

DOCUMENT MICROFILMING IDENTIFICATION

G.I.-30 SEPT. 1976

GEOCRES No. 30M12-231

DIST. 6 REGION _____

W.P. No. 49-78-01

CONT. No. _____

W. O. No. _____

STR. SITE No. _____

HWY. No. 7

LOCATION CNR OVERHEAD

No of PAGES -

=====

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. _____

REMARKS: _____



KENNETH H. KING, P. ENG.

(334533 ONTARIO LIMITED)

SUITE 203,
3174, EGLINTON AVE. EAST,
SCARBOROUGH, ONT., CANADA
M1J 2H5

(416) 267-3492 (OFFICE)
(416) 282-5697 (HOME)

February 6, 1979

WP 49-78-01
GEOCRES 30M12-231

Canadian National Railways
Great Lakes Region
Union Station
Toronto, Ontario

WP 49-78-01

Attention: Mr. C. S. Dunn, P. Eng.
Construction Engineer

Re: Bramport Intermodal Terminal
Hwy #7 Overhead, Mile 2.69

Dear Mr. Dunn:

I apologize for the delay in submitting my report but this was occasioned by the high groundwater levels recorded in the most recent set of piezometer readings. This required a re-examination of the soil samples, particularly in the region of the proposed footings. As a result I am quite satisfied that the founding soil is inherently sound and is not susceptible to degradation by uplift pressures. In fact the evidence that uplift pressures below footing level do not exist is confirmed. Thus the conclusions given in the attached report with regard to foundation design and bearing pressures are still valid. However, there is the possibility of lateral seepage into the excavations which should be mentioned in the report although special construction procedures are not called for. I wish to review my report in this respect, plus other editorial changes which I know are required, and therefore ask if you can accept the enclosed subject to editing.

Trusting that this will be satisfactory for your present purposes.

Yours very truly,


Kenneth H. King, P. Eng.

cc: Office of the Chief Engineer
CNR, Montreal
Attention: Mr. W. W. Wong, P. Eng.





KENNETH H. KING, P. ENG.

(334533 ONTARIO LIMITED)

SUITE 203,
3174, EGLINTON AVE. EAST,
SCARBOROUGH, ONT., CANADA
M1J 2H5

(416) 267-3492 (OFFICE)
(416) 282-5697 (HOME)

February 10th. 1979

Reference No. 7812.2

Office of the Chief Engineer,
Canadian National Railways,
13th Floor,
CN Headquarters Building,
935 LaGauchitiere Street West,
Montreal, Quebec.

GEOCRES No 30M12-231

Attention: Mr. W. W. Wong, P. Eng.,
Senior Geotechnical Engineer.

WP 49-78-01

Re: Soil Investigation for Proposed Structures: -
1. Highway No. 7 Overhead, Mile 2.69
2. Woodslea Road Subway, Mile 1.37
Bramport Intermodal Terminal,
Toronto Area.

Dear Sirs:

In accordance with your recent instructions a soil investigation has been performed at the sites of these proposed structures in the Bramport Intermodal Terminal and the findings are reported herein.

PREVIOUS INVESTIGATION

In the initial investigation performed in November 1976 for the Terminal Project some soil data was obtained from borings at, or close to, these structures. This data has been reviewed for the present investigation and the relevant borehole logs are included herein for completeness. In the previous investigation the presence of an aquifer at depth containing water under artesian pressure was revealed. Boreholes 25S and 26S at Highway 7 encountered the water-bearing soil at the level where it is now proposed to construct the foundations of the mile 2.69 bridge

2....

structure. Because a bridge structure at mile 1.37 was not contemplated at the time only shallow boreholes were put down at this location in the earlier investigation but the interpolated stratigraphy suggested that the artesian water-bearing stratum might be encountered at depth at this location also.

FIELD WORK IN THIS INVESTIGATION

Based on the earlier findings as discussed above the principal objective in the present investigation was to determine the possible problems associated with groundwater at the proposed foundation levels or at shallow depths beneath them. In addition, special attention was given to an examination of any recently-placed fill where it was known that this would underlie foundations. This was done because the deliberate incorporation of "topsoil" into the fill had been a feature of the earth-work construction.

In this investigation four detailed exploratory boreholes were performed at the locations shown on Figure I enclosed. These recent boreholes are numbered 37S to 40S inclusive to conform with the sequence established in the 1976/77 investigation. Boreholes 37S and 38S were put down at the Woodslea Road Subway (Mile 1.37) site; and boreholes 39S and 40S were put down at the Highway 7 Overhead (Mile 2.69) site. The results of previous boreholes 25S and 26S at the latter site are also reproduced herein.

The field work was performed in the period January 3rd to 10th, 1979 using a continuous-flight power auger drill mounted on a tracked vehicle. Sampling was performed with a split-spoon sampler driven by the Standard Penetration Test method. Generally a 2-inch diameter spoon was used except at depths close to the proposed footing grades where an "N" - size spoon was employed in order to effect better recovery of the very dense soils. A sampling interval of 2.5 feet was maintained below the

proposed footing levels. Piezometers were installed and sealed in where zones of coarser-grained, and possible water-bearing, soils were encountered. All locations and elevations given in this report were obtained by surveying from reference points and local bench-marks designated by the site supervisory personnel of C.N.R.

SOIL CONDITIONS

Detailed logs of the boreholes are presented on Figures 2 to 7 inclusive herein. The properties of the subsoil strata relevant to foundation design and construction are discussed in the following.

Recent Fill

Boreholes 37S and 38S were put down at the Woodslea Road (mile 1.37) site through about 23 feet of recent fill. This fill was placed with compaction under controlled conditions as part of the grading for the Bramport Terminal. Thus the material consists of the clays and tills derived from on-site excavations. It is known that in their original state these soils were clay and had natural water contents close to optimum as a result of over-consolidation. The boreholes show that the fill retains these properties as a result of the uniformly high degree of compaction achieved. The Standard Penetration Tests gave "N" values ranging from 31 to 82 blows per foot in the fill.

Because it was known that some of the original topsoil from the site had been incorporated in the earth fill a special search was made for this material in the drilling and sampling operations. This showed that any organic matter present was evidenced by a darker colouration of discrete layers of soil less than 1 foot in thickness. This evidence conforms with the known properties of the original topsoil covering the site and with the specified method of emplacement within the body of the fill.

Natural Subsoils

The natural subsoils underlying the proposed bridge sites consist of a

complex sequence of glacial and interglacial deposits. For the most part these are clayey (i.e., cohesive) in nature although interglacial silts, and interbedded sands and silts, are associated with the Halton Till stratum. These non-cohesive strata are generally water-bearing and were encountered in all of the boreholes put down at the Hwy. 7 (mile 2.69) bridge site. There they occur as thin bands, generally no more than 1 to 2 feet in thickness, at various elevations between approximately 595 and 605 depending on location.

These strata are moderately to heavily over-consolidated and thus have inherently high bearing capability in their undisturbed state.

The presence of frequent boulders at the base of the upper till (Wildfield Till) stratum is to be noted. The boulders were particularly evident at elevation 600 in borehole 26S and at elevation 605 in borehole 39S.

Shale Bedrock

The presence of shale bedrock between approximate elevations 580 and 585 was indicated by the refusal to augering and sampling experienced in boreholes 39S and 40S. For the purpose of this investigation, it was not deemed necessary to prove the bedrock by diamond core-drilling.

GROUNDWATER CONDITIONS

The previous boreholes had revealed the presence of water-bearing seams in the ground at or below the proposed footing levels of the Hwy. 7 bridge. Observations made at that time (November 1976) indicated artesian water pressures with a static head at about elevation 609 which is about 13 feet above the footing level. Although these water-bearing seams were also encountered in the present boreholes at the Hwy. 7 site (B.H.'s 39S and 40S) only a trace of seepage into the boreholes was observed during the field work. Subsequent observations give a piezometric level at

about elevation 607 as shown by the Table of Observations (Figure 8). The response of the piezometers in B.H.'s 39S and 40S was relatively rapid in contrast to that observed in B.H.'s 37S and 38S. In the latter boreholes the response was very slow, indicating the highly impermeable nature of the strata and the final readings were at or below the proposed footing level of the Woodslea Road Subway.

At the Highway 7 Overhead structure site it is concluded that free groundwater is retained within a thin confined aquifer zone of limited extent occurring between approximate elevations 597 and 605. Within this zone the seepage emanates from various layers of fine-grained soils interbedded with relatively impermeable tills. The thickness of an individual layer is estimated to be no greater than about 1 foot and the aggregate thickness of the water-bearing seams probably does not exceed about 3 feet within the 8 foot zone within which they are likely to be encountered.

DISCUSSION

1. Highway No. 7 Overhead (Mile 2.69)

This is to be a three-span continuous steel beam structure. Footings for the west abutment and the two piers are to be at elevation 596.0; for the east abutment at elevation 603.0, and for the wing-walls at elevation 616.0.

Boreholes 25S; 26S; 39S and 40S put down at this site show that the abutment and pier footings will be in natural soil having high bearing capability when undisturbed. The most recent observations, which were obtained in this investigation, show that high groundwater pressures exist within a narrow water-bearing zone above the footing levels. Furthermore the free water is contained within layers probably having an individual thickness no greater than 12 inches. Thus it is expected that there will be minor lateral seepage only to contend with in the excavations. Consequently, loss of support because of loosening of the subsoils by upwards seepage should not occur and the inherently high bearing capacity of the subsoil may be utilized in design.

For normal simply supported structure, a bearing value of 8 kips per square foot would be recommended for spread footings. Because of the

lesser tolerance of a continuous-beam structure to differential settlements it is recommended that the design bearing value be reduced to 5 K.S.F. in this case.

The proposed elevation of the wing-wall footings (616.0) appears to place them at, or even slightly above, existing grade. If this is the intent then care should be exercised to ensure that all topsoil and existing uncompacted highway fill is removed by sub-excavation below footing grade. Backfill up to the underside of these footings should consist of granular material placed and compacted in shallow lifts.

It should be noted that the main footing excavations are likely to encounter boulders, particularly at elevations between 600 and 605. Locally, high seepage may be associated with bouldery zones but overall it is believed that the water inflow into the excavations can be handled by normal pumping from sumps.

From all of the boreholes performed for the Terminal Project it is known that the subsoils consist of highly-consolidated tills and interglacial strata. A thin surficial deposit of lacustrine clay covers the area in places. This has been overconsolidated by desiccation and thus is of stiff to hard consistency. Consequently no problems of embankment instability or settlement are anticipated. This conclusion is substantiated by the fill construction which has already been performed on the Terminal.

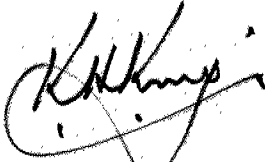
2. Woodslea Road Subway (Mile 1.37)

This will be a single-span simply-supported structure with abutment footings at elevation 576.50 and wing-wall footings at elevation 590±. Boreholes 37S and 38S show that the abutment footings will be in natural subsoil consisting of hard clayey silt till followed by a very dense sandy silt till to a significant depth. Based on these conditions it is considered that the abutment footings may be designed for an allowable bearing value of 8 K.S.F.

The wing-wall footings will be within the recently-placed earth fill. This is a well-compacted material consisting of native clay till soils derived from the local excavations. The presence of original topsoil is evidenced by zones of darker coloured soil which is still in a dry, hard state. This was the evidence of the boreholes, however, the actual footing excavations should be inspected carefully for the possible presence

of discrete organic material in a soft state. If encountered, such material should be removed and replaced by compacted granular material, or the footing grade lowered locally.

Respectfully submitted,

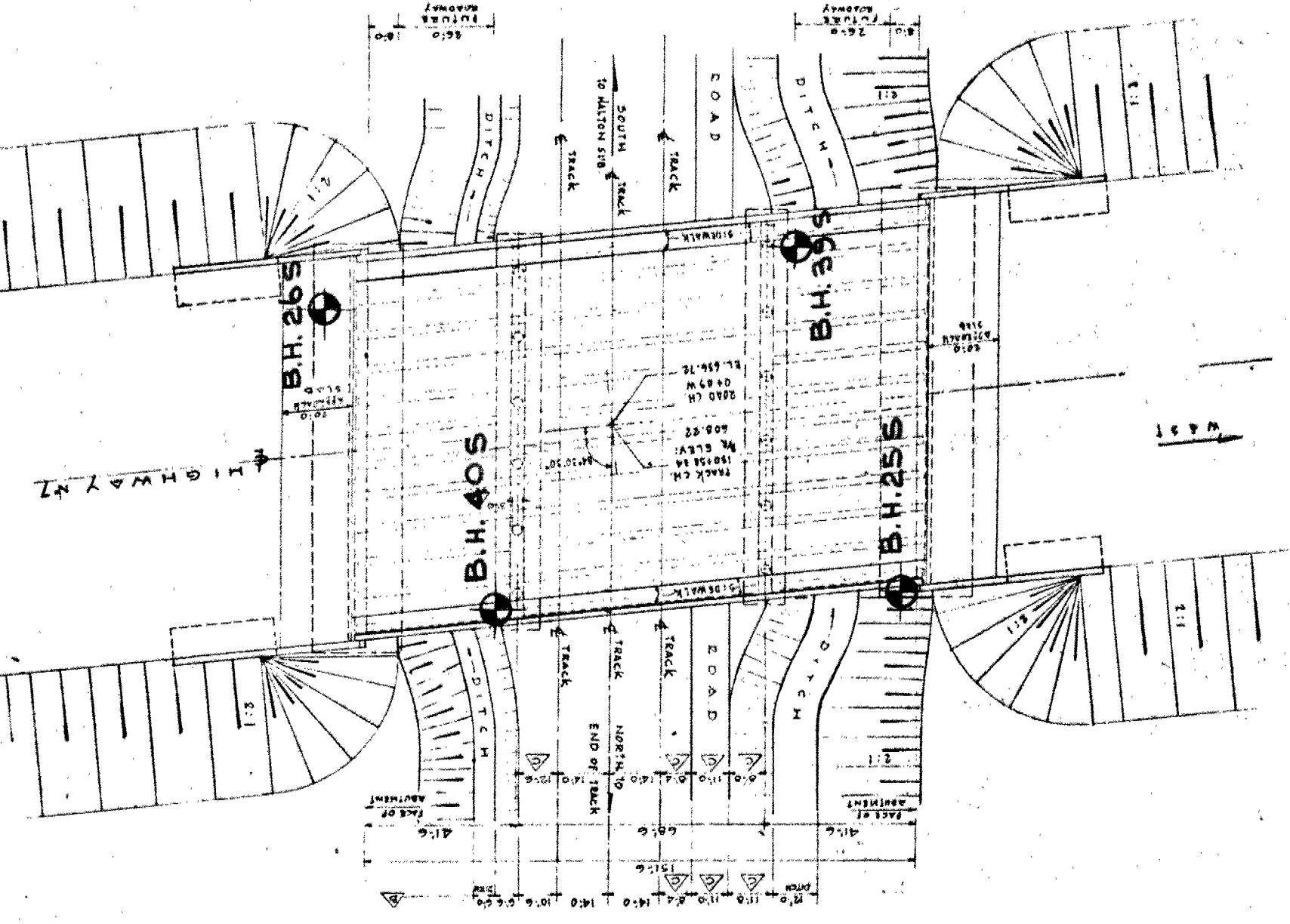
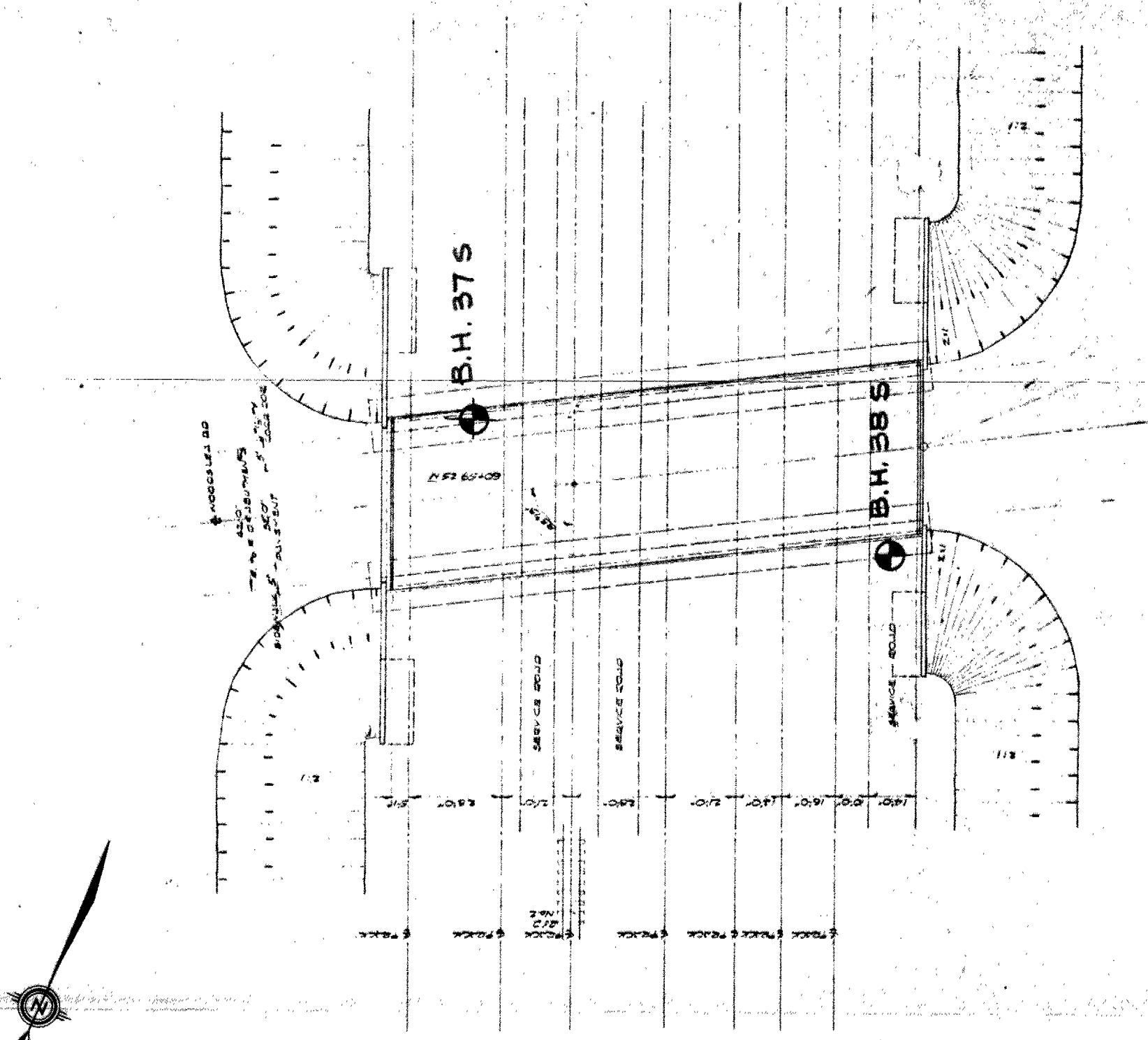


Kenneth H. King



BOREHOLE LOCATION PLAN

SCALE :- 1" TO 40 FT."



WOODSLEA RD. SUBWAY

HWY. 7 OVERHEAD

LOG OF BOREHOLE No. 255 (Sta. 131+04; 80'L.)

JOB No.: 7812.2
 JOB DESCRIPTION:
 METHOD OF BORING:

LOCATION: BRAMPTON, ONTARIO
 CNR MALPORT INTERMODAL TERMINAL; Hwy. 7 Overhead
 FLIGHT AUGER

FIG. No.: 2
 DATE: 26 November, 1976

ELEV. DEPTH	SOIL DESCRIPTION	SAMPLES			DEPTH SCALE	PENETRATION		RESISTANCE (blows/foot)		WATER LEVEL
		No.	TYPE	"N"		SHEAR	STRENGTH	I.K.S.F.		
615	Ground Surface									
0.0	Gravelly <u>SAND FILL</u>									
613.5	(Road Shoulder)									
1.5	Loose Brown	1	Do	4	4	○				
611.5	<u>SAND FILL</u> (Moist)									
3.5	Firm Dark Brown	2	Do	7		○				
	To Black Clayey									
608	<u>SILT FILL</u> : Some Organic Matter									
7.0	Stiff Mottled Gray and	3	Do	10	8	○				
606	Brown Clayey <u>SILT</u>									
9.2	Hard Brown	4	Do	56	12					○
	Clayey <u>SILT TILL</u>									○
	(Damp)									
	Sand Seams Below									
	14.5 Feet.									
599		5	Do	100/ 9"	16					○
15.8	Very Dense Gray									
	Fine Sandy <u>SILT</u>									
596.5	(Saturated)									
18.5	Very Dense Gray	6	Do	100/ 10"	20					○
	Silty <u>SAND TILL</u>									
593	(Moist to Wet)									
22.0	Hard Gray Clayey	7	Do	100/ 8"	24					○
	<u>SILT TILL</u> With									
	<u>SHALE</u> Fragments				28					
	(Damp)									
583.5		8	Do	100	32					○
31.5	END OF BOREHOLE									

KENNETH H. KING, P. ENG.

LOG OF BOREHOLE No. 265 (Sta. 130+27; 80'R.)

JOB No.: 7812.2
 JOB DESCRIPTION:
 METHOD OF BORING:

LOCATION: BRAMPTON, ONTARIO
 CNR MALPORT INTERMODAL TERMINAL, Hwy. 7 Overhead
 FLIGHT AUGER
 FIG. No.: 3
 DATE: 26 November, 1976

ELEV. DEPTH	SOIL DESCRIPTION	SAMPLES			DEPTH SCALE	PENETRATION RESISTANCE (lb./sq. in.)				WATER LEVEL
		No.	TYPE	"N"		SHEAR STRENGTH (K.S.F.)				
615	Ground Surface									
0.0	Gravelly <u>SAND FILL</u>									
613.5	Road Shoulder									
1.5	Loose Dark Brown Sandy <u>SILT FILL</u> (Moist)				4					
609		1	Do	8						
6.0	Topsoil									
7.0	Firm Dark Brown Clayey <u>SILT</u> (Moist)	2	Do	6	8					
604.5	Hard Brown Clayey <u>SILT TILL</u> Occasional Boulders, Particularly at Depth. (Damp)									
9.5		3	Do	56	12	F. ABT. FIG. 603.0				
		4	Do	100/ 8"						
600		5	Do	100/ 6"	16					
15.0	Very Dense Gray Sandy <u>SILT TILL</u> (Damp)									
596	Hard Gray Clayey <u>SILT TILL</u> With SHALE Fragments and Layers of <u>SHALE</u> Increasing with Depth (Dry)	6	Do	100/ 6"	20					
19.0										
		7	Do	100/ 7"	24	NOTE				
584					28	Water Level At 24.0' (El. 591) Upon Completion of Drilling				
		8	Do	100/ 7"		Water Level At 6.0' (El. 609) And Cave-in At 16.0' On 30 Nov. 76				
30.6	END OF BOREHOLE				32					

KENNETH H. KING, P. ENG.

LOG OF BOREHOLE No. 375 (STA. 59+20; 30' R.)

JOB No.: 7812.2

LOCATION: BRAMPTON, ONTARIO

FIG. No.: 4

JOB DESCRIPTION: CNR BRAMPORT INTERMODAL TERMINAL; WOODSLEA RD. SUBWAY

METHOD OF BORING: HOLLOW-STEM AUGER

DATE: 9-10 JAN. 1979

ELEV. DEPTH	SOIL DESCRIPTION	SAMPLES			DEPTH SCALE	PENETRATION RESISTANCE (blows/foot)			WATER LEVEL
		No.	TYPE	"N"		SHEAR STRENGTH		(K.S.F.)	
604.5	TOP OF FILL								
0.0	COMPACT EARTH FILL (MAINLY CLAYEY SILT TILL WITH OCCASIONAL TRACES OF ORGANIC MATTER).				4				
		1	DO	31					
					8				
		2	DO	45	12				
					16				
		3	DO	55	20				
				24					
	VERY STIFF BROWN CLAYEY SILT TILL (DAMP)	5	DO	29	28	ABT. PTGS. 576.5			
					32				
		6	DO	82					
		7	DO	81					
	VERY DENSE GRAY SILT TILL (DAMP)	8	DO	45	36				
		9	DO	43	40				
	HARD GRAY CLAYEY SILT TILL WITH SHALE FRAGMENTS. (DRY)	10	DO	33					
		11	DO	145	44				
	END OF B.H.	12	DO	120					
		13	DO	REF	48	NOTE: PIEZOMETER SEALED IN AT 47 FT. DEPTH.			
47.7					52				

NOTE: PIEZOMETER SEALED
IN AT 47 FT. DEPTH.

LOG OF BOREHOLE No. 38S (STA. 60+80; 95° L.)

JOB No. 7812.2

LOCATION: BRAMPTON, ONTARIO

FIG. No. 5

JOB DESCRIPTION: CNR BRAMPORT INTERMODAL TERMINAL; WOODSLEA ROAD SUBWAY

METHOD OF BORING: HOLLOW-STEM AUGER

DATE: 10 JAN. 1979

ELEV. DEPTH	SOIL DESCRIPTION	SAMPLES			DEPTH SCALE	PENETRATION RESISTANCE (lb./sq. in.)		WATER LEVEL
		No.	TYPE	"N"		10	20	
604.5	TOP OF FILL							
0.0								
					4			
		1	DO	40				
					8			
	COMPACT EARTH FILL							
	(MAINLY CLAYEY SILT TILL WITH OCCASIONAL TRACES OF ORGANIC MATTER)	2	DO	39				
					12			
		3	DO	82	16			
		4	DO	49	20			
581.0								
23.5					24			
	VERY STIFF BROWN CLAYEY SILT TILL	5	DO	73				
	(DAMP)				28			
		6	DO	130				
					32			
		7	DO	64				
569.0								
35.5		8	DO	77	36			
	VERY DENSE GRAY SILT TILL (DAMP)	9	DO	83				
		10	DO	83	40			
		11	DO	140	44			
558.5								
45.0		12	DO	400				
	HARD GRAY CLAYEY SILT TILL WITH SHALE FRAGMENTS (DRY)	13	DO	400	48			
554.0		14	DO	350				
50.5	END OF B.H.				52			

NOTE: PIEZOMETER
SEALED IN AT 48 FT
DEPTH.

KENNETH H. KING, P. ENG.

LOG OF BOREHOLE No. 39S (STA. 130+10; 50' L.)

JOB No. 7812.2 LOCATION: BRAMPTON, ONTARIO FIG. No. 6
 JOB DESCRIPTION: CNR BRAMPTON INTERMODAL TERMINAL; HWY. 7 OVERHEAD
 METHOD OF BORING: HOLLOW-STEM AUGER DATE: 8 JAN. 1979

ELEV. DEPTH	SOIL DESCRIPTION	SAMPLES			DEPTH SCALE	PENETRATION 20 RESISTANCE (lb./sq. foot)		WATER LEVEL
		No.	TYPE	"N"		SHEAR	STRENGTH (K.S.F.)	
614.0	ROAD SHOULDER							
0.0	GRAVELLY SAND FILL							
610.5								
3.5	HARD BROWN CLAYEY SILT TILL (DAMP)	1	DO	32	4			
605.0								
9.0	LAYER OF BOULDERS	2	DO	35	8			
603.0								
11.0	SOME SAND LAYERS BELOW 11 FEET	3	DO	REF.	12			
599.5		4	DO	120				
14.5	SANDY SILT (Saturated)							
15.5		5	DO	200	16			
	HARD GRAY CLAYEY SILT TILL WITH SHALE FRAGMENTS.	6	DO	53				
		7	DO	153	20			
		8	DO	150	24			
		9	DO	200				
587.0								
27.0	MOSTLY WEATHERED SHALE FRAGMENTS (Probably Transition Into Shale Bedrock)	10	DO	400	28			
582.0		11	DO	REF.	32			
32.0	END OF B.H.							

LOG OF BOREHOLE No. 40S (STA. 131+10; 30' R.)

JOB No.: 7812.2

LOCATION: BRAMPTON, ONTARIO

FIG. No.: 7

JOB DESCRIPTION: CNR BRAMPORT INTERMODAL TERMINAL; HWY. 7 OVERHEAD

METHOD OF BORING: HOLLOW-STEM AUGER

DATE: 3 - 8 JAN. 1979

ELEV. DEPTH	SOIL DESCRIPTION	SAMPLES			DEPTH SCALE	PENETRATION RESISTANCE (lb./sq. in.)			WATER LEVEL
		No.	TYPE	"N"		SHEAR	STRENGTH	(K.S.F.)	
614.5	ROAD SHOULDER								
0.0									
613.0	EARTH FILL								
1.5	FIRM BLACK ORGANIC CLAYEY SILT								
610.0									
4.5	FIRM DARK BROWN CLAYEY SILT	1	DO	8					
607.5	(MOIST)								
7.0	HARD BROWN CLAYEY SILT TILL	2	DO	34					
605.0									
9.5	INTERBEDDED LAYERS OF SAND AND SILT TILL	3	DO	240					
	VERY DENSE. (DAMP TO WET)	4	DO	240					
600.0									
14.5	VERY DENSE GRAY SANDY SILT TILL	5	DO	300					
547.0									
17.5		6	DO	200					
		7	DO	240					
		8	DO	300					
		9	DO	300					
		10	DO	200					
		11	DO	95					
581.0									
33.0	WEATHERED SHALE FRAGMENTS	12	DO	400					
579.0									
35.3	END OF B.H.								

PIER FTG. 596.0

NOTE: - PIEZOMETER
SEALED IN AT 32 FT.
DEPTH.

Reference No. 7812.2

B.H. No.	Ground Surface Elevation (Ft.)	Date of Drilling	Water Observed During Drilling & Upon Completion	Piezometer Installed at (Depth/Elev.)	Water Level Observations on Date Shown (<u>Depth</u> / <u>Elevation</u>)			
					30 Nov. 1976	10 Jan. 1979	31 Jan. 79	8 Feb. 1979
25S	615±	26 Nov 1976	Hole uncased. Seepage from 14 to 18ft. depths. Water level @ 12.0'/El.603	N.A.				
26S	615±	26 Nov. 1976	Hole uncased. Water level @ 24ft. depth (El.591) upon completion.	N.A.	$\frac{6.0*}{609.0}$			
39S	614.0	8-9th. Jan. 1979	Hole cased (H.S. Augers) to 20 ft.. Seepage observed @ 10 ft.. Water level inside augers @ 8.0' (El.606)	$\frac{15.0}{599.0}$		$\frac{5.0**}{610.0}$		$\frac{7.0}{607.0}$
40S	614.5	3-8th. Jan. 1979	Hole uncased. Slight seepage @ 7.0' (El.607.5)	$\frac{32.0}{582.5}$		$\frac{3.0**}{611.5}$	$\frac{7.5}{607.0}$	$\frac{7.8}{606.7}$
37S	604.5	9-10 Jan. 1979	Hole uncased. No free water observed	$\frac{47.0}{557.5}$		Dry		$\frac{37.5}{567.0}$
38S	604.5	10 Jan 1979	Hole uncased. No free water observed.	$\frac{48.0}{556.5}$		Dry		$\frac{28.0}{576.5}$

* Open-hole reading. Cave-in at 16.0' (El.599.0)

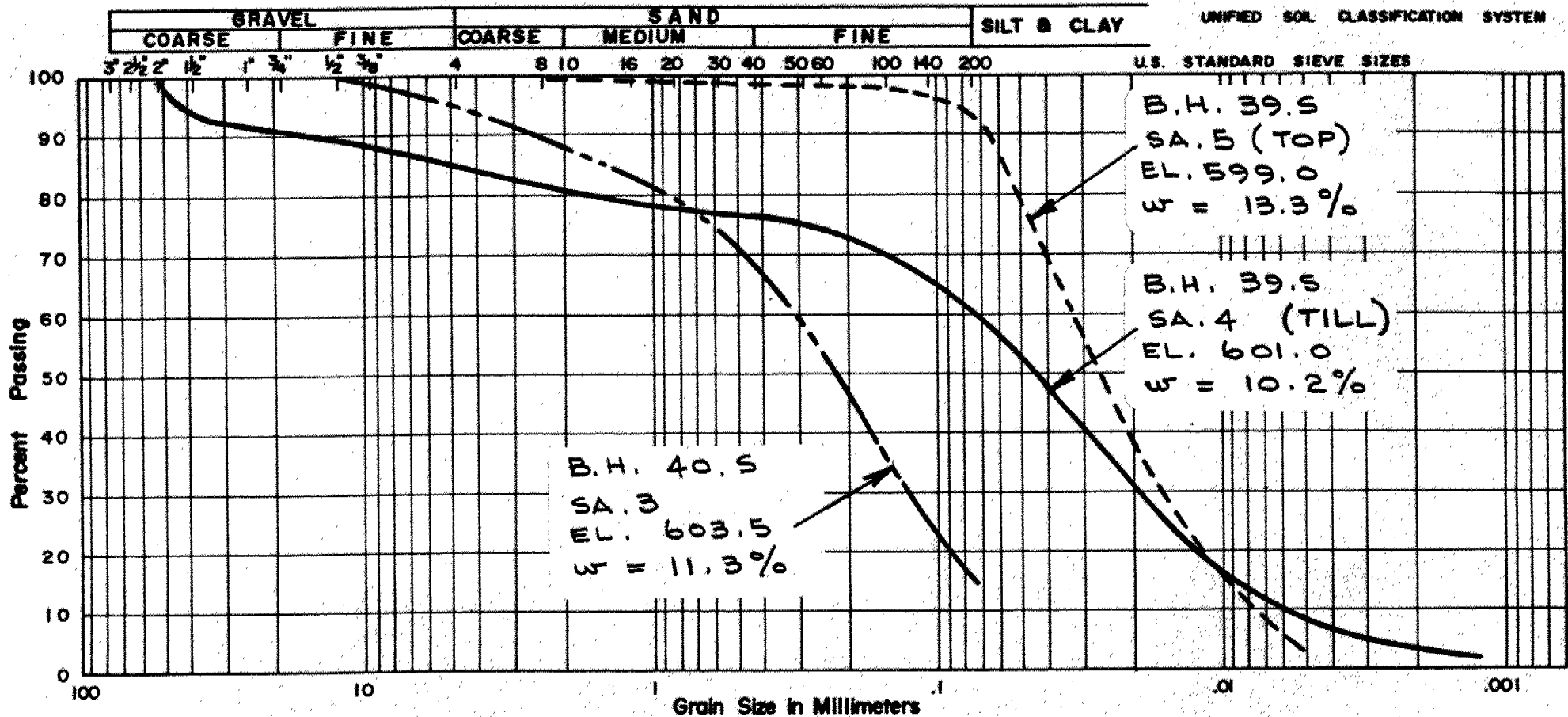
** Open-hole readings



K.H.KING

GRAIN SIZE DISTRIBUTION

OUR REFERENCE NO 1812.2



PROJECT: HWY. 7 OVERHEAD
LOCATION: BRAMPORT
BOREHOLE NO:
SAMPLE NO:
DEPTH:
ELEVATION:

TYPICAL GRADING CURVES
& NATURAL WATER CONTENTS
OF UPPER TILL AND THE
INTERBEDDED SEAMS OF
WATER-BEARING SANDS AND
SILTS BETWEEN APPROXIMATE
ELEVATIONS 597 AND 605

PLASTIC PROPERTIES

LIQUID LIMIT % =
PLASTIC LIMIT % =
PLASTICITY INDEX % =
MOISTURE CONTENT % =

ENCLOSURE NO 2



Ontario

Ministry of
Transportation and
Communications

Structural Section,
Central Region,
3501 Dufferin Street,
Downsview, Ontario.
M3K 1N6
Telephone: 248-3097

April 2, 1979

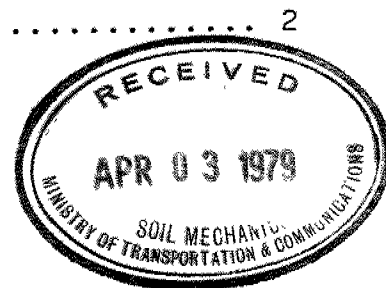
Mr. N.M. Engelman,
Engineer of Bridges
and Structures,
CN Rail
Box 8100,
Montreal, Quebec.
H3C 3N4

Dear Sir:

Re: CNR Overhead at Highway 7
Brampton Intermodal Terminal Mi. 2.69
W.P. 49-78-01, Site 24-448
District 6, Toronto

We have reviewed the February 23, 1979 Bridge and Culvert drawings for the above project and wish to make the following documents:

- a) It is still our opinion that the west abutment footing should be raised to elevation 603+. This would reduce construction problems and would yield a more economical design. The west ditch could be realigned slightly to allow for this. Furthermore, there is no need for the west retaining wall footings to be also at elevation 600.50'. It could be stepped to a higher elevation, with a reduction in excavation and overall cost.
- b) We are still concerned about the large walkway cantilever, and think it should be reduced by widening the deck slab and abutment seat.
- c) Although a joint sealant has been provided, we expect maintenance problems with leakage through the walkway construction joints. In our opinion, hair-line cracks on the walkway would create a smaller problem.



- d) Screed elevations should be calculated and shown on the drawings, so that the final roadway surface, after dead load deflection, will fit the designed vertical curve without bouncing.
- e) It is recommended that at least one construction joint and waterstop be placed in abutment walls as shown from top of footing to top of ballast wall.
- f) Remove SS116-23 from drawings since detail shown at end of Bridge cannot fit. Two 3" Ø conduits will now be required in the south walkway and one will be required on the north side. Revise SS116-20 as shown. All 3" Ø ducts to be capped 2' beyond ends of extended walkway in granular material.
- g) Brampton Hydro ducts should swing back under the extended walkway and should be fully encased in concrete beyond the abutment walls. The duct spacing through the expansion joints should be adjusted as per detail "A" on SS116-23. This detail should be cut out and modified to read 4" Rigid PVC for the Hydro ducts, and should be included on one of the standard drawings. The specifications call for transite ducts instead of P.V.C. as required by Brampton Hydro, and do not include the matter of payment for concrete encasements. Please revise the specification to suit that attached to our letter of February 26, 1979 to Brampton Hydro. The encasement should extend beyond the ends of the walkway. Plan, cross-section and reinforcing details should be shown on the drawings. Please contact Brampton Hydro for further details on their ducts.
- h) Some revisions are required to the reinforcing steel details and quantities as shown on the marked-up drawings.

We note in your letter of March 20, 1979, that you are satisfied with the design of the walkways. We are willing to accept this as long as CN would agree to repair any work required due to undesirable cracking and leaching of the walkways.

After construction, please supply this office with one set of "As Constructed" mylars of the structure drawings.


We would also appreciate receiving one set of photographs mentioned on Page 19 of the specifications.

..... 3

Please refer to the enclosed marked-up set of Bridge Drawings for other revisions. Please contact us by phone if they are not clear, or if any of the requested revisions cannot be made.

Yours truly,

GCEB/KP:lc
Encl.



G.C.E. Burkhardt,
Head, Structural Section.

cc: A. Sulavella
C.S. Grebski
M. Devata ✓
R.J. Spahn (C.N.R.)
A. Silbiger

memorandum



To: Mr. M. Devata,
Supervising Engineer,
Soil Mechanics Section,
Room 315,
Central Building, Downsview.

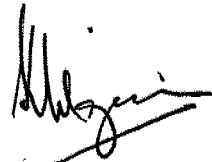
Date: 1979-03-27

RE: C.N.R. Overhead at Highway 7,
W.P. 49-78-01, Site 24-448,
District 6, Toronto

Attached please find a copy of C.N.R.'s letter of 1979-03-20 with their comments on our recommendations on the foundation design. C.N. was verbally informed of the contents of your memorandum of 1979-03-13, and a copy was sent to them also.

Could we please have your additional comments at your earliest convenience.

KP:gj
Attach.



K. Pilgrim,
Senior Structural Engineer,
for:
G.C.E. Burkhardt,
Head, Structural Section.



Operations

CN Rail
Box 8100, Montreal, Quebec
H3C 3N4

G.A. Van de Water
Chief Engineer

Exploitation

CN Rail
C.P. 8100, Montréal, Québec
H3C 3N4

G.A. Van de Water
Ingénieur en Chef

20 March 1979

Reference 5705-475

N/réf.

Mr. G.C.E. Burkhardt
Head, Structural Section,
Ministry of Transportation and
Communications
Central Region
3501 Dufferin Street
Downsview, Ontario
M3K 1N6



Re: Overhead Bridge at Highway No. 7 and Brampton Intermodal Spur,
Mi. 2.69, M.T.C. Site No. 24-448.

Dear Sir:

In reply to your letter dated 9 March 1979, we wish to thank you very much for the prompt attention given to this project, and in particular, for your comments.

With regard to the points made in your letter and on our drawings returned to us we wish to reply as follows:

The level of the bottom footing of the west abutment, elevation 600.50, has been reviewed with our Senior Geotechnical Engineer, Mr. W. W. Wong who is satisfied that the soil at that level is quite adequate to support the loading imposed on it, (240 blows per 1 ft.).

With regard to the water content, after having had additional borings carried out, Mr. Wong is confident that the control of the ground water will not present any major problems during construction.

We are reluctant to use styrofoam as frost protection, because it has been our experience, in the life of a bridge, excavations are often made near footings for ducts, drains, etc., by inexperienced people and the styrofoam not replaced.

The capacity of the footings of the East Pier has been checked and found adequate.

The walkways have been designed to satisfy the requirements of AASHTO Specifications for Highway Bridges and of CSA Standard S6.

It has been our standard practice, because of our large live loads, to provide joints in walkways on our bridges, to prevent cracking.

Three sets of the contract documents are being forwarded to you by Mr. Spahn's office.

Yours truly,

J. W. Strzelecki

J. W. Strzelecki
For: N. M. Engelman
Engineer of Bridges and Structures

Structural Section,
Central Region,
3501 Dufferin Street,
Downsview, Ontario.
M3K 1N6
Telephone: 248-3097

March 20, 1979

Cole Sherman & Associates Ltd.,
Consulting Engineers & Planners,
2025 Sheppard Avenue East,
Willowdale, Ontario.
M2J 1W3


Atten: Mr. B. Hurd, P. Eng.

Dear Sir:

RE: Hwy. 400/Rutherford Road Interchange,
W.P. 49-78-01, District 6, Toronto

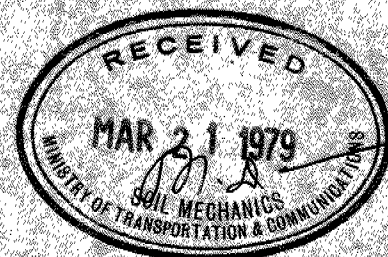
Further to our telephone conversation today, attached please find a copy of a memorandum dated March 15, 1979 from our Soil Mechanics Section with recommendations for the retaining wall footings. Please take appropriate action.

Yours truly,


K. Pilgrim,
Senior Structural Engineer,
for:
G.C.E. Burkhardt,
Head, Structural Section.

KP:ggj
Attach.

c.c. M. Devata ✓ →



B-24
↓
File

Mr. G.C.E. Burkhardt
Head, Structural Section
Central Region
3501 Dufferin St., Downsview

Soil Mechanics Section
Engineering Materials Office
Room 315, Central Building

79 03 13

Mr. K. Pilgrim

Re: CNR Overhead at Hwy. 7
W.P. 49-78-01, Site 24-448
District 6, Toronto

This is to summarize our recent verbal discussion with you about the design drawings for the above mentioned structure.

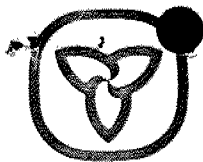
1. The east pier footings, in our opinion, are located very close to the railway tracks. We are not sure whether CNR has considered the effect of vibration caused by moving trains on the footings founded in granular subsoil, as well as on the structure.
2. In view of the groundwater conditions, it would be desirable to found the west abutment footings at a higher elevation in the clayey silt till stratum (at elevation 603), rather than in the underlying sandy silt deposit below the prevailing water level. This will avoid extensive dewatering requirements for the footing excavation and will minimize disturbance to the foundation soil due to unbalanced hydrostatic head.
3. It may be advantageous to carry out the excavation for the railway tracks and the ditches prior to the excavation for the footings. This will result in lowering of the groundwater level in the area and minimize the dewatering requirements.

B. Ly
Senior Engineer

For: M. Devata
Supervising Engineer

BL/MD/gs

cc: Files /



Ontario

Ministry of
Transportation and
Communications

Structural Section,
Central Region,
3501 Dufferin Street,
Downsview, Ontario.
M3K 1N6
Telephone: 248-3097

March 9, 1979.

Mr. J.W. Strzelecki,
Canadian National Railways,
Engineering Department,
935 La Cauchetiere St. West,
Montreal, Quebec.
M3C 3N4

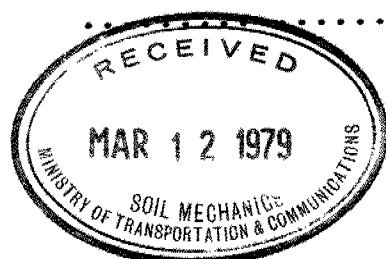
Dear Sir:

Re: C.N.R. Overhead at Hwy. 7
Brampton Intermodal Terminal
W.P. 49-78-01, Site 24-448
District 6, Toronto

We have completed our review of bridge drawings AA 899-8.81-3.1 to 7, 3.9 and 3.11, and return herewith one set of marked-up plans with our comments. Please refer to previous correspondence and make the necessary revisions. Please find enclosed our standards SS10-13 to 10-19, SS110-11 and SS110-21 metric standards with a copy of our reinforcing steel bending data to be used in the barrier wall. Data required on SS116-40 is also enclosed. Design standards SS10-10 to 10-13 sent to you earlier are to be destroyed.

Please add SS116-40 as one of your drawings, and stick the appropriate SS standards on a blank sheet to make the standard drawings. The contractor will supply all materials except for the steel pins and data and site figures which will be supplied by M.T.C.

The west abutment footing should be raised to elevation of east abutment footing (i.e. bottom at elev. 603.0).

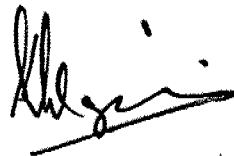


This will permit the footing foundation to be founded on the glacial till material instead of the fine sandy silt stratum with its water bearing seams.

Please note that drawings 8 and 10 have not been reviewed by us. We would appreciate it if we could receive three (3) sets of revised completed drawings when they are completed.

If you have any questions about the notes or data required on the standard drawings, please feel free to call us for clarification.

Yours truly,



K. Pilgrim,
Senior Structural Engineer,
for:
G.C.E. Burkhardt,
Head, Structural Section.

KP:lc
Encl.

cc: M. Devata ✓
A. Sulavella
R. J. Spahn (C.N.R.)

memorandum



To: Mr. M. Devata,
Supervising Engineer,
Soil Mechanics Section,
Room 315,
Central Building, Downsview.

Date: 1979-03-07

RE: C.N.R. Overhead at Highway 7,
W.P. 49-78-01, Site 24-448,
District 6, Toronto

Further to your memo of 1979-03-05, enclosed please find a supplementary report which was received from C.N. today.

The latest drawings we have, show the bottom of the footings at the following elevations - west abutment (600.5'), west and east pier (599.0'), and east abutment (603.0').

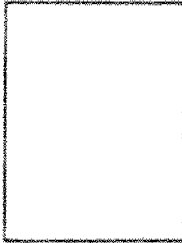
Please let us know as early as possible, if any further information is required. The final bridge design drawings are being checked at this time.

A handwritten signature in dark ink, appearing to read "K. Pilgrim".

KP:gj
Encl.

K. Pilgrim,
Senior Structural Engineer,
for:
G.C.E. Burkhardt,
Head, Structural Section.





KENNETH H. KING, P. ENG.

(334533 ONTARIO LIMITED)

SUITE 203,
3174, EGLINTON AVE. EAST,
SCARBOROUGH, ONT., CANADA
M1J 2H5

(416) 267-3492 (OFFICE)
(416) 282-5697 (HOME)

February 12th. 1979

Canadian National Railways
Great Lakes Region
Union Station
Toronto, Ontario

Attention: Mr. C. S. Dunn, P.Eng.
Construction Engineer

Re: Bramport Intermodal Terminal
Hwy. #7 Overhead, Mile 2.69

Dear Mr. Dunn,

Further to my letter of February 6th. 1979, the necessary editorial changes in the Soils Report have now been made. The final version is enclosed herewith.

At Hwy. No. 7 Overhead structure site the presence of water-bearing seams down to foundation level has been confirmed by the latest observations. However, it is concluded that these will not affect the design bearing pressures recommended previously.

A section has been added to the Report to express the opinion that there will be no problems of instability or settlement of the approach embankments.

Please do not hesitate to call on me if you should have any further questions.

Yours very truly,

Ken King

Kenneth H. King, P.Eng.

KHK:jk

cc. CNR

Montreal

Attention: Mr. W. W. Wong, P.Eng.

ENCLOS: - 4 Copies of Report.



Copy to Mr. King

*1 cop. to W. Wong.
1 cop. to N.T.C.
1 cop. OFFICE.*

*Feb 21 1979
I.S.*

Mr. G.C.E. Burkhardt
Head, Structural Section
Central Region
3501 Dufferin St., Downsview

Soil Mechanics Section
Engineering Materials Office
Room 315, Central Building

79 03 05

Mr. K. Pilgrim

Re: C.N.R. Overhead at Hwy. 7
W.P. 49-78-01, Site 24-448
District 6, Toronto

Further to your request we have reviewed the Foundation Investigation Report prepared for C.N. for the above mentioned structure by K.G. King, P. Eng. Our comments are as follows.

The foundation investigation revealed the presence of water bearing layers in the ground at or below the proposed footing levels. Observations made at that time (November, 1976) of investigation indicated a static head at about elevation 609 which is about 10 feet above the footing level (elevation 599). The report does not contain the results of subsequent observations made by means of piezometers. In order to comment upon the susceptibility of the foundation soil to degradation by uplift pressures, the piezometric data in this area including the construction sequence will be required.

In our opinion, the west abutment footing could be raised to elevation 604.50.

M. Devata
Supervising Engineer

MD/gs

cc: Files ✓

Attach.