

62-F-254M

ROCHESTER STREET

OTTAWA QUEENSWAY

MCROSTIE & ASSOCIATES LTD.

CONSULTING ENGINEERS

OTTAWA 1

CANADA

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SUPPLEMENTARY SUBSURFACE INVESTIGATION FOR THE PROPOSED STRUCTURE AT ROCHESTER STREET AND THE OTTAWA QUEENSWAY

1. TERMS OF REFERENCE

We were requested by the Ottawa office of De Leuw Cather & Company of Canada Limited, to undertake a subsurface investigation verifying the depth to rock below the western wing walls of the structure (bridge no. 16) to carry the Queensway over Rochester Street. A subsoil investigation for the entire structure has been carried out previously by J. D. Paterson, Consulting Engineer, and his report No. S-109-59 was made available to us. Our report was to include design recommendations for the foundations of only the western wing walls.

2. CONCLUSIONS AND RECOMMENDATIONS

2.1 Foundation Type

Footings resting on the weathered and fractured limestone rock would be a practical type of foundation for the wing walls of the western abutment. The rock surface slopes rapidly to the west and therefore stepped footings can be anticipated. Footing levels can be expected to vary between elevation 212 (borehole no. 1 J.D. Paterson) and elevation 192 at borehole no.7.

2.2 Rock Strength

An allowable bearing capacity of 10,000 POUNDS PER SQUARE FOOT may be assumed for the rock used as support for the western wing walls of the structure. This low bearing capacity is stated in view of the multiple fractures observed in the core recovered, the drops recorded during drilling and the low core recovery.

2.3 Construction Precautions

The structure and in particular perhaps, the western abutment is located very near a known fault area. Variations in the rock surface level, and therefore footing elevations, between boreholes may be expected since the western wing walls, at least, spread above the fault zone; consequently contract payment procedures should make clear which party is to bear the cost of these variations.

3. PIPE INVESTIGATION

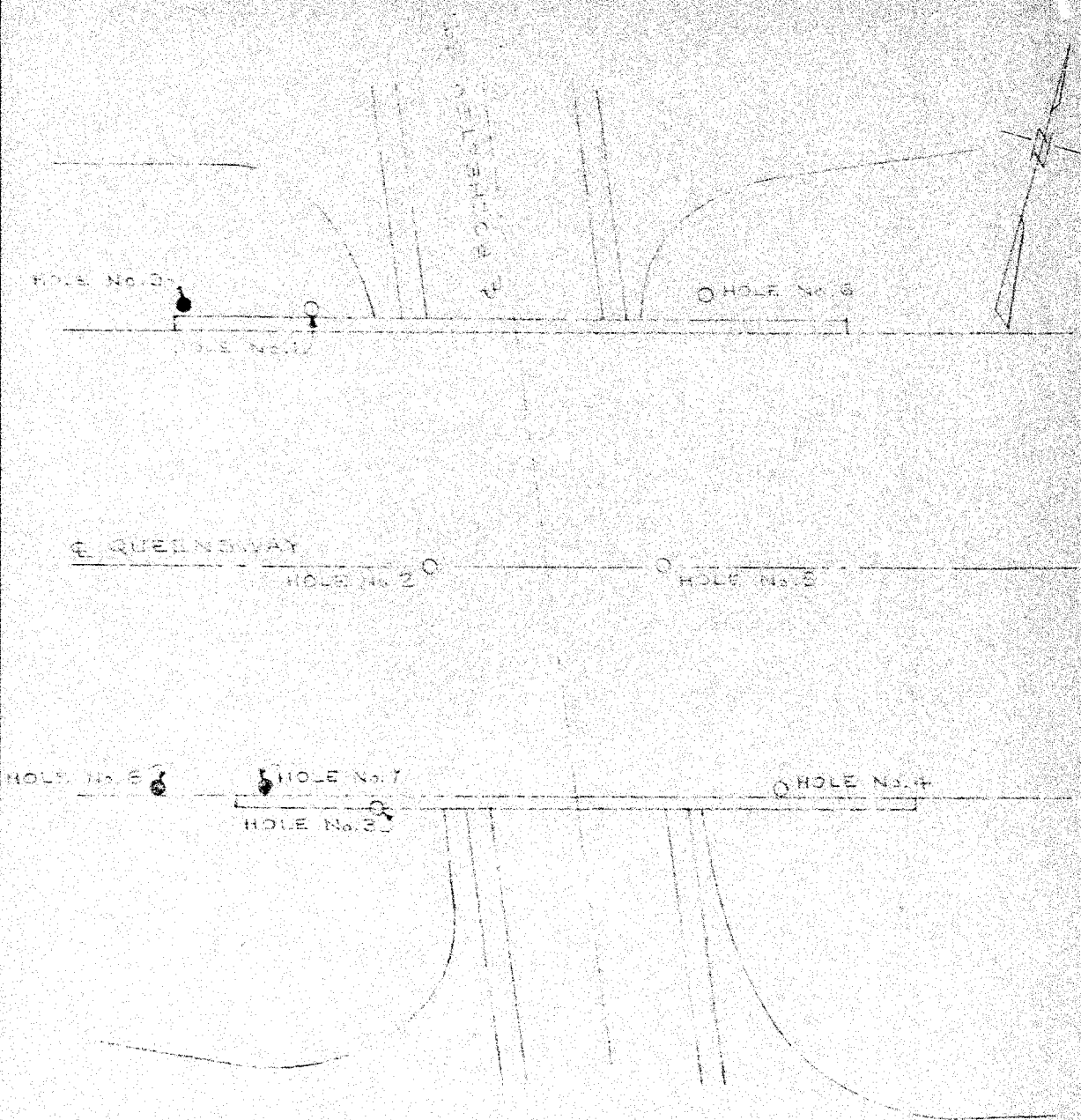
3.1 Field Work

Three boreholes were made at the site in the approximate locations shown on plate no. 1. The actual borehole locations were to be determined by De Louw Cather & Company Limited. A truck mounted drilling rig operated by J.B. Dufresne & Co., Ltd., carried out the boring operations under our supervision. 31 casing with diamond bits were used to drill through the thick frost and rocky fill layer at this site. Split barrel samples were retrieved from the overburden (fill) where possible. The samples were brought to our laboratory for examination and classification.

Bedrock, encountered in the three boreholes, was diamond drilled and 12 size cores were recovered for inspection and logging. Core recovery percentages were determined to assist in evaluating the structural properties of the rock. A careful watch was maintained for drops of drill rods and loss of drill water during the drilling to detect the presence of seams in the rock formation.

3.2 Observations

The subsurface profile as revealed by the three boreholes is shown on the accompanying plates No. 2, 3 and 4. The subsoil consisted of fill (mainly sand, gravel and boulders) of variable thickness (2.5 feet to 12.5 feet) underlain by weathered and fractured limestone rock. The rock contains multiple fractures predominantly filled with calcite, some shale partings and several seams. The area investigated is located above a fault zone and consequently only a low strength value can be assigned to this rock.



NOTE:

BOREHOLES NO. 1 TO 6 INCLUSIVE
MADE BY J.D. PATTERSON, REPORT NO. S-103-F3.
BOREHOLES NO. 7, 8, 9 (LOCATED BY DE LEUW, CATHAR & CO.)
MADE BY MCROSTIE & ASSOCIATES LTD.

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CONSULTING ENGINEERS

BOREHOLE LOCATIONS
(APPROXIMATE)
ROCHESTER & QUEENSWAY

SCALE 1" = 40'

PLATE 1

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SOIL PROFILE AND SUMMARY

OF FIELD AND LABORATORY TESTS

RIVERVIEW & QUEENSWAY

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 193.6

DATE JAN. 12, 1962

HOLE NO.

REMARKS GROUND SURFACE ELEVATION DETERMINED BY DE LEW. CATHY & CO.

7

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 DROP	INCH DIA. ROD
GROUND SURFACE							BLOWS PER FOOT OR	SHEAR STRENGTH IN KIPS PER FT. ²
					0'	193.6'		
				FILL (SAND FILL & BOULDERS)				
	1/2" DROP			WEATHERED & FRACTURED LIMESTONE	7.5'	192.1'		
				CORE RECOVERY - 74%	13.3'			
				FRACTURED LIMESTONE				
	1" DROP			CORE RECOVERY - 70%	16.3'	191.4'		
	2" DROP			CORE RECOVERY - 50%	21.5'			
				CORE RECOVERY - 67%	28.3'	193.3'		
				BOTTOM OF HOLE				
R - REMOULDED							% WATER CONTENT NATURAL <input type="checkbox"/> LIQUID LIMIT <input type="checkbox"/> PLASTIC LIMIT <input type="checkbox"/>	
							PLATE 2	

SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

RECEIVED
JAN 10 1964
U.S. DEPARTMENT OF AGRICULTURE
WASHINGTON, D.C.

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 192.7

DATE JAN. 13, 1962

HOLE NO.

REMARKS: SEE PLATE No. 2

2

[illegible]

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SOIL PROFILE AND SUMMARY OF FIELD AND LABORATORY TESTS

ROCHESTER & QUEENSWAY

ELEVATION OF GROUND SURFACE (ZERO DEPTH) 211.2

DATE JAN. 15, 1962

HOLE NO.

REMARKS SEE PLATE No. 2

C

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
GROUND SURFACE							BLOWS PER FOOT OR	SHEAR STRENGTH IN KIPS PER FT. ²
				FILL (SAND GRAVEL SHOULDER)	0.0	211.2		
				WEATHERED & FRACTURED LIMESTONE	3.5	208.7		
				CORE NO. 1 - 151%	4.4			
				CORE NO. 2 - 75%	5.2			
				CORE NO. 3 - 45%	12.1	104.2		
				CORE NO. 4 - 25%	15.6			
				CORE NO. 5 - 50%	17.1			
				FRAGMENT LIMESTONE	19.0			
				CORE NO. 6 - 01%	20.5	99.2		
				BOTTOM OF HOLE				

R - REMOULDED

% WATER CONTENT

NATURAL ○

LIQUID LIMIT □

PLASTIC LIMIT △

PLATE

4