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55-F-203C

Q.E.W.

FREEMAN TO

WOLFE ISLAND

BA 502
55-8-2030

RACEY, MacCALLUM AND ASSOCIATES LIMITED

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METEOROLOGIST
JACQUES POULIN,
QUEBEC LAND SURVEYOR
THE VIBRATION ENGINEERING COMPANY

REPORT NO. S-500-501/55/T-138-1

310 Odeon Building,
20 Carlton Street,
Toronto, Ontario.

Department of Highways for Ontario,
c/o Lazarides, Lount and Partners,
79 Scollard Street,
Toronto, Ontario.

18 August 1955.

RE: FOUNDATION INVESTIGATION AT PROPOSED
CROSSING OF THE PROPOSED REVISED
WESTBOUND LANE QUEEN ELIZABETH WAY &
THE EASTBOUND LANE FREEMAN TO WOLFE
ISLAND.

Dear Sirs:

The soil investigations at the above site have been
completed and we wish to report on our findings as follows:

LOCATION OF THE SITE AND OF THE BOREHOLES

The investigated site is located approximately three
quarters of a mile north north east of the Highway crossing in the village
of Freeman, north west of Burlington, Ontario (see topographical sketch,
enclosure No.1).

The boreholes were marked off by our engineer in the
field as proposed by the client (see sketch showing the location of the
boreholes, enclosure No.1). The elevations of the boreholes were determined
referring to borehole No.2 being elevation 340 (contour line on client's
drawing).

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18 August 1955.

THE DRILLING WORK

The geological conditions in the area being known to us, we decided to carry out only three of the four proposed boreholes as the soil conditions were found to be sufficiently uniform.

The drilling equipment was moved to the site on August 7th 1955. Drilling of borehole No.1. was done on August 8th 1955. On August 9th the equipment was moved to borehole No.2 and this borehole completed on August 10th. After moving the equipment to borehole No.4, this borehole was completed on the same day. Subsequently the drilling equipment was moved from the site and returned to the warehouse. Sampling in the soil was done with the standard 2" Split barrel sampler at 2.5' intervals where applicable, as weathered rock was encountered at depths of 4.5' to 7'. Drilling in weathered rock and sound rock was done with AXT diamond bits.

The soil and rock samples will be stored on our premises for one half year and will be destroyed thereafter if no instructions are received to the contrary.

DISCUSSION OF THE RESULTS AND CONCLUSIONS

The soil profile as revealed by the investigation, represents a residual mantle developed by weathering of the underlying rock. There is a gradual change downward from brown silty clay with some fine shaly or limestone gravel extending to about 5' depth (elevation 335), to reddish silty clay with reddish brown shale and some gravel, reflecting the character of the underlying shale and leading into more or less rotten rock found at a depth varying from 4.5' to 7'.

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18 August 1955.

Sound rock was found in borehole No.1 at elevation 329.2 and in borehole No.2 at elevation 331.5 and in borehole No.4 at elevation 331.8. Bedrock consists of sound red clay shale with a varying lime content and corresponding varying hardness and fissility. The clay shale is interbedded by solid argillaceous limestone beds up to a thickness of 3". However, these limestone beds do not extend horizontally very far, they more or less represent flat lenses at irregular vertical distances. The bedding is practically horizontal. This rock belongs to the youngest formation (Queenston) of the Ordovician period.

For classification purposes and for a consideration of the compressibility of the soil, some laboratory tests were carried out. The liquid limit of a representative sample of the clay soil was found to be 15.9%, the plastic limit was determined to be 23.5% and the following water contents were determined: At depths between 2.5' and 3.5'; 12.3, 12.9 and 13.2%, and depths of 5' to 6': 10.2 and 11.4%. The water contents, therefore, are below the plastic limit. As the plastic limit is near to the shrinkage limit of a soil, it is to be expected that no noticeable settlement and no differential settlement will occur.

The number of blows per foot of penetration of the 2" Split barrel sampler is indicative for the unconfined compressive strength. The allowable soil pressure with a factor of safety of 3 based on the lowest penetration value found in borehole No.4 at elevation 335.3 is slightly above 2 tons per sq.ft. and increases rapidly with depth. At elevation 334 the allowable soil pressure with a factor of safety of 3 is well above 3 tons per sq.ft.

The soil proved to be practically impermeable, however, the water levels in boreholes Nos.1 and 2 were found to be between 330 and 330.6 feet M.S.L., this possibly being the ground water level developed in the underlying rock.

We trust that the foregoing information is satisfactory and

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18 August 1955.

shall be pleased to discuss the matter further with you if you deem it desirable.

Yours very truly,

RACEY, MacCALLUM AND ASSOCIATES LTD.

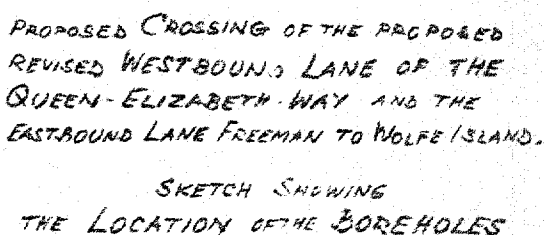
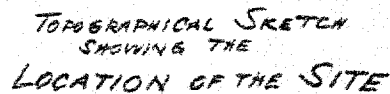
K. Tubbesing

KT/MD

K. Tubbesing, P.Eng.

Original

& 2 copies - Ontario Dept. of Highways, c/o Lazarides, Lount & Partners.
2 - Racey, MacCallum and Associates Ltd., Montreal, P.Q.
1 - Soils Engineer.



D. M. CURRY
Driller

Hole Begun 8/8/55

Foundation Engineering Division

Hole Ended 6/6/55

Engineering Data Sheet for Borehole: /

L. BELL
Held

Job Name: PROPOSED BRIDGE - Q. E. WAY, FREEMAN-WOLFE IS., C.A.H.

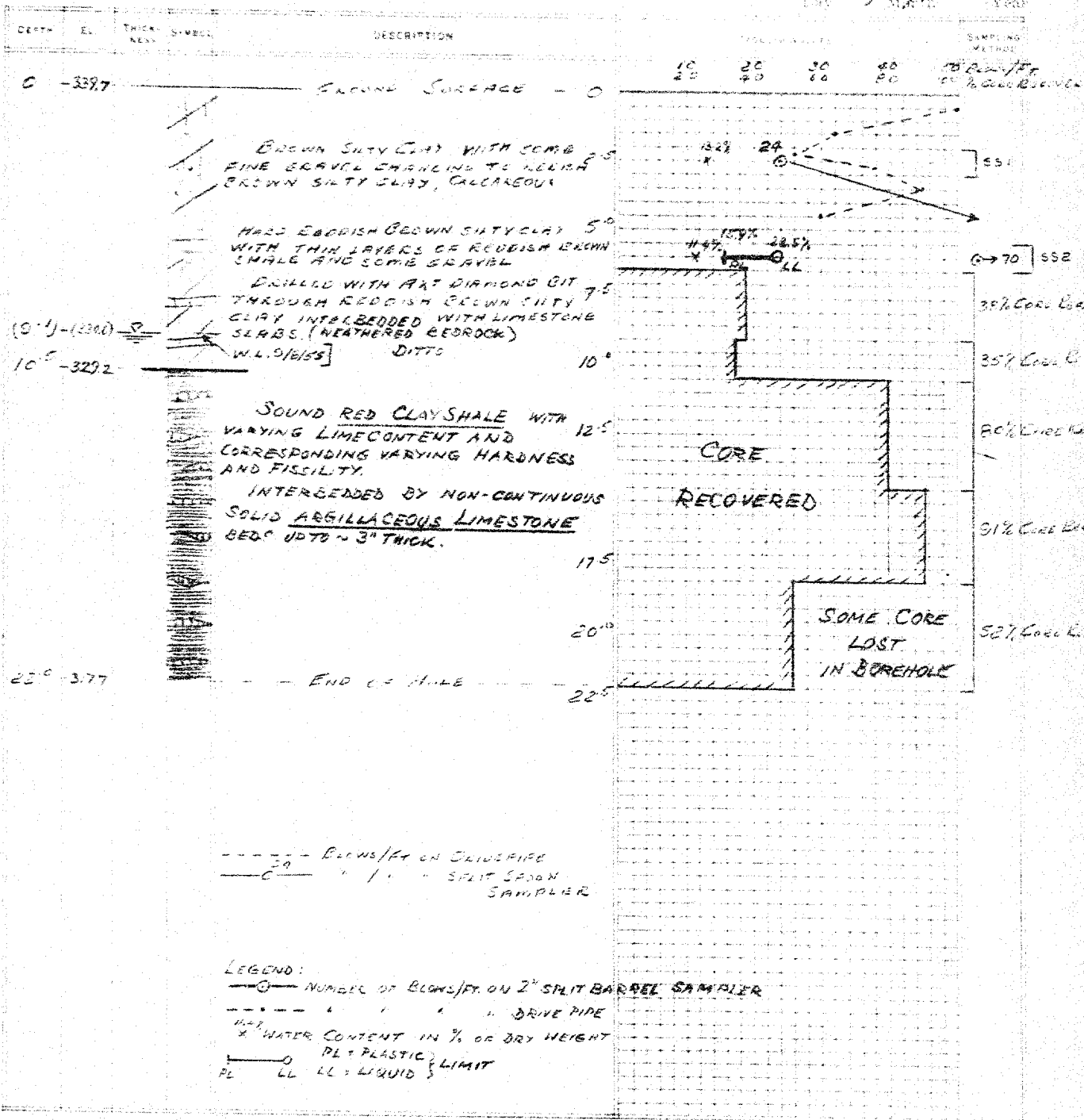
B.F.W.
checked by

Job Located: 1 mile North of Burlington Ont.

Hole Located: A2 SHOWN ON ATTACHED SKETCH PLAN

Hole Elevation: 339.7 Datum: M. S. L.

10/8/55



Order No.: S-500-501/55/E-128 RACEY, MACCALLUM AND ASSOCIATES

LIMITED

D. M. CURDY

Driller

Hole Begun 9/8/55

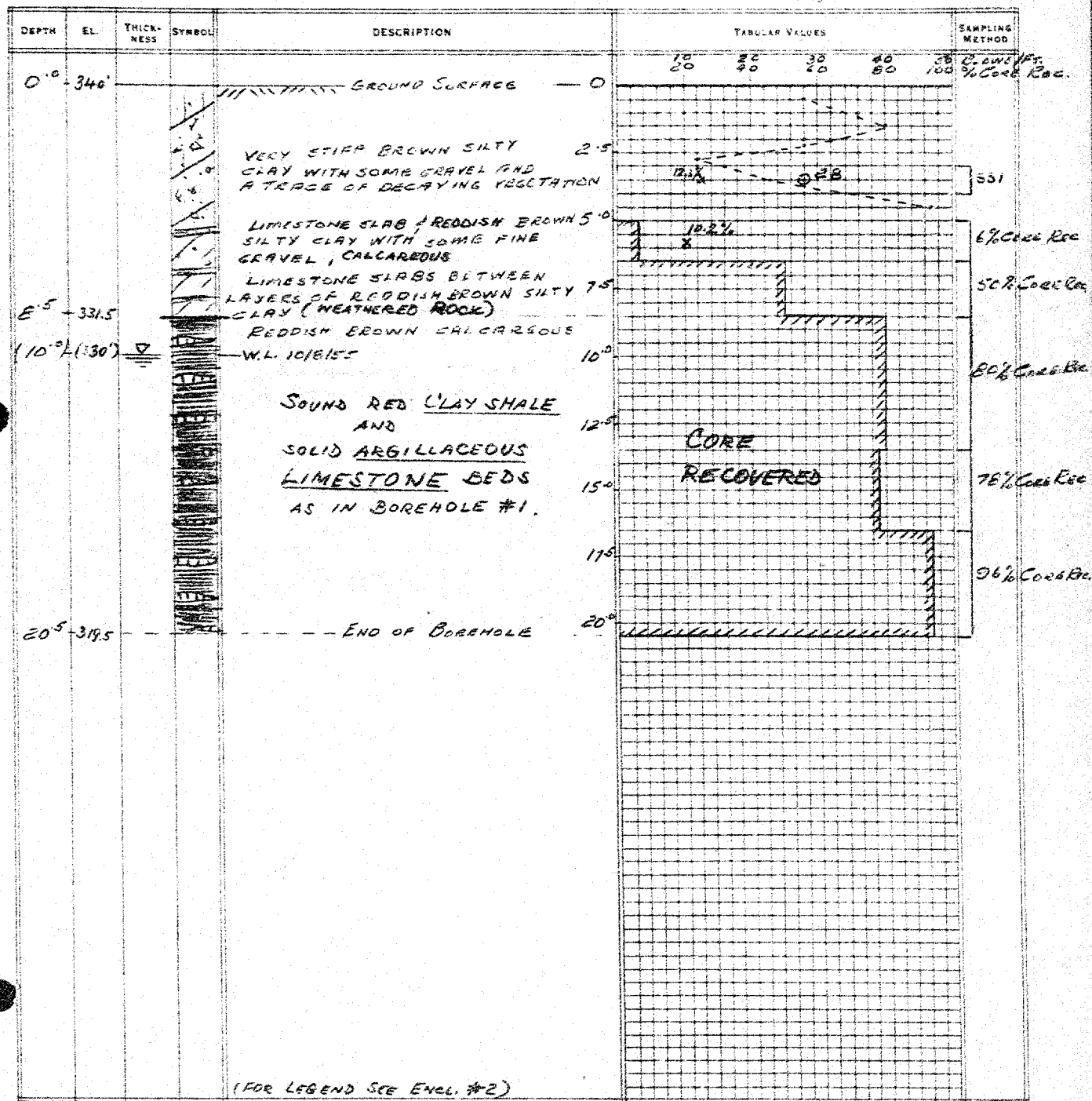
Foundation Engineering Division

Hole Ended 9/8/55Engineering Data Sheet for Borehole: 2L. BELLY

Helper

Job Name: PROPOSED BRIDGE - J. E. WAY & FREEMAN - WOLFE IS. CAN.P. F. W.

Checked by

Job Located: 1 MILE NORTH OF BURLINGTON ONTHole Located: AS SHOWN ON ATTACHED SKETCH PLANHole Elevation: 340' Datum: M.S.L.Day 11/8/55 Month Year

Order No. 5-500-50/597138 RACEY, MACCALLUM AND ASSOCIATES

LIMITED

D. M. CURRY

Driller

Hole Begun 10/8/55

Foundation Engineering Division

Hole Ended 10/8/55Engineering Data Sheet : Borehole: 4L. BELLY

Helper

Job Name: PROPOSED BRIDGE - Q. E. WAY / FREEMAN-WOLFE IS. C.A.H.B. F. W.

Checked by

Job Located: 1 MILE NORTH OF EURLINGTON ONTARIOHole Located: AS SHOWN ON ATTACHED SKETCH PLANHole Elevation: 338.8 Datum: M.S.L.Day 11/8/55 Month Year