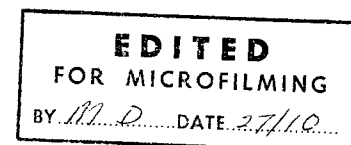


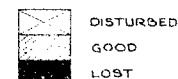
# 55-F-37  
Hwy. # 120  
SWAMP RIVER  
WEST OF  
SHEBANDOWAN



TL 129  
MATERIALS LABORATORY-DEPARTMENT OF HIGHWAYS - ONTARIO  
OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG CORE DRILL #1 JOB 55-F-37 HWY #120 AT SWAMP RIVER BORING NO. 1  
CASING BY (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM STA 515+78.23 LT DATE REPORT  
SAMPLER HAMMER WT 250 # DROP INCHES COMPILED BY B.H. CHECKED BY BORING DATE Oct 20 & 21 1955

SAMPLE CONDITION



SAMPLE TYPES

CS - CHUNK  
DO - DRIVE OPEN  
D.F. - DRIVE FOOT VALVE  
TO - THIN WALLED OPEN

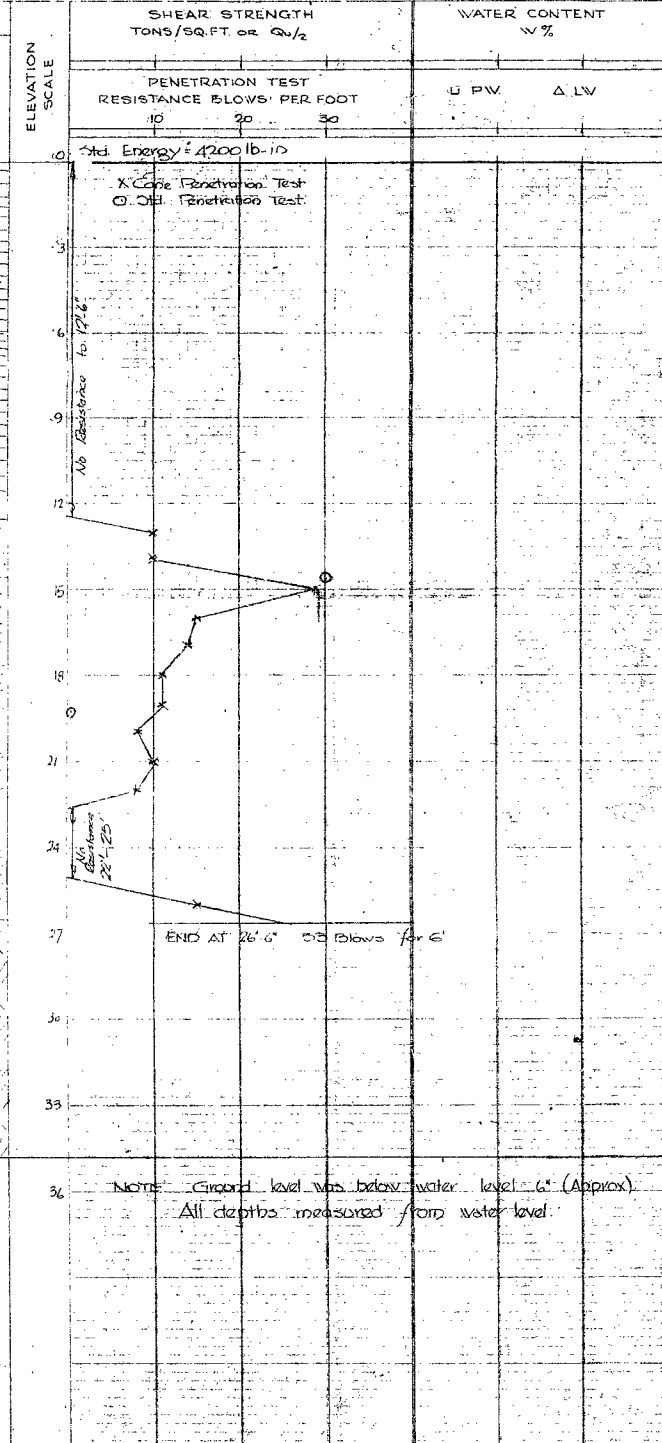
VS - WASHED SAMPLE  
RC - ROCK CORE

ABBREVIATIONS

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

SOIL PROFILE

ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT
1473.9		Swamp Surface	
1463.4		Very soft saturated brown silty clay muck with decayed organic material	
1461.4		Dark gray medium sand	
1441.4		Red Lira	



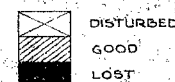
OTHER TESTS	CONDITION	TYPE	NO.	PENETRATION RESISTANCE	ELEV. RECOV.
	CS	1		4200 lb-in	1467.9
	DO	2	39 ft	100	1462.1
	DO	3	18 blows 30"	76	1457.9
	DO	4	28 blows 18"	100	1453.9
	RC	6	Run #1	3' 6" broken rock core recovered	1443.9
	RC	6	Run #2	1 ft broken core recovered	

NOTE: Ground level was below water level 6" (Approx).  
All depths measured from water level.

TL 129  
MATERIALS LABORATORY-DEPARTMENT OF HIGHWAYS - ONTARIO  
OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG CORE DRILL #1 JOB 55-F-37 HWY #120 AT SWAMP RIVER BORING NO. 2  
CASING BY (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM STA 515+78.23 LT DATE REPORT  
SAMPLER HAMMER WT 250 # DROP INCHES COMPILED BY B.H. CHECKED BY BORING DATE Oct 21 & 22 1955

SAMPLE CONDITION



SAMPLE TYPES

CS - CHUNK  
DO - DRIVE OPEN  
D.F. - DRIVE FOOT VALVE  
TO - THIN WALLED OPEN

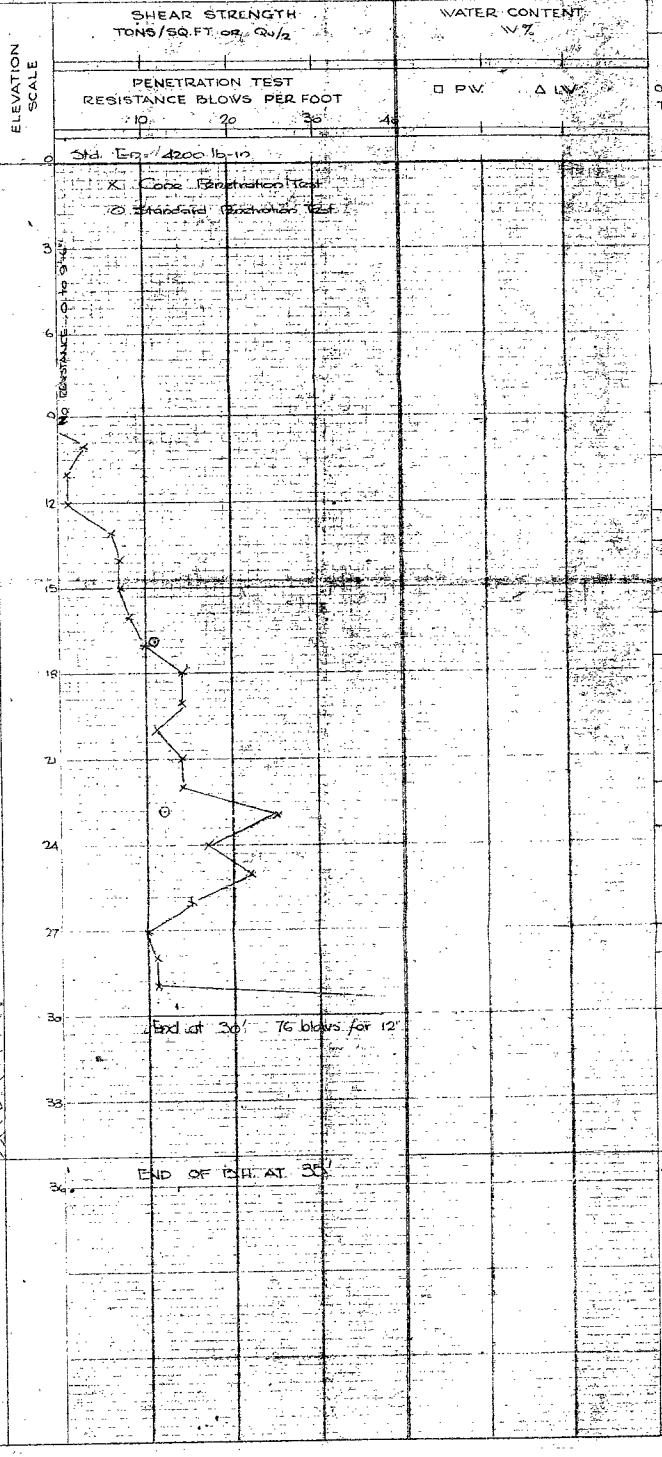
VS - WASHED SAMPLE  
RC - ROCK CORE

ABBREVIATIONS

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

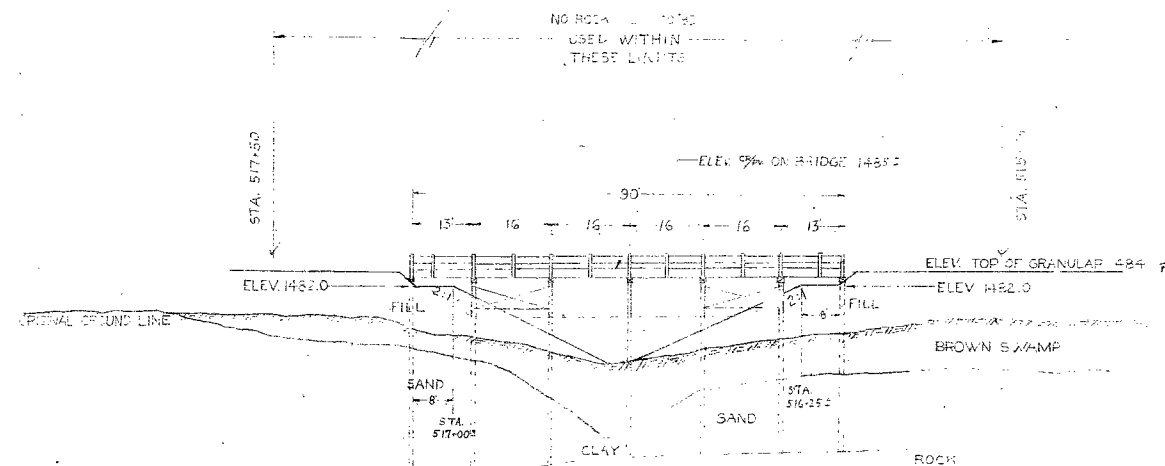
SOIL PROFILE

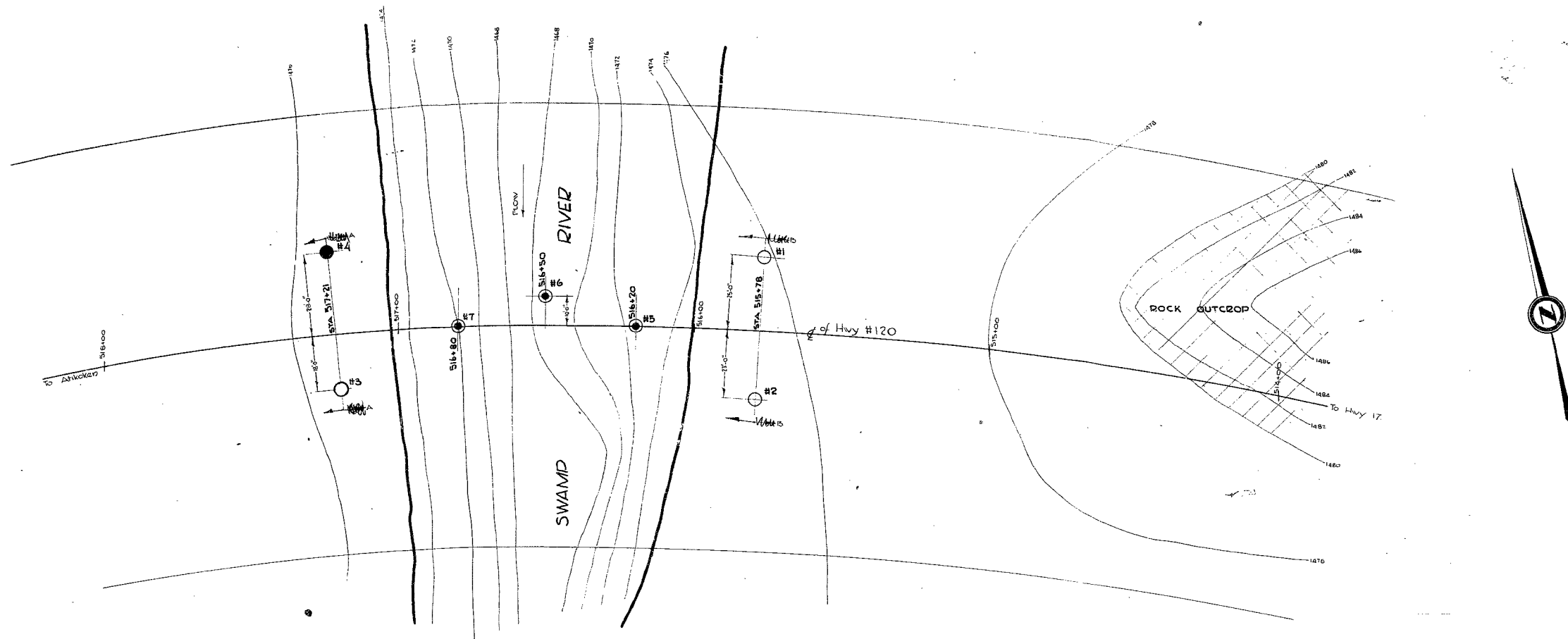
ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT
1473.9		Swamp Surface	
1463.9		VERY SOFT SATURATED BROWN SILTY CLAY MUCK WITH DECAYED ORGANIC MATERIAL	
1463.9		DARK GRAY MEDIUM SAND	
1446.4		RED ROCK	



OTHER TESTS	CONDITION	TYPE	NO.	PENETRATION RESISTANCE	ELEV. RECOV.
	CS	1		4200 lb-in	1467.9
	DO	2	39 ft	100	1463.4
	DO	3	18 blows 30"	76	1457.9
	DO	4	28 blows 18"	100	1453.9
	VS	5			1448.9
	RC	6	Run #1	3' 6" broken rock core recovered	1443.9

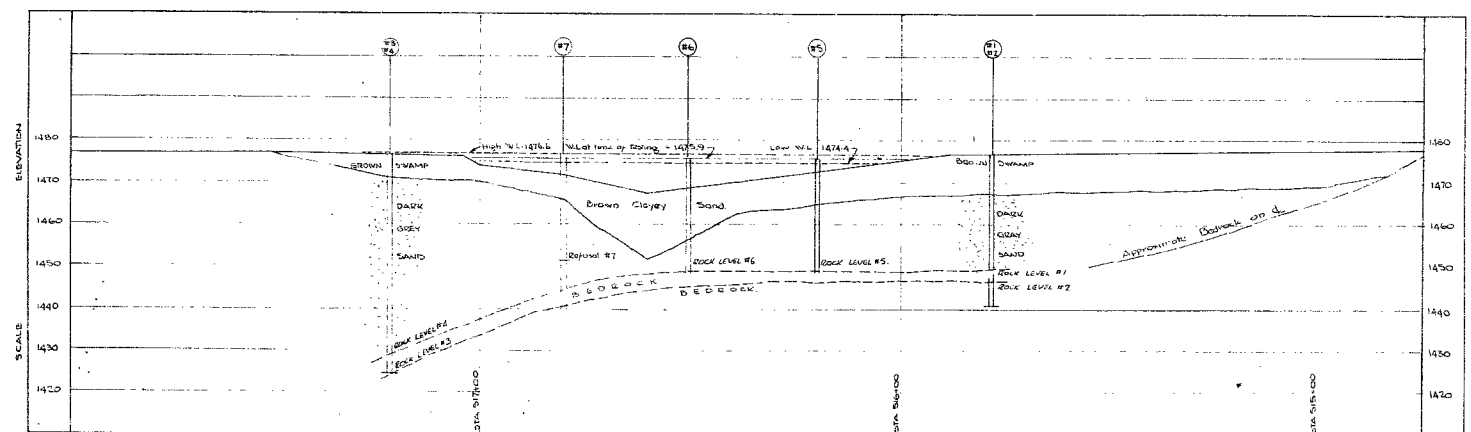
DRILL RIG CORP. DRILL #1 JOB 55-P ST HWY 120 AT SWAMP OVER BORING NO. 3  
CASING 1 3/4" (STANDARD SAMPLERS TO FIT UNLESS NOTED) DATUM 4524 5174.21 18" LT. DATE REPORT  
SAMPLER HAMMER WT. 250 # DROP 10 INCHES COMPILED BY B.H. CHECKED BY BORING DATE OCT 24-27, 1955

[illegible][illegible]



**PLAN**

Scale 1 inch = 20 feet

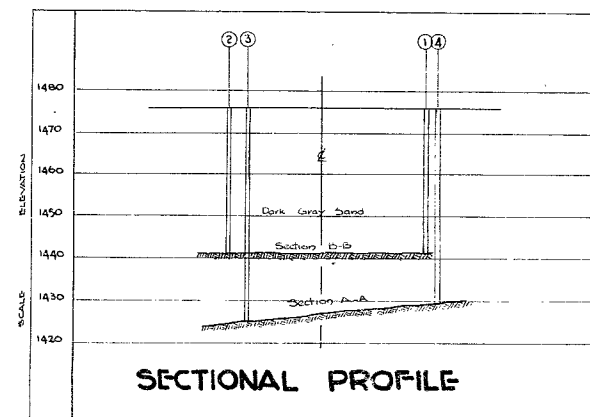


**PROFILE**

Scale Hor & Vert 1 inch = 20 feet

**-LEGEND-**

- Borehole / Penetration
- Penetration only
- ⊙ Water jetted hole



**SECTIONAL PROFILE**

E 2977 - 2/3  
F 3595 - 31  
120A-B

REVISIONS		
NO.	FOR	DATE

DEPARTMENT OF HIGHWAYS-ONTARIO- BRIDGE OFFICE-TORONTO			
<b>PROPOSED BRIDGE OVER</b>			
<b>THE SWAMP RIVER</b>			
THE KING'S HIGHWAY No. 120		DIV. No.	
CO. DISTRICT OF THUNDER BAY			
TWP. CONA-CHEZ	LOT	CON.	
APPROVED			
CHIEF BRIDGE ENGINEER		CHIEF ENGINEER	
DESIGN	CHECK	CONTRACT NUMBERS	
DRAWING	CHECK	LOADING	
TRACING	CHECK	DRAWING NUMBER	F 55- 37A
DATE	JAN 10 1956		

REVISIONS	DATE	BY	DESCRIPTION

COPY

For the Information of:

Mr. F.C. Brownridge

Design Office, 1173 Bay Street,  
Toronto, January 14, 1957.

MEMORANDUM TO-

Mr. H. Tregaskes,  
Construction Engineer,  
Room 2608, Dept. of Highways,  
BUILDINGS.

Re: Swamp River Bridge, Shebandowan 55-F-37  
W.P. 668-56, Highway No. 120

The Bridge Office have decided to construct a 90-foot structure with piles driven to bedrock. It is felt that the swamp material must be completely removed in order to

- (1) eliminate lateral thrust on the piles due to the approach fills
- (2) to provide adequate lateral support to the piles especially at the center of the stream where depth of mineral soil over bedrock is very shallow.

The suggested methods of construction are:

- (1) Beginning at Station 515/75, excavate the swamp material and backfill with granular material. This operation is to continue across the river to Station 517/50.
- (2) Excavate and backfill from each end to the center of the river and facilitate removal of the center portion of swamp material by the use of dynamite.

In both cases the river channel would then be excavated to proper section. If the flow of the water in the river is not too great, corrugated iron pipes could be used while backfilling across the river. If the swamp material will not displace completely during excavating and backfilling operations, the use of dynamite may also be required.

/Cont'd...

AR

Mr. H. Tregaskes

It is emphasized that all of the swamp material is to be removed between Station 515/75 to 517/50.

It would be preferable to perform this work before the bridge contract is called. Could this work be done by the present grading contractor at reasonable prices? If not, kindly advise so that this work may be incorporated in the bridge contract.

J. WALTER  
Design Engineer

JW/ey

c.c. Mr. F.C. Brownridge,  
Mr. John Garland.

REPORT OF FOUNDATION INVESTIGATION

BRIDGE AT SWAMP RIVER ON

HIGHWAY # 120

STICOWAN TO JUNCTION HWY. #17

Copies to:

Mr. A. Loye, Bridge Engineer (2)

Mr. H. Tregaskes, Const. Engineer (1)

Mr. J. Walter, Design Engineer (1)

Mr. J. Garland, Dist Engineer, (1)  
Fort William, Ontario

Mr. G. Parantatos (1)

File (1)

E 2977 - 2/3

F 3595 - 31

120A - 8

Project 55-F-37

## I N D E X

	Page
INTRODUCTION	1
SITE CONDITIONS	1
PROCEDURE	1
SOIL CONDITIONS	2
WATER CONDITIONS	2
<u>ANALYSIS OF TEST RESULTS AND DISCUSSION</u>	<u>2, 3</u>
CONCLUSION	3



### INTRODUCTION:

Highway #120 is being revised along the old section leading from the junction with Highway #17, and a new bridge will be required at the Swamp River.

An investigation of the subsoil at the bridge site was made to determine the soil characteristics and the best type of foundation for the bridge.

### SITE CONDITIONS:

The bridge site is located about 1,000 ft. upstream of the existing bridge and about 3,000 ft. from where the river empties into Lake Shebandowan.

The current is very slow and from the available information would not be subject to more than 1 to 2 ft. of increase in level in time of flood.

The surrounding land is swampy and low with an outcrop of rock leading into a ridge 150 ft. from the east bank. In the west the swamp extended for 1,500 ft.

### PROCEDURE:

Two dynamic penetration tests and two boreholes were made on the east bank of the river and two dynamic penetration tests and a single borehole were made on the west bank. In addition to these, three water jetted holes were made in the river at the quarter points on the centre line so as to determine a profile of the bedrock.

The surface of the swamp was too soft to support the drill so a timber cribbing road was constructed across the swamp to the drill sites, and the drill was winched along on it. Log piers were constructed to support the tripod.

Sampling of the soil was made difficult by the soft nature of the soil but good recoveries were made for classification purposes.

The location of the boreholes are shown on drawing F-55-37A.

The logs of the boreholes and dynamic penetration tests are found in Appendix I.

SOIL CONDITIONS:

Very soft swampy material consisting of saturated brown silty clay muck with a high content of organic material was found to overlay a bed of medium dark gray sand. On the west bank the swampy material was about 4 ft. thick but on the east it extended to a depth of 12 ft.

The sand was very loose and on the west bank particularly, it was in a quick condition.

Underlying the sand, bedrock was found at an elevation of 1446 to 1449 on the east bank to 1426 to 1429 on the west bank. The rock sloped to the south west.

WATER CONDITIONS:

The water level in the boreholes at all times remained equal to the water level in the river and the surrounding swamp.

ANALYSIS OF TEST RESULTS AND DISCUSSION:

The swampy muck near the surface has no bearing capacity at all.

Except for a layer immediately below the swampy material the gray medium sand is very loose with a standard penetration resistance of less than 1 blow per foot at a standard energy of 4200 lb. in. Its bearing capacity is therefore negligible and a piled foundation would be necessary.

Piles should be driven to bedrock for end bearing and little difficulty should be experienced in driving them to this level.

The difference between high and low water level is very small and scour of the river bed would be slight in time of high water.

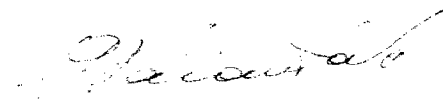
If timber piles are used a suitable type of steel driving shoe should be fitted to the point as a precaution against crushing of the piles and damage to the point during driving.

CONCLUSION:

The subsoil material is soft and has a poor bearing capacity. A piled foundation for the bridge is therefore necessary.

Piles should be driven to bedrock. The bedrock profile is indicated on drawing F55-37A. It's elevation varies from 1446 to 1449 on the east bank to 1426 to 1429 on the west bank with a general dip to the south east.

The piles, if timber, should be protected against crushing and damage during driving with a suitable form of steel driving shoe.

  
S. Parantatos  
Foundation Engineer.

APPENDIX I

RESULTS OF WATER JETTED TESTS  
IN THE RIVER AND OF A ART RIVER

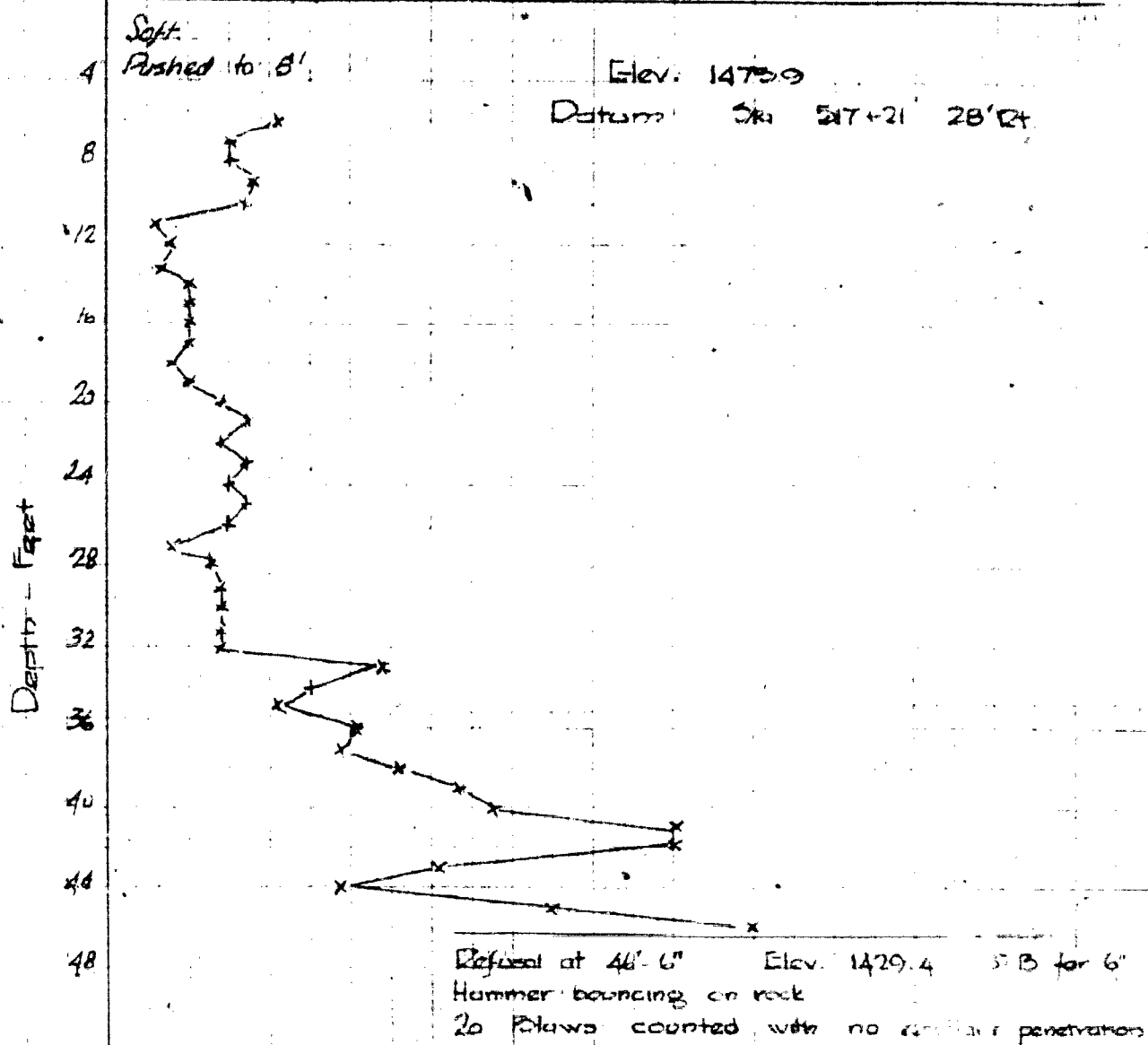
<u>Hole#</u>	<u>Datum</u>	<u>Results</u>
5	St. 516/20 G	Rock Elev. 1449
6	St. 516/50 Rt. 10 ft.	Rock Elev. 1448
7	St. 516/80 G	Stopped at 1453

Water level at time of test 1475.9

Holes #5 and 6 were stopped on solid material which was probably  
red rock. Hole #7 was abandoned at 23 ft. after rods became  
jammed in sand.

## GRAPH OF CONE PENETRATION TEST

No. of Blows at Std. En = 4200 lb-in.  
 20 40 60 80



Prepared by BH

Oct 27, 1955