

# 59-F-215-C

CREDIT RIVER

BRIDGE

CHEL TEN HAM

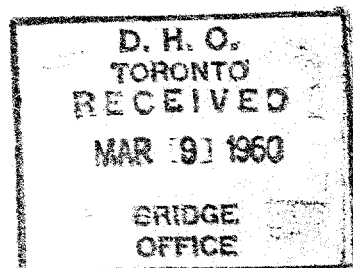
ROBERT A. CRUISE, B.A. Sc.  
REGISTERED PROFESSIONAL ENGINEER, ONTARIO  
ENGINEER AND ROAD SUPT.  
COUNTY OF PEEL



COUNTY BUILDINGS  
1 WELLINGTON ST. E.  
BRAMPTON, ONT.  
TELEPHONES:  
BRAMPTON - GLENDALE 1-2150  
TORONTO - ATWATER 9-9322

March 8, 1960.

Mr. K. L. Kleinsteinber,  
Municipal Liaison Engineer,  
Department of Highways,  
Parliament Buildings,  
Toronto, Ontario.



RE: Cheltenham Bridge  
Credit River

Dear Sir:

Enclosed please find one copy of the Soil Report  
as requested.

Yours truly,

R. A. Cruise, P. Eng.,  
County Engineer.

CK:sm

# RACEY, MACCALLUM AND ASSOCIATES

LIMITED

A COMPANY OWNED, DIRECTED AND OPERATED BY

Consulting Engineers

AND ASSOCIATED STAFF

MONTREAL



VANCOUVER

TORONTO

DONALD C. MACCALLUM, B.ENG., M.E.I.C., P.ENG.

H. JOHN RACEY, B.SC., M.E.I.C., P.ENG.

A. ERIC RANKINE, B.SC., M.E.I.C., A.M.I.ELEC.E., P.ENG.

TORONTO DIVISION  
27 CARLTON STREET

OUR REPORT NO. S-610/7-1819

Toronto 2, Ontario

County of Peel,  
County Buildings,  
BRAMPTON, Ontario.

July 21st, 1959.

59-F-215C

Attention: Mr. R. Cruise

RE: SOIL INVESTIGATION FOR PROPOSED  
CREDIT RIVER BRIDGE, CHELTENHAM,  
PEEL COUNTY

Dear Sirs:

Following your verbal request, a soil investigation at the above-mentioned site was conducted on July 9th, 10th and 13th. The following presents a detailed description of our field work and results together with recommendations regarding the engineering characteristics of the subsoil.

## FIELD INVESTIGATION:

The field work was carried out using our Dutch Sounding Apparatus. Approval as to the use of this equipment on this particular site was obtained from your Mr. J. Hubicki. It was felt that under the present site conditions such an apparatus would prove more suitable than either a standard diamond drill rig or a power auger.

Basically, the sounding device is used to perform static penetration tests, but is also equipped with a device for undisturbed soil sampling. The static penetration test is one in which a 60° cone of 1.4 in. base diameter is pushed into the ground at a slow and fairly constant rate. The reaction to this jacking is provided by four auger-type soil anchors. The pressure required to force the cone into the soil is measured on a pressure gauge. This reading gives the specific cone resistance at the depth to which the cone is driven. When skin friction values are required, a cone with a surrounding mantle is pushed into the ground, the gauge recording the total resistance, i.e. the point resistance of the cone and the friction resistance of the mantle. In this particular case both the point resistance and point and friction resistance were taken at every second foot or so, alternating with some sampling.

OUR REPORT NO. S-610/T-1819

July 21st, 1959

Further literature on the static cone penetration test and its applications may be found in the enclosed folder.

The locations of the two soundings are shown on Enclosure No. 1, and the results on Enclosures No. 2 and 3. A maximum depth of 16½' was reached at location No. 1 and 12' at location No. 2. As the soil profile was similar and the material at these depths very dense, further sounding was discontinued.

#### SOIL PROFILE:

Under a loose to medium dense sand-gravel overburden, there is a very dense silt layer. In the vicinity of location No. 1, this silt layer occurs at approximate elevation of 83.0, whereas at location No. 2 it is at a slightly higher elevation of 87.5.

The river water level is approximately 88.9; and the river invert varies from 85.0 to 86.0 in the immediate vicinity of the existing bridge.

#### DISCUSSION OF RESULTS:

As the sand-gravel surface layer is in a loose state, foundations would have to be founded in the very dense silt layer. An ordinary footing type of foundation is quite feasible in this particular instance, as the silt layer is found at relatively shallow depths.

Using correlations established by Meyerhof<sup>1</sup> the allowable bearing pressures for a footing foundation can be determined. These values for various elevations are given in the following table:

Location:	<u>Allowable bearing pressure ( p.s.f. )</u>		
	7,000	8,000	10,000
1	83.4	82.0	
2			87.0

These values are based on the settlement being not greater than 1" uniformly or 3/4" differentially.

Allowing 4 to 5' below river invert for possible scour, the founding elevation for footings will be approximately 81.0 to 82.0. As a result, the excavation will be approximately 7' below present river level. As the overburden is quite permeable, definite water problems will occur during construction procedures. A possible solution to such

1. "Penetration Tests and Bearing Capacity of Cohesionless Soils", by G. G. Meyerhof, Proc. A.S.C.E., Paper 866.

OUR REPORT NO. S-610/T-1819

July 21st, 1959

would be the installation of a watertight sheeted cut-off wall down to the silt layer. This would at least eliminate undesirable seepage from the river itself, but there would still be some water table seepage through the silt which might possibly cause a loss of bearing capacity. Such a condition occurring may be eliminated if a perimeter well-point system is installed. An added precaution would result from a tight construction schedule which would minimise the exposure time of the silt excavation to possible disturbance.

CONCLUSIONS AND RECOMMENDATIONS:

Summarising the foregoing results and considerations, the following conclusions and recommendations seem warranted:

1. The subsoil at the site consists of a loose sand-gravel overlying a very dense silt.
2. The recommended foundation is a footing founded in the silt layer. The allowable bearing pressures for such are given in the foregoing table.
3. No water or excavation problems of consequence should occur if proper construction procedures are adopted. Such would include the installation of a watertight cut-off wall to restrict river seepage; and the installation of a well-point system to eliminate the possibility of the silt losing its bearing power on excavation below water table.

*Approved by  
T. MacCallum  
20/6*

We trust this will give you sufficient information, and we thank you for this opportunity to be of service to you. If you have any further questions regarding this report, do not hesitate to get in touch with us.

Yours very truly,

RACEY, MacCALLUM AND ASSOCIATES LIMITED

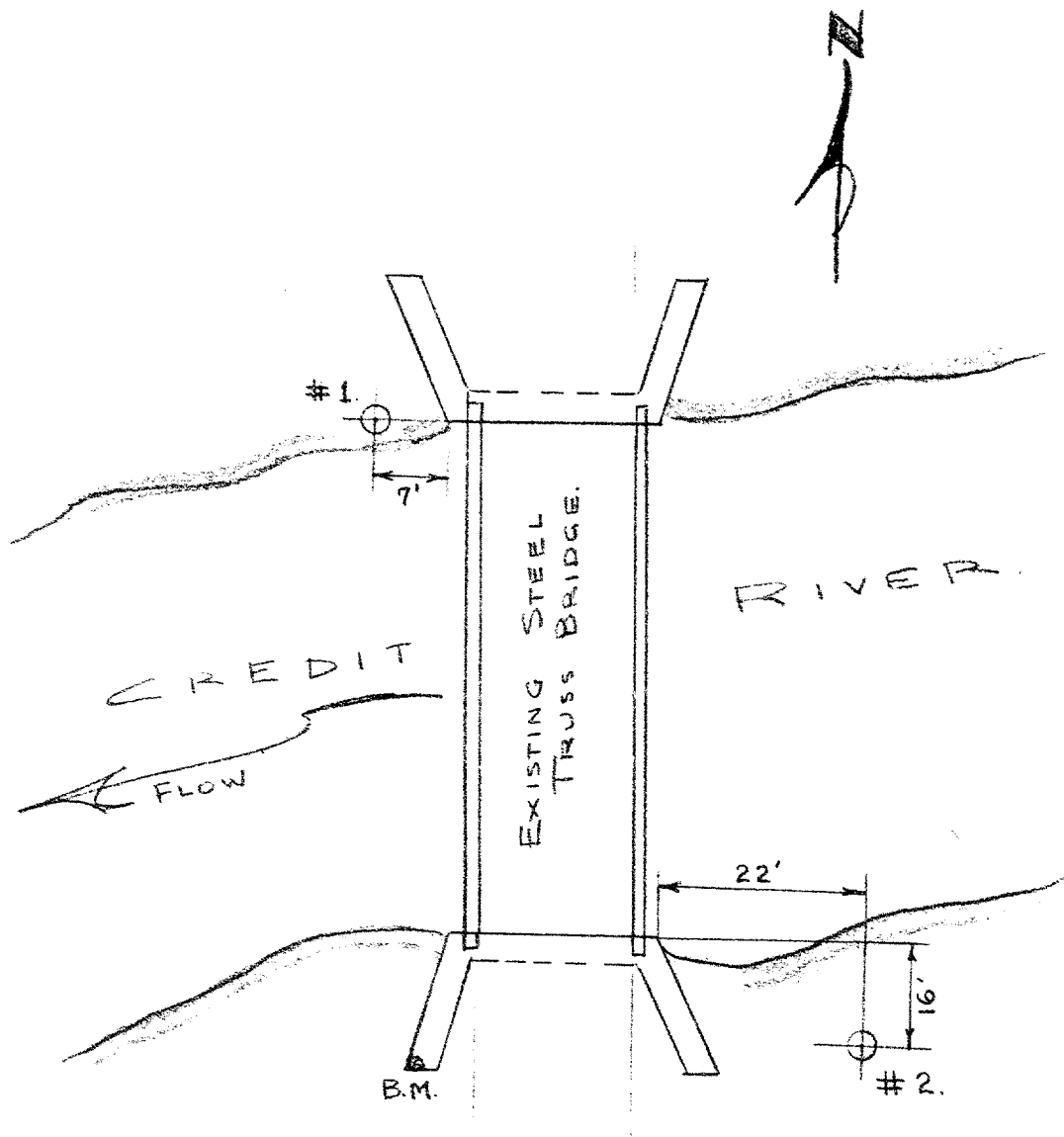
*L. P. Winters*

L. P. Winters, P.Eng.  
Project Engineer.

LPW/KA  
Enclosures.

Prep. By L.P.W.

# BORE-HOLE LOCATIONS FOR PROPOSED BRIDGE OVER CREDIT RIVER, CHELTENHAM.



NOTES: • NOT TO SCALE.

• S.W. CORNER WING WALL OF SOUTH ABUTMENT  
B.M. ELEV. 100.0

**RACEY MacCALLUM AND ASSOCIATES LTD.**

Foundation Engineering Division

Engineering Data Sheet for Borehole: No 1

Project: PROPOSED CREDIT RIVER BRIDGE

Location: CHELTENHAM, PEEL COUNTY.

Hole Location: See Enclosure No 1.

Hole Elevation and Datum: 92.4 Feet.

Field Supervisor: C.B. Prep.: L.P.W.

Driller: D.S.

Checked:

Date:

**LEGEND**

Shear Strength (C)

Unconfined compression

Vane test and sensitivity (S)

Penetration Resistance (P)

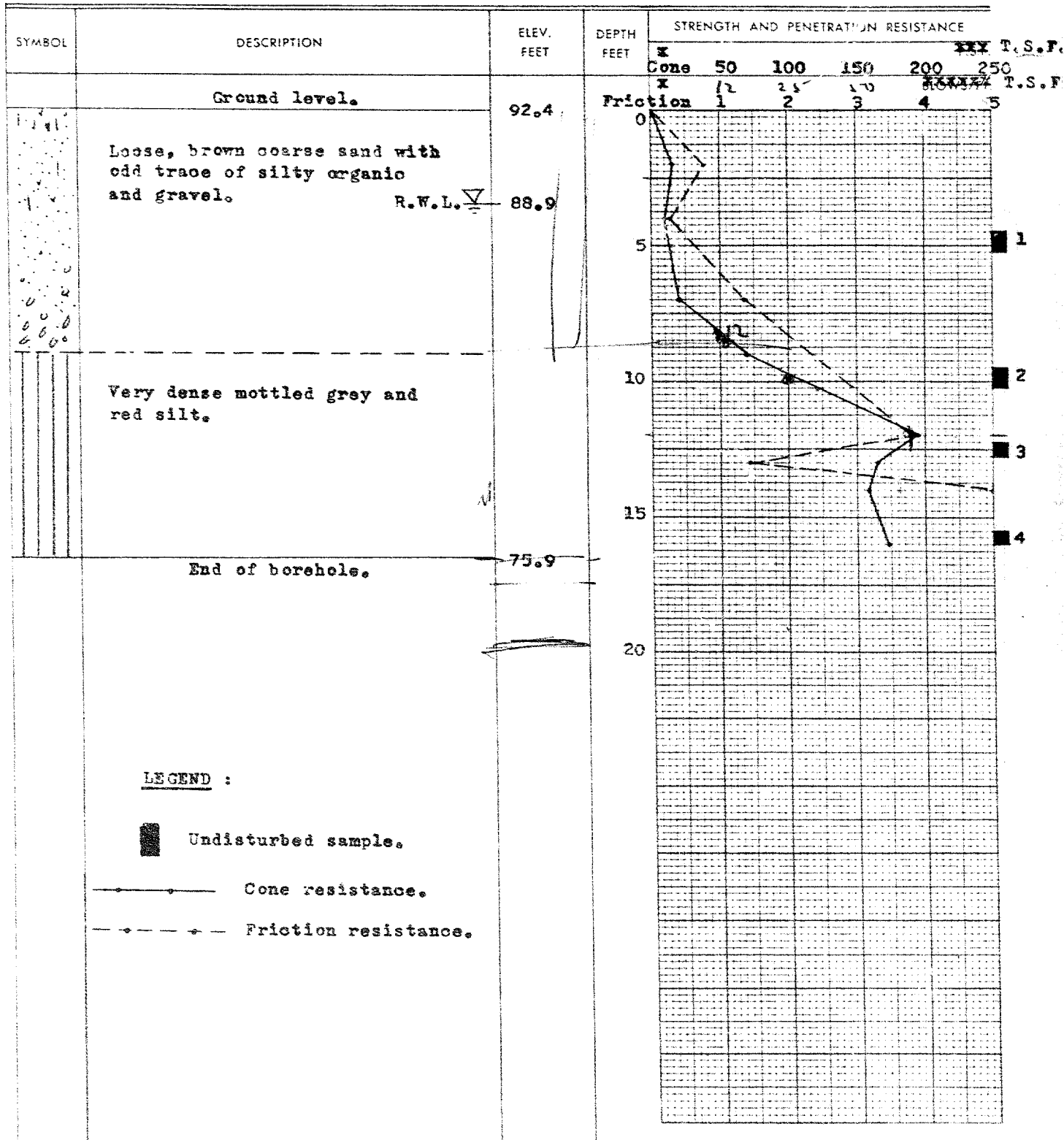
2" Split tube

2" Dia. Cone

Casing

⊕  
+S

⊕ ⊕



**RACEY MacCALLUM AND ASSOCIATES LTD.**

Foundation Engineering Division

Engineering Data Sheet for Borehole: No 2

Project: PROPOSED CREDIT RIVER BRIDGE,  
 Location: CHELTENHAM, PEEL COUNTY.  
 Hole Location: See Enclosure No 1.  
 Hole Elevation and Datum: 94.2 Feet.  
 Field Supervisor: C.B. Prep.: L.P.W.  
 Driller: D.S. Checked: Date:

**LEGEND**

Shear Strength (C)

Unconfined compression

Vane test and sensitivity (S)

Penetration Resistance (P)

2" Split tube

2" Dia. Cone

Casing

⊕  
+s

⊕ ⊕

