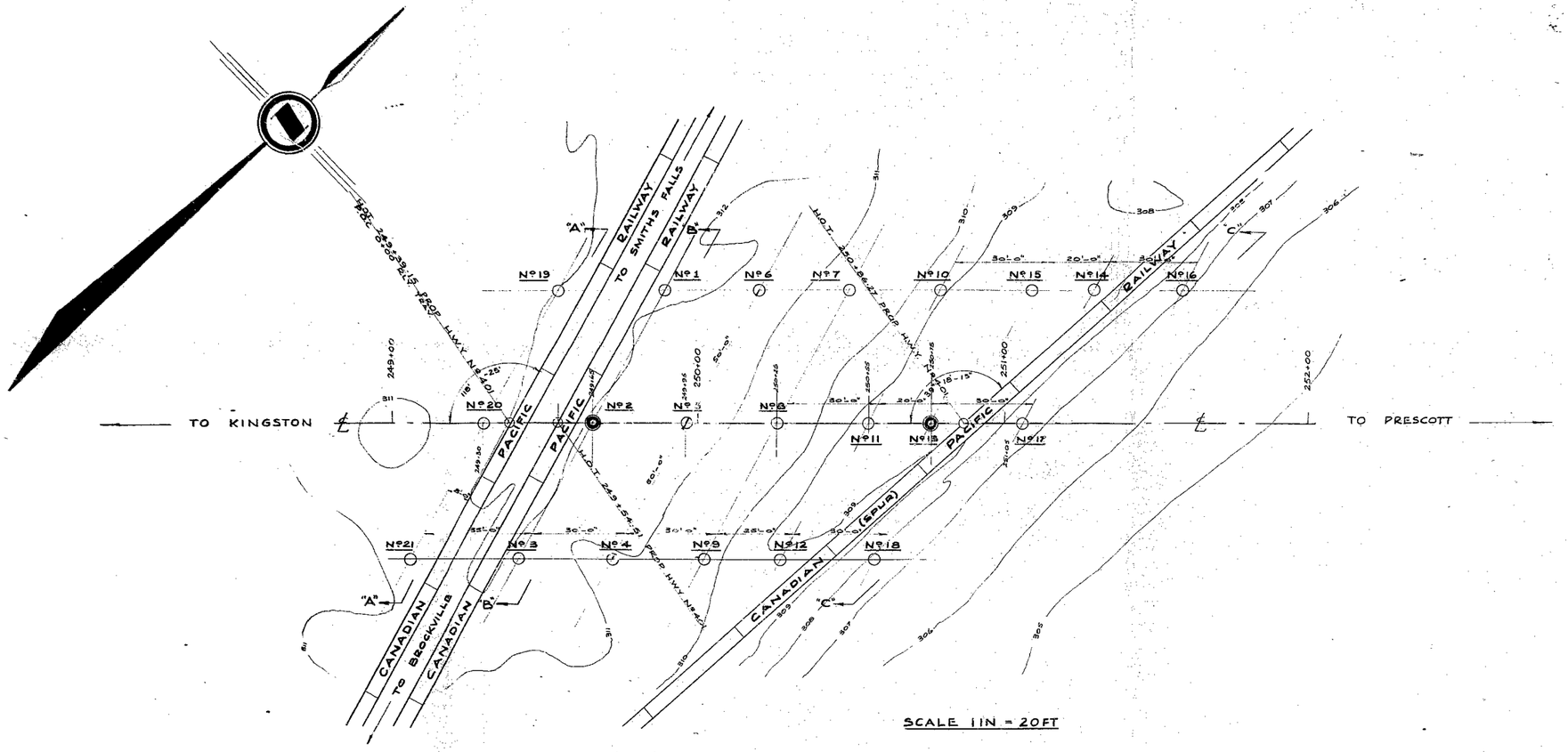
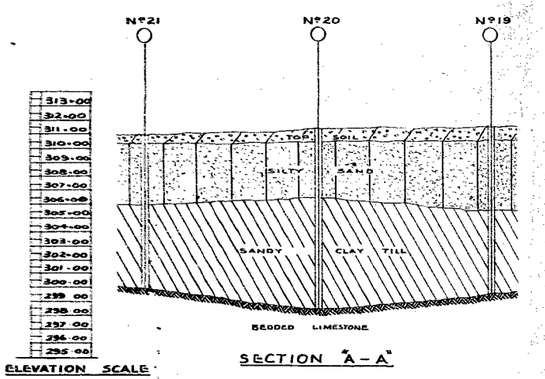
55-F-7

Hwy. #401

C.P.R. Overpass

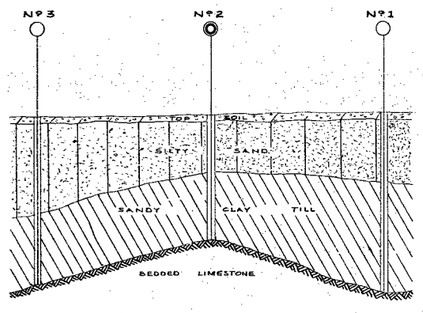
Near Brockville



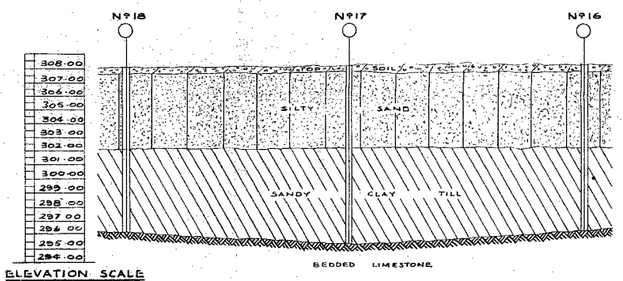


ELEVATION SCALE

SECTION "A-A"



SECTION "B-B"



ELEVATION SCALE

SECTION "C-C"

LEGEND

AUGER HOLES

PENETRATION & BORE HOLES

SCALES

HOR. 1 IN = 20 FT
VERT. 1 IN = 5 FT

PRINT RECORD

NO.	BY	DATE

REVISIONS:

DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS:-ONTARIO-
BRIDGE OFFICE:-TORONTO

BROCKVILLE

PLAN SHOWING LOCATION OF BORINGS AND SECTIONS OF SUB-STRATA.

THE KING'S HIGHWAY No. 401 DIV. No. 8
CO. LEEDS
TWP. ELIZABETHTOWN TWP^D 2 LOT 10 CON. 1
H.W.Y #401. LINE 'B' STA. 250+00 C.P.R.
PROPOSED OVERPASS AT THE ~~C.N.R.~~

APPROVED

CHIEF BRIDGE ENGINEER — CHIEF ENGINEER

DESIGN		CHECK		CONTRACT NUMBERS
DRAWING	D.F.D.	CHECK		
TRACING		CHECK		LOADING
DATE				DRAWING NUMBER 55-F-7A

MATERIALS LABORATORY - DEPARTMENT OF HIGHWAYS - ONTARIO

OFFICE REPORT ON SOIL EXPLORATION

JOB 55-F-7 401 & CNR BROCKVILLE — BORING Nº 2
(STANDARD SAMPLERS TO FIT UNLESS NOTED) — DATUM — DATE REPORT
SAMPLER HAMMER WT. 250 — DROP — INCHES — COMPILED BY BH — CHECKED BY — BORING DATE August 17 & 18 1955

SAMPLE CONDITION — **SAMPLE TYPES**: C.S - CHUNK; D.O. - DRIVE OPEN; D.F. - DRIVE FOOT VALVE; T.O. - THIN WALLED OPEN; W.S. - WASHED SAMPLE; R.C. - ROCK CORE

ABBREVIATIONS: V - INSITU VANE SHEAR TEST; M - MECHANICAL ANALYSIS; U - UNCONFINED COMPRESSION; Qc - TRIAXIAL CONSOLIDATED QUICK; Q - TRIAXIAL QUICK; S - TRIAXIAL SLOW; γ - UNIT WEIGHT; K - PERMEABILITY; C - CONSOLIDATION; CA - CASING; WL - WATER LEVEL IN CASING; WT - WATER TABLE IN SOIL

SOIL PROFILE — SHEAR STRENGTH TONS/SQ.FT. or Qu/2 — PENETRATION TEST RESISTANCE BLOWS PER FOOT 20 40 60 80 — WATER CONTENT W% (□ PW, △ LW) — SAMPLES

Blows/ft at Std En = 4200 lb in

Blows/ft at Std En = 4200 lb in

Limit of penetration

Limit of borehole

OTHER TESTS	CONDITION	TYPE	Nº	PENETRATION RESISTANCE	ELEV. RECOV. %
					311.9
					307.9
	Disturbed	D.O.	1	4	67
					305.4
	Disturbed	D.O.	2	5	44
					303.4
	Disturbed	D.O.	3	7-12, 33-6"	72
					298.9
		R.C. & W.S.	4		1 ft. of broken rock core
					290.9
		R.C.	5		5 ft. of good broken rock core

54-90

MATERIALS LABORATORY - DEPARTMENT OF HIGHWAYS - ONTARIO

OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG CORE DRILL # 4 — JOB 55-F-7 # 401 & CPR BROCKVILLE — BORING Nº 13
CASING BX (STANDARD SAMPLERS TO FIT UNLESS NOTED) — DATUM 307.59 Sta 250+75 ℄ — DATE REPORT Sept 20
SAMPLER HAMMER WT. 250 # — DROP 22 INCHES — COMPILED BY P.B. — CHECKED BY — BORING DATE Aug - 19 - 22 / 55

SAMPLE CONDITION: DISTURBED; GOOD; LOST

SAMPLE TYPES: C.S - CHUNK; D.O. - DRIVE OPEN; D.F. - DRIVE FOOT VALVE; T.O. - THIN WALLED OPEN; W.S. - WASHED SAMPLE; R.C. - ROCK CORE

ABBREVIATIONS: V - INSITU VANE SHEAR TEST; M - MECHANICAL ANALYSIS; U - UNCONFINED COMPRESSION; Qc - TRIAXIAL CONSOLIDATED QUICK; Q - TRIAXIAL QUICK; S - TRIAXIAL SLOW; γ - UNIT WEIGHT; K - PERMEABILITY; C - CONSOLIDATION; CA - CASING; WL - WATER LEVEL IN CASING; WT - WATER TABLE IN SOIL

SOIL PROFILE

ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION
307.59 / 0		BLACK TOPSOIL
	WT 305.59	SAND
297.59 / 10.0		THIN HORIZONTALLY BEDDED LIMESTONE

SHEAR STRENGTH TONS/SQ.FT. or Qu/2 — PENETRATION TEST RESISTANCE BLOWS PER FOOT, STANDARD ENERGY 4000 lbs INS — 20 40 60 80 — WATER CONTENT W% (□ PW, △ LW)

X DYNAMIC CONE

LIMIT OF PENETRATION

SAMPLES

OTHER TESTS	CONDITION	TYPE	Nº	PENETRATION RESISTANCE	ELEV. RECOV. %
					307.59
					303.59
	Disturbed	D.O.	1	5-11, 6-15, 6-10	62.5
					299.59
	Disturbed	D.O.	2	6-11, 6-14	33%
		R.C.			Broken Rock R-core
					287.59

LIMIT OF BOREHOLE

Mr. A. Toye, Bridge Engineer

Department of Highways

F. C. Brownridge,
Materials & Research Engineer.

October 13, 1955

Re: Foundation Invest. Report

Hwy. 401 C.P.R. Crossing North of Brockville, Station 250+00 Line "B" Site Plan # 2816-1 Project: 5587.

Attached herewith is the foundation report for the above noted structure. This structure is located on the proposed Brockville by pass, a portion of which is already under contract 54-146.

The subsoil is composed of silty sand over a sandy clay till which is over a bedded limestone. For a rigid framed structure, the till can support a bearing of 1½ tons per square foot. For a simply supported structure the till can support a bearing of 2½ tons.

The subsoil can support the approach fill of approximately 30.

F. C. Brownridge
Materials and Research Engineer

per:

(A. Gutka)

A/jw
attach.

Copies to:

Mr. A. Toye - Bridge Engineer (2)
Mr. J. Walter - Design Engineer (1)
Mr. [illegible] - Const. Engineer (1
Mr. L. C. Walker - Dist. Engineer (1)(Kingston)
Mr. G. Farantatos
File

A REPORT ON THE FOUNDATION

INVESTIGATION AT STA. 250 + 00, LINE "B"

HWY. # 401 FOR THE PROPOSED OVERPASS

WITH THE C.P.R. NEAR BROCKVILLE

Copies to -

Mr. A. Toye, Bridge Engineer (2)

Mr. J. Walter, Design Engineer (1)

Mr. H. Tregaskes, Const. Engineer (1)

Mr. L. E. Walker, Dist. Engineer, Kingston (1)

Mr. G. Farantatos (1)

File (1)

Project 55-F-7

INDEX

INTRODUCTION:

The following report is concerned with a sub-surface investigation at Station 250+00 of Line "B", Hwy.# 401 at the site of the proposed overpasses with the ~~G.N.R.~~ C.P.R. near Brockville.

The ground conditions have been explored to recommend the most suitable foundations for the structures and examine the stability of the approach fills.

PROCEDURE:

The site was first examined with a power auger having a maximum reach of 15 ft. Generally, the auger showed silty sand overlying sandy clay till to between 11 & 15 ft. where boring was stopped by hard material. Subsequently a coredrill was brought to the site and borings put down to explore the hard material where the auger stopped.

The positions of the auger and coredrill holes are shown in Appendix I and plan No. 55-F-7A which was prepared from survey plan No. E-2816-1; also attached are logs of the two coredrill holes Nos. 2 & 13 giving all the relevant information .

SOIL CONDITIONS:

Silty sand becoming sandy clay till at about 6 ft. overlies bedded limestone found at depths ranging from 9 to 13 ft. Firm, solid rock was found at approximately 20 ft. below ground level.

WATER CONDITIONS:

In both coredrill holes artesian heads were tapped, producing free surfaces at an elevation of 305 approximately. Also, the auger holes between the double and single tracks showed the presence of ground water.

ANALYSIS OF RESULTS AND RECOMMENDATIONS:

For the worst conditions shown in borehole # 2 the material down to 8Ft. is fairly loose. At approximately 9 ft. below ground level it is more compact; making allowance for the saturated condition, the sandy clay till can support a load of 1½ tons per square foot for a settlement not greater than 1 inch.

Otherwise, if the settlement is not considered, 2½ tons per square foot could be applied at an elevation of 302 approximately.

A alternative would be to take the footings down to the bedded limestone which could support 3 tons per square foot bearing pressure without appreciable settlement but might require an excavation 13 feet deep.

ANALYSIS OF RESULTS AND RECOMMENDATIONS: (continued)

In the event of footings on sandy clay till a plate loading test could be carried out by the Materials Laboratory in accordance with the National Building Code of Canada Section 4:2 A in case it may be possible to increase the bearing pressures. In both cases the foundation level is below the water table and the ground should be dewatered during construction. The well point method is probably best suited to these conditions.

CONCLUSION:

There are two alternatives for a rigid frame structure. Footings on sandy clay till at an elevation of 302 approximately using a bearing pressure of 1½ tons per square foot or footings on bedded limestone approximately 13 feet below ground level, applying a foundation pressure of 3 tons per square foot.

For a simply supported bridge, footings on sandy clay till at elevation 302.00 would be permissable using a bearing pressure of 2½ tons per square foot.

If footings on sandy clay till are adopted a plate loading test could be carried out in accordance with the National Building Code of Canada, with a view to increasing the bearing pressure.

The ground should be dewatered during construction.

G. N. Farantatos
Foundation Engineer

APPENDIX I