

#59-F-222C

BRIDGE #13

OTTAWA

QUEENSWAY

BAYSWATER AVE.

MCROSTIE & ASSOCIATES

CONSULTING ENGINEERS AND SURVEYORS

OTTAWA 1
CANADA

G. C. MCROSTIE, B.A.Sc., O.L.S., P. ENG., M.E.I.C.
ASSOCIATES
A. SETO, B. ENG., P. ENG., M.E.I.C.
G. E. B. SINCLAIR, B.Sc., D.L.S., P. ENG., M.E.I.C.
W. J. MACLEAN, B.A., D.L.S., O.L.S.
ASSOCIATE CONSULTANT
D. F. COATES, M. ENG., M.A., P. ENG., M.E.I.C.

393 BELL STREET
TELEPHONE CE. 2-5334

59-F-2226

FOUNDATION INVESTIGATION - BRIDGE NO. 13

1. TERMS OF REFERENCE

We were requested by the Ottawa Office of De. Leuw Cather & Company of Canada Limited to investigate the foundation conditions at Bridge No. 13 where a reinforced concrete structure will carry the Queensway over Bayswater Avenue.

2. RECOMMENDATIONS

2.1 Soil and Rock Strengths

Soils would not likely be used for support of the bridge abutments but for the wing walls of the structure at higher elevations soil materials were found. Bearing values can be recommended as follows:

East abutment, on limestone below elevation 228	30,000 POUNDS PER SQUARE FOOT
West abutment, on weathered or fractured rock below elevation 228	70,000 POUNDS PER SQUARE FOOT, but construction grout- ing required.
West abutment, on weathered or fractured rock below elevation 228	10,000 POUNDS PER SQUARE FOOT, without construction grouting
Wing walls, on weathered rock or dense till below elevation 234	10,000 POUNDS PER SQUARE FOOT

2.2 Construction Grouting

If it is necessary to develop the maximum rock bearing values, it would also be necessary to drill grout

holes in the area of the footing bases to a depth of at least 10 feet and grouting attempted in these holes so that any possible openings in the rock would be filled. If the lower capacities recommended above are still economical, grouting would not be required since the bearing capacity of the material in possible seams would not be exceeded.

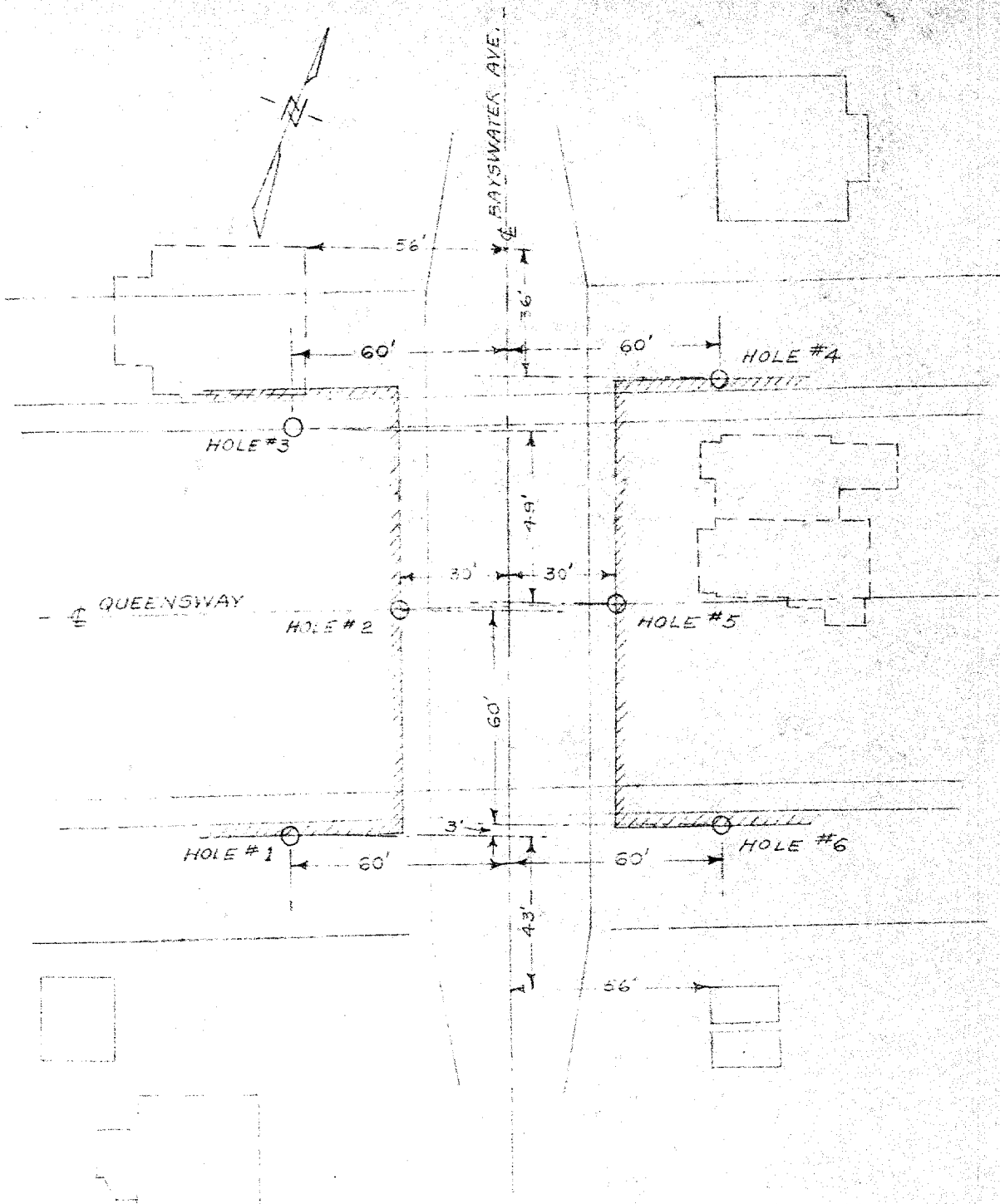
2.3 Groundwater

When the upper rock layers are pervious, a flow of groundwater can be expected during wet seasons even though test holes are dry during the present low groundwater conditions. Pumping from sumps or pits within the excavation would be a suitable method of groundwater control provided that sufficient capacity is kept available at the site.

3. SITE INVESTIGATION

Six boreholes were made at the site with our test drilling rig in the locations shown on Plate 1. Two inch split barrel samples were taken in the non-cohesive soil layers and the samples visually classified. Standard penetration tests were performed in the boreholes and groundwater levels were observed during the test drilling program. Rock at the site was diamond drilled and cores were recovered for inspection and logging. Detailed measurements of core recovery percentages were made to aid in evaluating the rock structure, and a careful watch was kept for drops encountered during the drilling to detect the presence of seams of unconsolidated material.

Soil and rock conditions are shown in detail on Plates 2 to 7 but can be generalized as consisting of a few feet of dense glacial till underlain by limestone rock of the Ottawa Formation. The upper rock surface is weathered and evidence of fracturing exists for several feet below the surface. The fractured structure was found to exist at greater depths in the westerly abutment area than in the easterly area. Several drops were observed during the drilling program and these can be taken as an indication of possible seams. Precautions required by the presence of seams have been covered in the recommendations given above.



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CONSULTING ENGINEERS

BOREHOLE LOCATIONS
BAYSWATER AT QUEENSWAY

SCALE : 1" = 40'

PLATE 1

McROSTIE & ASSOCIATES

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

QUEENSWAY & BAYSWATER
BRIDGE No.13

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 236.9' DATE APRIL 28, 29/59

HOLE NO.

REMARKS B.M. TOP OF WEST ARM OF FIRE HYDRANT ON WEST SIDE OF
BAYSWATER SOUTH OF YOUNG ST. (EL. 246.63'). BOREHOLE DRY AFTER
3 HOURS

1

UNCONFINED COMPRESSIVE STRENGTH KIPS/FT. ²	SMALL SCALE PENETROMETER KIPS/FT. ²	STANDARD PENETRATION BLOWS/FT.	SAMPLE NUMBER	DESCRIPTION OF SOIL	DEPTH IN FEET	ELEVATION	PROBING OR VANE TEST	
						LB. HAMMER	NO CASING
						INCH DROPINCH DIA. ROD
							BLOWS PER FOOT OR	SHEAR STRENGTH IN KIPS PER FT. ²
				GROUND SURFACE —				
					0'	236.9'		
				FILL				
				LIMESTONE (WEATHERED) (CORE RECOVERY 43%)	1.8'	235.1'		
				LIMESTONE (WEATHERED) (CORE RECOVERY 47%) (CALCITE SEAMS)	3.1'	233.8'		
				LIMESTONE (WEATHERED) (CORE RECOVERY 67%)	5.6'	231.3'		
				LIMESTONE (WEATHERED) (CORE RECOVERY 75%)	7.3'	229.6'		
				LIMESTONE (CORE RECOVERY 100%)	13.1'	223.8'		
				LIMESTONE (CORE RECOVERY 100%)	16.3'	220.6'		
				LIMESTONE (CORE RECOVERY 100%)	18.5'	219.4'		
				BOTTOM OF HOLE —				
							% WATER CONTENT	PLATE
							NATURAL ○	
							LIQUID LIMIT □	
							PLASTIC LIMIT △	2

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

QUEENSWAY & BAYSWATER
BRIDGE No. 13

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 239.6'

DATE APRIL 29, 1959

HOLE NO.

REMARKS SEE PLATE No 2 FOR B.M. REFERENCE

BOREHOLE DRY OVERNIGHT

2

UNCONFINED COMPRESSIVE STRENGTH KIPS/FT. ²	SMALL SCALE PENETROMETER KIPS/FT. ²	STANDARD PENETRATION BLOWS/FT.	SAMPLE NUMBER	DESCRIPTION OF SOIL	DEPTH IN FEET	ELEVATION	PROBING OR VANE TEST	
							LB. HAMMER INCH DROP	NO CASING INCH DIA. ROD BLOWS PER FOOT OR SHEAR STRENGTH IN KIPS PER FT. ²
				GROUND SURFACE	0'	239.6'		
				FILL	1.5'	238.1'		
			37 21	DENSE GRAVELLY TILL	3.5'	236.1'		
				WEATHERED LIMESTONE (CORE RECOVERY 65%)	5.1'	234.5'		
				LIMESTONE (CORE RECOVERY 75%)	10.6'	229.0'		
				LIMESTONE (CORE RECOVERY 75%)	13.6'	226.0'		
				LIMESTONE (SOME VERTICAL JOINTS) (CORE RECOVERY 71%)	15.1'	224.5'		
				BOTTOM OF HOLE				

% WATER CONTENT					PLATE
20	40	60	80	100	
NATURAL					3
LIQUID LIMIT					
PLASTIC LIMIT					

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

QUEENSWAY & BAYSWATER
BRIDGE No.13

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 239.7'

DATE APRIL 29, 30, 1959

HOLE NO.

REMARKS SEE PLATE No 2 FOR B.M. REFERENCE

BOREHOLE DRY OVERNIGHT

3

UNCONFINED COMPRESSIVE STRENGTH ² KIPS/FT.	SMALL SCALE PENETROMETER KIPS/FT. ²	STANDARD PENETRATION BLOWS/FT.	SAMPLE NUMBER	DESCRIPTION OF SOIL	DEPTH IN FEET	ELEVATION	PROBING OR VANE TEST	
						 LB. HAMMER	NO CASING
						 INCH DROP INCH DIA. ROD
							BLOWS PER FOOT OR SHEAR STRENGTH IN KIPS PER FT. ²	
				GROUND SURFACE	0'	239.7'		
				FILL				
					2.5'	237.2'		
				DENSE TILL	3.4'	236.6'		
				LIMESTONE (WEATHERED)				
				(CORE RECOVERY 22%)	4.7'	235.0'		
				LIMESTONE				
				(CORE RECOVERY 99%)	6.1'	233.6'		
				LIMESTONE				
				(CORE RECOVERY 79%)	8.1'	231.6'		
				LIMESTONE				
				(CORE RECOVERY 67%)				
				(CALCITE SEAMS)	9.6'	230.1'		
				FRACTURED LIMESTONE				
				(CORE RECOVERY 72%)				
					15.1'	224.6'		
				LIMESTONE				
				(CORE RECOVERY 91%)				
					19.7'	220.0'		
				BOTTOM OF HOLE				
							20 40 60 80 100	
							% WATER CONTENT	PLATE
							NATURAL <input type="radio"/>	
							LIQUID LIMIT <input type="checkbox"/>	
							PLASTIC LIMIT <input type="triangle"/>	
								4

DE LEUW, CATHER & COMPANY
OF CANADA LIMITED
CONSULTING ENGINEERS
TORONTO OTTAWA

226 SPARKS STREET
OTTAWA 4, ONTARIO
CENTRAL 3-9663

June 29th, 1959.

Mr. F. I. Hewson,
Consultant Liaison Engineer,
Bridge Design Office,
Department of Highways,
280 Davenport Road,
Toronto 5, Ontario.

Dear Mr. Hewson:

Re: Bridge No. 13 at Bayswater Ave.
Ottawa Queensway, District #9

We enclose herewith three copies of McRostie and Associates soils foundation Report No. SF 428 for the above structure.

Yours very truly,

DE LEUW, CATHER & CO. OF CANADA LIMITED.

Leon J. Marshall

Leon J. Marshall, P. Eng.,
Senior Structural Engineer.

LJM/m:s
Encl.