

#

55-F-2150

#

Hwy 4018 37

THURLLOW Twp.

BA 416

# RACEY, MACCALLUM AND ASSOCIATES LIMITED

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A COMPANY OWNED, DIRECTED AND OPERATED BY

## Consulting Engineers AND ASSOCIATED STAFF



MONTREAL: 4123 CHERBROOKE STREET WEST, FITZROY 5261  
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**Affiliations:**

THE E. B. ALLEN INSPECTION COMPANY  
ISOTOPE PRODUCTS LIMITED,  
RADIOGRAPHERS  
IRVING P. KRICK, PH.D.,  
METEOROLOGIST  
JACQUES POULIN,  
QUEBEC LAND SURVEYOR  
THE VIBRATION ENGINEERING COMPANY

REPORT NO. S-500-501/55/T-62-1

Toronto, Ontario,  
March 22nd, 1955.

Ontario Department of Highways,  
c/o T. O. Lazarides, Lount and Partners,  
79 Scollard Street,  
TORONTO, Ontario.

55F215C

RE: FOUNDATION INVESTIGATION -  
THURLOW TWP. BRIDGE NO. 5

Dear Sirs:

In accordance with your instructions we carried out the drilling of four (4) boreholes at the above site. The examination of the samples being now completed, we are pleased to report on our findings.

LOCATION OF SITE AND BOREHOLES (See enclosures Nos. 1 and 2)

The site of the Thurlow Township Bridge No. 5 is situated at the intersection of the proposed Highway No. 401 and Highway No. 37 about one and a half miles north of the town of Belleville, Ontario.

The location of the boreholes was shown on a sketch handed over to us by the client. The spotting of the boreholes and the levelling, with reference to data received by the Trenton D.H.O. Survey Department, was done by our engineer in the field. (For elevations see the attached Engineering Data Sheets).

DRILLING WORK

The drilling equipment was carried to the site and set up on February 17th, 1955. The last borehole was completed on February 25th, 1955. A Longyear diamond core drill was used for pipe driving and diamond drilling. Extra heavy duty pipe, of 3" I.D., was driven with a drive hammer to refusal on bedrock. Core drilling with AXT-size diamond bits was performed subsequently to a depth of 10' and 12' respectively. The core recovery was 100% of the drilled depth in rock.

The rock samples, kept in wooden boxes, will be stored for six months from the issue of this report. If no instructions are received to the contrary the samples will then be destroyed.

REPORT NO. S-500-501/55/T-62-1 Cont'd

The overburden, consisting of a brown loam with boulders, proved to be of only 2 feet or 2.5 feet depth and it was here that the drive pipe met refusal. This depth marks the surface of bedrock. The elevations, referring to M.S.L. datum, for the rock surface are:-

BH #1 EL. 304.9  
BH #2 EL. 304.4  
BH #3 EL. 304.1  
BH #4 EL. 305.3

The rock appeared to be a grey to dark grey, fossiliferous and argillaceous limestone, the dark grey beds being more argillaceous and shaly. The rock is laminated, the bedding is practically horizontal, and the beds are up to eight inches thick. The rock is solid and very sound, but it is to a certain extent fractured by a cleavage system. The surface layers of the rock seem to be more fractured due to weathering action. No mudseams were noticed.

The groundwater level, as measured in the boreholes, was very near to the surface or at only two feet depth respectively.

CONCLUSIONS

The shallow depth of the rock surface will permit the foundation to rest on bedrock. The bearing capacity of laminated rock of this kind is far beyond the needs of the proposed bridge structure. To ensure adequate shear resistance, however, it would be advisable to design stepped foundations preferably starting not higher than two foot deep in rock.

We trust that this information will be satisfactory. We shall be pleased to answer any questions to clarify our recommendations further if you deem it advisable.

Yours very truly,

RACEY, MacCALLUM AND ASSOCIATES LIMITED

*K. Tubbesing*

K. Tubbesing, P. Eng.

KT/PW

Original and

Two Copies

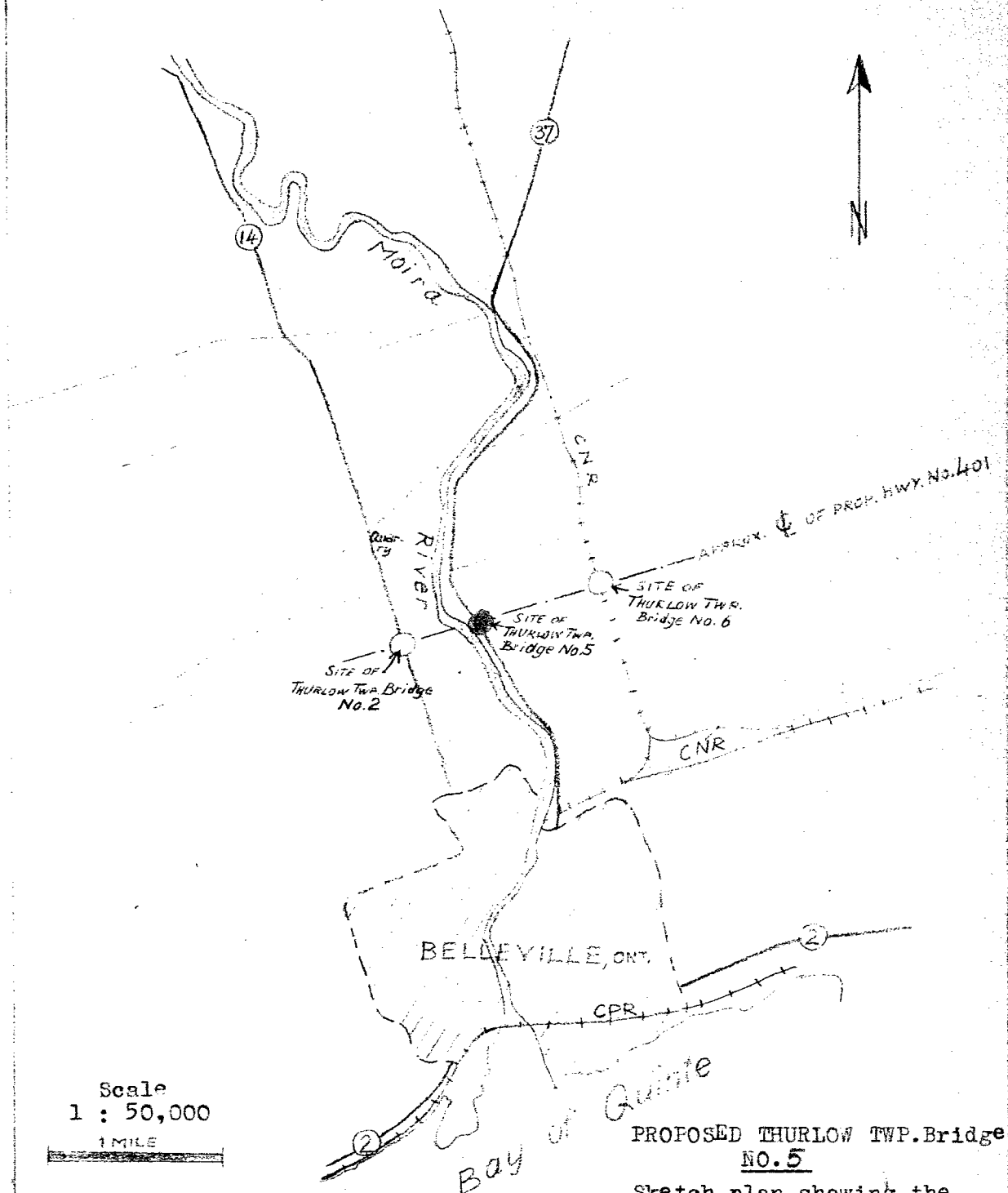
c.c.'s

- Messrs. T. O. Lazarides, Lount and Partners, Toronto, Ont.
- 2 - Messrs. Racey, MacCallum and Associates Ltd., Montreal, P.Q.
- 1 - Soils Engineer

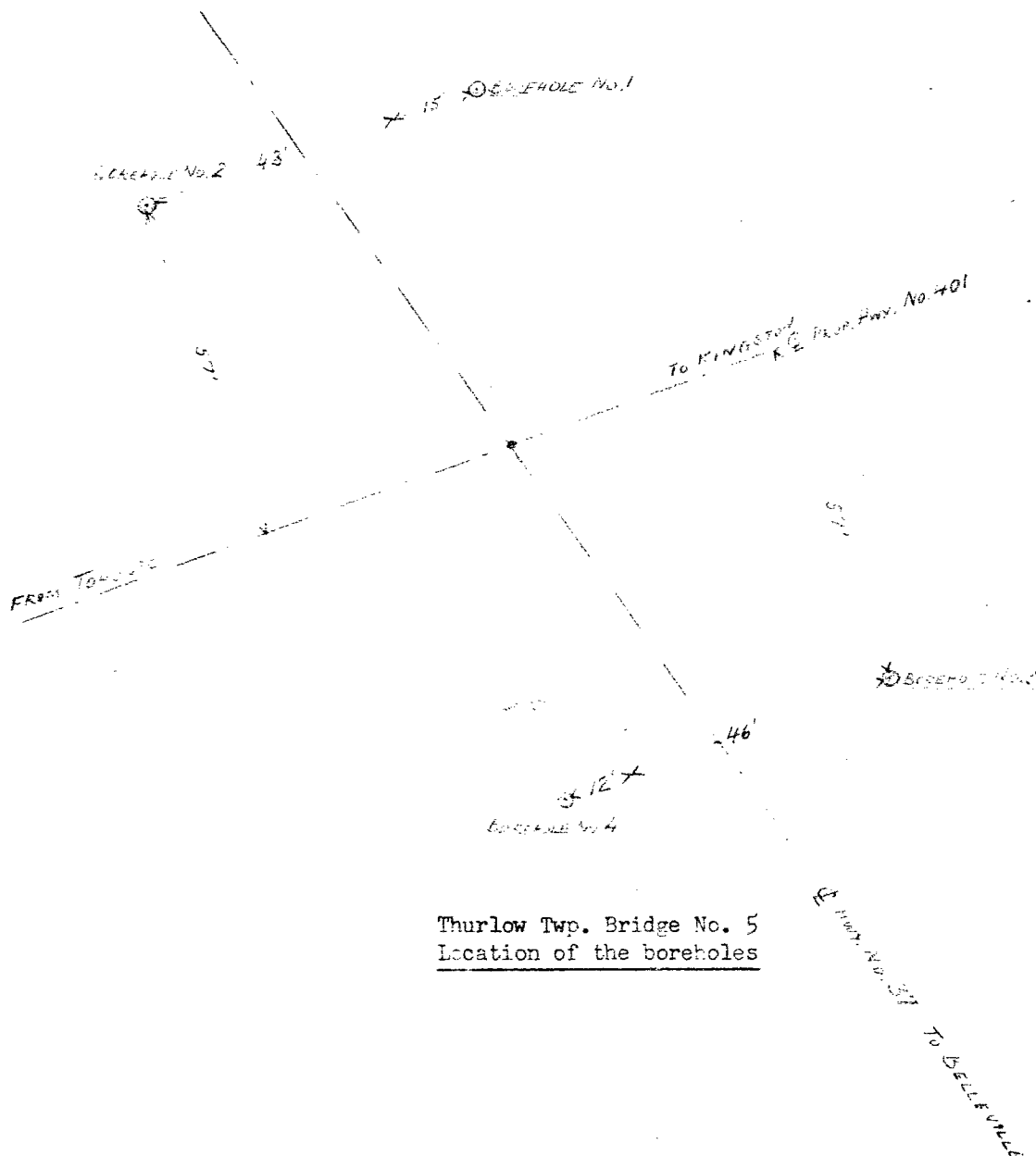
S-500-501/55/T-62

PREP. & DRAWN: K.T.

Encl. No. 1



S-500-501/55/T-62



RACEY, MACCALLUM AND ASSOCIATES LIMITED

Order No.: S-500-501/55/T-62 RACEY, MacCALLUM AND ASSOCIATES

M. LEGER

Dated

Limited

Driller

Day Month Year

Foundation Engineering Division

Hole Begun: 21/2/55

R. CONSTANTINEAU

Hole Ended: 22/2/55Engineering Data Sheet for Borehole: /

Helper

Job Name: THURLOW TWP. BRIDGE NO. 5

K. TUBBESING

Job Located: INTERSECTION HWY. NO. 37 AND PROP. HWY. NO. 401; ~2 MILES N. OF BELLEVILLE, ONT.

Checked by

Hole Located: AS SHOWN ON ATTACHED SKETCH PLAN.Hole Elevation: 306.9 Datum: M.S.L.

5/2/55

Day Month Year

DEPTH	EL.	THICKNESS	SYMBOL	NARRATIVE	TANGENT VALUES	SAMPLING				
					20 20%	40 40%	60 60%	80 80%	100 100%	BLOWS/FT. CORE RECD VERY
0	306.9			GROUND SURFACE	0					
				OVERBORDEN						
2'	304.9			REFUSAL (BEDROCK)	2.5					100%
				GREY TO DARK GREY,						
				ARGILLACEOUS, FOSSILIFEROUS						
				LIMESTONE.	5					100%
				DARK GREY BEDS MORE ARGILLACEOUS						
				AND SHALY.						
				BEDDING CLOSE TO THE HORIZONTAL.	7.5					100%
				BEDS UP TO 8" THICK.						
				VERY SOUND ROCK.	10					100%
					12.5					
					15					
14.5	292.4			END OF BOREHOLE						

ADDITIONS

WATER SATURATED M. MOST W. FUND.

J. SKY

SS, - PL. 20 CM. TW. TW. WALL (SAMPLES)

F. LUSK

Driller

W. LINTON

Engineering Data Sheet for Hierarchy: 2

Helper

K. TUBBESING

Checked by

5/3/55

Day Month Year

DEPTH	EL.	THICKNESS	SYMBOL	NARRATIVE	TOLERANCE VALUES					SAMPLING
					20	40	60	80	100	BLOWS/FT.
					20%	40%	60%	80%	100%	CORE RECOVERY
- 0	306.9			GROUND SURFACE	0					
				OVERBURDEN						
- 2.5'	304.4			REFUSAL (BEDROCK)	2.5					
				FOSSILIFEROUS, ARGILLACEOUS, GREY TO DARK GREY LIMESTONE.	5'					100%
				DARK GREY BEDS MORE ARGILLACEOUS AND SHALEY.	7.5					100%
				BEDDING CLOSE TO THE HORIZONTAL.						
				BEDS UP TO 8" THICK.	10'					100%
				VERY SOUND ROCK						
- 12.5	294.4			END OF SPK. HOLE	12.5					

REMARKS:  
IN WATER: S SATURATED IN 40" H. PUMP  
D DRY  
S 9, SPW 0.004, TW 1.111 (MILLER)

Order No.: S-500-501/55/T-62

Dated

Day Month Year

Hole Begun 17/2/55

Hole Ended 19/2/55

Engineering Data Sheet for Borehole: 3

R. CONSTANTINEAU

Helper

Job Name: THALON TWA BRIDGE NO. 5

K. TUBBESING

Job Located: INTERSECTION HWY. NO. 37 AND PROP. HWY. NO. 401 - 2 MILES N. OF BELLEVILLE, ONT.

Checked by

Pole Located: SEE ATTACHED SKETCH PLAN

Hole Elevation: 306.6      Return: M.S.L.

5/3/55

Day Month Year

DEPTH	E.	THICKNESS	SYMBOL	NARRATIVE	TORQUE VALUES				SAMPLING
					20 20%	40 40%	60 60%	80 80%	BLOGS/F CORE RECU
-0	306.6			GROUND SURFACE	0				
				OVERBURDEN					
-2'	304.6			WATER LEVEL BEFORE START OF WORK, 10/2/55					
-2.5	304.1			REFUSAL (BEDROCK)	2.5				100%
				GREY TO DARK GRAY					100%
				Fossiliferous AND ARGILLACEOUS	5'				100%
				LIMESTONE.					
				DARK GRAY BEDS MINE ARGIL-	7.5				100%
				LACEOUS AND SHALEY,					
				BEDDING CLOSE TO THE HORIZONTAL	10'				100%
				SEDG UP TO 8" THICK.					
				VERY SOUND ROCK.					100%
					12.5				
-27'	-293.9			END OF BOREHOLE	15'				



Order No. S-500-501/55/T-62

RACEY, MacCALLUM AND ASSOCIATES

M. LEGER

Dated

Limited

Driller

Day Month Year

Foundation Engineering Division

Hole Began 19/2/55

R. CONSTANTINEAU

Hole Ended 21/2/55

Engineering Data Sheet for Borehole: 4

Helper

Job Name: THURLOW TWP. BRIDGE NO. 5

K. TUBBESING

Job Located: INTERSECTION AWD. NO. 37 AND PROP. HWY. NO. 401; ~ 2 MILES N. OF BELLEVILLE, ONT. Checked by

Hole Located: AS SHOWN ON ATTACHED SKETCH PLAN

Hole Elevation: 307.3 Return: H.S.L.

5/3/55

Day Month Year

DEPTH	EL.	THICKNESS	SYMBOL	NARRATIVE		TOLERANCE VALUES					SAMPLING
						20%	40%	60%	80%	100%	
0	307.3			GROUND SURFACE	0						BLOWS/FT. 100% CONE RECOVERY
				OVERBANKS							
2'	305.3			REFUSAL (BEDROCK)	2.5						100%
				GRAY TO DARK GREY							
				TOYALIFEROUS AND ARGILLACEOUS	5'						100%
				LIMESTONE.							
				DARK GREY BEDS MORE ARGIL-							100%
				LACEOUS AND SHALY.	7.5						100%
				BEDDING CLOSE TO THE HORI-							100%
				ZONTAL.							
				BEDS UP TO 8" THICK.	10'						100%
				VERY SOUND ROCK.							
					12.5						100%
14.2	296.2			END OF BOREHOLE	15'						

ADDITIONAL

WATER - 3 SATURATED M. 400 T. W. 4000

J. 100

S. 1000