

55-F-206C

Hwy 401 &
C.P.R.

SHANNONVILLE

TYENDINAGA

T.W.P.

Murray Associates, Limited, Toronto.
RACEY, MacCALLUM AND ASSOCIATES
LIMITED

BA 443

Directors:

A COMPANY OWNED, DIRECTED AND OPERATED BY

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AND ASSOCIATED STAFF**



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THE VIBRATION ENGINEERING COMPANY

REPORT NO. S-500-516/55/T-99-1

Suite 310,
20 Carlton St.,
Toronto, Ont.
June 23, 1955

Murray Associates Ltd.,
130 Queen's Quay E.,
Toronto, Ont.

55F206C

RE: SOILS INVESTIGATION - INTERSECTION
PROPOSED HIGHWAY NO. 401 AND CPR
RAILWAY TRACK, TWO MILES NORTH OF
SHANNONVILLE, ONTARIO

Dear Sirs:

Following your instructions we have carried out the drilling of six boreholes at the above mentioned site. The soil and rock core samples secured in the boreholes have been studied, and we wish to report as follows:

LOCATION OF THE SITE AND OF THE BOREHOLES

The bridge site is located approximately two miles north of Shannonville at the intersection of the C.P.R. Railway and the future Highway No. 401. (See Enclosure No.1, Topographical Sketch.)

The location of the boreholes is in accordance with the client's requirements, and was determined in a conversation prior to the field work. The boreholes were spotted by our engineer in the field, and the elevations were obtained by levelling, referring to the elevation off the Southern rail at the intersection, being Elevation 381.4.

REPORT NO. S-500-516/55/T-99-1 cont'dTHE DRILLING WORK

The drilling equipment was brought to the site on May 24th, 1955. The drilling of Borehole No.1 was started the following day and completed on May 26th. Borehole No.2 was drilled from May 26th to May 27th. Borehole No.3 was drilled subsequently, and completed May 28th. Borehole No.4 was begun on May 30th and completed on June 1st. The peg marking Borehole No.5 having disappeared, it was decided to drill Borehole No.6 prior to No.5, and this borehole was begun and completed on June 1st. Borehole No.5 was begun and completed on June 2nd, 1955. The equipment was subsequently removed from the site and returned to the warehouse in Toronto.

The drilling equipment consisted of a standard diamond drill, manufactured by Carl Ayre. Three inch extra heavy duty drive-pipe was driven into the ground by a 350 lb. hammer, dropped 20 inches. Sampling was carried out with a standard 2" split barrel sampler, driven with an energy equalling to 4,200 in. lbs.

Core drilling was carried out with an AXT diamond bit and the recovered cores of bedrock are kept in wooden core boxes.

The number of blows per foot of penetration into the soil for the split barrel sampler was recorded and plotted in the accompanying Engineering Data Sheets. (Enclosures Nos. 2 to 7.) The number of blows on the drive-pipe was counted additionally and is shown in the diagrams of the enclosures.

Soil samples of the overburden were generally taken at intervals of 2.5 feet. Samples of bedrock were obtained by core drilling carried out to a depth of approximately 10' into rock.

The rock samples will be stored for one-half year from the present date and will then be destroyed if no instructions are received to the contrary.

DISCUSSION OF THE RESULTS

The results of the field work are laid down in the attached Engineering Data Sheets, which show the soil profile, the penetration resistance of the split barrel sampler, and of the drive-pipe, as well as the recovery of the core.

The surface of bedrock was found at fairly shallow depth.

REPORT NO. S-500-516/55/T-99-1 cont'dDISCUSSION OF THE RESULTS cont'd

The overburden was found to be not quite uniform. Calcareous, silty clay, with sand and fine to coarse gravel, was found to be prevalent but the presence of calcareous, very dense silty and clayey sand with gravel, as revealed in Borehole No.3, should not be overlooked. It is not clearly understood whether this occurrence of gravelly sand is only developed as a local pocket in the clay, or whether it is extending over a greater area of the site. However, we feel that no serious water problem may arise from the presence of the water bearing sand.

The penetration resistance of the drive-pipe shows that the overburden down to a depth of 2.5 feet from the ground surface is generally soft to medium clay. Below this level the soil is very stiff and dense down to bedrock.

The surface of the rock was found in depths of 5.3, 7.6, 7.5, 7.5, 8.0 and 10.0 depth from the surface of the ground, in the sequence of the numbering of the boreholes. The respective true elevations of the surface of bedrock in the different boreholes is given by the following table:

Borehole No.1	Borehole No.2	Borehole No.3	Borehole No.4	Borehole No.5	Borehole No.6
374.4	373.6	373.6	373.5	372.1	371.1

Bedrock was found to be composed of a argillaceous, dark-grey limestone, which proved to be solid but slightly shaley. Interbeds of grey crystalline limestone occur. The rock was found to be sound and solid in all six boreholes.

CONCLUSIONS

The rock formations at the site, being located at shallow depth, we feel that the foundation should be resting on bedrock rather than on the overburden. The bearing capacity of the overburden at about 5' depth is estimated from the penetration resistance of the soil to be of the order of 1.5 tons, with a factor of safety of 3.

REPORT NO. S-500-516/55/T-99-1 cont'd

CONCLUSIONS cont'd

The allowable bearing value for the rock, as encountered on the present site is, in accordance with the 1953 edition of the National Building Code, 20 tons per square foot. It will be advisable to excavate about 2 feet into rock in order to increase the lateral resistance against shear, and to avoid any superficial layers of fractured rock.

We trust that this information will be satisfactory and will be pleased to answer any questions to clarify matters.

Yours very truly,

RACEY, MacCALLUM AND ASSOCIATES LIMITED

K. Tubbesing

K. Tubbesing, P. Eng.

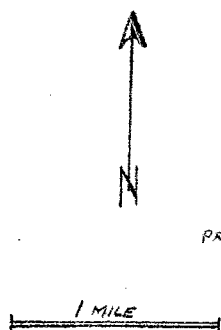
KT/jb

3 copies - Murray Associates, Limited, Toronto
2 " - Montreal Office
1 " - Soils Engineer

S-500-516/55/T-99

PREP & DRAWN: K.T.

ENCLOSURE No. 1



PROPOSED HWY. NO. 401

BRIDGE SITE

CPR

CNR

Salmon River

MILLTOWN

SHANNONVILLE

FROM BELLEVILLE

TO KINGSTON

MARYVILLE CREEK



FROM
BELLEVILLE, TORONTO

B.H. #5
EL. 370.1 (372.1)

B.H. #4
EL. 371.0 (373.5)

B.H. #6
EL. 381.1 (374.1)

BOREHOLE #1
EL. 379.7 (374.4)

B.H. #2
EL. 381.2 (373.6)

B.H. #3
EL. 381.1 (370.6)

TO
KINGSTON

LEGEND:

EL. 379.7 M.S.L. EL. GROUND SURFACE
(374.4) EL. OF SURFACE OF BEDROCK

Order No.: 2-500-504/55/T-22 RACEY, MacCALLUM AND ASSOCIATES

LIMITED

M. CHEURIER
DrillerHole Begun 24/5/55

Foundation Engineering Division

Hole Ended 26/5/55Engineering Data Sheet for Borehole: 1

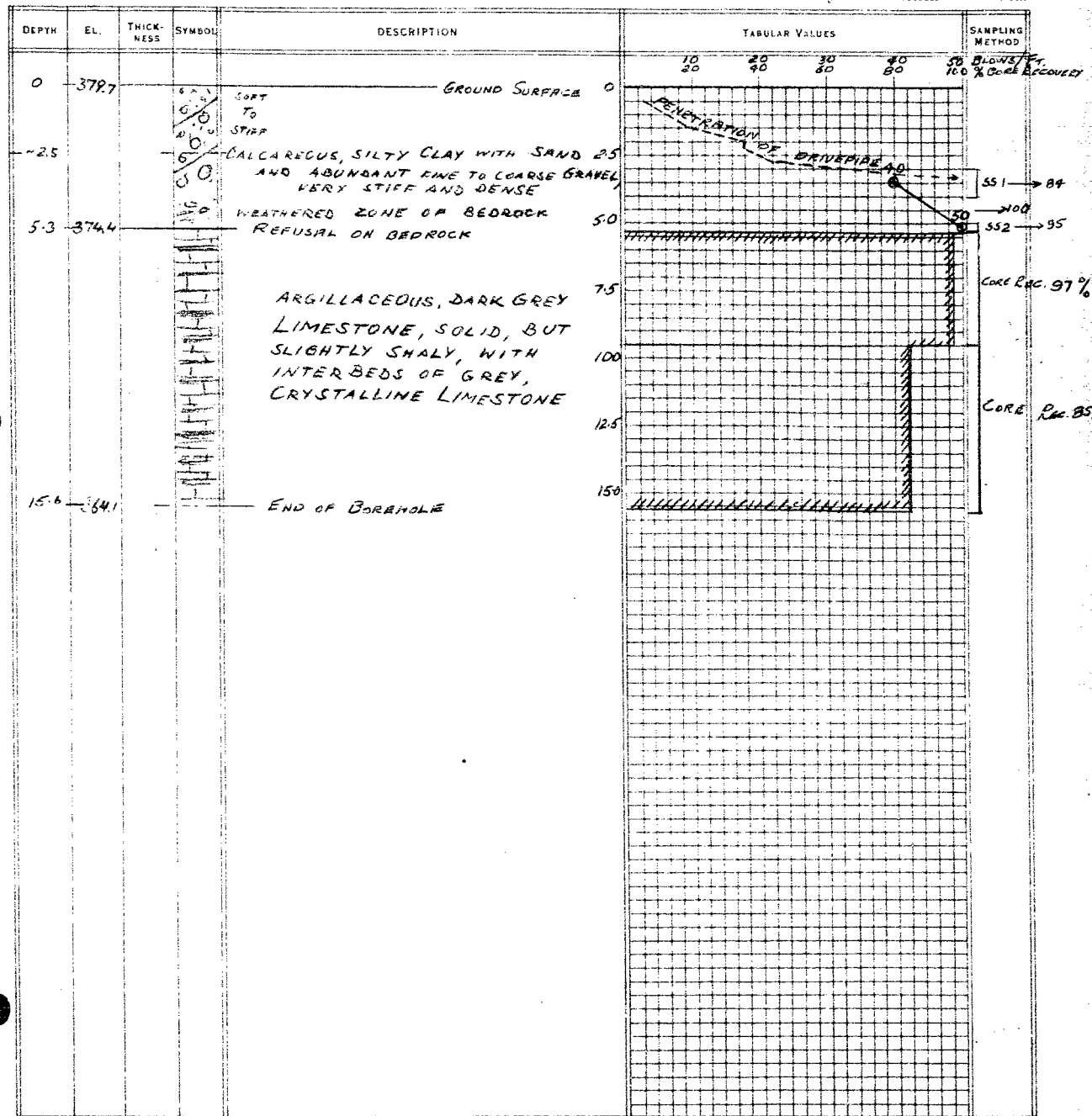
Helper

Job Name: TYENDINAGA TWP. BRIDGE No. 3. - C.P.R.

B.F.W. S.K.T.

Job Located: PROPOSED HWY. No. 401 CROSSING OVER C.P.R.; ~ 10 MILES E.N.E. OF BELLEVILLE, ONT.

Checked by

Hole Located: AS SHOWN ON ATTACHED SKETCH PLANHole Elevation: 379.7' Datum: M.S.L.Day 30/5/55 Month Year

Order No.: 5-500-674/55/T-29RACEY, MACCALLUM AND ASSOCIATES
LIMITEDM. CHARRIER
DrillerHole Begun 26/5/55

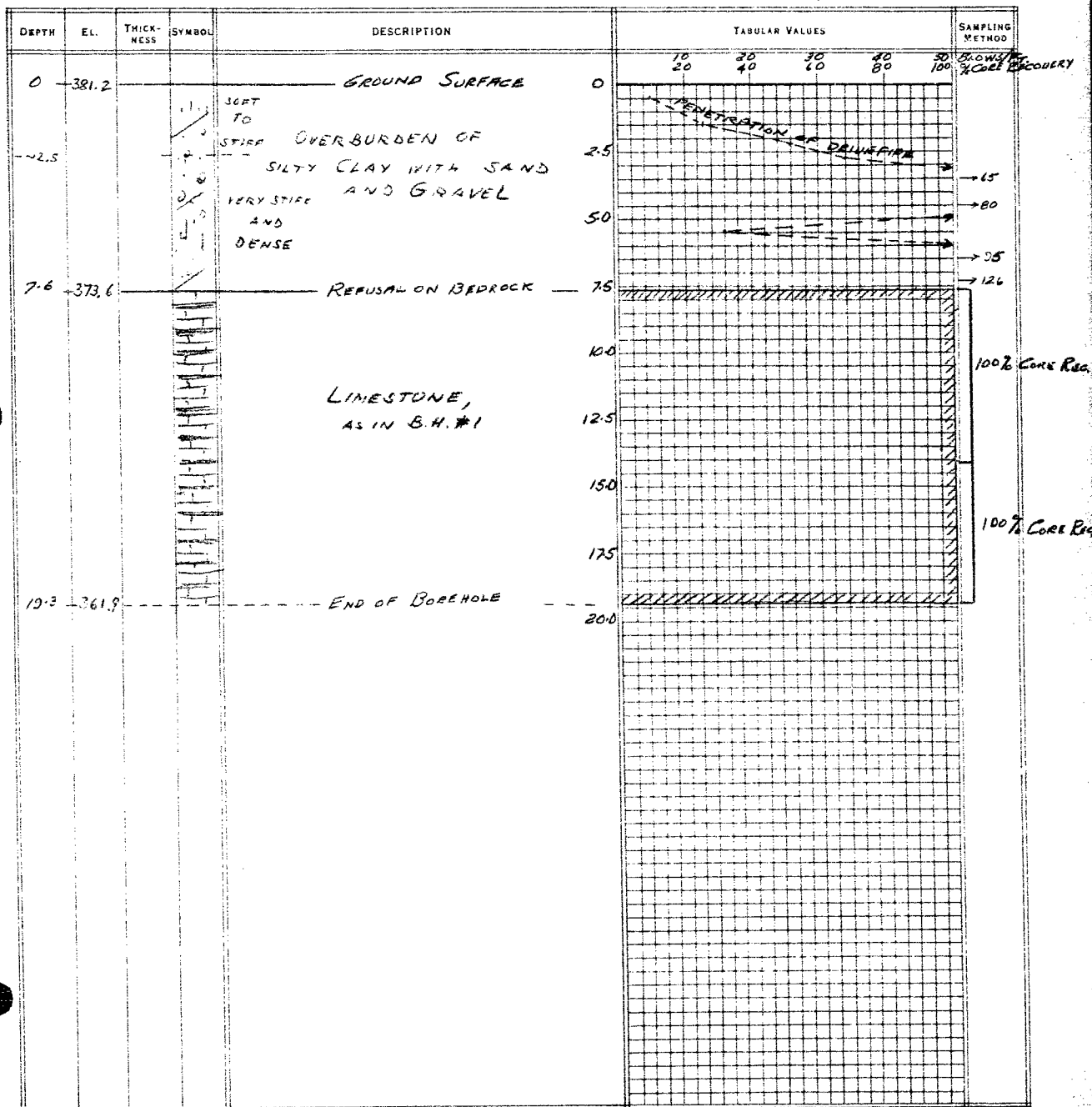
Foundation Engineering Division

Hole Ended 27/2/55Engineering Data Sheet for Borehole: 2

Helper

Job Name: TYNDINABA TWP. BRIDGE No. 3 - C.P.R.B.F.W. & K.T.Job Located: PROPOSED HWY. No. 401 CROSSING OVER C.P.R. - 10 MILES E.N.E. OF BELLEVILLE, ONT.

Checked by

Hole Located: AS SHOWN ON ATTACHED PLANHole Elevation: 381.2 Datum: M.S.L.Day 1/6/55 Month Year

Order No.: S-500-508/55/7-99 RACEY, MACCALLUM AND ASSOCIATES

LIMITED

M. CHEVRIER

Driller

Hole Begun 27/5/55

Foundation Engineering, Division

Hole Ended 28/5/55

Engineering Data Sheet for Borehole: 3

J. VOISELLE

Helper

Job Name: TYENDINAGA TWP. BRIDGE NO. 3 - C.P.R.

B.F.W. EKT

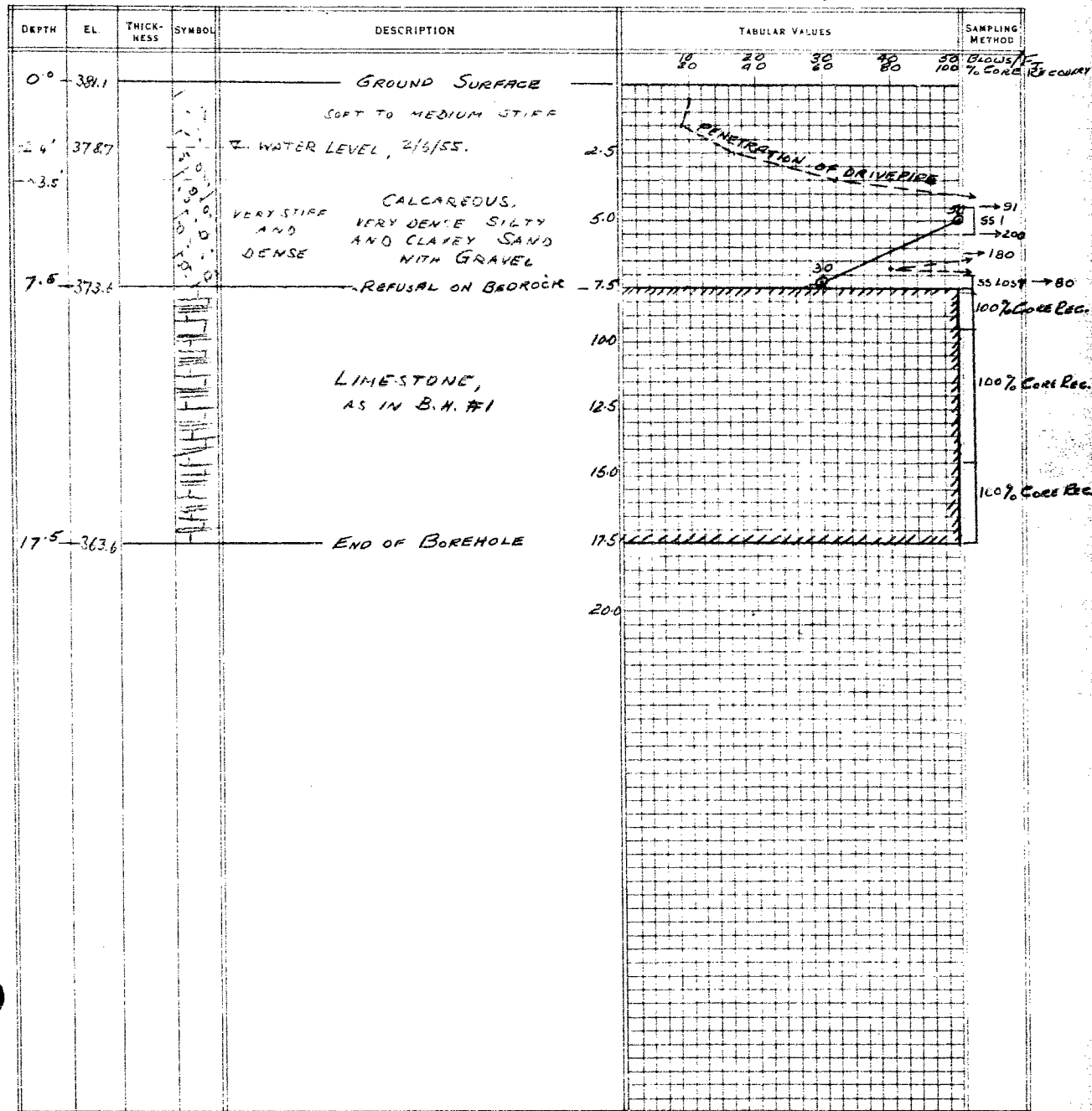
Job Located: PROPOSED HWY 110.401 CROSSING OVER C.P.R. - 10 MILES E.N.E. OF BELLVILLE ONT.

Checked by

Hole Located: AS SHOWN ON ATTACHED SKETCH PLAN

Hole Elevation: 381.1 Datum: M.S.L.

Day 9/6/55 Month Year



Order No.: 500-504/55/7-99

RACEY, MACCALLUM AND ASSOCIATES

LIMITED

M. CHEVRIER

Driller

Hole Begun 30/5/55

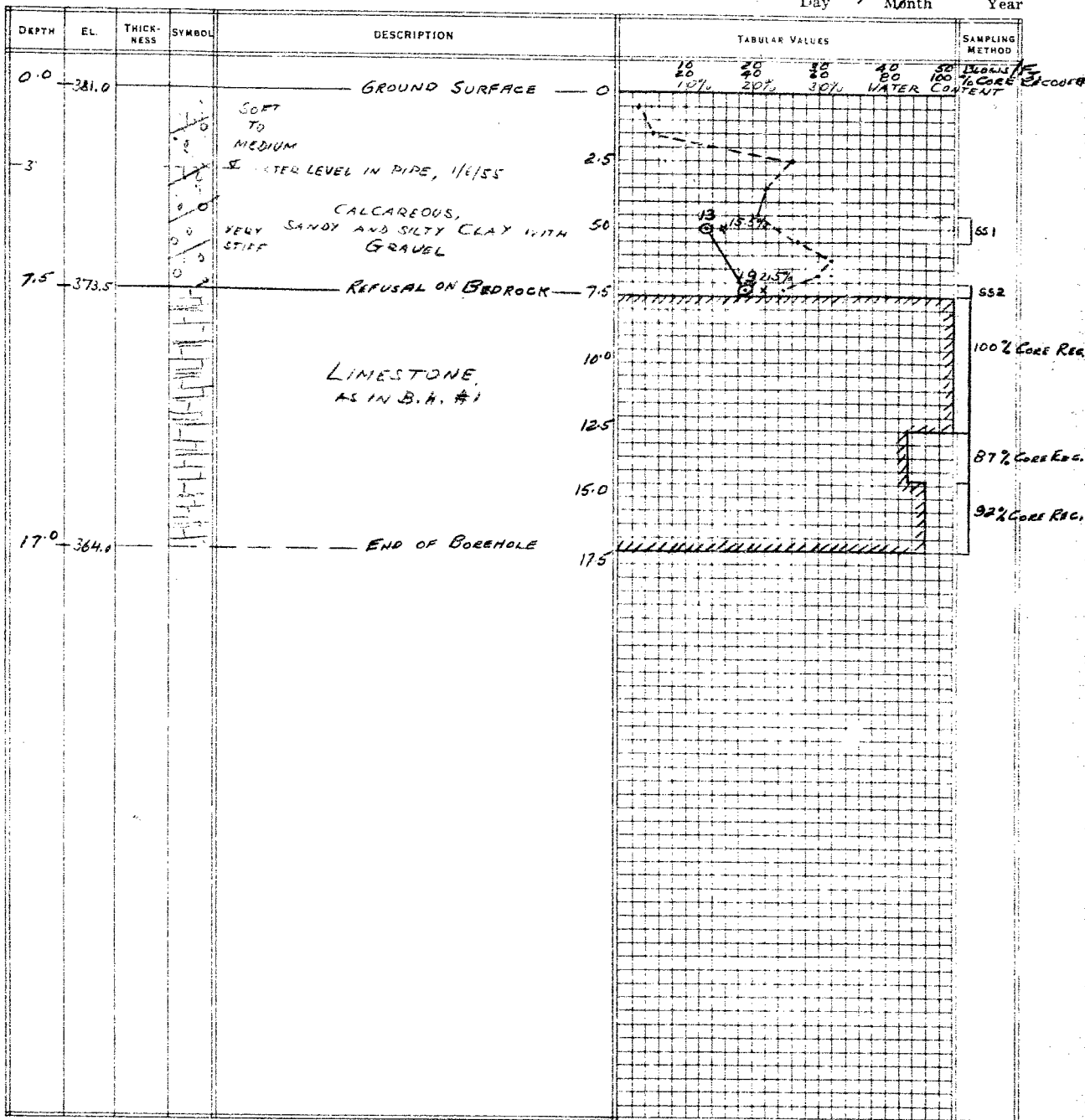
Foundation Engineering, Division

Hole Ended 1/6/55Engineering Data Sheet for Borehole: 4J. VOISELLE

Helper

Job Name: TYENDINAGA TWP. BRIDGE No. 3. - C.P.R.Job Located: PROPOSED HWY. No. 401 CROSSING OVER C.P.R. - 10 MILES E.N.E. OF BELLVILLE ONT.B.F.W. & H.T.

Checked by

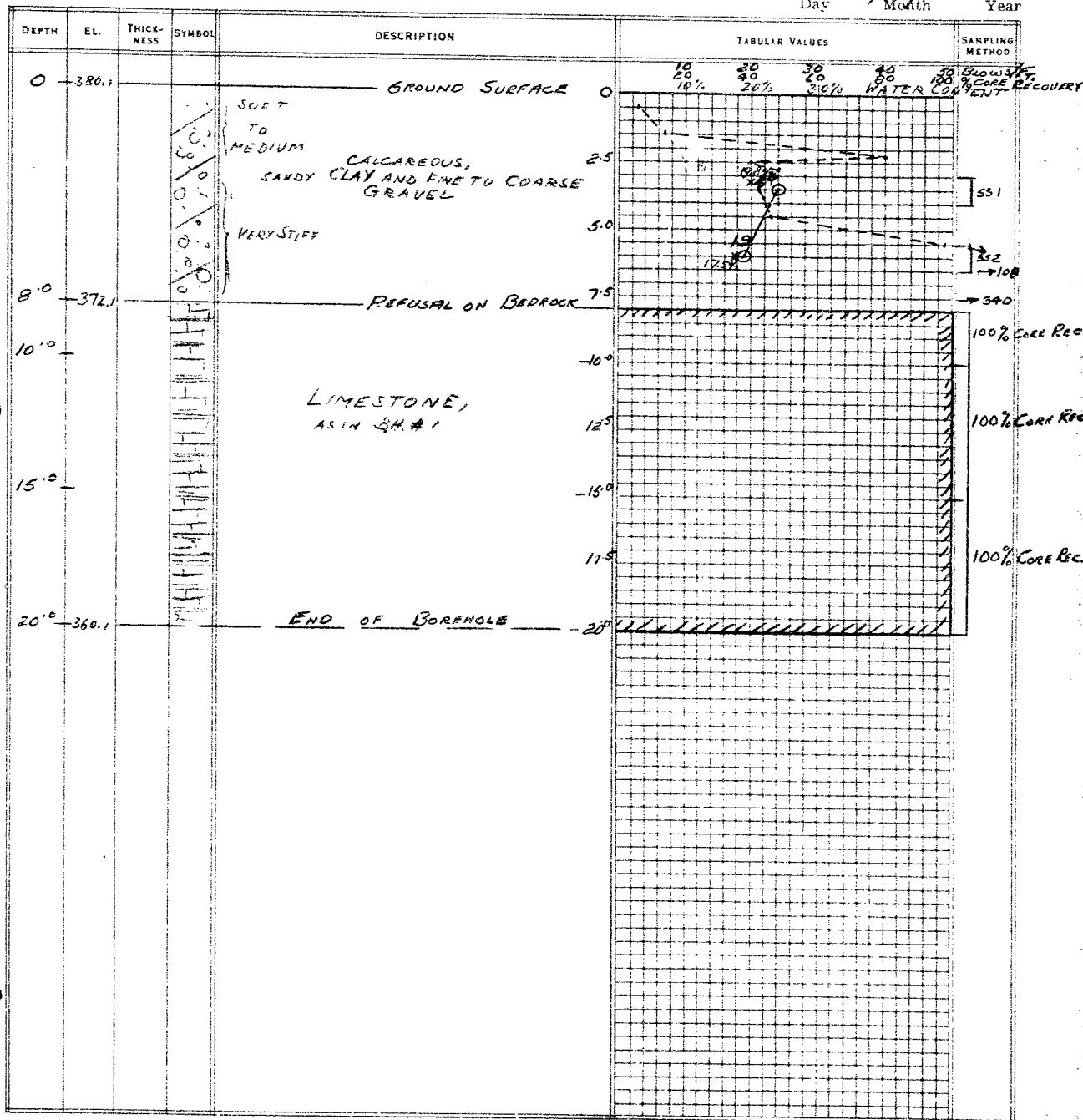
Hole Located: AS SHOWN ON ATTACHED SKETCH PLANHole Elevation: 381.0 Datum: M.S.L.Day 9/6/55 Month Year

Order No. 3500-246/5/23RACEY, MACCALLUM AND ASSOCIATES
LIMITEDM. CHEVRIER
DrillerHole Begun 2/6/55

Foundation Engineering Division

Hole Ended 2/6/55Engineering Data Sheet for Borehole: 5J. VOISIELE
HelperJob Name: TYENDINAGA TWP BRIDGE No. 3 - C.P.R.G.W. K.T.Job Located: PROPOSED HWY. No. 401 CROSSING OVER C.P.R. - 10 MILES E.N.E. OF BELLEVILLE

Checked by

Hole Located: AS SHOWN ON ATTACHED SKETCH PLANHole Elevation: 380.1' Datum: M.S.L.Day 9/6/55 Month Year

Order No.: ~~5-500-7-4/57-59~~ RACEY, MACCALLUM AND ASSOCIATES
LIMITED

M. CHEVRIER
Driller

Hole Begun 1/6/55 Foundation Engineering, Division

Hole Ended 1/6/55 Engineering Data Sheet for Borehole: 0

J. VOISELLE
Helper

Job Name: TYNDINAGA TR. BRIDGE No. 3 - C.P.R.

B.F.W. I.K.T.
Checked by

Job Located: PROPOSED HWY No. 401 CROSSING OVER C.P.R. - 10 MILES E.N.E. OF BELLEVILLE ONT.

Hole Located: AS SHOWN ON ATTACHED SKETCH PLAN

Hole Elevation: 381.1' Datum: M.S.L.

Day 9 / Month 6 / Year 55

