

MEMORANDUM

BA - 1536

To: Mr. A. M. Toye,  
Bridge Engr.,  
Bridge Division.

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

Attn: Mr. K.L. Kleinsteinber,  
Mun. Bridge Liaison Engr.

Date: October 4, 1962.

Our File Ref.

In Reply To

SUBJECT: Re: D.H.O. FOUNDATION INVESTIGATION REPORT -  
Proposed Crossing at South River and  
Township Road at Nipissing, Lot 13,  
Con. X, Twp. of Nipissing. District of  
Parry Sound (District #13) -  
W.J. 62-F-103 -- W.O. 34-62-91.

Attached, we are forwarding to you, our detailed  
foundation investigation report dealing with existing  
subsoil conditions at the above structure site.

We believe you will find the factual data and  
recommendations contained therein, adequate for your  
future design work. Should there be any queries con-  
cerning this project, please feel free to contact our  
Office

KYL/MdeF  
Attach.

cc: Messrs. A. M. Toye (3)  
J. P. Howard  
J. H. Cook  
E. F. Saint  
A. Watt

Foundations Office  
Gen. Files.

*KYL*  
K. Y. Lo,  
SUPERVISING FOUNDATION ENGR.  
For:

A. G. Stermac,  
PRINCIPAL FOUNDATION ENGR.

D. H. O.  
TORONTO  
RECEIVED  
NOV 14 1962  
BRIDGE  
OFFICE

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-

# FOUNDATION INVESTIGATION

For

Proposed Crossing at South River  
and Township Road at Nipissing,  
Lot 13, Con. X, Twp. of Nipissing,  
District of Parry Sound (Dist. #13)  
W.J. 62-F-103 -- W.O. 34-62-91.

## 1. INTRODUCTION:

A request for a foundation investigation at the site of the proposed new South River Bridge at Nipissing, was received from the Bridge Office in a memo dated July 31, 1962. A field investigation was subsequently carried out by this Section to determine the subsoil conditions existing at the site of the new structure. The results of this investigation, together with laboratory findings, and recommendations pertaining to the design of the proposed structure foundations are contained in the following paragraphs of this report.

## 2. DESCRIPTION OF THE SITE:

The site is located in the Village of Nipissing which lies on the south shore of Lake Nipissing. The topography is of a rolling nature with occasional knobs resulting from bedrock outcrops. The South River flows from east to west at this point and is roughly 90' wide and 10' deep. The water level of the river at the time of the field investigation, was about 20' below the average surrounding ground level. The river banks are covered with grass, bush and a few trees.

cont'd. /2 ...

2. DESCRIPTION OF THE SITE: (cont'd.) ...

The existing bridge is a single lane, three span steel and concrete structure, in generally poor condition. The pier footings have been undercut by erosion. The new bridge will be located some 50' to the east of the existing one.

The soil in this area is of fluvial origin, being predominantly fine sand.

3. FIELD INVESTIGATION PROCEDURE:

A total of 6 borings and 5 dynamic cone penetration tests was carried out at the site. Boring was achieved by means of conventional diamond drilling equipment adapted for soil sampling purposes. Samples were recovered by means of a 2" O.D. split spoon driven into the soil with a driving energy of 350 ft.-lbs. per blow. Rock cores were obtained by means of an AXT core barrel. Dynamic cone penetration tests were carried out using an energy of 350 ft.-lbs. per blow to advance the cone. The locations and elevations of all boreholes are shown on the accompanying drawing #62-F-103A.

Samples were classified in the field before being transported to the laboratory. A careful visual examination of the samples was subsequently carried out in the laboratory as a result of which it was decided that further testing was unnecessary.

cont'd. /3 ...

#### 4. SOIL TYPES & SOIL CONDITIONS:

Subsoil at the site was found to consist of deposits of silty fine sand, silty clay and sand and gravel, overlying granite bedrock. The boundaries of the different deposits are shown on the accompanying borelog sheets in the appendix of this report. The estimated stratigraphical cross sections of Drawing #62-F-103A are based upon this information. From ground level downwards, the various soil types encountered are as follows:-

##### 4.1) Silty Fine Sand:

The material from this deposit consists predominantly of fine sand with a small percentage of particles within the silt and clay range. The depth of the deposit varies from about 10' in B.H. #1 to about 35' in B.H. #8. Standard penetration tests gave an average 'N' value of about 5 blows per foot, showing the material to be in a loose state.

##### 4.2) Silty Clay:

A deposit of silty clay with a very soft consistency was found to underlie the silty sand layer described above. On the north side of the river, a depth of only about 3' was observed whilst on the south side, the thickness ranged from 8' to 17'. Traces of organics were observed within the deposit on the south side, only.

cont'd. /4 ...

4. SOIL TYPES & SOIL CONDITIONS: (cont'd.) ...

4.3) Sand & Gravel:

A compact deposit of fine to coarse sand and gravel was observed to underlie the silty clay stratum. The deposit averaged about four feet in thickness. Standard penetration tests gave 'N' values ranging from 13 to 34 blows per foot.

4.4) Granite Bedrock:

Bedrock at the site was found to consist of sound granite gneiss, with the upper contact varying between elevations 605.0 and 640.0. Variation of the upper contact observed in adjacent borings, showed the surface to be sloping erratically with slopes as high as 2:1.

5. DISCUSSION & RECOMMENDATIONS:

5.1) General:

It is proposed to construct a new three span bridge at this location. The new Centre Line will be located about 50' east of the existing one. On the north approach, fills in the order of 18' will be required. On the south approach, shallow cuts and fills up to about 10' will be required. Subsoil at the site consists of deposits of loose silty sand, soft silty clay and compact sand and gravel underlain by granite gneiss bedrock. Depths to bedrock ranged from 10' to about 70' below ground level.

cont'd. /5 ...

5. DISCUSSION & RECOMMENDATIONS: (cont'd.) ...

5.2) Structure Foundations:

The investigation has shown the subsoil at this location to be in a loose condition with a structural value inadequate for the support of spread footings. It is therefore recommended that piled foundations be used to support the proposed structure. Piles should be driven to bedrock. For estimating purposes, bedrock elevation is interpolated or extrapolated from the sections shown on accompanying Drawing #62-F-103A. The design loads to be used will be dependent on the pile sections adopted and may be as high as 75 tons in the case of 12 BP at 74 steel 'H' piles. Either steel 'H' piles or steel tube piles may be used. The final choice should be based on economical considerations.

Driving through the overburden should be relatively easy and only slight lateral deflections of the piles should occur. Because of the sloping nature of the bedrock surface, the piles should be keyed into the bedrock to prevent sliding of the pile tips. In the case of steel tube piles, a suggested method is as follows: The piles should be driven open ended to the bedrock and jetted out clean. A four-foot deep hole of suitable diameter should then be drilled into the bedrock, into which can be inserted a six-foot long dowel bar. The pile should then be filled with concrete properly compacted. In the case of steel 'H' piles, a method of chiseling the pile into the bedrock until a satisfactory contact area is achieved, should be adopted. Oslo points

cont'd. /6 ...

5. DISCUSSION & RECOMMENDATIONS: (cont'd.) ...

5.2) Structure Foundations: (cont'd.) ...

may be fitted for this purpose. The procedure to be followed is outlined in Geotechnique, Vol. VII, page 73, 1957, and also in our Foundation Report #61-F-117.

Timber piles at this location are not recommended for the following reasons:-

(1) The danger of structural damage during driving immediately on contact with the bedrock: and

(2) the difficulty of obtaining a satisfactory key into the rock.

If pile caps are formed below the water level, a dewatering scheme will be necessary. If sheeting is used for this, it should be driven to a depth below the footing base equal to the height of the prevailing water level above it. This problem can be avoided at the pier locations by designing the piles as columns and capping them at the deck level. The abutments should be constructed within the approach fills with the slopes protected where necessary, by rip-rap.

5.3) Structure Approaches:

No stability problems are anticipated with regard to the proposed cuts and fills provided standard 2:1 slopes are adopted. Topsoil stripping should be carried out in accordance with D.H.O. standards.

cont'd. /7 ...



6. SUMMARY:

A field investigation at the site of the proposed new bridge over the South River at Nipissing is reported.

Subsoil at the site consists of deposits of loose silty sand, soft silty clay and compact sand and gravel underlain by granite bedrock. Depth to bedrock ranges from 10' to 70' below ground level.

Piled foundations are recommended. A method of keying the piles into the bedrock is described in Section 5.2. Either steel 'H' piles or steel tube piles may be used. The final choice should be based on economy.

No stability problems are anticipated with regard to the proposed bridge approaches.

7. MISCELLANEOUS:

The field work was carried out during the period 24th - 28th August, 1962, under the supervision of Mr. I. Holubec. This report was written by Mr. K. Selby of the Foundation Section.

Equipment used was owned and operated by F.E. Johnston Drilling Co., Ltd.

October 1962.

## 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 -

<u>CONSISTENCY</u>	<u>'N' BLOWS / FT.</u>	<u>C LB / SQ FT.</u>	<u>DENSENESS</u>	<u>'N' BLOWS / FT.</u>
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.	FORK 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.	FIELD VANE
QUU	CONSOLIDATED UNDRAINED TRIAXIAL	C.	CONSOLIDATION
QD	DRAINED TRIAXIAL	S.	SENSITIVITY

# ABBREVIATIONS USED IN THIS REPORT

## SOIL PROPERTIES

$\gamma$	UNIT WEIGHT OF SOIL (BULK DENSITY)
$\gamma_s$	UNIT WEIGHT OF SOLID PARTICLES
$\gamma_w$	UNIT WEIGHT OF WATER
$\gamma_d$	UNIT DRY WEIGHT OF SOIL (DRY DENSITY)
$\gamma'$	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
$\tau_s$	SHEAR STRENGTH
$c$	EFFECTIVE COHESION
$\phi$	EFFECTIVE ANGLE OF SHEARING RESISTANCE, OR FRICTION
$c_u$	APPARENT COHESION
$\phi_u$	APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION
$\mu$	COEFFICIENT OF FRICTION
$S_r$	SENSITIVITY

## GENERAL

$\pi$	$= 3.1416$
$e$	BASE OF NATURAL LOGARITHMS 2.7183
$\log_e \sigma$ OR $\ln \sigma$	NATURAL LOGARITHM OF $\sigma$
$\log_{10} \sigma$ OR $\log \sigma$	LOGARITHM OF $\sigma$ 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
$\sigma$	NORMAL STRESS
$\bar{\sigma}$	NORMAL EFFECTIVE STRESS ( $\bar{\sigma}$ IS ALSO USED)
$\tau$	SHEAR STRESS
$\epsilon$	LINEAR STRAIN
$\gamma$	SHEAR STRAIN
$\nu$	POISSON'S RATIO ( $\mu$ IS ALSO USED)
$E$	MODULUS OF LINEAR DEFORMATION (YOUNG'S MODULUS)
$G$	MODULUS OF SHEAR DEFORMATION
$K$	MODULUS OF COMPRESSIBILITY
$\eta$	COEFFICIENT OF VISCOSITY

## EARTH PRESSURE

$z$	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
$\delta$	ANGLE OF WALL FRICTION
$K$	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
$K_0$	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
$\beta$	ANGLE OF SLOPE TO HORIZONTAL



FOUNDATION SECTION

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS & RESEARCH DIVISION		RECORD OF BOREHOLE NO. 2		FOUNDATION SECTION	
JOB 62-F-103	LOCATION Sta. 14+82 72' Rt. of E	ORIGINATED BY H.S.			
W.P. W.O. 34-62-91	BORING DATE Aug. 24, 1962.	COMPILED BY H.S.			
DATUM 656.1	BOREHOLE TYPE Washboring	CHECKED BY K.S.			

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT — WL		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS / FOOT	SHEAR STRENGTH P.S.F.	PLASTIC LIMIT — WP	WATER CONTENT — W		
									WD — W — WL		
									WATER CONTENT %		
656.1	Groundlevel										
0.0											
	Silty fine sand					650					WL from observations in borehole
	Loose										649.6
											6.5
						640					
637.1											
19.0											
635.1	Silty clay very soft										
21.0	Silty sand with some coarse sand & gravel compact.										
632.7											
23.4	Bedrock (Granite)		1	RC							
			2	RC		630					
626.6											
29.5	End of borehole										
						620					

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

# RECORD OF BOREHOLE NO. 3

FOUNDATION SECTION

JOB 62-F-103 LOCATION Sta. 14+56 42' Rt. of E ORIGINATED BY H.S.  
W.P. W.O. 34-62-91 BORING DATE Aug. 23, 1962 COMPILED BY H.S.  
DATUM 655.9 BOREHOLE TYPE Washboring CHECKED BY K.S.

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT — WL		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLLOT	NUMBER	TYPE		BLOWS / FOOT	BLOWS / FOOT	PLASTIC LIMIT — WP	WATER CONTENT — W		
					660						
555.9	Groundlevel										
0.0	Silty fine sand Very loose to loose		1	SS	5						
			2	SS	3						
			3	SS	10						
45.7	Bedrock (Granite)		4	RC							
10.2			5	RC							
40.2					640						
15.7	End of borehole										

WL from  
observations  
in borehole

γ 648.9  
7.0

DEPARTMENT OF HIGHWAYS - ONTARIO  
 MATERIALS & RESEARCH DIVISION

RECORD OF BOREHOLE NO. 4

FOUNDATION SECTION

JOB 62-F-103 LOCATION Sta. 14+64 70' Rt. of E ORIGINATED BY H.S.  
 W.P. W.O. 34-62-91 BORING DATE Aug. 23, 1962 COMPILED BY H.S.  
 DATUM 656.7 BOREHOLE TYPE Washboring CHECKED BY K.S.

SOIL PROFILE		SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	SHEAR STRENGTH P.S.F.	LIQUID LIMIT — WL PLASTIC LIMIT — WP WATER CONTENT — W		BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER TYPE				WP — W — WL	WATER CONTENT %		
				660						
656.7 0.0	Groundlevel									
	Silty fine sand Very loose to loose.		1 SS 5							
			2 SS 2	650						
			3 SS 3							
			4 SS 1							
				640						
639.2 17.5	Sand and gravel Compact		5 SS 16							
634.5 22.2	Bedrock (Granite)		6 RC							
629.7 27.0	End of borehole			630						
				620						

WL from  
 observation  
 in borehole  
 = 649.3  
 7.4



DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

## RECORD OF BOREHOLE NO. 5

FOUNDATION SECTION

JOB 62-F-103 LOCATION Sta. 13+15.33' Rt. of C ORIGINATED BY H.S.  
W.P. W.O. 34-62-91 BORING DATE Aug. 27, 1962. COMPILED BY H.S.  
DATUM 655.5 BOREHOLE TYPE Washboring CHECKED BY K.S.

SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT ——— WL		BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	BLOWS / FOOT	PLASTIC LIMIT ——— WP		
SHEAR STRENGTH P.S.F.						WATER CONTENT ——— W			
+ Field vane test <td colspan="2">W.P. ——— W.L.</td> <td></td> <td></td>						W.P. ——— W.L.			
						WATER CONTENT %			
655.5 0.0	Groundlevel								
	Silty fine sand		1	SS	7	650			WL from observation in borehole
	Loose		2	SS	7				646.5 9.0
641.0 14.5			3	SS	3	640	+ 5.0		
	Silty clay with traces of organics.		4	SS	1		+ 7.0		
628.0 27.5	Bedrock (Granite)		5	SS	15	630			
623.5 32.0	End of borehole		6	RC			For 9" (Refusal)		Dynamic cone penetration 3' from borehole
						620			

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION

## RECORD OF BOREHOLE NO. 6

FOUNDATION SECTION

108 62-F-103

LOCATION 13/23 70' Rt. of E

ORIGINATED BY H.S.

W.P. W.O. 34-62-91

BORING DATE AUG. 27, 1962.

COMPILED BY H.S.

DATUM 656.5

BOREHOLE TYPE Dynamic Cone Penetration Test

CHECKED BY                      K.S.

[illegible]

FOUNDATION SECTION

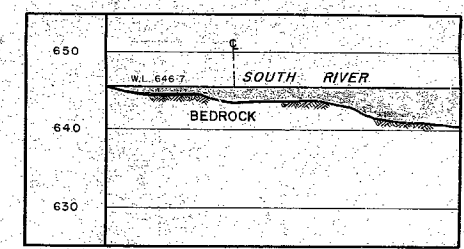
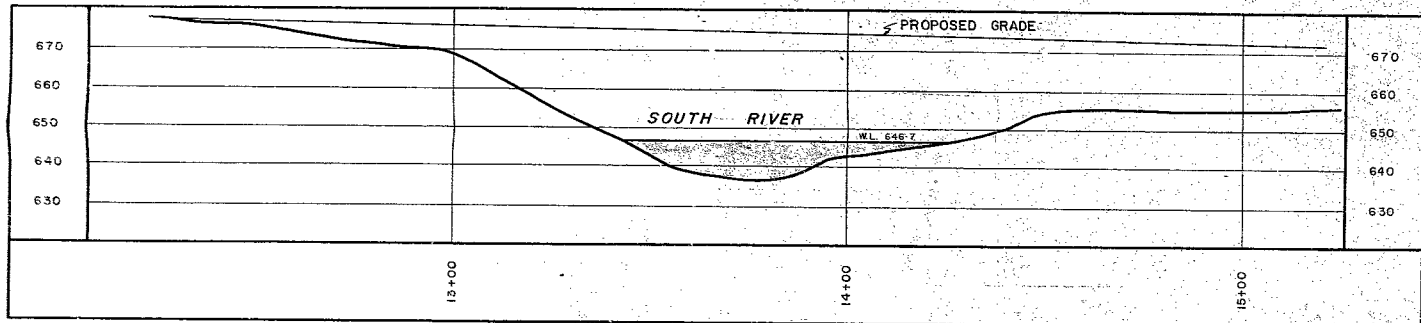
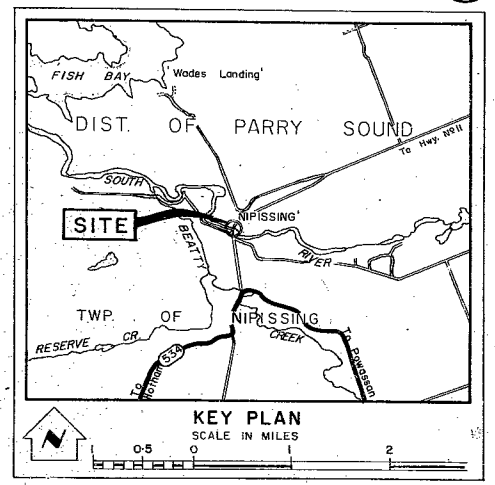
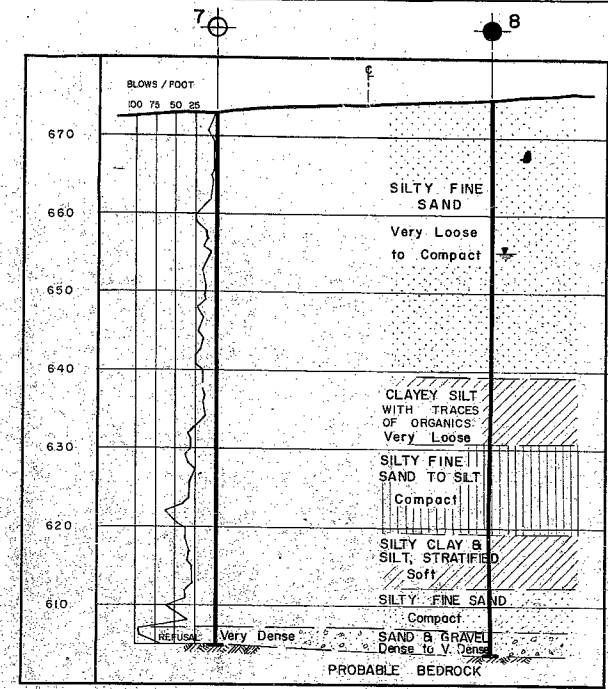
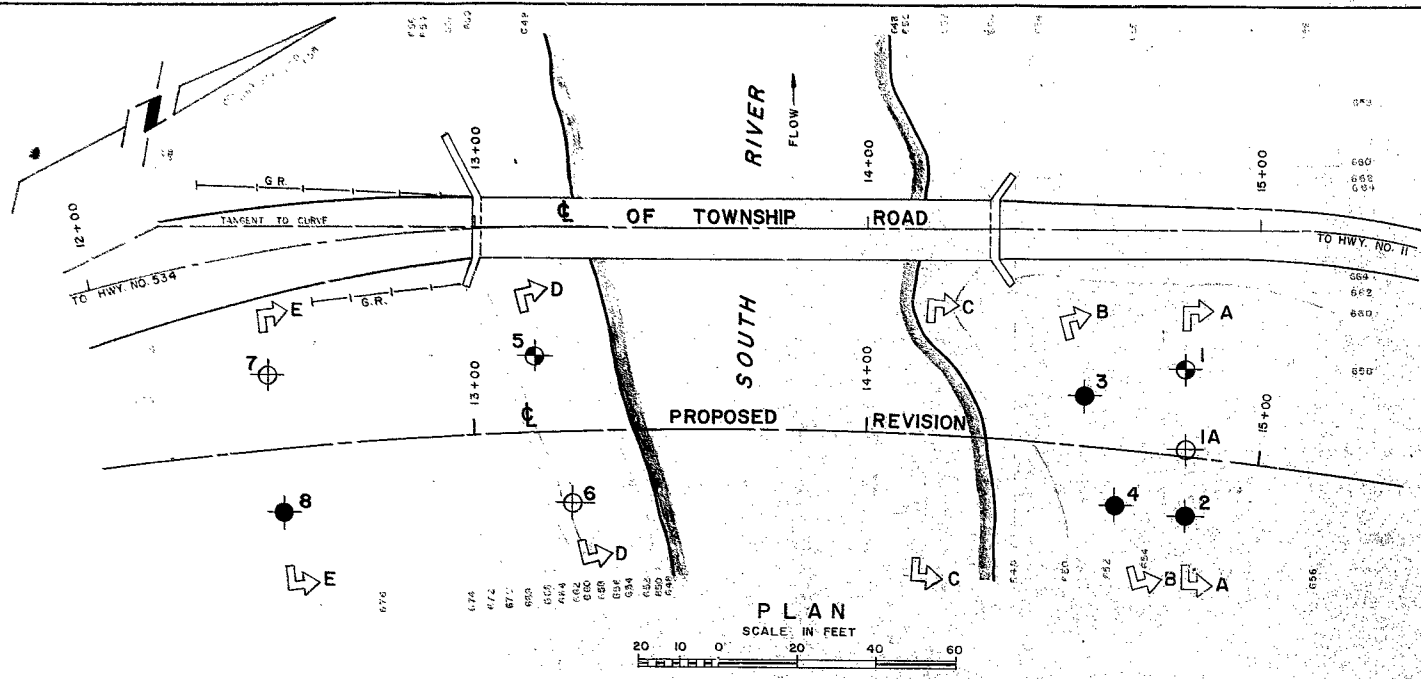
JOB	62-F-103	LOCATION	12447 39' N. of E	ORIGINATED BY	H.S.
W P	N.O. 34-62-91	BORING DATE	Aug. 28, 1962.	COMPILED BY	H.S.
DATUM	673.1	BOREHOLE TYPE	Dynamic Cone Penetration Test.	CHECKED BY	K.S.

[illegible]



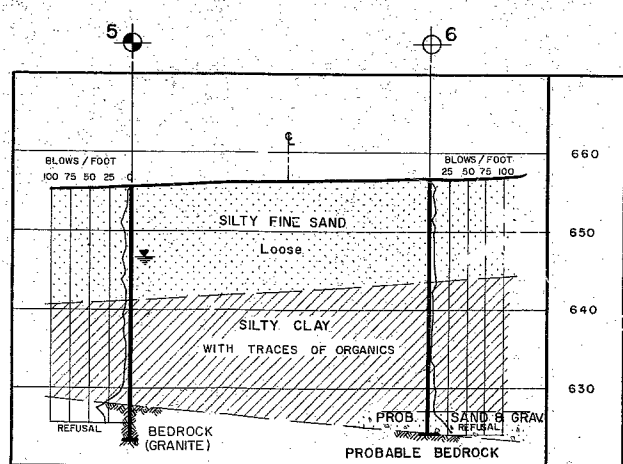
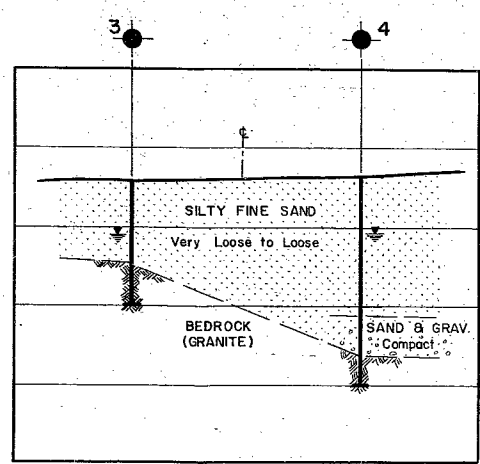
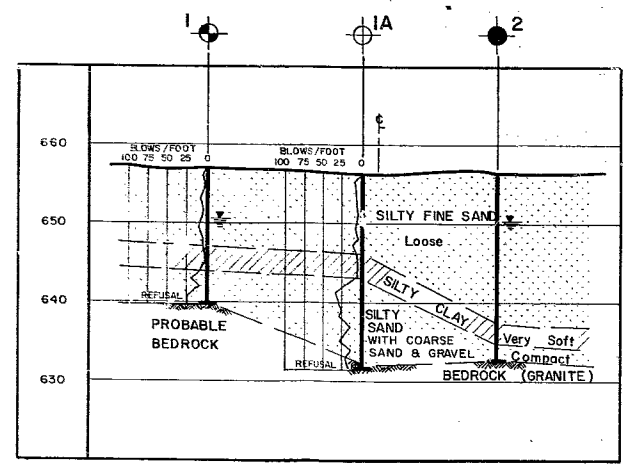
62-F-103  
SOUTH RIVER +  
TOWNSHIP RD. AT  
NIPISSING  
LOT 13, CON. 10

56-18



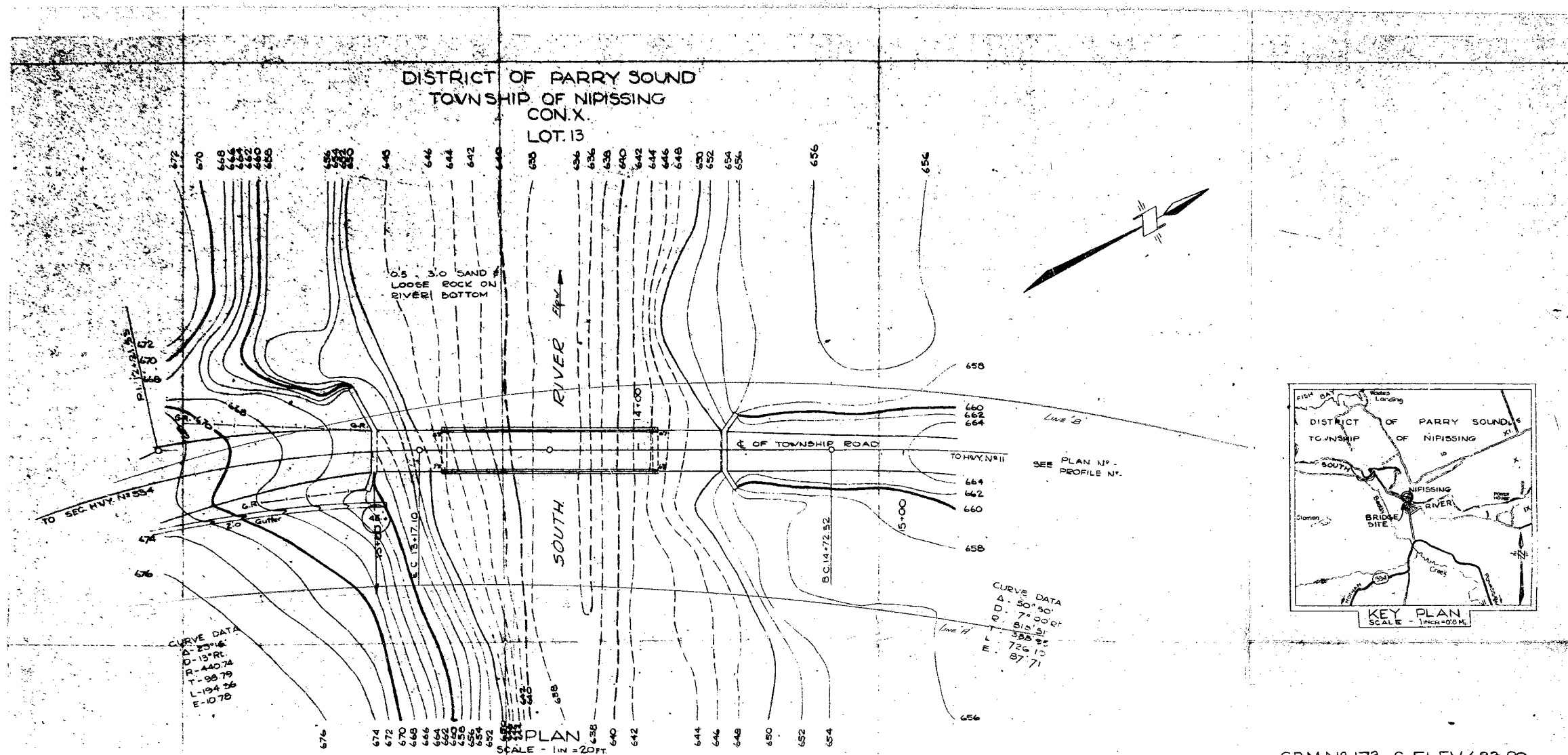
LEGEND			
	Bore Hole		
	Cone Penetration Hole		
	Bore & Cone Penetration Hole		
	Water Levels established at time of field investigation Aug. 1962		
NO.	ELEVATION	STATION	OFFSET EXISTING ROAD
1	657.0	14+82	35' RT.
1A	656.5	14+82	55' RT.
2	656.1	14+82	72' RT.
3	655.9	14+56	42' RT.
4	656.7	14+64	70' RT.
5	655.5	13+15	33' RT.
6	656.5	13+23	70' RT.
7	673.1	12+47	39' RT.
8	675.7	12+51	73' RT.

- 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.

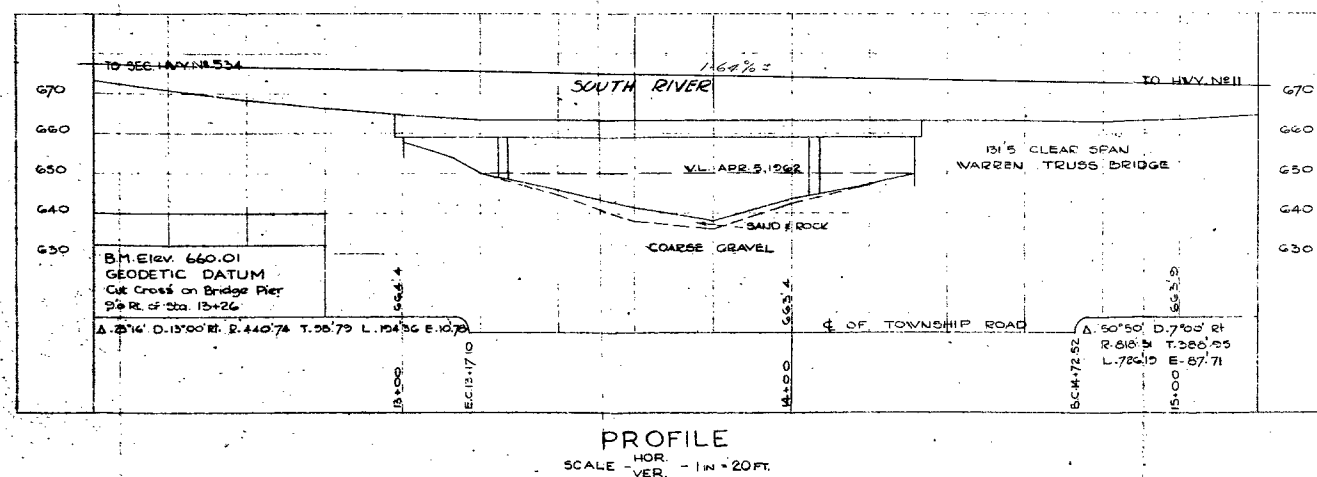


DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS & RESEARCH DIVISION - FOUNDATION SECTION		
SOUTH RIVER AND TOWNSHIP ROAD REVISION AT NIPISSING		
ORIGINATED I. HOLUBEC	DISTRICT NO. 13	DATE SEPT. 17, 1962
DRAWN F. CLARK	W.P. NO.	JOB NO. 62-F-103
CHECKED H. S.	CONTRACT NO.	DRAWING NO.
APPROVED H. S.		62-F-103A

REF. NO. E4120-1



GBM. N° 173-S ELEV. 683.89  
Rock surface at road junction, 600 feet north of  
Bridge over South River at Nipissing at N.E. side  
of road to Fish Bay, opposite production of vest  
line of road to Bridge. Tablet in Rock facing towards  
Bridge. Pub. N° 20 Nipissing.



DATE	REVISIONS & ADDITIONS	BY	CHKD.
DEPARTMENT OF HIGHWAYS - ONTARIO			
PLANNING & DESIGN BRANCH			
DISTRICT No 13			
PROPOSED CROSSING			
AT			
SOUTH RIVER			
AND			
TOWNSHIP ROAD			
NIPISSING			
LOT 13 CON. X.			
TOWNSHIP OF NIPISSING		DISTRICT OF PARRY SOUND	
BRIDGE SITE			
SURVEY BY		APPROVED	
CHIEF OF PARTY - L. ELLIS		<i>Director of Planning &amp; Design</i>	
SUPERVISOR - K. O. PERSSON			
DRAWN BY		SCALE - AS SHOWN	
DRAFTSMAN - M. C. JONES		DATE OF SURVEY - APR. 1962	
SUPERVISOR - G. BROWN		DATE OF PLAN - JUNE 1962	
CHECKED BY		WONE 34-62-91 KINGNS	
DRAFTSMAN - M. C. JONES		PLAN - E-4180-1	
SUPERVISOR - G. BROWN			