59-F-217C

W.P. # 941-59

BOOTH ST.

QUEENSWAY

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

226 SPARKS STREET
OTTAWA 4, ONTARIO
CENTRAL 3-9663

Our Ref. 20-Q-3(b)

December 11th, 1959

Mr. F. I. Hewson,
Consultant Liaison Engineer,
Bridge Design Office,
Department of Highways of Ontario,
Parliament Buildings,
Toronto, Ontario.

Dear Sir:

Bridge No. 17 at Booth Street
W.P. No. 941-59 - Queensway

Enclosed are three copies of John D. Patterson's Soils Foundation Investigation Report No. S-108-59 for the above structure.

Yours very truly,
DE LEUW, CATHER & CO. OF CANADA LIMITED

Léon J Marshall

Leon J. Marshall
Chief Bridge Engineer

LJM/rm
Encls.

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MEMBER
PROFESSIONAL ENGINEERS OF
ONTARIO
AMERICAN CONCRETE INSTITUTE

JOHN D. PATERSON, B.Sc., P.ENG.
CONSULTING ENGINEER AND GEOLOGIST
250 BESSERER STREET
OTTAWA 2, ONT.

59 - F - 217c

REPORT

SOIL INVESTIGATION

SITE OF BRIDGE NO. 17, AT BOOTH STREET,

THE QUEENSWAY

FOR

DE LEUW, CATHER & COMPANY OF CANADA, LIMITED,

CONSULTING ENGINEERS

Table of Contents

Report No. S - 108-59.

Ottawa, December 9th, 1959.

1. Introduction:

At the request of De Leuw, Cather and Company of Canada, Limited, Consulting Engineers for the design of the Queensway, Ottawa, a soil investigation was conducted at the site of proposed Bridge No. 17 located at Booth Street.

2. Field Work Procedure:

In accordance with Sketch Plan No. SK III - 30, dated July, 1958, seven test holes were put down at the designated locations — with two exceptions — Hole No. 1 was drilled a few feet to the southeast and Hole No. 7 a few feet to the southwest, because of the position of the existing C.N.R.tracks. The Test Borings Plan included in this report show the test hole locations.

Since bedrock is very close to the ground surface in this area the soil overlying bedrock was simply classified and no samples were taken. The standard procedure was used for recovering samples of the bedrock by diamond drilling and the recovery of core samples.

All test holes were drilled to a depth of approximately 5 feet below the proposed footing elevations which had been established by the Design Engineers. All core samples were retained in boxes for detailed examination in the laboratory. A standard drilling rig mounted on a truck was used for this work, which was under the supervision of an engineer member of our staff.

3. Sampling and Testing:

Samples of the soil overlying bedrock were examined in the field and classified but no laboratory tests were performed. Bedrock core samples retained in core boxes were examined in the laboratory for possible fault zones, fissures, etc., and the rock was classified mineralogically.

In view of the similarity of the rock to the rock examined and tested at Rochester Street (Bridge No. 16 — our Report No. S 109-59), no compressive strength tests were performed. Rochester Street is approximately 440 feet west of Booth Street.

4. Observations:

(a) Soil and Rock Types

The soil mantle overlying bedrock at this location is very thin and ranges in thickness from 2' 4" to 3' 6". The original soil, as noted in Holes 1 and 7, is a boulder till but where the test holes were drilled in the vicinity of existing houses the soil is a mixture of miscellaneous fill, boulders, clay and sand. The bedrock horizon is relatively flat with elevations ranging from 214.0 to 217.0.

The bedrock is limestone containing some thin shale bands and with some minor carbonate replacement and mineralization. Geologically, it is the typical Ottawa Formation of the Trenton and Black River Sub-Epoch in the Ordovician Period. No structural weaknesses were noted at this site. Below is shown the elevation of the bedrock at each of the test holes:

Hole No.	Bedrock Elevation
1	214.5
2	214.0
3	215.8
4	215.0
5	215.2
6	216.1
7	217.0

The detail of the investigation is shown on the Soil Profile and Laboratory Test Sheets included in this report.

(b) Ground Water

The ground water level is not too well defined since surface drainage conditions vary considerably and it is likely that the water levels as noted in the test hole. were influenced by surface conditions. The water levels noted in the test holes varied from 2 feet to 4½ feet below the present ground surface.

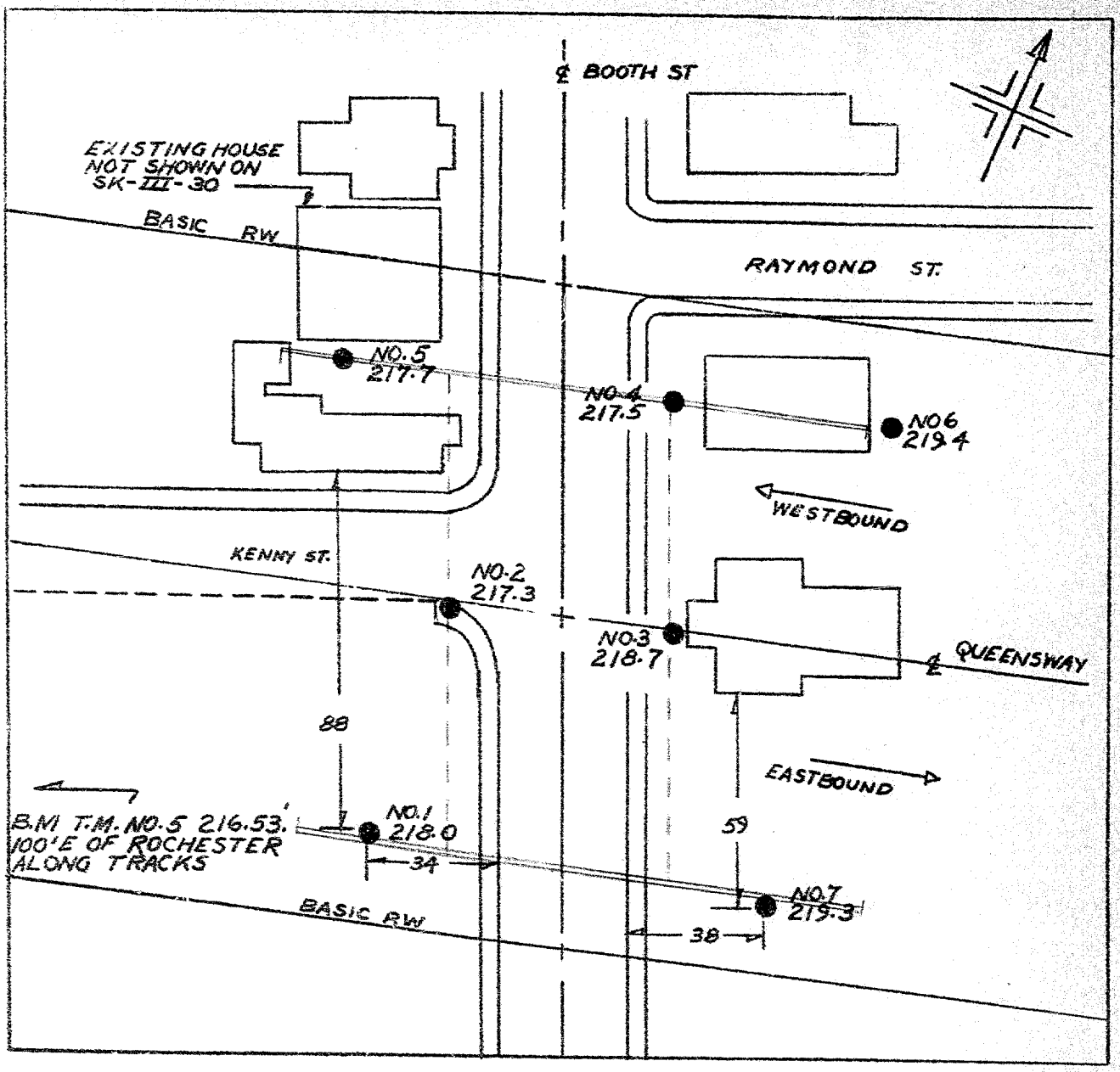
5. Conclusions and Recommendations:

The bedrock as found at this location is quite satisfactory for the support of the proposed structure. There are no unusual structural features and the bedding planes are relatively flat-lying. As mentioned previously, in view of the proximity to Rochester Street and the similarity of formation further strength tests were not considered necessary. The recommended maximum loading on unweathered rock at this location is 40,000 lbs. per square foot.

J. D. Paterson, P. Eng.

REGISTERED PROFESSIONAL ENGINEER
J. D. PATERSON
PROVINCE OF ONTARIO

JDP/MMC.



TEST BORING PLAN
QUEENSWAY
BRIDGE NO.17 AT BOOTH ST.
OTTAWA, ONT.

SCALE 1"=40' NOV. 1959

JOB NO C-44-M STAGE III.

PLAN TAKEN FROM SK-III-30

JOHN D. PATERSON
CONSULTING ENGINEER
OTTAWA CANADA

SOIL PROFILE
&
LABORATORY TESTS

Location: Bridge No. 17 - Booth Street, The Queensway.

ELEVATION (Zero Depth): 218.0
Remarks: Test Boring

Sheet No. 1 of 7
Hole No. 1

Borings by: F.E.Johnston Drilling Co.,Ltd. Date: Nov. 23, 1959.

BLOWS PER FOOT	SOIL DESCRIPTION	Samples Type	Samples No.	Unconf. Comp. Strength Tons/Sq Ft.	Depth in Feet	ELEV.	MOISTURE CONTENT PER CENT. 30 40 50 60 70
	Ground Surface 0				0	218.0	
	Boulder Till				1		
					2		
					3	215.0	
	3'6"					214.5	(Rock) Plugged and dr at 3'6".
	Bedrock				4		
					5		
	Limestone with thin bands of interbedded shale up to 2 inches thick. Minor carbonate replacement and slight evidence of mineralization.	Core		94% Recovery	6		
					7		
					8	210.0	Footing Elevation
					9		
					10		
					11		
					12		
					13	205.0	
	13'6"				14		
					15		

JOHN D. PATERSON
CONSULTING ENGINEER
OTTAWA CANADA

SOIL PROFILE
&
LABORATORY TESTS

Location: Bridge No. 17 - Booth St., The Queensway.

ELEVATION (Zero Depth): 217.3
Remarks: Test Borings

Sheet No. 2 of 7

Hole No. 2

Borings by: F. E. Johnston Drilling Co., Ltd. Date: Nov. 23,1959.

BLOWS PER FOOT	SOIL DESCRIPTION	Samples Type	Samples No.	Unconf. Comp. Strength Tons/Sq.Ft.	Depth in Feet	ELEV.	MOISTURE CONTENT PER CENT. 30 40 50 60 70
	Ground Surface 0				0	217.3	
	Fill Material - Clay and Angular Cobbles				1		
					2	215.3	
						215.0	Footing Elevation
	3'3"				3	214.0	(Rock)
	Bedrock				4	212.8	Ground Water Level 4'5".
	Limestone with inter-banded shale layers up to 3 inches thick. Minor carbonate and mineralisation replacement.	Core		92% Recovery	5		
					6		
					7	210.0	
	8'2"				8		
					9		
					10		

JOHN D. PATERSON
CONSULTING ENGINEER
OTTAWA CANADA

SOIL PROFILE
&
LABORATORY TESTS

Location: Bridge No. 17 - Booth Street, The Queensway.

ELEVATION (Zero Depth): 218.7
Remarks: Test Borings

Sheet No. 3 of 7

Borings by: F.E.Johnston Drilling Co., Ltd. Date: Nov. 25, 1959.

Hole No. 3

BLOWS PER FOOT	SOIL DESCRIPTION	Samples Type	Samples No.	Unconf. Comp. Strength Tons/Sq.Ft.	Depth in Feet	ELEV.	MOISTURE CONTENT PER CENT. 30 40 50 60 70
	Ground Surface 0				0	218.7	
	Black Top Soil 1				1		
	Fill - Boulders & Clay				2		Ground Water Level 2'6"
	2'10"					216.2	
						215.8	(Rock)
	Bedrock Limestone with minor shale. One band 1 inch thick. Minor carbonate replacement and mineralization.	Core		96% Recovery	3 4	215	Footing Elevation
		Core		97% Recovery	5 6		
	8'5½"				7 8		
					9	210	

JOHN D. PATERSON
CONSULTING ENGINEER
OTTAWA CANADA

SOIL PROFILE
&
LABORATORY TESTS

Location: Bridge No. 17 - Booth Street, The Queensway.

ELEVATION (Zero Depth): 217.5
Remarks: Test Borings

Sheet No. 4 of 7
Hole No. 4.

Borings by: F. E. Johnston Drilling Co.,Ltd. Date: Nov.24,1959.

BLOWS PER FOOT	SOIL DESCRIPTION	Samples Type	Samples No.	Unconf. Comp. Strength Tons/Sq.Ft.	Depth in Feet	ELEV.	MOISTURE CONTENT PER CENT. 30 40 50 60 70
	Ground Surface 0				0	217.5	
	Black Clayey Top Soil 1'				1		
	Fill Material (Clayey-Sand) 2' 6"				2	215.0	(Rock)
					3		
						214.0	Ground Water Level 3'6"
	Bedrock	Core		96% Recovery	4		
	Limestone to 7 feet followed by limestone interbedded with shale layers up to 2 inches thick. Minor carbonate and minor mineralization.				5		
					6		
					7		
					8	210.0	Footing Elevation
					9		
		Core		98% Recovery	10		
					11		
					12		
						205.0	
	13' 1"				13		
					14		
					15		

JOHN D. PATERSON
CONSULTING ENGINEER
OTTAWA CANADA

SOIL PROFILE
&
LABORATORY TESTS

Location: Bridge No. 17 - Booth Street, The Queensway.

ELEVATION (Zero Depth): 217.7
Remarks: Test Borings

Sheet No. 5 of 7
Hole No. 5.

Borings by: F.E.Johnston Drilling Co.,Ltd. Date: Nov. 24 & 25/59.

BLOWS PER FOOT	SOIL DESCRIPTION	Samples Type	Samples No.	Unconf. Comp. Strength Tons/Sq.Ft.	Depth in Feet	ELEV.	MOISTURE CONTENT PER CENT. 30 40 50 60 70
	Ground Surface				0	217.7	
	Fill Material				1		
	Clay and Cobbles				2		Ground Water Level 2' 1".
	2'6"						
	Bedrock	Core		71% Recovery	3	215.2	(Rock)
	Limestone interbanded with shale. A 4-inch band of shale at 7'6". Minor carbonate and mineralization.	Core		88% Recovery	4		
					5		
					6		
					7		
					8	210.0	Footing Elevation
		Core		95% Recovery	9		
					10		
					11		
					12		
		Core		100% Recovery	13	205.0	
	13'2"				14		
					15		

JOHN D. PATERSON
CONSULTING ENGINEER
OTTAWA CANADA

SOIL PROFILE
&
LABORATORY TESTS

Location: Bridge No. 17 - Booth Street, The Queensway.

ELEVATION (Zero Depth): 219.4
Remarks: Test Borings

Sheet No. 8 of 7

Hole No. 6

Borings by: F.E.Johnston Drilling Co., Ltd. Date: Nov. 25, 1959.

BLOWS PER FOOT	SOIL DESCRIPTION	Samples Type	Samples No.	Unconf. Comp. Strength Tons/Sq.Ft.	Depth in Feet	ELEV.	MOISTURE CONTENT PER CENT. 30 40 50 60 70
	Ground Surface				0	219.4	
	Ashes and Crushed Stone Fill				1		
					2		
	Fill - Boulders and Clay				3		
	3'4"					216.1	(Rock) Ground Water Level 4'5".
	Bedrock	Core		91% Recovery	4		
	Limestone with minor shale bands. Thickest band 1 inch. Minor carbonate and mineralization.				5		
					6		
					7		
					8		
					9		
						210.0	Footing Elevation
		Core		99% Recovery	10		
					11		
					12		
					13		
		Core		95% Recovery	14		
						205	
	14' 7"				15		

JOHN D. PATERSON
CONSULTING ENGINEER
OTTAWA CANADA

SOIL PROFILE
&
LABORATORY TESTS

Location: Bridge No. 17 - Booth Street, The Queensway.

ELEVATION (Zero Depth): 219.3
Remarks: Test Borings

Sheet No. 7 of 7.

Hole No. 7.

Borings by: P.S.Johnston Drilling Co., Ltd. Date: Nov. 26,1959.

BLOWS PER FOOT	SOIL DESCRIPTION	Samples Type	Samples No.	Unconf. Comp. Strength Tons/Sq Ft.	Depth in Feet	ELEV.	MOISTURE CONTENT PER CENT. 30 40 50 60 70
	Ground Surface 0				0	219.3	
	Black Top Soil				1		
	1 Boulder Till				2		
	2'4"					217.0	(Rock)
	Bedrock Limestone with thin layers of interbedded shale with decreasing shale content with depth. Minor carbonate replacement and very minor mineralization.	Core		100% Recovery	3		
					4	215.	
		Core		99% Recovery	5		
					6		
		Core		100% Recovery	7		
					8		
					9		
						210	Footing Elevation
		Core		94% Recovery	10		
					11		
					12		
					13		
		Core		95% Recovery	14		
						205	
	14'10½"				15		