

Mr. J. C. Thatcher,
District Engineer,
District 6, Toronto.

Foundation Section,
Materials & Testing Div.,
Room 107, Lab. Bldg.

Attn: Mr. G. A. Metcalfe,
Construction Engr.

December 23, 1964

64-F-102
W.P. 234-60

Site Inspection - Thursday, December 17, 1964.
Bridge No. 7, Hwy. 401 & Hwy. 400 Interchange,
Toronto. (Soils Report by H. G. Golder & Assoc. -
Bridge Design by De Leuw, Cather & Co. of Canada)

On Thursday, December 17, 1964, this section was asked by the District 6 Construction Engineer, Mr. G. A. Metcalfe, to inspect the north abutment footing of Bridge No. 7 of the Hwy. 401 & Hwy. 400 Interchange.

The inspection was requested because a crack across the footing, approximately in the middle of it, was noticed. From the location of the crack and its shape (open at the footing top, closing and disappearing towards the bottom), it became obvious that either the middle portion of the footing had lifted, or one or both far ends of the footing had settled.

At this bridge site during the original subsoil investigation, one borehole (No. 4) was put down by the Soil Consultant, H. G. Golder and Associates. It showed 23 feet of fill (very stiff gray and brown silty clay with some sand and gravel size particles) overlying the original ground. A seven-foot weathered zone of the original ground having very high shear strength, was reported.

An additional subsoil investigation was immediately initiated and work started the same day, Thursday afternoon, and proceeded until Tuesday, December 22, 1964. Two boreholes were put down - one at the east corner and one at the north-west corner of the footing. Also, twelve cone penetration tests, the location of which are shown on the attached drawing, were performed. In addition, two shafts were excavated along the middle south face of the footing and at its south-west corner. The cone test results are also presented on the attached drawing.

The inspection of the shafts has revealed a thin (1 - 2 inches thick) very soft layer. It was easy to scoop this material from underneath the footing. The cone tests also indicated lower resistance at the elevation corresponding to the footing bottom, or slightly below.

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It is practically impossible at this stage to explain how and why such a soft layer has formed. The fact remains that the footing has cracked and that the pressure on the soil was only about 450 p.s.f. When the entire structure is built, the load will be approximately tenfold - i.e., about 4,000 p.s.f., and it can be reasonably assumed that further movements could occur. The structure is a three-span continuous bridge, and movements of the expected magnitude would be prohibitive.

It is therefore recommended that the present footing be taken out and the excavation deepened for an additional two feet or more, should the inspection indicate this to be necessary. Very careful precautions should be taken to prevent any freezing of the foundation soil. After the completion of the excavation and prior to concrete pouring, one foot of clean granular material should be placed and well compacted.

We believe that the above is sufficient for you to proceed. Should there, however, be any additional information that you would require, please do not hesitate to call our office.

AGS/MdeP
Attach.

M. Devata
for A. G. Sternac,
PRINCIPAL FOUNDATION ENGINEER

cc: Messrs. H. A. Tregaskes
H. D. McMillan
A. M. Toye
D. M. Hopper
T. J. Kovich

Foundations Office ✓
Gen. Files

#64-F-102

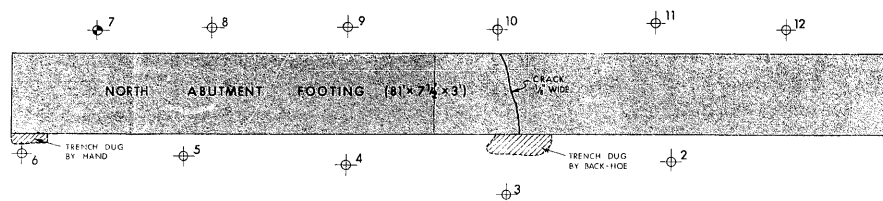
W.P. # 234-60

Hwy. # 400 &

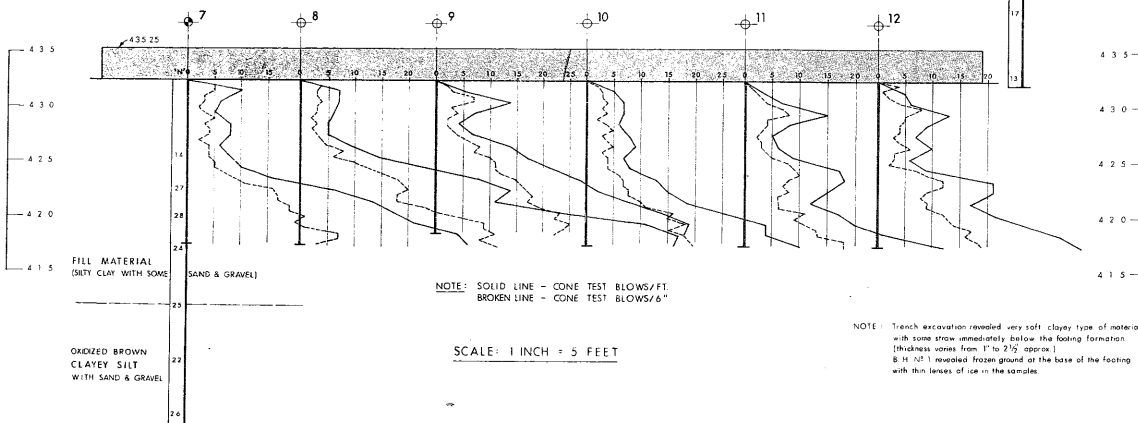
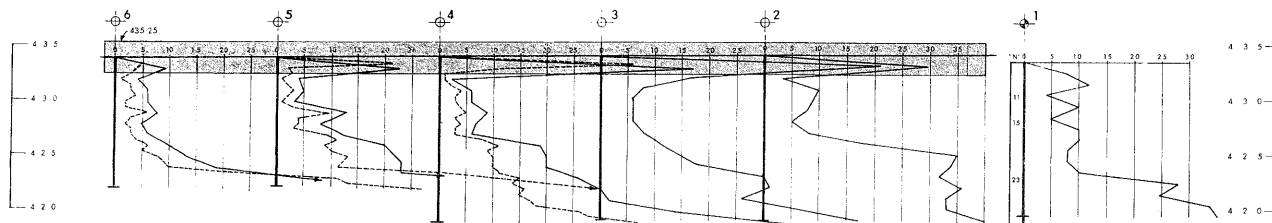
Hwy. # 401

INTERCHANGE

BR. # 7



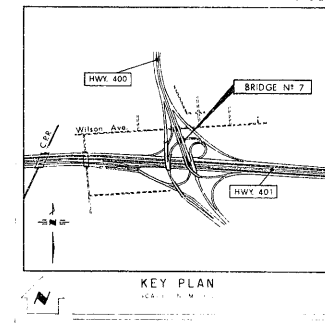
P L A N



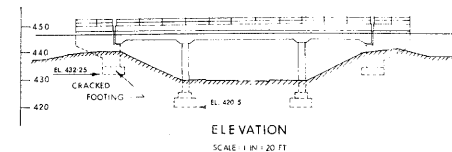
NOTE: SOLID LINE - CONE TEST BLOWS/FT.
BROKEN LINE - CONE TEST BLOWS/6"

SCALE: 1 INCH = 5 FEET

NOTE: Trench excavation revealed very soft clayey type of material with some straw immediately below the footing formation (thickness varies from 1" to 2 1/2" approx.)
8' 11" to 1' revealed frozen ground at the base of the footing with thin lenses of ice in the samples.



KEY PLAN



ELEVATION

SCALE: 1 IN = 20 FT

NOTE

The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence and may be subject to considerable error.

DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS - ONTARIO			
MATERIALS & RESEARCH DIVISION			
NORTH ABUTMENT FOOTING CRACK			
HWY. 401 & 400 INTERCHANGE			
(STRUCTURE No. 7)			
KING'S HIGHWAY NO. 400 & 401	DIST NO. 6		
CO. YORK	METROPOLITAN TORONTO		
TWP. NORTH YORK	CON		
DYNAMIC CONE PENETRATION TESTS			
TEST M.D. CHECKED	APP. 234-00	TEST NO. 64	
DATA D.M. CHECKED	APP. 234-00	TEST NO. 64 - F - 102 A	
DATE: 22 DEC 1964			
APPROVED: <i>[Signature]</i>			