was partly covered with snow in some places. The existing bridge is a single span structure (42') and is in bad shape with grades clearly visible and the concrete spalling. The adjacent creek banks are protected by hand-placed rip-raps. Selby Creek is a winding stream and flows in a direction from east to west. The velocity of flow is fairly slow but it depends on the prevailing wind conditions at the location of the structure.

Geologically, the site is situated in the area of the Napanee Plain. It is a flat to undulating plain of limestone

cont'd. /2 ...

2. DESCRIPTION OF SITE AND GEOLOGY: (cont'd.) ...

from which the glacier stripped most of the overburden. Centering on the Town of Napanee, the Napanee Plain covers approx. 700 sq. miles. While the soil is only a few inches thick over much of the region, some deeper glacial till occurs in the stream valleys. In the depression areas towards the south, shallow deposits of stratified clay exist.

3. DESCRIPTION OF FIELD AND LABORATORY WORK:

Field work consisted of six sampled boreholes with dynamic cone penetration tests adjacent to each borehole. The location of these boreholes was chosen from the given Plan No. E-4064-1.

The exploration programme was carried out by a standard core drill machine adapted for soil sampling. The machine was mounted on a 16' x 18' wooden raft when working on water. Conventional wash boring procedure was followed. Samples were recovered at required depths, by means of a 2-inch I.D. Shelby tube and by a 2-inch 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. Rock samples were obtained by the use of AXT core barrel.

Samples were visually examined and identified in the field before transportation to the laboratory. Tests were carried out in the laboratory on a selection of both disturbed and undisturbed samples for the determination of Atterberg limits, undrained triaxial compression tests, moisture content and grain size distribution.

cont'd. /3 ...

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

Laboratory and field test results have been summarized and are included in this report in Appendix I.

4. SUBSOIL CONDITIONS:

4.1) General:

The investigation has shown that in general, the subsoil stratification can be considered as regular. Apart from a thin layer of topsoil and organic material, three distinct layers were encountered in the following succession:

Silty clay with occasional thin sand seams.

Silty sand and gravel with clayey silt binder.

bedrock.

A detailed description of these three layers is given below:-

4.2) Silty Clay:

A layer of silty clay was encountered in all borings. It is slightly organic in places at its upper surface and contains some fine sand seams and only occasional fine gravel. This layer was encountered down to an approximate elevation 245 ft. It is 14' thick in borings #1 and #6 which were drilled from the ground surface, 9' in borings #2 and #3, 7.5' in boring #4 and 8.5' in boring #5, which were drilled below creek water level. The consistency of the material is very stiff at its upper surface, becoming stiff at greater depths. The minimum and maximum values of shear strength can be taken as 1300 p.s.f. and 2000 p.s.f., respectively, with an average value of 1600 p.s.f. The material in

cont'd. /4 ...

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

4.2) Silty Clay: (cont'd.) ...

this layer is of medium to high plasticity and is grey in color. The average value of Atterberg limits of 10 tests are 53% and 22%, respectively, and the average moisture content is 34% and the average total unit weight is 119 p.c.f.

4.3) Silty Sand and Gravel:

The material below the silty clay layer, consists of silty sand and gravel (max. size to 1" Ø) with a cohesive binder. The material is grey in colour and is in a compact to dense state, with an average penetration resistance 'N' of 26 blows per foot. During the investigation, an artesian water pressure was encountered in this layer in borings 1 and 4. In such a case, it may be noted that the Standard Penetration Test may not give very reliable information of the relative density of the soil.

Results of grain size analysis showed an average of 45% sand, 28% silt, 18% gravel and 9% clay.

4.4) Bedrock:

Below the above-mentioned layer of silty sand and gravel, limestone bedrock was encountered in all the borings. It contains some grey shale intrusions.

The elevations at which the bedrock was encountered are given below:

Bore Hole No.	Bedrock Elevations (In Feet).
1	239.4
2	239.2
3	239.4
4	238.2
5	238.2
6	238.7

cont'd. /5 ...

5. GROUND WATER CONDITIONS:

The elevation of the water in the creek was observed to be between elevation 259.5 and 257.5 during the period of field investigation. The water level in bore hole 1, which was drilled from the ground surface on snow-covered land, was found to be at elevation 260.5'. In bore hole 6 which was drilled at the bank of the creek, the elevation of water level was found at El. 257.5 ft., same as the creek water level.

An artesian water condition was observed in bore holes 1 and 4. Given below are the elevations of depths at which the artesian condition was observed and the heights to which the water rose in the casing:-

Bore Hole No.	Approx. Elev. at which Encountered	Elev. of W. Level.
1	245	266.7
4	238	258.8

6. DISCUSSION AND RECOMMENDATIONS:

It is proposed to construct a new bridge to carry Hwy. 2 over Selby Creek. The existing bridge is in a poor structural condition. It is located between Lots 31 and 32 and Con. II, in the County of Hastings.

In the preceding paragraphs, the differential layers and their respective properties have been described. The soil stratification can be considered as regular. Considering only the strength and compressibility characteristics of the subsoil as such, spread footings are feasible for a single-span structure. A safe bearing load of 1.5 T.S.F. can be used.

cont'd. / 6 ...

6. DISCUSSION AND RECOMMENDATIONS: (cont'd.) ...

However, for providing scour protection, it will be necessary to found the footings so as to keep the footing bottoms at least 7' below the creek bed level, that is, at an approx. elev. 245 ft. At this elevation, existence of artesian condition will cause difficult excavation problems for footing foundation. As an alternative to spread footings, a pile supported foundation is recommended. The structure can be supported on steel H-piles driven to refusal at bedrock contact. A safe load of up to 70 tons per pile may be used in case of 12 BP 74 H-piles driven to refusal at bedrock contact. Piles should be designed so as to take the horizontal thrust exerted by the weight of the fill material. If sheet piles are required to be driven, the elevation of pile bottoms should be 245' or lower.

No slope stability problems are anticipated to be encountered with the standard 2:1 slopes. All compressible organic material should, however, be removed before placing any new fill material.

The adjacent river banks should be protected by providing rip-raps.

7. CONCLUSIONS:

(a) The stratification of the investigated subsoil can be described as regular. A shallow layer of overburden which lies over limestone bedrock (elev.239') consists of cohesive material of medium to high plasticity to an approx. elev. 245'. Below this layer, a layer of granular material with a cohesive binder exists.

cont'd. /7 ..

7. CONCLUSIONS: (cont'd.) ...

(b) Elevation of creek water level was between 259.5 and 257.5 during the period of the field investigation. Artesian water condition was encountered in bore holes No. 1 and 4. This condition was traced in the layer of granular material which overlies bedrock.

(c) Spread footings are not favourable because of the relative low bearing capacity of the soil and the probable construction difficulties that may arise during excavation owing to the existence of artesian conditions. As an alternative, steel H-piles are recommended to be driven to bedrock contact. A safe bearing load up to 70 tons per pile can be taken for 12 BP 74 piles. If sheet piles are required to be driven, the elevation of pile bottoms should be 245' or lower.

(d) No slope stability problems are anticipated. The adjacent river banks should be protected by provision of rip-raps.

8. MISCELLANEOUS:

The field work was undertaken during the period from March 28 to April 5, 1962, by Mr. B. M. Ghadiali, who also prepared the report under the supervision of Mr. K. G. Selby.

Equipment was owned and operated by Johnston Drilling Co., Ltd., of Ottawa.

BMG/MdeF
May 1962.

K. Y. Lo
SUPERVISING FOUNDATION ENGR.

APPENDIX I.

ABBREVIATIONS USED IN THIS REPORT

PENETRATION RESISTANCE

STANDARD PENETRATION RESISTANCE 'N' :- THE NUMBER OF BLOWS REQUIRED TO ADVANCE A STANDARD SPLIT SPOON SAMPLER 12 INCHES INTO THE SUBSOIL, DRIVEN BY MEANS OF A 140 POUND HAMMER FALLING FREELY A DISTANCE OF 30 INCHES.

DYNAMIC PENETRATION RESISTANCE :- THE NUMBER OF BLOWS REQUIRED TO ADVANCE A 2 INCH, 60 DEGREE CONE, FITTED TO THE END OF DRILL RODS, 12 INCHES INTO THE SUBSOIL. THE DRIVING ENERGY BEING 350 FOOT POUNDS PER BLOW.

DESCRIPTION OF SOIL

THE CONSISTENCY OF COHESIVE SOILS AND THE RELATIVE DENSITY OR DENSENESS OF COHESIONLESS SOILS ARE DESCRIBED IN THE FOLLOWING TERMS :-

CONSISTENCY	'N' BLOWS / FT.	c LB. / SQ. FT.	DENSENESS	'N' BLOWS / FT.
VERY SOFT	0 - 2	0 - 250	VERY LOOSE	0 - 4
SOFT	2 - 4	250 - 500	LOOSE	4 - 10
FIRM	4 - 8	500 - 1000	COMPACT	10 - 30
STIFF	8 - 15	1000 - 2000	DENSE	30 - 50
VERY STIFF	15 - 30	2000 - 4000	VERY DENSE	> 50
HARD	> 30	> 4000		

TYPE OF SAMPLE

S.S.	SPLIT SPOON	T.W.	THINWALL OPEN
W.S.	WASHED SAMPLE	T.P.	THINWALL PISTON
S.B.	SCRAPER BUCKET SAMPLE	O.S.	OESTERBERG SAMPLE
A.S.	AUGER SAMPLE	F.S.	FOIL SAMPLE
C.S.	CHUNK SAMPLE	R.C.	ROCK CORE
S.T	SLOTTED TUBE SAMPLE		
	P.H. SAMPLE ADVANCED HYDRAULICALLY		
	P.M. SAMPLE ADVANCED MANUALLY		

SOIL TESTS

Qu	UNCONFINED COMPRESSION	L.V.	LABORATORY VANE
Q	UNDRAINED TRIAXIAL	F.V.	FIELD VANE
Qcu	CONSOLIDATED UNDRAINED TRIAXIAL	C	CONSOLIDATION
Qd	DRAINED TRIAXIAL	S	SENSITIVITY

ABBREVIATIONS USED IN THIS REPORT

SOIL PROPERTIES

γ	UNIT WEIGHT OF SOIL (BULK DENSITY)
γ_s	UNIT WEIGHT OF SOLID PARTICLES
γ_w	UNIT WEIGHT OF WATER
γ_d	UNIT DRY WEIGHT OF SOIL (DRY DENSITY)
γ'	UNIT WEIGHT OF SUBMERGED SOIL
G	SPECIFIC GRAVITY OF SOLID PARTICLES $G = \frac{\gamma_s}{\gamma_w}$
e	VOID RATIO
n	POROSITY
w	WATER CONTENT
S_r	DEGREE OF SATURATION
w_L	LIQUID LIMIT
w_P	PLASTIC LIMIT
I_P	PLASTICITY INDEX
s	SHRINKAGE LIMIT
I_L	LIQUIDITY INDEX $= \frac{w - w_P}{I_P}$
I_C	CONSISTENCY INDEX $= \frac{w_L - w}{I_P}$
e_{max}	VOID RATIO IN LOOSEST STATE
e_{min}	VOID RATIO IN DENSEST STATE
I_D	DENSITY INDEX $= \frac{e_{max} - e}{e_{max} - e_{min}}$
	RELATIVE DENSITY D_r IS ALSO USED
h	HYDRAULIC HEAD OR POTENTIAL
q	RATE OF DISCHARGE
v	VELOCITY OF FLOW
i	HYDRAULIC GRADIENT
k	COEFFICIENT OF PERMEABILITY
j	SEEPAGE FORCE PER UNIT VOLUME
m_v	COEFFICIENT OF VOLUME CHANGE $= \frac{-\Delta e}{(1+e)\Delta\sigma'}$
c_v	COEFFICIENT OF CONSOLIDATION
C_c	COMPRESSION INDEX $= \frac{\Delta e}{\Delta \log_{10} \sigma'}$
T_v	TIME FACTOR $= \frac{c_v t}{d^2}$ (d, DRAINAGE PATH)
U	DEGREE OF CONSOLIDATION
τ_f	SHEAR STRENGTH
c'	EFFECTIVE COHESION INTERCEPT
ϕ'	EFFECTIVE ANGLE OF SHEARING RESISTANCE, OR FRICTION
	IN TERMS OF EFFECTIVE STRESS $\tau_f = c' + \sigma' \tan \phi'$
c_u	APPARENT COHESION
ϕ_u	APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION
	IN TERMS OF TOTAL STRESS $\tau_f = c_u + \sigma \tan \phi$
μ	COEFFICIENT OF FRICTION
S_t	SENSITIVITY

GENERAL

π	= 3·1416
e	BASE OF NATURAL LOGARITHMS 2·7183
$\log_e a$ OR $\ln a$	NATURAL LOGARITHM OF a
$\log_{10} a$ OR $\log a$	LOGARITHM OF a TO BASE 10
t	TIME
g	ACCELERATION DUE TO GRAVITY
V	VOLUME
W	WEIGHT
M	MOMENT
F	FACTOR OF SAFETY

STRESS AND STRAIN

u	PORE PRESSURE
σ	NORMAL STRESS
σ'	NORMAL EFFECTIVE STRESS ($\bar{\sigma}$ IS ALSO USED)
τ	SHEAR STRESS
ϵ	LINEAR STRAIN
γ	SHEAR STRAIN
ν	POISSON'S RATIO (μ IS ALSO USED)
E	MODULUS OF LINEAR DEFORMATION (YOUNGS MODULUS)
G	MODULUS OF SHEAR DEFORMATION
K	MODULUS OF COMPRESSIBILITY
η	COEFFICIENT OF VISCOSITY

EARTH PRESSURE

d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
δ	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
K_o	COEFFICIENT OF EARTH PRESSURE AT REST

FOUNDATIONS

B	BREADTH OF FOUNDATION
L	LENGTH OF FOUNDATION
D	DEPTH OF FOUNDATION BENEATH GROUND
N	DIMENSIONLESS COEFFICIENT USED WITH A SUFFIX APPLYING TO SPECIFIC GRAVITY. DEPTH AND COHESION ETC. IN THE FORMULA FOR BEARING CAPACITY
k_s	MODULUS OF SUBGRADE REACTION

SLOPES

H	VERTICAL HEIGHT OF SLOPE
D	DEPTH BELOW TOE OF SLOPE TO HARD STRATUM
β	ANGLE OF SLOPE TO HORIZONTAL

FORM OB - ML - 126 REV. 1961
61-4391

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 1

FOUNDATION SECTION

JOB 62-F-35 LOCATION Sta. 523+95 and 25' to the left of ℄ of Hwy. 2 ORIGINATED BY B.M.G.

W. P. 271-61 BORING DATE March 28, 1962. COMPILED BY B.K.

DATUM G.S.C. BOREHOLE TYPE Washboring using BX Casing. CHECKED BY K.S.

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS / FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 / SHEAR STRENGTH P.S.F. 500 1000 1500 2000 2500	LIQUID LIMIT w_L / PLASTIC LIMIT w_P / WATER CONTENT w / WATER CONTENT % 20 40 60	BULK DENSITY γ P.C.F.	REMARKS
261'	Groundlevel									
259' 2.0'	Topsoil					260				W.L. at 260.5'
	Silty clay contains organic material to El. 257'. (Boulder at El. 249' Stiff to V. stiff brown to grey.		1	SS	10					
			2	SS	24				123.0	
			3	T	13	250			117.0	
245' 16.0'	(Artesian Pres.) Sand and fine gravel with clayey silt binder. Compact to dense grey.		4	SS	4				113.0	Art. Pres. observed around el. 245'. Art. Head to El. 266.7'
			5	T	22					
239.4 21.6			6	SS	34	240				
	Grey and black, limestone. Bedrock with some shaley seams.		7	RC	-					
234.4 26.5										

FORM OB-ML-126 REV. 1961
61-4391

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 2

FOUNDATION SECTION

JOB 62-F-35 LOCATION Sta. 523+65 and 20' to left of ℄ of Hwy. 2 ORIGINATED BY B.M.G.

W.P. 271-61 BORING DATE April 2, 1962. COMPILED BY B.K.

DATUM G.S.C. BOREHOLE TYPE Washboring using BX Casing. CHECKED BY H.S.

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS/FOOT 20 40 60 80 100 / SHEAR STRENGTH P.S.F. 1000 2000	LIQUID LIMIT w_L / PLASTIC LIMIT w_P / WATER CONTENT w — WATER CONTENT % 20 40 60	BULK DENSITY P.C.F.	REMARKS
259.5										
	Water									
255.0										
4.5	Org. mat'l. & sand.									
254.0	Creek Bed.									
5.5										
	Silty clay and fine sand (stratified)		1	SS	17	250				
	V. stiff to stiff Br. grey to grey.		2	SS	10					
245.0										
14.5	Silty sand and fine gravel with clayey silt binder.		3	T	11				152.0	
	Compact grey.					240				
239.2			4	SS	24					
20.2	Grey and black, limestone. Bedrock with some shaley seams)		5	RC	-					
234.2										
25.2										

FORM OB-ML-126 REV. 1961

61-4391

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 3

FOUNDATION SECTION

JOB 62-F-35 LOCATION Sta. 523+15 and 22' to left of ℄, Hwy. 2 ORIGINATED BY B.M.G.

W.P 271-61 BORING DATE April 3, 1962. COMPILED BY B.K.

DATUM G.S.C. BOREHOLE TYPE Washboring using BX Casing. CHECKED BY H.S.

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS / FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT (20 40 60 80 100) / SHEAR STRENGTH P.S.F. (1000 2000)	LIQUID LIMIT w_L / PLASTIC LIMIT w_P / WATER CONTENT w — WATER CONTENT % (20 40 60)	BULK DENSITY γ P.C.F.	REMARKS
258'										
254.7 / 3.5	Water									
253.2 / 4.8	Org. mat'l. and silt.									
	Silty clay. Some sand and fine gravel up to El. 249'.		1	SS	14	250			127.0	
			2	SS	10				123.0	
244.2 / 13.8	Stiff Grey.		3	T	11				155.0	
	Silty sand and gravel with clayey silt binder. Compact to dense. Grey.		4	T	23	240				
239.4 / 18.6			5	SS	25					
	Grey and black limestone. Bedrock with some shaley seams.		6	R.C.	-					
234.4 / 23.6										

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61-4391

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 4

FOUNDATION SECTION

JOB 62-F-35 — LOCATION Sta. 523+55 and 16' to right of ℄ Hwy. 2 — ORIGINATED BY B.M.G.

W. P. 271-61 — BORING DATE April 4, 1962. — COMPILED BY B.K.

DATUM G.S.C. — BOREHOLE TYPE Washboring using BX Casing. — CHECKED BY K.S.

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES: NUMBER	TYPE	BLOWS / FOOT	BULK DENSITY γ P.C.F.	REMARKS
257.8							
	Water						
253.5							
4.3	Org. Mat'l., sand-fine gravel & clayey silt. Brown.						
252.0							
5.8	Silty clay. Med. to high plasticity. V. stiff to stiff. Grey.		1	SS	17		
			2	T	5	119.0	
244.5							
13.2	Sand and gravel (max. 1"Ø) with clayey silt binder. Compact to dense grey.		3	T	10	121.0	
			4	SS	25		
238.2							
19.5	Grey and black limestone. Bedrock with some shale fragments.		5	R.C.	-		Art. Pr. Observed at 238.0' Art. Head to El. 258.8
233.2							
24.5							

ELEV SCALE

DYNAMIC PENETRATION RESISTANCE
BLOWS / FOOT 20 40 60 80 100
SHEAR STRENGTH P.S.F. 1000 2000

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w
w_P w w_L
WATER CONTENT % 20 40 60

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61-4391

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 5

FOUNDATION SECTION

JOB 62-F-35 LOCATION Sta. 523+40 and 42' to right of ℄ Hwy. 2 ORIGINATED BY B.M.G.

W.P 271-61 BORING DATE April 5, 1962. COMPILED BY B.K.

DATUM G.S.C. BOREHOLE TYPE Washboring using BX Casing. CHECKED BY K.S.

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES: NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE
257.5						
	Water					
254.3 / 3.2	Org. Mat'l-roots, sand and gravel.					
252.3 / 5.2	Silty clay and clayey silt. V. stiff to stiff. Grey.		1	SS	22	
			2	SS	13	
			3	T	10	
243.7 / 13.8	(Boulder at El.243.75)		4	SS	6	

DYNAMIC PENETRATION RESISTANCE
BLOWS / FOOT 20 40 60 80 100
SHEAR STRENGTH P.S.F. 1000 2000

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w
WATER CONTENT % 20 40 60

BULK DENSITY γ P C F.

REMARKS
114.0

FORM OB-ML-126 REV. 1961

61-4391

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 6

FOUNDATION SECTION

JOB 62-F-35 LOCATION Sta. 523+20 and 38' to right of ℄ Hwy. 2 ORIGINATED BY B.M.G.

W P 271-61 BORING DATE April 5, 1962. COMPILED BY B.K.

DATUM G.S.C. BOREHOLE TYPE Washboring using BX Casing. CHECKED BY K.S.

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES: NUMBER	TYPE	BLOWS / FOOT	ELEV SCALE
258.5						
257.5 / 1.0	Topsoil					
	Silty clay. (Trace of sand and organic material to El. 255.3) Stiff to v. stiff. Grey.		1	SS	7	
			2	SS	21	
			3	T	14	
			4	SS	9	
243.5 / 15.0	Silty sand and fine gravel with clayey silt binder. Compact. Grey.		5	SS	30	
238.7 / 19.8	Grey and black limestone. Bedrock with some shaley seams.		6	R.C.	-	
233.7 / 24.8						

DYNAMIC PENETRATION RESISTANCE
BLOWS / FOOT 20 40 60 80 100
SHEAR STRENGTH P.S.F. 1000 2000

LIQUID LIMIT —— w_L
PLASTIC LIMIT —— w_P
WATER CONTENT —— w
WATER CONTENT % 20 40 60

BULK DENSITY γ P.C.F.
115.0
122.0
152.0

REMARKS
W.L. at El. 257.5