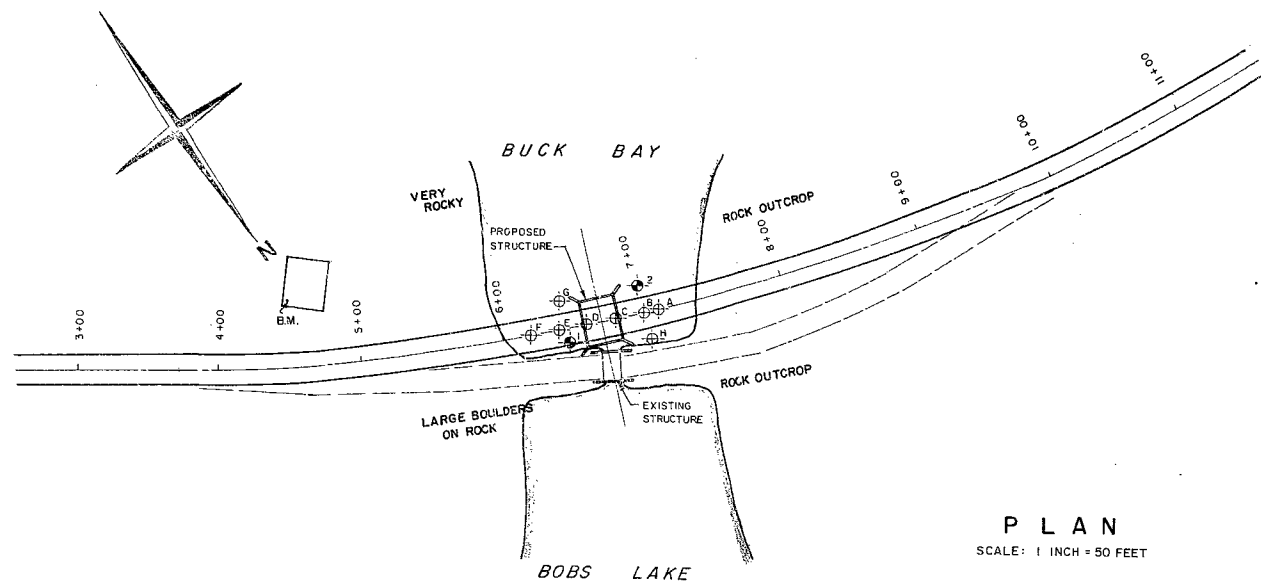
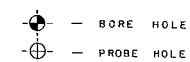


65-F-271M
BUCK BAY &
BOB'S LAKE

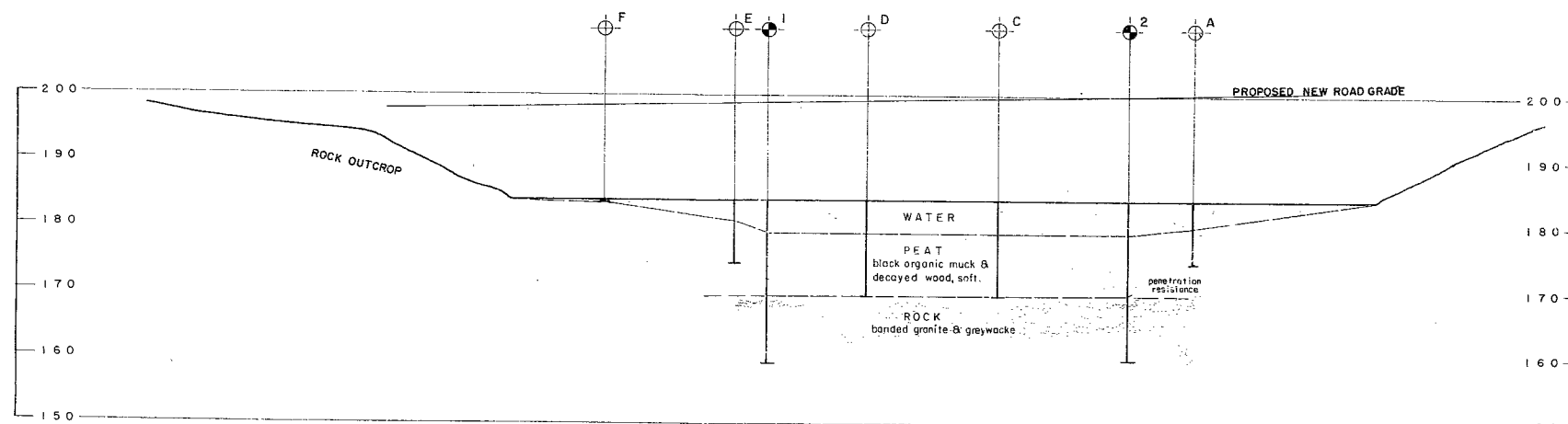


LEGEND

HOLE NO.	ELEVATION	STATION	OFFSET	Water Depth	Refusal	Comments
1	184.0	6+45	10' RT.			
2	184.0	7+00	20' LT.			
A	184.0	7+10	0'	4'	174.5	probable bedrock
B	184.0	7+00	0'	5'	171.0	..
C	184.0	6+60	0'	5'	169.5	..
D	184.0	6+60	0'	5'	169.5	..
E	184.0	6+40	0'	3'	174.5	..
F	184.0	6+20	0'	0.1'	183.9	boulders
G	184.0	6+45	20' LT.	5.5'	168.5	prob. bedrock
H	184.0	7+00	20' RT.	5'	177.0	rock fill



BENCH MARK EL. 200.0
Top of Fdn. N.E. corner of barn
43' Lt. Sta. 3+73.



NOTE

Samples will be kept for 3 months from the date of this report unless otherwise directed.

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.

William A. Trow & Associates Ltd.
FOUNDATION INVESTIGATION

**PROPOSED BRIDGE REPLACEMENT
BUCK BAY**

CO. OF FRONTENAC ONTARIO

PROJ. 1786 DATE FEB. 1965 DWG. No. 1

1850 Jane Street
Weston, Ontario
241-4644

William A. Trow
BA 3012

Project: J1786

Soil Mechanics
Consultants
W. A. Trow
MSc. MEIC. P. Eng.
K. Peaker
PhD. MEIC. P. Eng.
D. H. Shields
PhD. MEIC. P. Eng.



Associates Ltd.

J.D. Lee and Company Limited,
Consulting Engineers,
194 Ontario Street,
Kingston, Ontario.

February 11, 1965

65-F-2711

Attention: Mr. J.D. Lee, P.Eng.

STRUCTURE SITE No. 7-89

Re:

Foundation Investigation
Proposed Buck Bay Bridge Replacement
County of Frontenac, Ontario

Dear Sirs:

In conformance with your authorization of December 22, 1964, we have carried out an investigation of the soil conditions at the site of the proposed bridge replacement outlined above. In view of the straightforward nature of the conditions indicated by two sampled borings and 8 probes carried out in mid January, we take the liberty to present our report to you in brief, letter form.

PROJECT

It is proposed to replace the existing concrete culvert, which serves as an equalizer between Bucks Bay and Bob's Lake, with a new rigid frame structure of 20 feet span. A new road alignment will be incorporated in the replacement program and the new structure will be built a few feet south of the existing culvert.

FIELD PROGRAM AND SOIL CONDITIONS

The locations of the two sampled borings and 8 probes put down at this site are shown on Dwg. 1. A description of the soil conditions at each of the borings is contained in the logs, Dwgs. 2 and 3. The results of the probes are tabled on Dwg. 1. The information contained in Dwgs. 2 and 3 has been used to make up the estimated subsoil profile of Dwg. 1.

FOUNDATION CONSIDERATIONS

Because of the limited depth to bedrock and the soft compressible nature of the organic soil above, it is recommended that the bridge be supported on the rock. Either short piling of any type can be used or piers can be extended down to rock level. In the latter event, the area of the pier would have to be sheeted, the peat excavated and concrete placed by tremie or Prepakt methods.

If piling is used, the capacity of the piles driven to refusal on the rock will equal their structural capacity considered as a column with no fixity on the rock.

APPROACH EMBANKMENTS

Because of the compressible nature of the black organic peat found at this site, this material must be removed from under any approach fills. If it is not removed, experience has shown that this material will compress indefinitely. This would result in continued maintenance where the approaches join the new structure which will be founded on rock.

The peat should be removed preferably with a dragline working from the crest of the new fill as it progresses across the site. If the peat is removed in this fashion, there will not be a very large hole opened up at any one time and there should be no danger of the old road slipping into the void.

A less satisfactory alternative would be to advance the fill with a v-shaped front. The fill would have to be surcharged by about 5 feet of material, over that actually required for the roadway, to force as much peat as possible out from under the front of the fill. Because of the proximity of the existing roadway and the fairly high shear strength (for peat) of the lower levels of the muck, this method would only be suitable with carefully controlled blasting of the intact peat. Charges would have to be set so that the existing road is not endangered and remoulding of the peat is accomplished. With adequate disturbance to the peat, its shear strength will be only a fraction - probably $1/3$ - of that in its intact state. This would lead to more thorough displacement of the peat by the approach fills. Any pockets of trapped peat could lead to serious differential movements so that good control over this part of the project is essential. Because of the proximity of the existing road fill it will be very difficult to prevent the organic soil from becoming trapped between the old and the new roadways.

With either construction procedure, rock should be used for the lower levels of the fill. The rock will permit any small amount of peat that may remain to squeeze up into the voids and not influence the new roadway.

We trust that the foregoing comments will enable you to proceed with the design of this structure. Should you require any additional information, we would be pleased to hear from you.

Yours very truly,

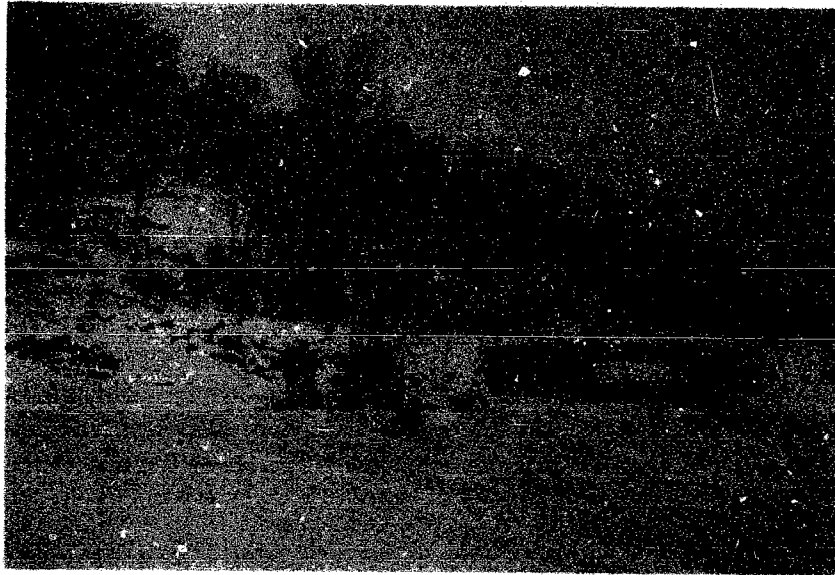


D.H. Shields, P.Eng.

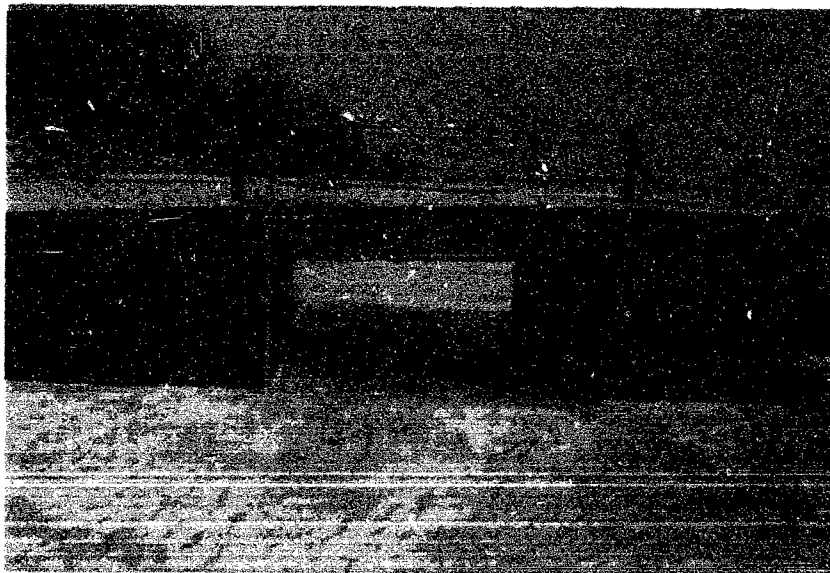
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J1786

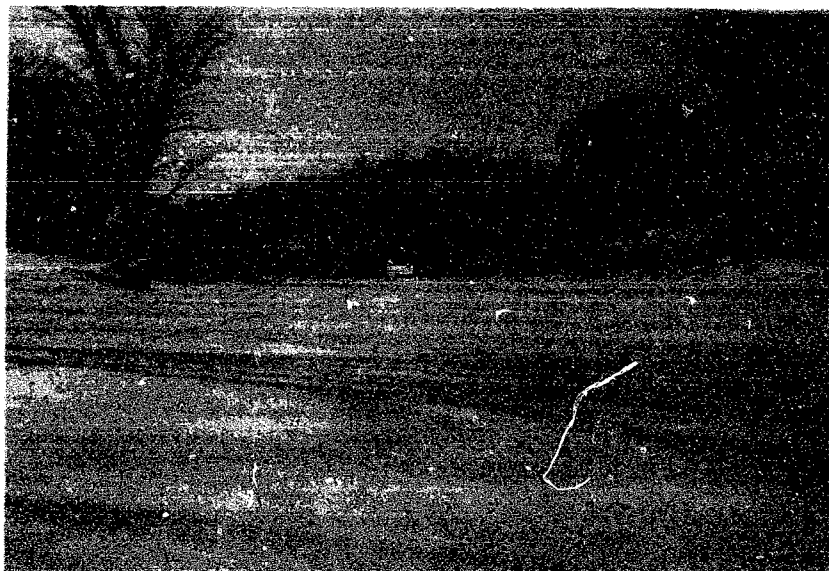
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Looking North
Drill on Borehole 2



South Face
of Bridge

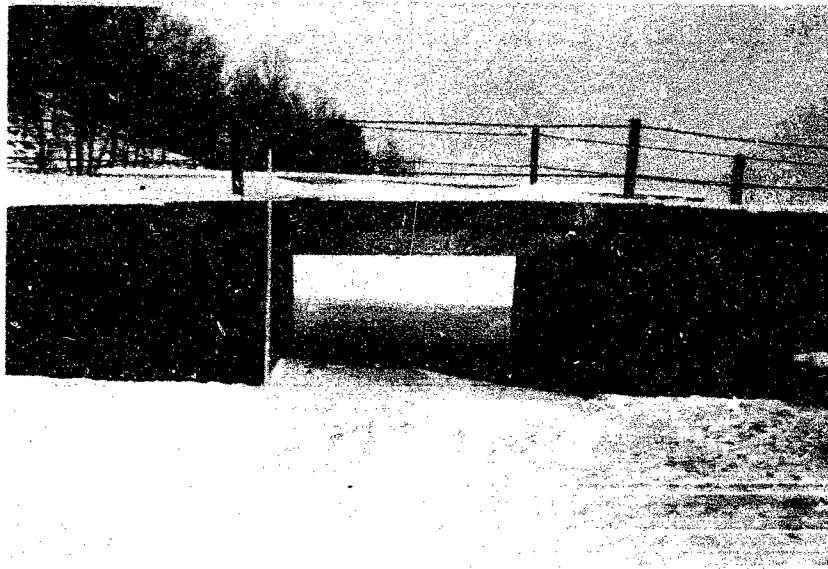


Bridge Looking
South

SUPER IMPOSED DOCUMENT MAY
APPEAR AS MULTI-FEED ON FILM.



Looking North
Drill on Forehole 2



South Face
of Bridge



Bridge Looking
South

SITE INVESTIGATIONS -- SOIL MECHANICS CONSULTATION

DRAWING NO. 2
PROJECT NO. J1786.

PENETRATION RESISTANCE

2" O.D. SPLIT TUBE —○—○—○—
2" I.D. SHELBY TUBE * * * * *
2" DIA. CONE —————

SHEAR STRENGTH

**UNDRAINED TRIAXIAL
AT OVERBURDEN PRESSURE**

UNCONFINED COMPRESSION

VANE TEST AND SENSITIVITY (S)

NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX

ATTERBERG LIMITS

LIQUID LIMIT

PLASTIC LIMIT

SAMPLE TYPE

2" O.D. SPLIT TUBE

2" I.D. SHELBY TUBE

3" O.D. SHELBY TUBE

BOREHOLE No. 1.

PROJECT Bridge Replacement.

LOCATION Bucks Bay, County of Frontenac.

HOLE LOCATION _____ See Dwg. 1.

HOLE ELEVATION 184.0 ft.

DATUM See Dwg. 1.

SYMBOL	SOIL DESCRIPTION	ELEV FEET	DEPTH FEET	PENETRATION RESISTANCE				350 FT. LB. BLOWS/FT.	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT	SAMPLE TYPE AND NO.	NATURAL UNIT WEIGHT P.C.F.
				20	40	60	80				
				SHEAR STRENGTH							
		184.0	0	100	200	300	400				
	Ice Surface										
	WATER	179.									
~ ~	PEAT-black organic muck and decayed										
~ ~			10					12.0			
~ -	wood, very soft.							7.7			
~		169.3									
	ROCK-banded granite and greywacke.		20								
	End of Hole	159.3									
			30								
			40								
Notes:	1) Conventional wash boring, holes cased to rock level.										
	2) 100% core recovery when drilling in bedrock.										




WILLIAM A. TROW & ASSOCIATES LTD.

SITE INVESTIGATIONS SOIL MECHANICS CONSULTATION




DRAWING NO. 3.
PROJECT NO. J1786.


LEGEND

PENETRATION RESISTANCE

2" O.D. SPLIT TUBE 
2" I.D. SHELBY TUBE 
2" DIA. CONE 

SHEAR STRENGTH




UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE 
UNCONFINED COMPRESSION 
VANE TEST AND SENSITIVITY (S) 

NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX 


ATTERBERG LIMITS

LIQUID LIMIT 
PLASTIC LIMIT 

SAMPLE TYPE

2" O.D. SPLIT TUBE 
2" I.D. SHELBY TUBE 
3" O.D. SHELBY TUBE 

BOREHOLE NO. 2.
PROJECT Bridge Replacement.
LOCATION Bucks Bay, County of Frontenac.
HOLE LOCATION See Dwg. 1.
HOLE ELEVATION 184.0 ft.
DATUM See Dwg. 1.

SYMBOL	SOIL DESCRIPTION	ELEV. FEET	DEPTH FEET	PENETRATION RESISTANCE				350 FT. LB. BLOWS/FT.	NATURAL MOISTURE CONTENT AND ATTERBERG LIMITS % DRY WEIGHT	SAMPLE TYPE AND NO	NATURAL UNIT WEIGHT P.C.F.
				20	40	60	80				
				SHEAR STRENGTH P.S.F.							
				100	200	300	400				
	Ice Surface	184.0	0								
	WATER-										
		179.									
~ ~ ~ ~ ~	PEAT-black organic muck and decayed										
	wood, very soft.		10								
		169.8									
	ROCK-banded granite and greywacke.		20								
	End of Hole	159.8									
Notes:	1) Conventional wash boring, hole cased to rock level.		30								
	2) 100% core recovery when drilling in bedrock.		40								