

e. m. peto associates ltd., 850 roselawn avenue, Toronto 10, Ontario

Job No. 5784

Client's Ref. No.

Date August 7th, 1957

Report on

31 F - 84

GEOCREs No.

SOIL SITE INVESTIGATIONS

TWO PROPOSED NEW BRIDGE SITES

HIGHWAY 62 - MADAWASKA RIVER CROSSING

near

COMBERBURY, ONTARIO

for

DEPARTMENT OF HIGHWAYS OF ONTARIO

TERMS OF REFERENCE:

We were retained, by a letter from Mr. J. O. McAllister dated June 27th, 1957, to perform a preliminary soils investigation at the two proposed river crossings, designated as line "A" and line "B". The purpose of this investigation was to ascertain accurately the soil conditions, and to determine, strictly from a soils point of view, which was the better of the two proposed bridge sites.

Seven boreholes in all were to be driven, at locations suggested by the D.H.O. bridge engineers. There were 4 holes along the centre line of the proposed structure at site number 1, and 3 holes immediately South of the existing bridge along the centre line at site number 2.

The work was to be performed in our standard manner, by driving and cleaning BX casing and sampling ahead at 5 ft. intervals or less with a 2" split spoon sampler. Standard penetration results were to be recorded throughout, and bedrock was to be proven at any points where refusal was encountered. Any other auxiliary information which could prove useful in the foundation design for the new bridge structure was also to be obtained.

METHOD OF OPERATIONS:

The work was performed by our number 1 unit, a skid-mounted Sullivan "12" drill rig with A-frame, which was trucked to the site from our yard in Toronto on July 5th, 1957. Work commenced on July 6th and was completed on July 24th. The equipment was trucked back to Toronto on July 25th. Since only 2 of the holes, namely boreholes 1 and 4, were performed on land a large sturdy raft had to be built by our crew on the site in order that the over water drilling could be efficiently performed. The above stated working times include both the construction and dismantling of the raft.

METHOD OF OPERATIONS: (Cont'd)

The 7 boreholes were performed at locations as shown on the site plan attached at the rear of this report. They were all performed in our standard manner, and only standard split spoon samples or wash samples were taken, as soil conditions did not warrant taking Shelby tube samples, vane tests, rock core drilling, etc.

All samples were carefully examined in our laboratory in Toronto and complete and detailed borehole logs were drawn up. These are included at the rear of this report. All samples will be retained for a period of at least 30 days, after which they will be discarded unless we are otherwise notified. All elevations shown on the borehole logs and mentioned in this report are referred to a D.H.O. bench mark on the site, which was referred to Geodetic datum. The bench mark was a cut mark in the South-East corner of the top of the concrete abutment at the extreme West side of the existing bridge, and its elevation was taken to be 935.14.

SITE AND GEOLOGY:

Generally hilly topography prevails at the bridge site. Unsorted sand and gravel deposits are frequently exposed throughout the area, but no bedrock is visible at all. This is undoubtedly a glaciated region which is characterized by very deep deposits of unsorted drift, with some moraines and drumlins.

The Madawaska River is the largest tributary of the Ottawa River, and drains an area of 3,300 sq. miles. The distance from the beginning of the Madawaska at Source Lake in Algonquin Park to the confluence with the Ottawa River at Arnprior is over 200 miles. A good majority of the course of the Madawaska River including the site under investigation lies in the Laurentian Shield, and the lower reaches of the river lie in the Ottawa valley lowland plain. The River has great volume and steep gradients at some points, making it a valuable source of hydro electric power. April and May are the months of highest flow, while September is usually the month of weakest flow. There are 8 large regulating dams and reservoirs on the Madawaska River system and 2 power plants in operation, but these are all below the bridge site at Combermere.

At the site itself the river is very wide and slow flowing. It is very shallow on the East side near hole number 4. It has very low banks in the vicinity of Combermere.

SITE AND GEOLOGY: (Cont'd)

The existing bridge is a light, wooden decked, single lane trussed structure, and is founded on five concrete piers and abutments protected by timber cribs.

SOIL CONDITIONS:

Although both proposed bridge sites are entirely underlain by deep deposits of sand with varying grain sizes and densities, there is no significant trend in the average penetration test values from one part of the site to the other, but only erratic variations.

The soil type encountered was a fine to medium to very coarse sand, heterogeneous in character, ranging in colour from bright yellowish-brown to brownish-grey to dark grey. Minor silt content was noted in the sand at various points throughout, and the coarser sand particles were almost entirely of igneous origin. The sand encountered at all the boreholes was generally of compact density. No particular increase of density in the sand was noticed with depth, except at one of the boreholes. No refusal was encountered at any of the test holes.

The following is a list of the average corrected standard penetration test results at each of the boreholes:

Borehole 1: 13 blows, borehole 2: 16 blows,
borehole 3: 21 blows, borehole 4: 14 blows,
borehole 5: 12 blows, borehole 6: 14 blows,
borehole 7: 16 blows.

Backing up of the sand in our driven casing, which is analogous to a quicking condition in an open excavation, was only noted at depths greater than 20 ft. in all of our boreholes. However, due to the relative densities in the natural state of the sand the void ratio is probably quite high and the critical depth at which quicking will occur is probably much less than 20 ft.

RECOMMENDATIONS AND CONCLUSIONS:

1. Basing judgment strictly on a careful study of the soil types encountered, it can be concluded due to the general similarity of conditions that there is no superiority of one site over the other. A great advantage at site no. 2 immediately South of the existing bridge is the shorter span, and the proximity to the present bridge will increase the efficiency of construction of the new bridge. However, there are certain non-technical considerations such as acquisition of right-of-way which are beyond the scope of this report.

RECOMMENDATIONS AND CONCLUSIONS: (Cont'd)

2. Regardless of which site is finally selected for the bridge, the design for each individual pier or abutment should be based on the results of the boreholes or holes closest to the proposed location. The design load for the foundations should consist of the full dead load, plus the pressure due to the weight of the footing, plus the maximum live load including wind and snow load that may ever reasonably be expected to act upon the footing at any one time. This value of live load should be used because most of the settlement of a footing on sand takes place as soon as the load is applied.
3. Should you contemplate using large spread footings whose least dimensions are limited to 10 feet, then in the vicinity of say boreholes 4 or 6, where the average penetration resistance below the footings is 14 blows, you must anticipate settlements of 4 inches under an imposed load (calculated as stated above) of 2.4 tons per sq. ft. Settlement will vary linearly with imposed load, i.e. a loading of 1.2 tons per sq. ft. should produce a settlement of 2 inches. Loadings in any case should not exceed 2.4 tons per sq. ft. in order that there be no bearing capacity failure.
4. If your design calls for raft foundations under the piers and abutments, with the rafts having a least dimension of 20 feet, then the recommended safe allowable soil pressure is 1.5 tons per sq. ft. and any settlements will be within tolerable limits. However, one serious drawback resulting from the use of spread footings or rafts is that they must be founded below the depth of potential scour, which we expect will be high, particularly at site no. 2 where there is a constriction in the river. The construction of the foundations under water and the excavation of sand of low relative density below the water table then becomes a major problem and the costs may be prohibitive.
5. In view of the water problem and the low relative density sand we would recommend that careful consideration be given to the use of piles, for example in the form of open pile bents to support the bridge structure. Although timber piles could be used if they remain permanently under water, we would recommend that you use either cast-in-place or precast tapered reinforced concrete piles driven to a standard of resistance determined by existing dynamic formulae. These piles will derive their support partly from side friction and partly from end-bearing.

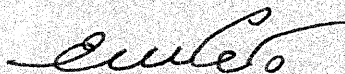
RECOMMENDATIONS AND CONCLUSIONS: (Cont'd)

5. (Cont'd) An important feature of driven piles is that the soil displacement caused by the piles and the vibrations during driving tend to compact the sand appreciably, and the sand so compacted will become a much better supporting material. If the bridge is to rest on pile footings, then the innermost piles in each group or cluster should be driven first to achieve the maximum and most uniform compaction beneath the location of each bridge support.

The use of piles could well prove to be the most economical alternative on this site. Piles under the abutments on each bank could be driven quite simply from dry land with no complications. If there are any lateral thrusts to be resisted batter piles would provide the most effective means of providing such resistance.

6. Regardless of which type of foundation is finally selected, but particularly if piles are used, we strongly recommend that protection against scour and ice be provided by the construction of rock-filled timber cribs around each pier and abutment. These should preferably have a prow facing upstream and should be of such a construction that a number of timber piles are driven at least 15 feet into the sand. The cribbing should extend above the water in order that it may also serve as protection against ice. Ice occasionally creates dangerous uplift pressures on piles.

E. M. PETO ASSOCIATES LTD.,



E. M. Peto, P. Eng.

MM:sb

e. m. peto associates ltd.
SOIL ENGINEERING SERVICE - TORONTO, ONTARIO
BOREHOLE LOG

Job Name Madawaska River Bridge, Job No. 5784 Borehole No. 1
Site No. 1
Client Dept. of Highways of Ontario Casing BX (2-1/2" diam.) Boring Date July 10th - 17th, 1957.
Datum Geodetic Compiled By M.M. Checked By E.M.P.

SAMPLE CONDITION

- ☒ UNDISTURBED
☒ FAIR
☒ DISTURBED
☒ LOST

SAMPLE TYPE

- S.S. 2" STANDARD SPLIT TUBE SAMPLE
S.L. SPLIT BARREL WITH LINERS
S.T. THIN-WALLED SHELBY TUBE SAMPLE
W.S. WASH SAMPLE
R.C. ROCK CORE

ABBREVIATIONS

- V.T. IN SITU VANE SHEAR TEST
Q_u UNCONFINED COMPRESSIVE STRENGTH
W.L. WATER LEVEL IN CASING
W.T. GROUND WATER TABLE IN SOIL

SOIL DESCRIPTION	COLOR	Density or Consistency	Depth Elevation	Legend	Sample No and Condition	Sample Type	No of Blows per Ft	WATER LEVELS, SOIL MOISTURE & REMARKS
ORGANIC SILTY AND SANDY TOPSOIL			0' 0" 931.5					
FINE TO MEDIUM SAND	YELLOWISH-RED	LOOSE			1 <input checked="" type="checkbox"/>	S.S.	7	QUITE MOIST — <u>2</u> W.L.
AS ABOVE	"	"	5' 0"		2 <input checked="" type="checkbox"/>	S.S.	9	SATURATED
" "	YELLOWISH-BROWN	"	10' 0" 921.5		3 <input checked="" type="checkbox"/>	S.S.	5	"
VERY LOOSE BETWEEN 10' & 13'								
" "	LIGHT BROWN	LOOSE TO COMPACT	15' 0"		4 <input checked="" type="checkbox"/>	S.S.	11	"
FINE SAND	LIGHT GREY-BROWN	LOOSE	20' 0" 911.5		5 <input checked="" type="checkbox"/>	S.S.	8	
" "	"	LOOSE TO COMPACT	25' 0"		6 <input checked="" type="checkbox"/>	S.S.	11	
" "	BROWNISH-GREY	LOOSE	30' 0" 901.5		7 <input checked="" type="checkbox"/>	S.S.	10	
VERY FINE SAND, MINOR SILT CONTENT	DARK GREY	COMPACT	35' 0"		8 <input checked="" type="checkbox"/>	S.S.	12	
AS ABOVE	"	LOOSE	40' 0" 891.5		9 <input checked="" type="checkbox"/>	S.S.	8	
" "	GREY	COMPACT	45' 0"		10 <input checked="" type="checkbox"/>	S.S.	11	
VERY FINE SILTY SAND	DARK GREY	"	50' 0" 881.5		11 <input checked="" type="checkbox"/>	S.S.	12	

VERY FINE SAND, MINOR SILT CONTENT	DARK GREY	COMPACT	35' 0" 851.0	8	<input checked="" type="checkbox"/>	S.S.	12
AS ABOVE	"	LOOSE	40' 0" 891.5	9	<input checked="" type="checkbox"/>	S.S.	8
"	GREY	COMPACT	45' 0"	10	<input checked="" type="checkbox"/>	S.S.	11
VERY FINE SILTY SAND	DARK GREY	"	50' 0" 891.5	11	<input checked="" type="checkbox"/>	S.S.	12
AS ABOVE	"	LOOSE	55' 0"	12	<input checked="" type="checkbox"/>	S.S.	10
VERY FINE SAND, LAYERS OF SILT	"	COMPACT	60' 0" 871.5	13	<input checked="" type="checkbox"/>	S.S.	13
AS ABOVE	"	LOOSE	65' 0"	14	<input checked="" type="checkbox"/>	S.S.	8
VERY FINE SANDY SILT	GREY	COMPACT	68' 0" 863.5 70' 0"	15	<input checked="" type="checkbox"/>	S.S.	17
AS ABOVE	"	"	75' 0"	16	<input checked="" type="checkbox"/>	S.S.	19
"	"	"	80' 0" 851.5	17	<input checked="" type="checkbox"/>	S.S.	18
"	"	"	85' 0"	18	<input checked="" type="checkbox"/>	S.S.	20
"	"	"	90' 0" 841.5	19	<input checked="" type="checkbox"/>	S.S.	19
AS ABOVE	"	"	95' 0"				
"	"	"	100' 0" 831.5				
			105' 0" 821.5				

WASHED A-RODS DOWN
TO 105'.

HOLE TERMINATED.

NO REFUSAL.



e. m. peto associates ltd.

SOIL ENGINEERING SERVICE - TORONTO, ONTARIO

BOREHOLE LOG

Job Name Madawaska River Bridge, Job No. 5784 Borehole No. 2
 Client Site No. 1 Dept. of Highways of Ont. Casing BX (2-1/2" diam.) Boring Date July 12th - 13th, 1957
 Datum Geodetic Compiled By M.M. Checked By E. M. P.

SAMPLE CONDITION

 UNDISTURBED
 FAIR
 DISTURBED
 LOST

SAMPLE TYPE

S.S. 2" STANDARD SPLIT TUBE SAMPLE
 S.L. SPLIT BARREL WITH LINERS
 S.T. THIN-WALLED SHELBY TUBE SAMPLE
 W.S. WASH SAMPLE
 R.C. ROCK CORE

ABBREVIATIONS

V.T. IN SITU VANE SHEAR TEST
 Q/u UNCONFINED COMPRESSIVE STRENGTH
 W.L. WATER LEVEL IN CASING
 W.T. GROUND WATER TABLE IN SOIL

SOIL DESCRIPTION	COLOUR	Density & Consistency	Depth Elevation	Legend	Sample No. and Container	Sample Type	No. of Blows per Ft.	WATER LEVELS, SOIL MOISTURE & REMARKS
			0' 0" 929.0					RIVER WATER LEVEL
			13' 0" 916.0					RIVER BOTTOM
FINE TO MEDIUM SAND, SOME ORGANIC SILT	DARK BROWN	LOOSE	20' 0" 909.0			W.S.		
MEDIUM TO COARSE SAND, SOME SILT AND PEBBLE GRAVEL	DARK BROWN	LOOSE	25' 0"		2	S.S.	7 *	WITH TRAP VALVE IN BOTTOM OF SAMPLER
			30' 0" 899.0		3	S.S.	9 *	COARSE PARTICLES ARE ALL OF IGNEOUS ORIGIN.
FINE TO COARSE SAND	BROWN	LOOSE	35' 0"		4	S.S.	21 *	
AS ABOVE	"	COMPACT	40' 0" 889.0		5	S.S.	20 *	
FINE TO MEDIUM, SOME COARSE SAND	"	"	42' 0" 887.0					
FINE TO MEDIUM SAND	BROWNISH-BLACK	DENSE	45' 0"		6	S.S.	36	
FINE, SOME MEDIUM SAND	"	COMPACT	50' 0" 879.0		7	S.S.	21	

SAMPLE CONDITION		SAMPLE TYPE		ABBREVIATIONS			
UNDISTURBED	S.S. 2. STANDARD SPLIT TUBE SAMPLE	V. T.	IN SITU VANE SHEAR TEST				
FAIR	S.L. SPLIT BARREL WITH LINERS	Q/u	UNCONFINED COMPRESSIVE STRENGTH				
DISTURBED	S.T. THIN-WALLED SHELBY TUBE SAMPLE	W.L.	WATER LEVEL IN CASING				
LOST	W.S. WASH SAMPLE	W.T.	GROUND WATER TABLE IN SOIL				
	R.C. ROCK CORE						

SOIL DESCRIPTION	COLOUR	Density or Consistency	Depth Elevations	Legend	Sample No. and Condition	Sample Type	No. of Blows per Ft.	WATER LEVELS, SOIL MOISTURE & REMARKS
			0' 0" 829.0					▽ RIVER WATER LEVEL
			13' 0" 816.0					
FINE TO MEDIUM SAND, SOME ORGANIC SILT	DARK BROWN	LOOSE	20' 0" 809.0			W.S.		
			25' 0" 800.0		2	S.S.	7 *	WITH TRAP VALVE IN BOTTOM OF SAMPLER
MEDIUM TO COARSE SAND, SOME SILT AND PEBBLE GRAVEL	DARK BROWN	LOOSE	30' 0" 899.0		3	S.S.	9 *	COARSE PARTICLES ARE ALL OF IGNEOUS ORIGIN.
FINE TO COARSE SAND	BROWN	LOOSE	35' 0" 890.0		4	S.S.	21 *	
AS ABOVE	"	COMPACT	40' 0" 880.0		5	S.S.	20 *	
FINE TO MEDIUM, SOME COARSE SAND	"	"	42' 0" 887.0					
	BROWNISH-BLACK	DENSE	45' 0" 884.0		6	S.S.	36	
FINE TO MEDIUM SAND			50' 0" 879.0		7	S.S.	21	
FINE, SOME MEDIUM SAND	"	COMPACT	55' 0" 874.0		8	S.S.	21	
AS ABOVE	"	"						
								LOSING WASH WATER BELOW THE CASING
Excessive amounts of sand backing up inside casing made further progress impossible.	"	"	61' 0" 868.0		9	S.S.	23	
HOLE TERMINATED.								

BOREHOLE LOG

Borehole No. 3
Boring Date July 12th, 1957
Checked By E. M. P.

ABBREVIATIONS

Y. T. IN SITU VANE SHEAR TEST
Q/u UNCONFINED COMPRESSIVE STRENGTH
W. L. WATER LEVEL IN CASING
W. T. GROUND WATER TABLE IN SOIL





SOIL DESCRIPTION	COLOR	Density or Consistency	Depth Elevation	Legend	Sample No. and Condition	Sample Type	No. of Blows per Ft	WATER LEVELS, SOIL MOISTURE & REMARKS
			0'0" 925.0					RIVER WATER LEVEL
			30'0" 899.0					RIVER BOTTOM
ORGANIC SILT, WITH LAYERS OF MED AND COARSE SAND		LOOSE	35'0"					
			40'0" 889.0					
ORGANIC SILTY MEDIUM TO COARSE SAND	REDDISH-BROWN	COMPACT	45'0"	1	X	S.S.	23*	WITH TRAP VALVE IN BOTTOM OF SAMPLER.
			47'0" 882.0					
FINE TO COARSE SAND POSSIBLE MINOR SILT CONTENT	LIGHT REDDISH-BROWN	"	50'0"	2	X	S.S.	23*	
AS ABOVE	"	"	55'0"	3	X	S.S.	29*	
SOME PEBBLES UP TO $\frac{3}{16}$ "	BROWN	"	60'0" 865.0	4	X	S.S.	24*	
1 FT. LAYER OF GRAVEL			62'0"					
MED TO VERY COARSE SAND	MIXED COLOURS: WHITE, PINK, RED, BLACK, BROWN	COMPACT	65'0"	5	X	S.S.	21*	ALL COARSE PARTICLES ARE OF IGNEOUS ORIGIN
AS ABOVE	"	"	70'0" 853.0	6	X	S.S.	18*	

e. m. peto associates ltd.

SOIL ENGINEERING SERVICE - TORONTO, ONTARIO

BOREHOLE LOG

Job Name Madawaska River Bridge Job No. 5784 Borehole No. 4
 Client Site No. 1 Casing BX (2-1/2" diam) Boring Date July 6th - 9th, 1957
Dept. of Highways of Ont. Compiled By M.M. Checked By E.M.P.
 Datum Geodetic

SAMPLE CONDITION		SAMPLE TYPE		ABBREVIATIONS	
	UNDISTURBED	S.S.	2" STANDARD SPLIT TUBE SAMPLE	V.T.	IN SITU VANE SHEAR TEST
	FAIR	S.L.	SPLIT BARREL WITH LINERS	Q/u	UNCONFINED COMPRESSIVE STRENGTH
	DISTURBED	S.T.	THIN-WALLED SHELBY TUBE SAMPLE	W.L.	WATER LEVEL IN CASING
	LOST	W.S.	WASH SAMPLE	W.T.	GROUND WATER TABLE IN SOIL
		R.C.	ROCK CORE		

SOIL DESCRIPTION	COLOUR	Density or Consistency	Depth Elevation	Legend	Sample No. and Condition	Sample Type	No. of Blows per Ft.	WATER LEVELS, SOIL MOISTURE & REMARKS
			0' 0"					
			931.9					
FINE TO COARSE SAND, SOME ORGANIC SILT.	YELLOWISH- RED	VERY LOOSE V			1	S.S.	3	RIVER WATER LEVEL
			5' 0"					
LTLY FINE TO MED. SAND	YELLOWISH- BROWN	COMPACT			2	S.S.	13	VERY WET
			10' 0"					
			921.9		3	S.S.	10	SATURATED
FINE TO MEDIUM SAND, MINOR SILT CONTENT	BROWN	LOOSE						
			15' 0"					
MEDIUM TO COARSE SAND	"	"			4	S.S.	10	"
			20' 0"					
			911.9		5	S.S.	7	"
MEDIUM TO VERY COARSE SAND	"	"						
			25' 0"					
AS ABOVE	"	LOOSE TO COMPACT			6	S.S.	11	
								LOSING WATER BELOW CASING
			30' 0"					
			901.9		7	S.S.	8	
FINE TO COARSE SAND	LIGHT BROWN	LOOSE						
			35' 0"					
AS ABOVE	"	"			8	S.S.	8	
			40' 0"					
			891.9		9	S.S.	29	
					10	W.S.		
			45' 0"					
FINE TO MEDIUM SAND	BROWNISH- GREY	"			11	S.S.	19	
			47' 6"					
			884.4					
			50' 0"					
			881.9		12	S.S.	23*	WITH TRAP VALVE IN BOTTOM OF SAMPLER
FINE SAND	"	"						

SOIL DESCRIPTION	COLOR	Density or Consistency	Depth Elevation	Legend	Sample No. and Condition	Sample Type	No. of Blows per Ft.	WATER LEVELS, SOIL MOISTURE & REMARKS
			0' 0" 931.9					
FINE TO COARSE SAND, SOME ORGANIC SILT	YELLOWISH- RED	VERY LOOSE			1	S.S.	3	RIVER WATER LEVEL
			5' 0"		2	S.S.	13	VERY WET
FINE TO MEDIUM SAND, MINOR SILT CONTENT	BROWN	LOOSE	10' 0" 921.9		3	S.S.	10	SATURATED
			15' 0"		4	S.S.	10	"
MEDIUM TO COARSE SAND	"	"	20' 0" 911.9		5	S.S.	7	"
			25' 0"		6	S.S.	11	
AS ABOVE	"	LOOSE TO COMPACT						LOSING WATER BELOW CASING
FINE TO COARSE SAND	LIGHT BROWN	LOOSE	30' 0" 901.9		7	S.S.	8	
			35' 0"		8	S.S.	8	
	LIGHT GREY-BROWN	COMPACT	40' 0" 891.9		9	S.S.	29	
					10	W.S.		
			45' 0"		11	S.S.	19	
FINE TO MEDIUM SAND	BROWNISH- GREY	"	47' 6" 884.4					
			50' 0" 881.9		12	S.S.	23*	WITH TRAP VALVE IN BOTTOM OF SAMPLER.
			55' 0"		13	S.S.	11*	
	GREY	"						
VERY FINE SAND	"	"	60' 0" 871.9		14	S.S.	17*	
			65' 0"		15	S.S.	17*	
FINE SAND	"	"						
HARD PACKED SAND OR GRAVEL			69' 0" 862.9					HOLE TERMINATED

e. m. peto associates ltd.

SOIL ENGINEERING SERVICE - TORONTO, ONTARIO

BOREHOLE LOG

Job Name Madawaska River Bridge
 Site #2
 Client Department of Highways
 Datum Geodetic

Job No. 5784
 Casing (BX 2-1/2" diam)
 Compiled By M.M.

Borehole No. 5
 Boring Date July 18th - 19th, 1957
 Checked By E.M.P.

SAMPLE CONDITION

- ☒ UNDISTURBED
- ☒ FAIR
- ☒ DISTURBED
- ☒ LOST

SAMPLE TYPE

- S.S. 2" STANDARD SPLIT TUBE SAMPLE
- S.L. SPLIT BARREL WITH LINERS
- S.T. THIN-WALLED SHELBY TUBE SAMPLE
- W.S. WASH SAMPLE
- R.C. ROCK CORE

ABBREVIATIONS

- V.T. IN SITU VANE SHEAR TEST
- Q/u UNCONFINED COMPRESSIVE STRENGTH
- W.L. WATER LEVEL IN CASING
- W.T. GROUND WATER TABLE IN SOIL

SOIL DESCRIPTION	COLOUR	Density or Consistency	Depth Elevation	Legend	Sample No. and Condition	Sample Type	No. of Blows per Ft.	WATER LEVELS, SOIL MOISTURE & REMARKS
			0' 0"					▽ RIVER WATER LEVEL
			923.3					
			4' 0"					RIVER BOTTOM
			925.3					
ORGANIC SANDY SILT		VERY LOOSE	7' 0"					
			922.3					
MEDIUM TO COARSE SAND	YELLOWISH- POSSIBLE MINOR SILT CONTENT	PROBABLY LOOSE	10' 0"					
			915.3					
			15' 0"					
MEDIUM TO VERY COARSE SAND	MIXED COLOURS	LOOSE			2	<input checked="" type="checkbox"/> S.S.	9	
AS ABOVE, SOME FINE SAND	BROWN	"	20' 0"		3	<input checked="" type="checkbox"/> S.S.	10	
			909.3					
VERY LOOSE SAND STRATUM			21' AND 23'					
DROVE BX CASING WITH 2 BLOWS								
			25' 0"					SAND BACKING UP IN CASING
MEDIUM TO COARSE SAND, SOME FINE SAND AND SILT	BROWN	COMPACT			4	<input checked="" type="checkbox"/> S.S.	17	
			30' 0"					
AS ABOVE	"	"	899.3		5	<input checked="" type="checkbox"/> S.S.	14	
			35' 0"					
FINE TO COARSE SAND	GREYISH-BROWN	LOOSE			6	<input checked="" type="checkbox"/> S.S.	10	
			40' 0"					
FINE TO VERY COARSE SAND	BROWN & MIXED COLOURS	"	889.3		7	<input checked="" type="checkbox"/> S.S.	10	IGNEOUS PARTICLES UP TO 1/4" SIZE
			45' 0"					
MEDIUM TO COARSE SAND	"	"			8	<input checked="" type="checkbox"/> S.S.	7	
			50' 0"					
FINE TO MEDIUM SAND	LIGHT BROWNISH-GREY	"	879.3		9	<input checked="" type="checkbox"/> S.S.	7	

DEPTH	DESCRIPTION	COLOUR	TEST	LOG	REMARKS
15'0"	MEDIUM TO VERY COARSE SAND	MIXED COLOURS	LOOSE	2	S.S. 9
20'0"	AS ABOVE	BROWN	"	3	S.S. 10
21' AND 23'	VERY LOOSE SAND STRATUM BETWEEN DROVE BX CASING WITH 2 BLOWS.				
25'0"	MEDIUM TO COARSE SAND, BROWN	COMPACT		4	S.S. 17
30'0"	AS ABOVE	"	"	5	S.S. 14
35'0"	FINE TO COARSE SAND	GREYISH-BROWN	LOOSE	6	S.S. 10
40'0"	FINE TO VERY COARSE SAND	BROWN & MIXED COLOURS	"	7	S.S. 10
45'0"	MEDIUM TO COARSE SAND	"	"	8	S.S. 7
50'0"	FINE TO MEDIUM SAND	LIGHT BROWNISH-GREY	"	9	S.S. 7
55'0"	AS ABOVE	LIGHT GREY-BROWN	"	10	S.S. 9
60'0"	"	"	"	11	S.S. 6
65'0"	"	COMPACT	"	12	S.S. 13
70'0"	VERY FINE SAND	GREY	"	13	S.S. 15
75'0"	AS ABOVE	"	"	14	S.S. 18
80'0"	"	"	"	15	S.S. 20
85'0"	"	"	"	16	S.S. 21
86'0"	AS ABOVE	"	"		

WASHED A-RODS AHEAD TO 86'

HOLE TERMINATED

e. m. peto associates ltd.

SOIL ENGINEERING SERVICE - TORONTO, ONTARIO

BOREHOLE LOG

Job Name Madawaska River Bridge
 Site # 2
 Client Department of Highways
 Datum Geodetic

Job No. 5784
 Casing BX (2-1/2" diam.)
 Compiled By M.M.

Borehole No. 6
 Boring Date July 20th - 22nd, 1957.
 Checked By E.M.P.

SAMPLE CONDITION

SAMPLE TYPE

ABBREVIATIONS

 UNDISTURBED
 FAIR
 DISTURBED
 LOST

S. S. 2" STANDARD SPLIT TUBE SAMPLE
 S. L. SPLIT BARREL WITH LINERS
 S. T. THIN-WALLED SHELBY TUBE SAMPLE
 W. S. WASH SAMPLE
 R. C. ROCK CORE

V. T. IN SITU VANE SHEAR TEST
 Q/u UNCONFINED COMPRESSIVE STRENGTH
 W. L. WATER LEVEL IN CASING
 W. T. GROUND WATER TABLE IN SOIL

SOIL DESCRIPTION	COLOUR	Density or Consistency	Depth Elevation	Legend	Sample No. and Condition	Sample Type	No. of Blows per Ft.	WATER LEVELS, SOIL MOISTURE & REMARKS
			0'0"					▽ RIVER WATER LEVEL
			929.3					
			5'0"					— RIVER BOTTOM
			924.3					
ORGANIC SILTY SAND	GREY	LOOSE	9'0"					
FINE TO COARSE SAND, SOME ORGANIC SILT CONTENT	BROWNISH-GREY	PROBABLY LOOSE	15'0"		1	W.S.		
AS ABOVE	GREY-BROWN	VERY LOOSE			2	S.S.	1	SATURATED
FINE TO COARSE SAND	LIGHT GREY	" "	20'0"		3	S.S.	2	"
			909.3					
AS ABOVE	"	LOOSE	25'0"		4	S.S.	5	"
MEDIUM TO COARSE SAND	LIGHT REDDISH-BROWN	"	30'0"		5	S.S.	9	"
			899.3					
SILTY FINE SAND WITH NUMEROUS PEBBLES TO 1/2" SIZE	GREY-BROWN	COMPACT	35'0"		6	S.S.	17	
SILTY MEDIUM TO VERY COARSE SAND	MIXED COLOURS	"	40'0"		7	S.S.	14	
			889.3					
AS ABOVE	LIGHT REDDISH-BROWN	"	45'0"		8	S.S.	12	
MEDIUM TO VERY COARSE SAND	"	"	50'0"		9	S.S.	12	
			879.3					

DISTURBED

LOST

R, C, ROCK CORE

SOIL DESCRIPTION	COLOUR	Density or Consistency	Depth Elevation	Legend	Sample No. and Condition	Sample Type	No. of Blows per Ft.	WATER LEVELS, SOIL MOISTURE & REMARKS
			0'0" 929.3					RIVER WATER LEVEL
			5'0" 924.3					RIVER BOTTOM
ORGANIC SILTY SAND	GREY	LOOSE	9'0"					
FINE TO COARSE SAND, SOME ORGANIC SILT CONTENT	BROWNISH- GREY	PROBABLY LOOSE	15'0"		1	W.S.		
AS ABOVE	GREY-BROWN	VERY LOOSE			2	S.S.	1	SATURATED
FINE TO COARSE SAND	LIGHT GREY	" "	20'0" 908.3		3	S.S.	2	"
AS ABOVE	"	LOOSE	25'0"		4	S.S.	5	"
MEDIUM TO COARSE SAND	LIGHT REDDISH- BROWN	"	30'0" 899.3		5	S.S.	9	"
SILTY FINE SAND WITH NUMEROUS PEBBLES TO ½" SIZE.	GREY-BROWN	COMPACT	35'0"		6	S.S.	17	
SILTY MEDIUM TO VERY COARSE SAND	MIXED COLOURS	"	40'0" 889.3		7	S.S.	14	
AS ABOVE	LIGHT REDDISH- BROWN	"	45'0"		8	S.S.	12	
MEDIUM TO VERY COARSE SAND	"	"	50'0" 879.3		9	S.S.	12	
AS ABOVE	"	"	55'0"		10	S.S.	26	
			57'0" 872.3					
FINE TO MEDIUM SAND	LIGHT GREY-BROWN	COMPACT TO DENSE	60'0" 869.3		11	S.S.	31	
AS ABOVE	"	"	66'0" 863.3		12	S.S.	30	
				HOLE	TERMINATED			

e. m. peto associates ltd.

SOIL ENGINEERING SERVICE - TORONTO, ONTARIO

BOREHOLE LOG

Job Name Madawaska River Bridge
 Site # 2
 Client Department of Highways
 Datum Geodetic

Job No. 5784
 Casing BX (2-1/2" diam.)
 Compiled By M.M.

Borehole No. 7
 Boring Date July 22nd - 23rd, 1957.
 Checked By E.M.F.

SAMPLE CONDITION

- ☒ UNDISTURBED
- ☒ FAIR
- ☒ DISTURBED
- ☒ LOST

SAMPLE TYPE

- S.S. 2" STANDARD SPLIT TUBE SAMPLE
- S.L. SPLIT BARREL WITH LINERS
- S.T. THIN-WALLED SHELBY TUBE SAMPLE
- W.S. WASH SAMPLE
- R.C. ROCK CORE

ABBREVIATIONS

- V. T. IN SITU VANE SHEAR TEST
- Q/u UNCONFINED COMPRESSIVE STRENGTH
- W. L. WATER LEVEL IN CASING
- W. T. GROUND WATER TABLE IN SOIL

SOIL DESCRIPTION	COLOUR	Density or Consistency	Depth Elevation	Legend	Sample No. and Condition	Sample Type	No. of Blows per Ft	WATER LEVELS, SOIL MOISTURE & REMARKS
			0' 0"					▽ RIVER WATER LEVEL
			929.3					
			20' 0"					
			22' 0"					← RIVER BOTTOM
			907.3					
			25' 0"					
MEDIUM TO COARSE SAND	YELLOWISH-RED	LOOSE			1	W.S.		
			30' 0"					
			899.3					
			35' 0"					
MEDIUM TO VERY COARSE SAND	"	"			2	S.S.	7	SATURATED
			37' 0"					
			892.3		3	W.S.		
SILTY FINE SAND	GREY							
			39' 0"					
			890.3					
COARSE TO VERY COARSE SAND	MIXED COLOURS	COMPACT			4	S.S.	14	"
			45' 0"					
FINE TO COARSE SAND	BROWN	"			5	S.S.	15	"
			50' 0"					
			879.3		6	S.S.	19	
MEDIUM TO COARSE SAND	"	"						
LAYERS OF FINE GREY SAND			55' 0"					
AS ABOVE	"	"			7	S.S.	17	
SOME VERY COARSE PARTICLES			60' 0"					
			869.3		8	S.S.	17	
AS ABOVE	"	"	65' 0"					
	LIGHT BROWN	"			9	S.S.	20	
FINE TO COARSE SAND	BROWN	"						

DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 31 F-84

W. P. No. _____

CONT. No. _____

W. O. No. _____

STR. SITE No. _____

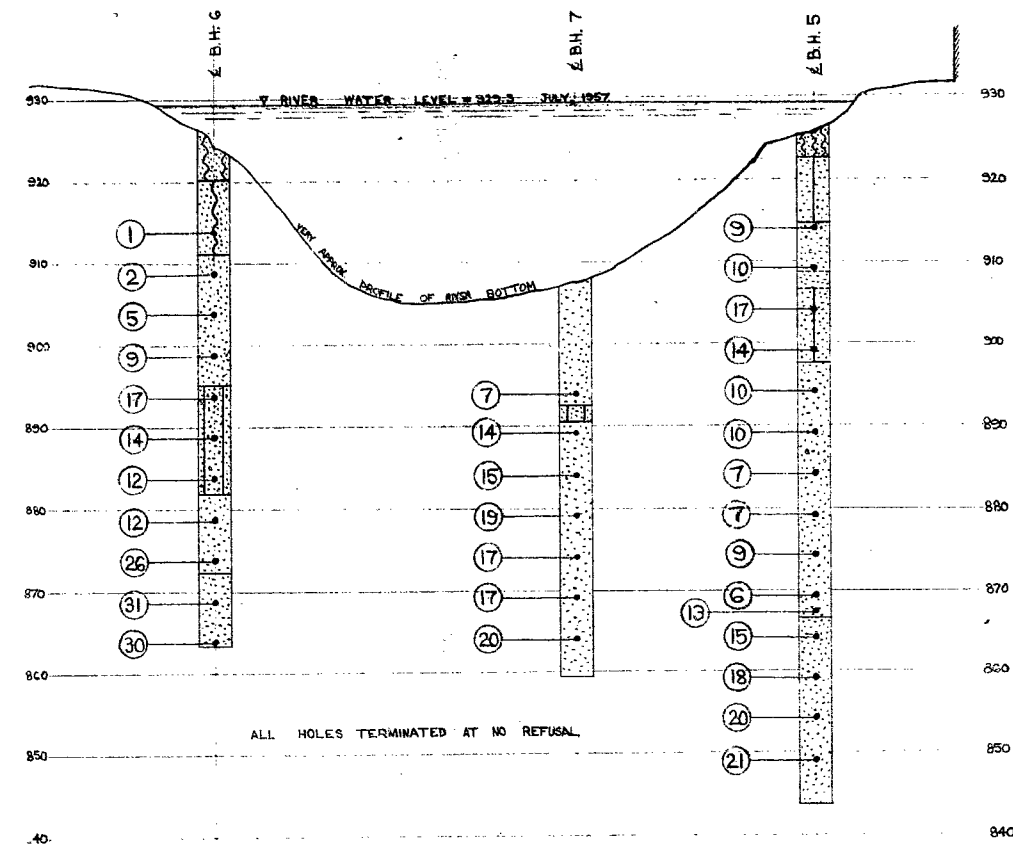
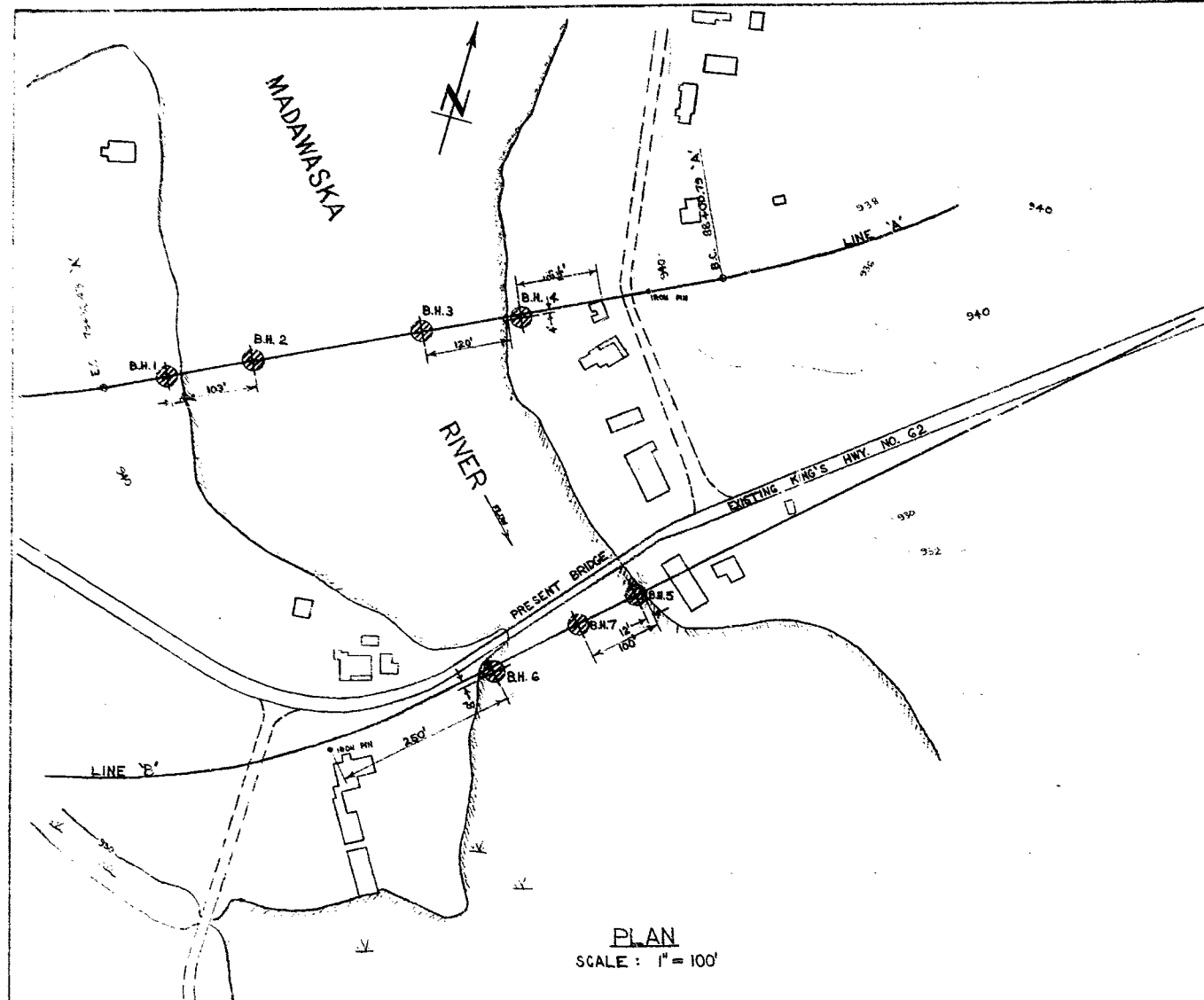
HWY. No. 62

LOCATION MADAWASKA Riv.
NEAR COMBERMERE,

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. ONE

REMARKS: _____

G.I.-30 SEPT 1976



- LEGEND**
- ORGANIC SANDY SILT
 - ORGANIC SILTY SAND
 - SILTY SAND
 - SAND, MINOR SILT CONTENT
 - FINE, MEDIUM OR COARSE SAND
 - STANDARD PENETRATION TEST RESULTS. BLOWS PER FOOT.

31F-84
GEOTECH. DIV.



e.m. peto & associates ltd.
SOIL SITE INVESTIGATION
AT
TWO PROPOSED SITES
NEW HWY. 62-MADAWASKA R. BRIDGE
FOR
DEPARTMENT OF HIGHWAYS OF ONTARIO
OUR JOB No. 5784 DATE: AUG. 6, 1957.
CLIENTS PLAN No. PRELIM. NO NUMBER PER. M.M.