28-67-37
~~W.P. 47-65-1~~

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

To: Mr. B. R. Davis,
Bridge Engineer,
Bridge Division.

Attention: Mr. S. McCombie

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

Date: March 25, 1966

Our File Ref.

In reply to

APR 13 1966

Subject:

FOUNDATION INVESTIGATION REPORT
For
Proposed Retaining Structure at the
Future Interchange at Q.E.W. and
Islington Ave., Metropolitan Toronto,
Twp. of Etobicoke, Dist. #6 (Toronto).
W.J. 66-F-14 -- W.P. 47-65-1

Attached, we are forwarding to you, our detailed foundation investigation report on the subsoil conditions existing at the above structure site.

We believe that you will find the factual data and recommendations contained therein, adequate for your design requirements.

Should additional information be required, please feel free to contact our Office.

A. G. Stermac,
PRINCIPAL FOUNDATION ENGINEER

AGS/MdeF
Attach.
cc: Messrs. B. R. Davis (2)
H. A. Tregaskes
D. W. Farren
G. K. Hunter (2)
J. C. Thatcher
T. J. Kovich
A. Watt

Foundations Office
Gen. Files

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FOUNDATION INVESTIGATION REPORT
For
Proposed Retaining Structure at the
Future Interchange at Q.E.W. and
Islington Ave., Metropolitan Toronto,
Twp. of Etobicoke, Dist. #6 (Toronto).
W.J. 66-F-14 -- W.P. 47-65-1

1. INTRODUCTION:

The Foundation Section was requested to carry out an investigation for the proposed retaining walls at the future interchange of Q.E.W. and Islington Ave. in Metropolitan Toronto. A request was contained in a memo from the Bridge Location Section, dated January 13, 1966. An investigation was subsequently carried out by this Section to determine the subsoil conditions existing at the site. This report contains the results of our investigation, together with recommendations pertaining to the foundations of the proposed retaining structures.

The area in the immediate vicinity of the site is heavily built up with light industry and residential buildings. The topography may be described as flat to gently undulating. Physiographically, the area is situated in the low-lying part of the region referred to as the Iroquois Plain which was formed during the late Pleistocene period by the body of water since designated as Lake Iroquois. Soils in this part of the region are mainly heavy-textured shale and limestone tills.

2. SUBSOIL CONDITIONS:

2.1) General:

A total of 22 boreholes was carried out during the course of the field work. These borings revealed that the subsoil over the site area consists of deposits of silty sand and clayey silt with sand and gravel (glacial till), followed by shale bedrock. The boundaries between different deposits are shown on the borelog sheets contained in the Appendix. The estimated stratigraphical

cont'd. /2 .....

2. SUBSOIL CONDITIONS: (cont'd.) ...

2.1) General: (cont'd.) ...

profiles shown on Dwg. 66-F-14A, are based upon this information. A description of various soil types follows:

2.2) Silty Sand:

This deposit was observed immediately below the ground surface in all the boreholes. The percentage of silt and sand varied somewhat throughout the stratum, but in general, the deposit may be described as silty sand with traces of gravel. In B.H.'s #2, 20 and 21, this stratum extends to shale bedrock; elsewhere, it is underlain by a stratum of hard clayey silt with sand and gravel (glacial till).

Grain size distribution curves indicate the following average composition: gravel 2%, sand 61%, silt 34%, clay 3%. The average moisture content is in the order of 10%. The 'N' values obtained from Standard Penetration tests in general, ranged from 13 to more than 100 blows/ft. The relative density is estimated to range from compact to dense at the surface, to very dense at the lower boundary. In B.H.'s #20, 21 and 22, this deposit is generally loose with 'N' values ranging from 2 to 15 blows/ft.

2.3) Clayey Silt with Sand and Gravel (Glacial Till):

This stratum underlies the silty sand stratum and extends for depths ranging from 1 ft. in B.H. #6 to 10 ft. in B.H. #12. This deposit was not observed in B.H.'s #2, 20 and 21. The material of this deposit consists mainly of a heterogeneous mixture of clayey silt, sand and gravel in the following average proportions: clay 20%, silt 42%, sand 29%, gravel 9%. A wide range of 'N' values, 16 to in excess of 100 blows/ft., indicates some variation in consistency which is estimated to range from stiff to hard. Physical properties are summarized as follows:

cont'd. /3 .....

2. SUBSOIL CONDITIONS: (cont'd.) ...

2.3) Clayey Silt with Sand and Gravel (Glacial Till): (cont'd.)

Liquid Limit	--	25% - 30%
Plastic Limit	--	16% - 20%
Moisture Content	--	9% - 23%

2.4) Shale Bedrock:

Bedrock was observed at depths 6.5 to 15 ft. below ground surface at this site. In all cases, the bedrock was not drilled and proved, but the contact was established by meeting refusal with a Penn. auger. Boreholes carried out at the Islington Ave. Underpass on Q.E.W. (W.J. 65-F-35), indicated the upper 12 inches of shale bedrock have been subjected to extensive weathering.

3. WATER CONDITIONS:

Ground water levels varied considerably over the site, but in general, were found to be within the silty sand stratum. The exact water levels observed furing the time of the field investigatio are shown on the enclosed drawing as well as borehole logs.

4. RECOMMENDATIONS:

Retaining Structures A, B, C, & D -

It is recommended that the proposed retaining structure be founded on spread footings within the dense silty sand deposit. A safe net pressure of up to 2.5 t.s.f. may be assumed for design purposes. The exact depth of the footings will be dependent on the finished ground levels on the low side of the wall, but should not be higher than about 4 ft. below present existing ground surface. Sufficient cover for frost protection must be provided. If footings are located at or below the prevailing ground water level, a de-watering scheme may be required.

cont'd. /4 .....

4. RECOMMENDATIONS: (cont'd.) ...

Retaining Structure E -

In this portion, the retaining structure can be founded on spread footings within the clayey silt or silty sand stratum some 4 ft. below the existing ground surface. In such a case, a safe bearing pressure of 2.5 t.s.f. can be used for design purposes. No major dewatering problems are anticipated, since excavations for the footings will be carried out above observed ground water levels. It is recommended that an expansion joint be provided between the footings founded on sand and clayey silt deposits in order to accommodate any possible differential settlements

Retaining Structure F -

At this location, the silty sand stratum is generally loose and cannot provide economical spread footing support within this deposit. Therefore, the footings should be founded on sound shale bedrock in the vicinity of B.H.'s #20 and #21, and clayey silt in the area of B.H. #22. It is estimated that differential settlements between the footings founded on rock and those founded in the clayey silt stratum, will be in the order of one inch or less. No major dewatering problems are anticipated; however, any seepage from the side slopes can be controlled by ordinary pumping methods.

5. MISCELLANEOUS:

The field work, performed during the period February 1 to February 9, 1966, was undertaken by Mr. V. Korlu, Project Foundation Engineer. The equipment used was owned and operated by Dominion Soil Investigation Ltd.

General supervision of this project was carried out by Mr. M. Devata, Senior Foundation Engineer, who also prepared this report.

March 1966

APPENDIX I

65-1831

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 1,2, 3

FOUNDATION SECTION

JOB 66-F-14 LOCATION Q.E.W. & Islington Ave. Vicinity ORIGINATED BY V.K.
W.P. 47-65-1 BORING DATE Feb. 1, 1966. COMPILED BY V.K.
DATUM Geodetic BOREHOLE TYPE Drive BX Casing & Wash. CHECKED BY M.D.

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS / FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT / SHEAR STRENGTH P.S.F.	LIQUID LIMIT w_L / PLASTIC LIMIT w_P / WATER CONTENT w — WATER CONTENT % (15, 30, 45)	BULK DENSITY γ P.C.F.	REMARKS
346.0	B.H. #1 Groundlevel									
0.0	Silty sand		1	SS	32					Gr0%Sa75% Si23%Cl 2%
	Dense		2	SS	50	340				
338.0			3	SS	45					W.L. ▼ 339.0
8.0	Clayey silt, sand & gravelly, till hard.		4	SS	61					Gr9%Sa41% Si34%Cl 16%
334.0			5	SS	81					
12.0	(Probable Bedrock) End of borehole.					330				
347.0	B.H.#2 Groundlevel									
0.0	Silt sand (Dense to v. dense)		1	SS	33					Gr6%Sa75% Si18%Cl 1%
			2	SS	57					W.L.
			3	SS	126	340				340.0 ▼
337.5			4	SS	52					Gr0%Sa85% Si14%Cl 1%
9.5	Probable Bedrock End of borehole					330				
344.0	B.H.#3 Groundlevel									
0.0	Silty sand. (Dense to v. dense)		1	SS	51					Gr0%Sa45% Si53%Cl 2%
			2	SS	77	340				W.L.337.0 ▼
337.0			3	SS	25					
7.0	Clayey silt, sand & gravel. (V. stiff to hard)		4	SS	22					Gr17%Sa30% Si37%Cl 16%
			5	SS	42					
			6	SS	70	330				
329.0			7	SS	77					
15.0	Probable Bedrock End of borehole.					320				

FORM OB-MT-126 (FORMERLY OB-ML-126)
65-1831

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 4, 5 & 6

FOUNDATION SECTION

JOB 66-F-14 LOCATION Q.E.W. & Islington Ave. Vicinity ORIGINATED BY V.K.

W.P. 47-65-1 BORING DATE Feb. 2, 1966 COMPILED BY V.K.

DATUM Geodetic BOREHOLE TYPE Drive BX Casing & Wash. CHECKED BY M.D.

SOIL PROFILE ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT / SHEAR STRENGTH P.S.F.	LIQUID LIMIT w_L / PLASTIC LIMIT w_P / WATER CONTENT w / WATER CONTENT % (15, 30, 45)	BULK DENSITY P.C.F.	REMARKS
	B.H.#4									
344.0	Groundlevel									
0.0	Silty sand (trace of organics)		1	SS	14	340				I-1.5 W.L. 338.0 Gr 0% Sa 76% Si 19% Cl 5%
			2	SS	13					
	Compact to very dense.		3	SS	66					
335.0			4	SS	36					
9.0	Clayey silt, sand & gravel, till		5	SS	23					Gr 0% Sa 32% Si 65% Cl 3%
330.0	(V. stiff to hard)		6	SS	53	330				
14.0	Probable Bedrock End of borehole.									
	B.H.#5									
346.0	Groundlevel									
0.0	Silty sand. Compact to dense.		1	SS	26					Gr 0% Sa 3% Si 91% Cl 6% W.L. 340.0
			2	SS	49	340				
340.0										
6.0	Clayey silt, sand & gravel, till		3	SS	67					
336.5	Very dense. Hard.		4	SS	>100					
9.5	Probable Bedrock End of borehole.					330				
	B.H.#6									
344.0	Groundlevel									
0.0	Silty sand.		1	SS	19	340				W.L. 339.0 Gr 0% Sa 39% Si & Cl 61%
	Compact to very dense.		2	SS	27					
337.0			3	SS	59					
336.0	Clayey silt, sand & gravel, till.									
8.0	Probable Bedrock End of borehole.					330				

FORM 08-MT-126 (FORMERLY 08-ML-126)
65-1831

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 7,8 & 9

FOUNDATION SECTION

JOB 66-F-14 LOCATION Q.E.W. & Islington Ave. Vicinity ORIGINATED BY V.K.
W.P. 47-65-1 BORING DATE Feb. 3, 1966 COMPILED BY V.K.
DATUM Geodetic BOREHOLE TYPE Drive BX Casing & Wash. CHECKED BY M.D.

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	REMARKS
345.0	B.H.#7 Groundlevel						
	Silty sand.		1	SS	16	340	W.L. 340.0
	Compact to v. dense.		2	SS	77		Gr 2%
			3	SS	82		Sa 79%
336.0			4	SS	65		Si 20% Cl 1%
9.0 / 333.0	Clayey silt, sand & gravel, till. (Hard)		5	SS	61		
12.0	Probable Bedrock					330	
	End of borehole.						
345.0	B.H.#8 Groundlevel						
0.0	Silty sand.		1	SS	27	340	Gr 0%
	Compact to dense.		2	SS	29		Sa 80%
337.0			3	SS	46		Si 19% W.L.
8.0	Clayey silt, sand & gravel, till. V. stiff		4	SS	24		Cl 1% 340.5
333.0	to hard.		5	SS	49		
12.0	Probable Bedrock.					330	
	End of borehole.						
345.0	B.H.#9 Groundlevel						
0.0	Silty sand.		1	SS	17	340	Gr 0%
	Compact to v. dense.		2	SS	33		Sa 90%
337.0			3	SS	59		Si 7%
8.0	Clayey silt, sand & gravel, till.		4	SS	21		Cl 3% W.L.
331.0	V. stiff to hard.		5	SS	33		337.0
			6	SS	58		
14.0	Probable Bedrock					330	
	End of borehole.						

DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT
SHEAR STRENGTH P.S.F.
LIQUID LIMIT — w_L
PLASTIC LIMIT — w_P
WATER CONTENT — w
WATER CONTENT % 15 30 45
BULK DENSITY γ P.C.F.

FORM OB-MT-126 (FORMERLY OB-ML-126)
65-1831

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 10, 11 & 12

FOUNDATION SECTION

JOB 66-F-14 LOCATION C.E.W. & Islington Avenue Vicinity ORIGINATED BY V.K.
W.P. 47-65-1 BORING DATE Feb. 4, 1966. COMPILED BY V.K.
DATUM Geodetic BOREHOLE TYPE Drive BX Casing & Wash. CHECKED BY M.D.

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS / FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT — SHEAR STRENGTH P.S.F.	LIQUID LIMIT W_L — PLASTIC LIMIT W_P — WATER CONTENT W — WATER CONTENT % 15 30 45	BULK DENSITY P.C.F.	REMARKS
	B.H.#10									
344.0	Groundlevel									
0.0	Silty sand. Compact to very dense.		1	SS	24	340				Gr0%Sa62% Si34%Cl 4% W.L. 333.0
			2	SS	52					
			3	SS	59					
			4	SS	91					
333.0			5	SS	43					
331.0	Clayey silt, sand & gravel, till, Hard.		6	SS	>100	330				
13.0	Probable Bedrock End of borehole.									
	B.H.#LL									
345.0	Groundlevel									
0.0	Silty sand. Compact to very dense.		1	SS	17	340				Gr2%Sa73% Si24%Cl 1% W.L. 334.0
			2	SS	87					
			3	SS	58					
			4	SS	89					
334.0			5	SS	120					
333.0	Clayey silt, sand & gravel.									
12.0	Probable Bedrock End of borehole.					330				
	B.H.#12									
334.0	Groundlevel									
0.8	Silty sand.									
332.0			1	SS	31	330				Gr9% Sa30% Si40% Cl 21% W.L. 332.0
2.0	Clayey silt, sand & gravel, till. Hard.		2	SS	34					
			3	SS	43					
			4	SS	59					
322.0			5	SS	46					
12.0	Probable Bedrock End of borehole.					320				

FORM OB-MT-126 (FORMERLY OB-ML-126)
65-1831

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 13,14 & 15

FOUNDATION SECTION

JOB 66-F-14 LOCATION Q.E.W. & Islington Ave. Vicinity ORIGINATED BY V.K.
W.P. 47-65-1 BORING DATE Feb. 7, 1966. COMPILED BY V.K.
DATUM Geodetic BOREHOLE TYPE Drive BX Casing & Wash. CHECKED BY M.D.

SOIL PROFILE ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT / SHEAR STRENGTH P.S.F.	LIQUID LIMIT W_L / PLASTIC LIMIT W_P / WATER CONTENT W / WATER CONTENT % 15 30 45	BULK DENSITY γ P.C.F.	REMARKS
334.0	B.H.#13 Groundlevel									
0.0	Silty sand. Compact.		1	SS	17	330				W.L. 329.0 Gr0% Sa57% Si41% Cl 2%
329.0			2	SS	29					
5.0	Clayey silt, sand & gravel, till. Hard.		3	SS	84					
323.0			4	SS	82					
11.0	Probable Bedrock. End of borehole.		5	SS	128	320				
334.0	B.H.#14 Groundlevel									
0.0	Silty sand. Compact.		1	SS	20	330				Gr6% Sa20% Si47% Cl 27% W.L. 330.5
330.5			2	SS	47					
3.5	Clayey silt, sand & gravel, till. (Hard)		3	SS	69					
325.0			4	SS	113					
9.0	Probable Bedrock End of borehole.					320				
336.0	B.H.#15 Groundlevel									
0.0	Silty sand. Compact.		1	SS	22	330				Gr0% Sa38% Si55% Cl 7% W.L. 332.5
332.5			2	SS	27					
3.5	Clayey silt, sand & gravel, till. V. stiff to hard.		3	SS	18					
325.5			4	SS	56					
10.5	Probable Bedrock. End of borehole.		5	SS	100 for 5"	320				

FORM DB-MT-126 (FORMERLY DB-ML-126)
65-1831

OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 16,17,18 & 19

FOUNDATION SECTION

JOB 66-F-14 LOCATION Q.E.W. & Islington Ave. Vicinity ORIGINATED BY V.K.
W.P. 47-65-1 BORING DATE Feb. 8, 1966. COMPILED BY V.K.
DATUM Geodetic BOREHOLE TYPE Drive BX Casing & Wash. CHECKED BY M.D.

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS / FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT — SHEAR STRENGTH P.S.F.	LIQUID LIMIT w_L — PLASTIC LIMIT w_P — WATER CONTENT w — WATER CONTENT % (15 30 45)	BULK DENSITY γ P.C.F.	REMARKS
334.0	B.H.#16 Groundlevel									
0.0	Silty sand.		1	SS	32	330				W.L.
330.0	Dense									Gr8%
4.0	Clayey silt, sand & gravel, till.		2	SS	28					Sa48%
			3	SS	25					Si33% 330.0
325.0	V. stiff to hard.		4	SS	134					Cl 11%
9.0	Probable Bedrock End of borehole.					320				
334.0	B.H.#17 Groundlevel									
0.0	Sand		1	SS	23	330				W.L.
332.0										Gr5%
2.0	Clayey silt, sand & gravel, till. V. stiff to hard.		2	SS	23					Sa26% 332.0
			3	SS	33					Si52%
325.5			4	SS	117					Cl 17%
8.5	Probable Bedrock End of borehole.					320				
334.0	B.H.#18 Groundlevel									
0.0	Sand. Compact to dense.		1	SS	20	330				W.L.
327.5			2	SS	33					Gr0%
6.5	Clayey silt, sand & gravel, till (Hard)		3	SS	40					Sa24% 327.5
325.5			4	SS	100					Si73%
8.5	Probable Bedrock End of borehole.					320				Cl 3%
332.0	B.H.#19 Groundlevel									
0.0	Sand. Compact to dense.		1	SS	18	330				W.L.
326.0			2	SS	43					326.0
6.0	Till (Hard)		3	SS	80					
6.5	Probable Bedrock End of borehole.					320				

FORM 08-MT-126 (FORMERLY 08-ML-126)
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OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 20,21 & 22

FOUNDATION SECTION

JOB 66-F-14 LOCATION Q.E.W. & Islington Ave. Vicinity ORIGINATED BY V.K.
W.P. 47-65-1 BORING DATE Feb. 15, 1966. COMPILED BY V.K.
DATUM Geodetic BOREHOLE TYPE Drive BX Casing & Wash. CHECKED BY M.D.

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE
357.0	B.H.#20 Groundlevel					
0.0	Silty sand. Very loose to very dense.		1	SS	6	350
			2	SS	2	
			3	SS	2	
347.0			4	SS	10	
346.0			5	SS	12	
11.0	Probable Bedrock End of borehole.					340
357.0	B.H.#21 Groundlevel					
0.0	Silty sand. Very loose to dense.		1	SS	15	350
			2	SS	4	
			3	SS	3	
			4	SS	7	
346.0			5	SS	49	
11.0	Probable Bedrock End of borehole.					340
357.5	B.H.#22 Groundlevel					
0.0	Silty sand. Very loose to dense.		1	SS	38	350
			2	SS	29	
			3	SS	7	
			4	SS	3	
347.0			5	SS	16	
10.5	Clayey silt, sand & gravel, till. (V. stiff)		6	SS	19	
340.5						340
17.0	Probable Bedrock End of borehole.					

DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT
SHEAR STRENGTH P.S.F.

LIQUID LIMIT — w_L
PLASTIC LIMIT — w_P
WATER CONTENT — w
WATER CONTENT % 15 30 45

BULK DENSITY γ P.C.F.

REMARKS

- Gr 0% Sa 76% Si 22% Cl 2% — W.L. 354.0
- Gr 0% Sa 77% Si 21% Cl 2%
- Gr 0% Sa 72% Si 24% Cl 4% — W.L. 354.0
- Gr 10% Sa 39% Si 41% Cl 10% — W.L. 354.5

ABBREVIATIONS USED IN THIS REPORT

PENETRATION RESISTANCE

STANDARD PENETRATION RESISTANCE 'N' :- THE NUMBER OF BLOWS REQUIRED TO ADVANCE A STANDARD SPLIT SPOON SAMPLER 12 INCHES INTO THE SUBSOIL, DRIVEN BY MEANS OF A 140 POUND HAMMER FALLING FREELY A DISTANCE OF 30 INCHES.

DYNAMIC PENETRATION RESISTANCE :- THE NUMBER OF BLOWS REQUIRED TO ADVANCE A 2 INCH, 60 DEGREE CONE, FITTED TO THE END OF DRILL RODS, 12 INCHES INTO THE SUBSOIL, THE DRIVING ENERGY BEING 350 FOOT POUNDS PER BLOW.

DESCRIPTION OF SOIL

THE CONSISTENCY OF COHESIVE SOILS AND THE RELATIVE DENSITY OR DENSENESS OF COHESIONLESS SOILS ARE DESCRIBED IN THE FOLLOWING TERMS :-

CONSISTENCY	'N' BLOWS/FT.	c LB./SQ.FT.	DENSENESS	'N' BLOWS/FT.
VERY SOFT	0 - 2	0 - 250	VERY LOOSE	0 - 4
SOFT	2 - 4	250 - 500	LOOSE	4 - 10
FIRM	4 - 8	500 - 1000	COMPACT	10 - 30
STIFF	8 - 15	1000 - 2000	DENSE	30 - 50
VERY STIFF	15 - 30	2000 - 4000	VERY DENSE	> 50
HARD	> 30	> 4000		

TYPE OF SAMPLE

S.S.	SPLIT SPOON	T.W.	THINWALL OPEN
W.S.	WASHED SAMPLE	T.P.	THINWALL PISTON
S.B.	SCRAPER BUCKET SAMPLE	O.S.	OESTERBERG SAMPLE
A.S.	AUGER SAMPLE	F.S.	FOIL SAMPLE
C.S.	CHUNK SAMPLE	R.C.	ROCK CORE
S.T.	SLOTTED TUBE SAMPLE		
	P.H. SAMPLE ADVANCED HYDRAULICALLY		
	P.M. SAMPLE ADVANCED MANUALLY		

SOIL TESTS

Qu	UNCONFINED COMPRESSION	L.V.	LABORATORY VANE
Q	UNDRAINED TRIAXIAL	F.V.	FIELD VANE
Qcu	CONSOLIDATED UNDRAINED TRIAXIAL	C	CONSOLIDATION
Qd	DRAINED TRIAXIAL	S	SENSITIVITY

ABBREVIATIONS USED IN THIS REPORT

SOIL PROPERTIES

γ	UNIT WEIGHT OF SOIL (BULK DENSITY)
γ_s	UNIT WEIGHT OF SOLID PARTICLES
γ_w	UNIT WEIGHT OF WATER
γ_d	UNIT DRY WEIGHT OF SOIL (DRY DENSITY)
γ'	UNIT WEIGHT OF SUBMERGED SOIL
G	SPECIFIC GRAVITY OF SOLID PARTICLES $G = \frac{\gamma_s}{\gamma_w}$
e	VOID RATIO
n	POROSITY
w	WATER CONTENT
S_r	DEGREE OF SATURATION
w_L	LIQUID LIMIT
w_P	PLASTIC LIMIT
I_P	PLASTICITY INDEX
s	SHRINKAGE LIMIT
I_L	LIQUIDITY INDEX $= \frac{w - w_P}{I_P}$
I_C	CONSISTENCY INDEX $= \frac{w_L - w}{I_P}$
e_{max}	VOID RATIO IN LOOSEST STATE
e_{min}	VOID RATIO IN DENSEST STATE
I_D	DENSITY INDEX $= \frac{e_{max} - e}{e_{max} - e_{min}}$
	RELATIVE DENSITY D_r IS ALSO USED
h	HYDRAULIC HEAD OR POTENTIAL
q	RATE OF DISCHARGE
v	VELOCITY OF FLOW
i	HYDRAULIC GRADIENT
k	COEFFICIENT OF PERMEABILITY
j	SEEPAGE FORCE PER UNIT VOLUME
m_v	COEFFICIENT OF VOLUME CHANGE $= \frac{-\Delta e}{(1+e)\Delta \sigma'}$
c_v	COEFFICIENT OF CONSOLIDATION
C_c	COMPRESSION INDEX $= \frac{\Delta e}{\Delta \log_{10} \sigma'}$
T_v	TIME FACTOR $= \frac{c_v t}{d^2}$ (d, DRAINAGE PATH)
U	DEGREE OF CONSOLIDATION
τ_f	SHEAR STRENGTH
c'	EFFECTIVE COHESION INTERCEPT
ϕ'	EFFECTIVE ANGLE OF SHEARING RESISTANCE, OR FRICTION
	IN TERMS OF EFFECTIVE STRESS $\tau_f = c' + \sigma' \tan \phi'$
c_u	APPARENT COHESION
ϕ_u	APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION
	IN TERMS OF TOTAL STRESS $\tau_f = c_u + \sigma \tan \phi$
μ	COEFFICIENT OF FRICTION
S_t	SENSITIVITY

GENERAL

π	= 3·1416
e	BASE OF NATURAL LOGARITHMS 2·7183
$\log_e a$ OR $\ln a$	NATURAL LOGARITHM OF a
$\log_{10} a$ OR $\log a$	LOGARITHM OF a TO BASE 10
t	TIME
g	ACCELERATION DUE TO GRAVITY
V	VOLUME
W	WEIGHT
M	MOMENT
F	FACTOR OF SAFETY

STRESS AND STRAIN

u	PORE PRESSURE
σ	NORMAL STRESS
σ'	NORMAL EFFECTIVE STRESS ($\bar{\sigma}$ IS ALSO USED)
τ	SHEAR STRESS
ε	LINEAR STRAIN
γ	SHEAR STRAIN
ν	POISSON'S RATIO (μ IS ALSO USED)
E	MODULUS OF LINEAR DEFORMATION (YOUNGS MODULUS)
G	MODULUS OF SHEAR DEFORMATION
K	MODULUS OF COMPRESSIBILITY
η	COEFFICIENT OF VISCOSITY

EARTH PRESSURE

d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
δ	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
K_o	COEFFICIENT OF EARTH PRESSURE AT REST

FOUNDATIONS

B	BREADTH OF FOUNDATION
L	LENGTH OF FOUNDATION
D	DEPTH OF FOUNDATION BENEATH GROUND
N	DIMENSIONLESS COEFFICIENT USED WITH A SUFFIX APPLYING TO SPECIFIC GRAVITY. DEPTH AND COHESION ETC. IN THE FORMULA FOR BEARING CAPACITY
k_s	MODULUS OF SUBGRADE REACTION

SLOPES

H	VERTICAL HEIGHT OF SLOPE
D	DEPTH BELOW TOE OF SLOPE TO HARD STRATUM
β	ANGLE OF SLOPE TO HORIZONTAL

File 66-F-14

DOMINION SOIL INVESTIGATION LIMITED

77 CROCKFORD BOULEVARD - SCARBOROUGH ONTARIO CANADA - TELEPHONE 421-2567

BRANCH
[redacted] QUEENS AVENUE
LONDON, ONTARIO
TELEPHONE GE. 3-3851

FOUNDATION ENGINEERS

ASSOCIATED COMPANY
SOIL TESTING AND ENGINEERING LTD.
34 BRENTFORD ROAD,
KINGSTON 5, JAMAICA, WEST INDIES
TELEPHONE: 66896

August 10, 1966.

Our Ref. 6-6-28
Your Ref. W.J. 66-F-14

Mr. A. G. Stermac,
Principal Foundation Engineer,
Materials & Testing Division,
Department of Highways,
Downsview Avenue,
Downsview, Ontario.

Attention: ~~Mr. K. Selby, P. Eng.,~~ Mr M Devata

Re: Soil Investigation for Future Interchange of Q.E.W. and Islington Ave., Retaining Wall No. 8.

Dear Sirs:

At your request, we have put down two additional boreholes at the proposed location of Retaining Wall No. 8 (E) to be constructed for the South-East ramp of the future interchange. The boreholes were numbered by yourself as 20 and 21. The subsurface conditions encountered in the boreholes are shown on the Geotechnical Data Sheets enclosed with this letter.

Yours very truly,

DOMINION SOIL INVESTIGATION LIMITED,

I. P. Lieszkowszky, P. Eng.,
Project Engineer.

IPL/ds

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

To: **Mr. M. Devata,**
Senior Foundation Engineer,
Room 107, Lab. Building

From: **Bridge Division,**
Downsview, Ontario

Date: **June 20, 1966**

Our File Ref.

In reply to

Subject: **W.P. 47-65-1**
Retaining Wall #8 (Wall E)
District 6, Hwy. Q.E.W.
W.J. 66-F-14

66-F-14

We notice that the set of boreholes taken for the above retaining wall, i.e. holes #12 to #19 running from west to east, fall somewhat short of the easterly end of this structure.

Borehole #19 is at Station 108 + 00 approximately, and we require foundation information easterly as far as the end of the wall at Station 104 + 00.

We apologize for the apparent discrepancy in original borehole requirements and trust we can obtain this new additional information at your earliest convenience.

H.S. Bawcutt,
Bridge Design Section

HSB:rd

c.c. W. Melinyshyn

Ken,

I am enclosing the necessary Dwgs for additional borings on the retaining structure. As we agreed upon the borings will be carried out by Dominion Soils.

Merely
6 July 166

cc: Foundations Office (Rm. 110)

Mr. B. E. Davis,
Bridge Engineer,
Bridge Division.

Attention: Mr. W. M. McFarlane

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

May 25, 1966

Proposed Retaining Structure at the
Future Interchange at Q.E.W. and
Islington Ave., Metropolitan Toronto,
Twp. of Etobicoke, Dist. #6 (Toronto).
W.J. 66-F-14 -- W.P. 47-65-1

This is to summarize the discussion of this morning pertaining to the retaining wall 'F' at the above mentioned interchange:

It is understood that the wall will retain a fill of only 3 ft. height.

We would recommend that the wall foundations be placed 5 ft. below ground level to provide for adequate frost protection.

The investigation has disclosed that the ground water table is close to the existing ground level, and therefore dewatering will have to be applied to enable the placement of the wall footings at the required depth.

The choice of the dewatering scheme should be left to the discretion of the contractor. The only stipulation we would recommend is that the excavation has to be dry and that no boiling had taken place anywhere within the area of the footings. We believe that effective dewatering could be achieved by lowering sumps down to either bedrock or very stiff glacial till, and by pumping ahead of commencing the excavation. The sumps should be protected with spaced and braced timber sheeting.

We would recommend that once the excavation is completed, a vibratory roller should make six passes in order to compact the underlying soil.

cont'd. /2 .....

It is also our recommendation that special attention be given to the compaction of the fill in front of the wall. This would enable the wall to mobilize considerable passive resistance with least movements. Backfilling with granular material using vibratory compaction equipment is recommended.

AGS/KdeP

A. G. Stermac,
PRINCIPAL FOUNDATION ENGINEER

cc: Messrs. H. A. Tregaskes
D. W. Farren
G. K. Hunter (2)
J. C. Thatcher
T. J. Kovish

Foundations Office
Gen. Files

66-F-14 W 47-65-1

Wall F BH 20 21 22

Retaining wall to support

4'.

9' to bedrock

4' for frost

Granular B

North ~~West~~ East Corner - Kipling and Q.E.W.

Short timber piles are suggested for compaction of the underlying soil. This information was given to Bridge office by Mr A. G. Sermac

cc: Foundations Office (Rm. 110)

Mr. S. McCombie,
Bridge Planning Engineer,
Bridge Division.

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

Attention: Mr. W.S. Mellanayhyn,
Regional Bridge
Location Engr.

August 18, 1966

Q.E.W. and Islington Ave. Interchange -
Retaining Wall #8 (E)
District #6 (Toronto)
W.J. 66-F-14 -- W.P. 47-65-1

As requested by the Bridge Design Section, for the retaining wall #8 (E) which has been extended some 400 ft. easterly from Sta. 104+00, we have obtained additional sub-soil information. The sub-surface conditions encountered in B.H.'s #20 and #21, together with their locations, are shown on the enclosed Dwg. #66-F-148.

We trust that the foregoing information will be adequate for your design requirements. If you have any further queries, please contact this Office.

M. Devata

M. Devata,
SUPERVISING FOUNDATION ENGR.
For:
A. G. Steremc,
PRINCIPAL FOUNDATION ENGR.

MD/MdeF
Attach.

cc: Messrs. H. A. Tregaskes
D. W. Farren
G. K. Hunter (2)
P. Allen
T. J. Kovich

Foundations Office ✓
Gen. Files

GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 20 . .

OUR REFERENCE NO. 6-6-2P
YOUR REF. W.J. 66 – F – 14
CLIENT: D. H. O.
PROJECT: Q.E.W. & ~~HWY. No. 27~~ INTERCHANGE
LOCATION: 181,105 N ; 219,993 E
DATUM ELEVATION: G.S.C.

ISLINGTON AVE.

METHOD OF BORING: WASHBORING
DIAMETER OF BOREHOLE: 3"
DATE: AUG. 2. 1966.
W.P. 47 – 65 – 1

ENCLOSURE NO.

ELEVATION ft.	DEPTH ft.	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES N — or Advancement of Sampler	PENETRATION RESISTANCE blows per foot 20 40 60 80 100 / SHEAR STRENGTH lbs/sq ft	CONSISTENCY water content % PL W LL	REMARKS
330.9	0	GROUND SURFACE							
		12" TOPSOIL							
		Very Hard CLAYEY SILT with embedded GRAVEL and SHALE fragments (GLACIAL TILL)		1	SS	58			
	5	Brown / Grey		2	SS	50/2"			W.L. 324.5 Ft. AUG. 4. 1966.
325.0									
321.4	9.5								
	10			3	RC	51 %			
320.0		Grey SHALEY LIMESTONE BEDROCK		4	RC	33 %			
	15								
315.0				5	RC	57 %			
	20								
310.0		END OF BOREHOLE							
	25								
305.0									

VERTICAL SCALE: 1 IN. TO 5 FT.

DOMINION SOIL INVESTIGATION LIMITED

MADE: V.G.H. CH'D:

GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 21 . . .

OUR REFERENCE NO. 6-6-28
YOUR REF. W.J. 66-F-14
CLIENT: D.H.O.
PROJECT: Q.E.W. & ~~HWY. No. 27~~ INTERCHANGE
LOCATION: 181,152 N ; 220,163 E
DATUM ELEVATION: G.S.C.

ISLINGTON AVE.

METHOD OF BORING: WASHBORING
DIAMETER OF BOREHOLE: 3"
DATE: JULY 29. 1966.
W.P. 47-65-1

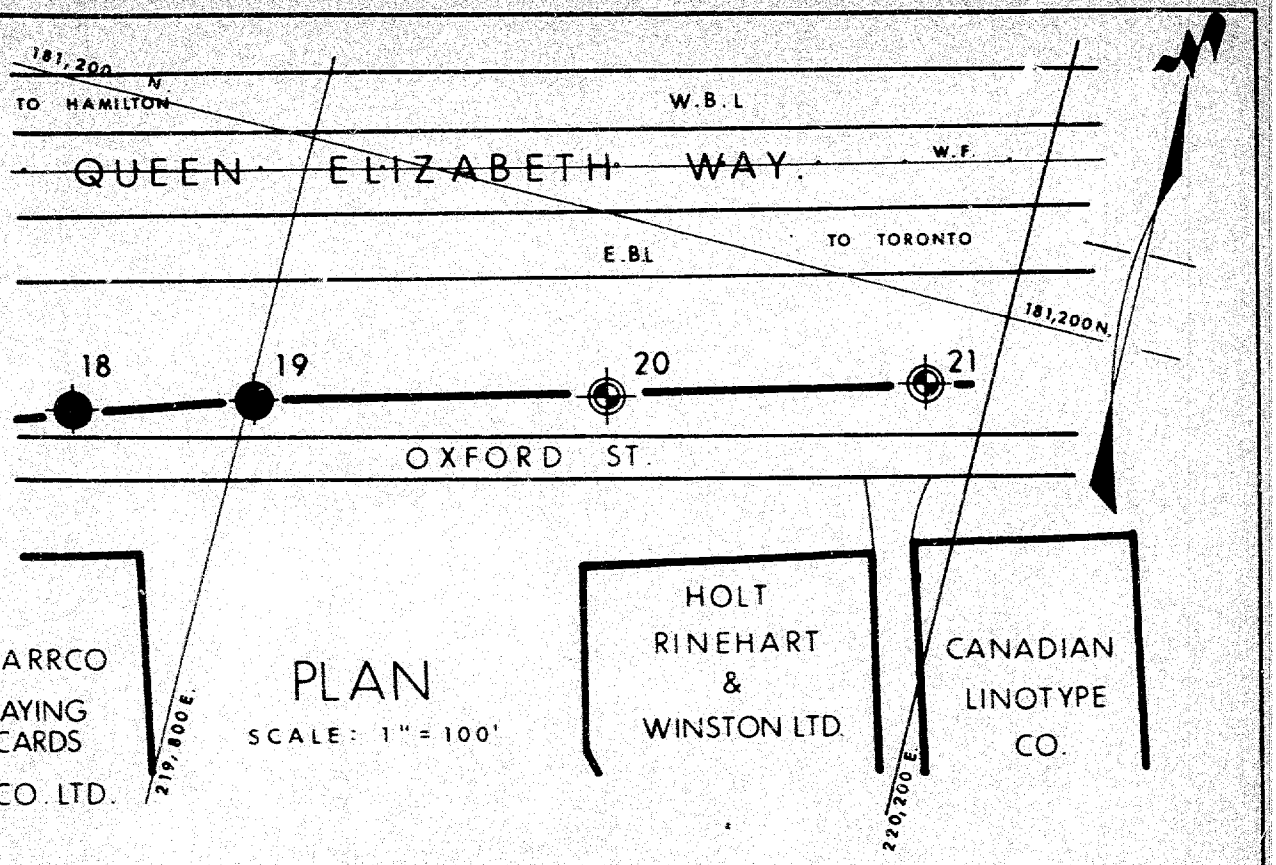
ENCLOSURE NO.

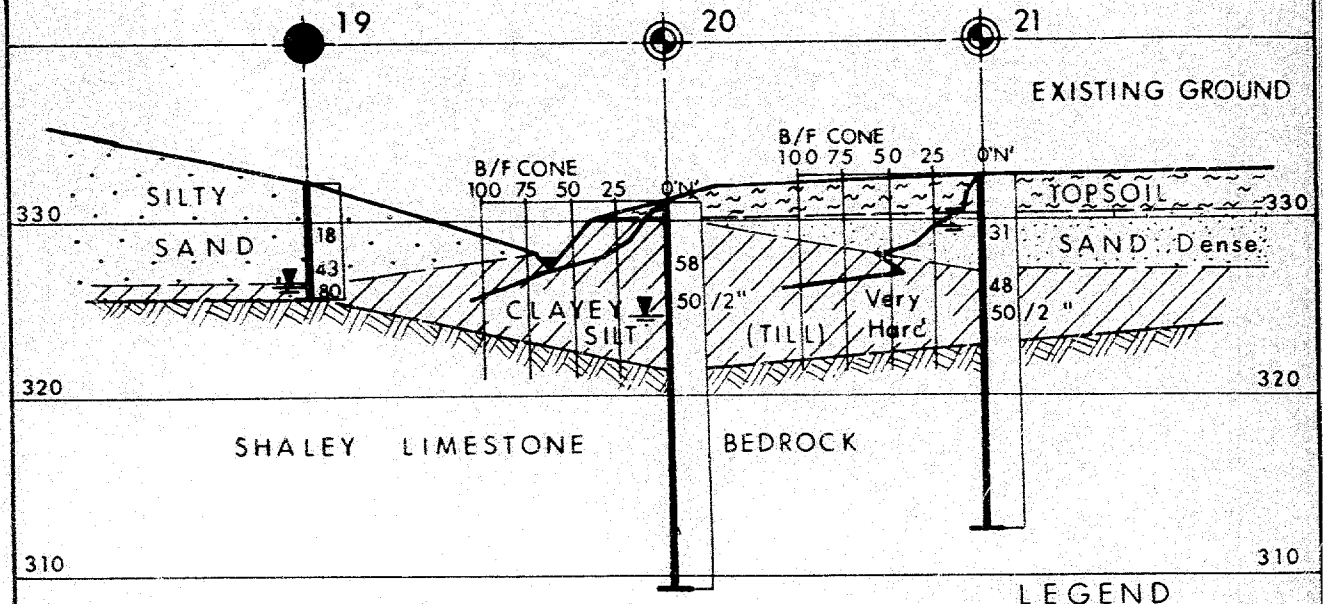
ELEVATION, ft.	DEPTH ft.	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES N — or Advancement of Sampler	PENETRATION RESISTANCE blows per foot (20 40 60 80 100) / SHEAR STRENGTH lbs/sq ft	CONSISTENCY water content % (PL W LL)	REMARKS
332.3	0	GROUND SURFACE							
		Black Organic TOPSOIL							
330.2	2.0								
330.0		Dense Brown FINE SAND (wet)		1	SS	31			HOLE DRY CAVE-IN EL. 329.7 Ft. AUG. 2. 1966.
	5			2	SS	48			
325.0		Very Hard Grey CLAYEY SILT (GLACIAL TILL)		3	SS	50/2"			
	10			4	RC	62%			
320.0		Grey SHALEY LIMESTONE BEDROCK							
	15			5	RC	82%			
315.0									
	20	END OF BOREHOLE							
310.0									
	25								

VERTICAL SCALE: 1 IN. TO 5 FT.

DOMINION SOIL INVESTIGATION LIMITED

MADE: V. G. H. CH'D:





SECTION (E)

SCALE: 1" = 100'

LEGEND

- BORE HOLE (D.H.O.)
- BORE & CONE (DOM. SOIL)
- WATER LEVEL

DEPARTMENT OF HIGHWAYS
MATERIALS and TESTING DIVISION
ONTARIO

Q.E.W. & ISLINGTON AVE. INTERCHANGE

RETAINING WALL (E) EXTENSION

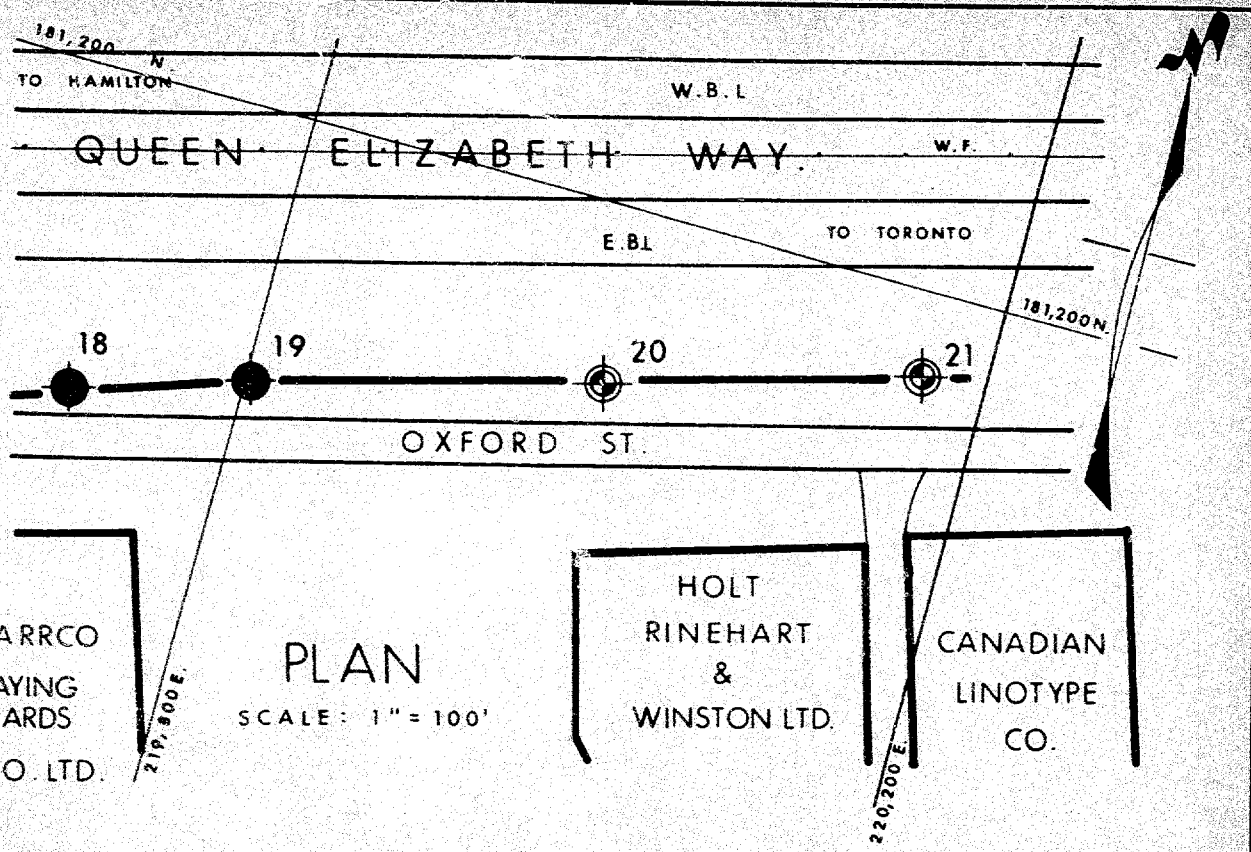
WP 47 - 65 - 1

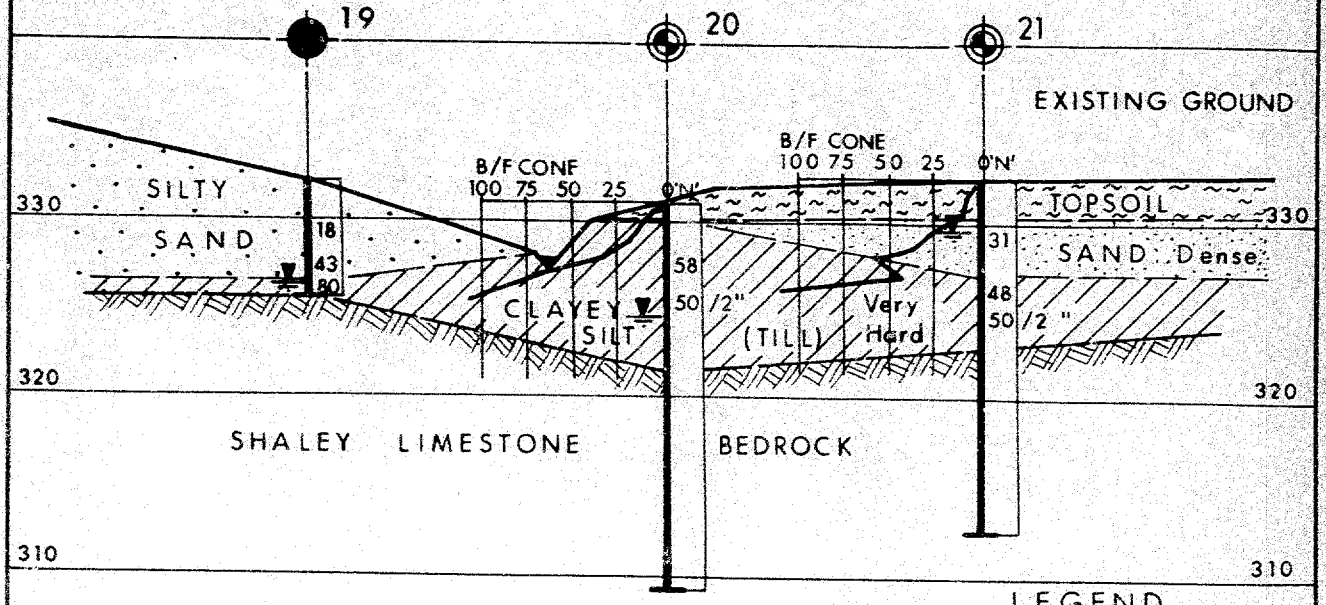
JOB 66 - F - 14

DATE 24 AUG 1966

APPROVED

DRAWING NO. 66-F-14B





SECTION 'E'

SCALE: 1" = 100'

LEGEND

- BORE HOLE (D.H.O.)
- BORE & CONE (DOM. SOIL)
- WATER LEVEL

DEPARTMENT OF HIGHWAYS
MATERIALS and TESTING DIVISION
ONTARIO

Q.E.W. & ISLINGTON AVE. INTERCHANGE

RETAINING WALL (E) EXTENSION

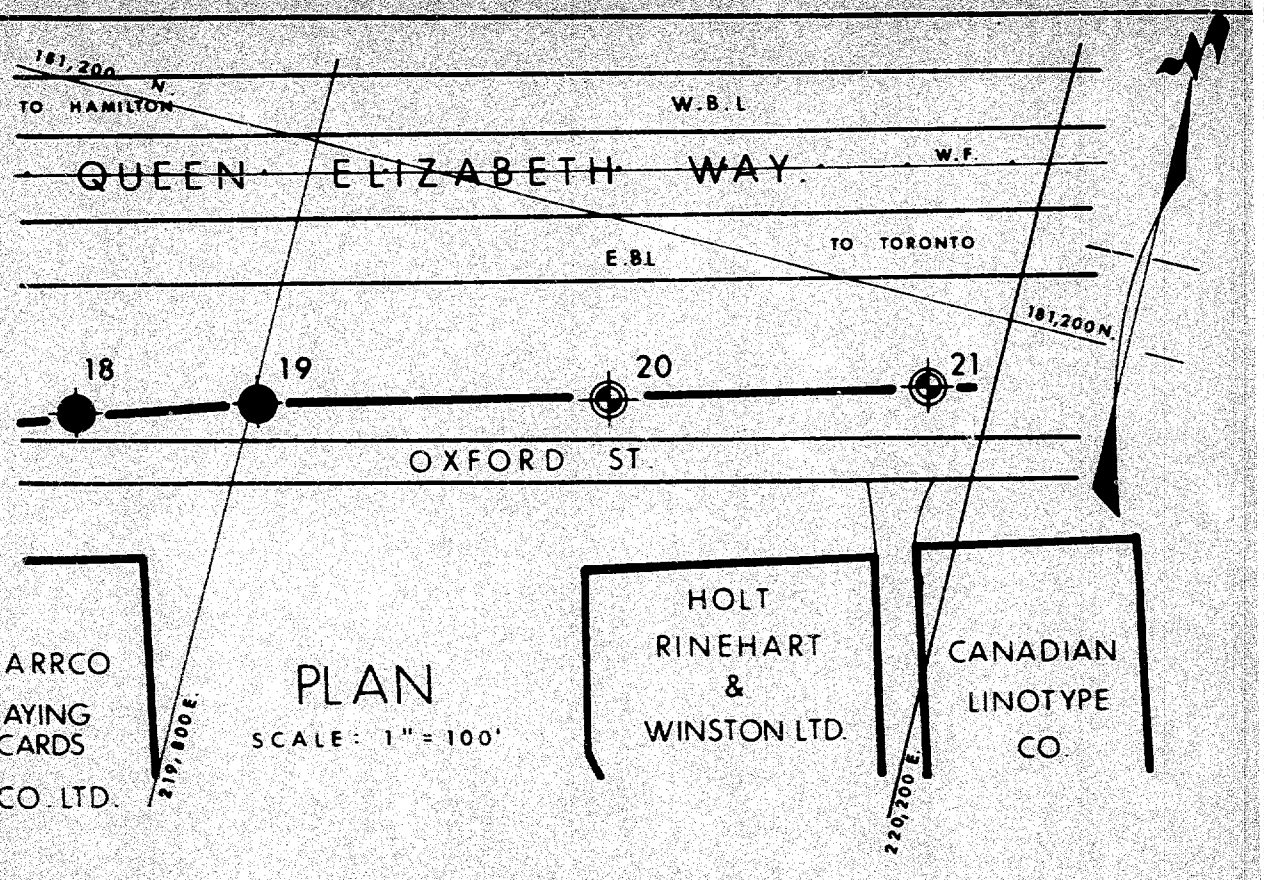
WP 47 - 65-1

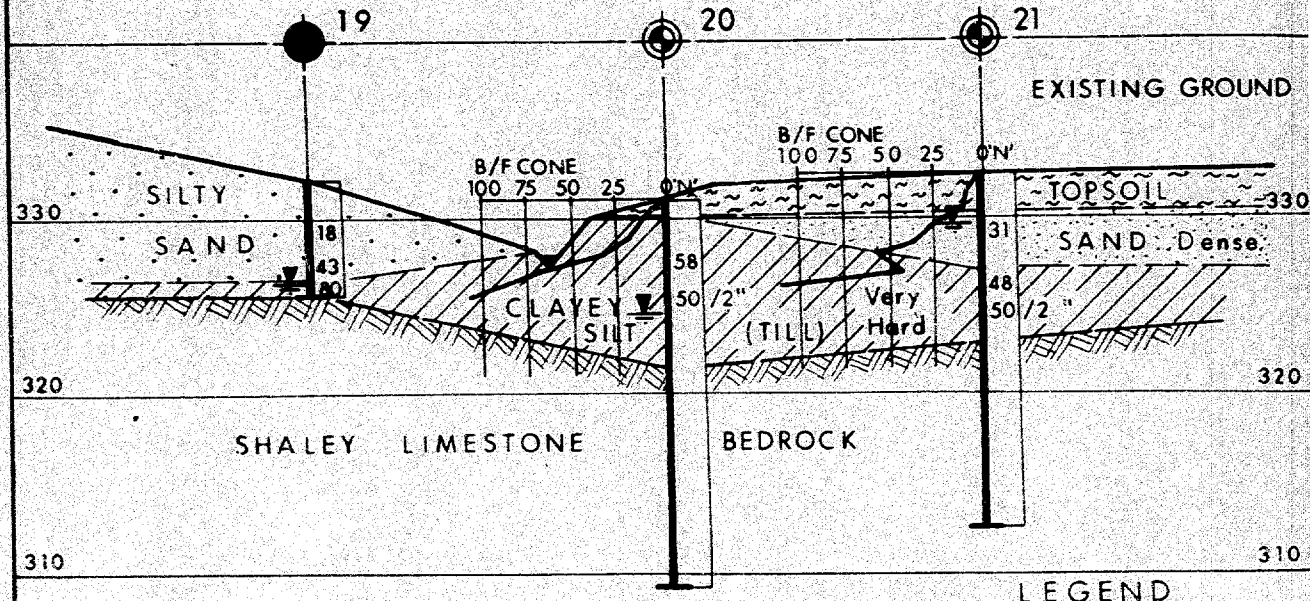
JOB 66-F-14

DATE 24 AUG 1966

APPROVED

DRAWING NO. 66-F-14B





SECTION (E)

SCALE: 1" = 100'

LEGEND

- BORE HOLE (D.H.O.)
- BORE & CONE (DOM. SOIL)
- WATER LEVEL

DEPARTMENT OF HIGHWAYS
MATERIALS and TESTING DIVISION
ONTARIO

Q.E.W. & ISLINGTON AVE. INTERCHANGE

RETAINING WALL (E) EXTENSION

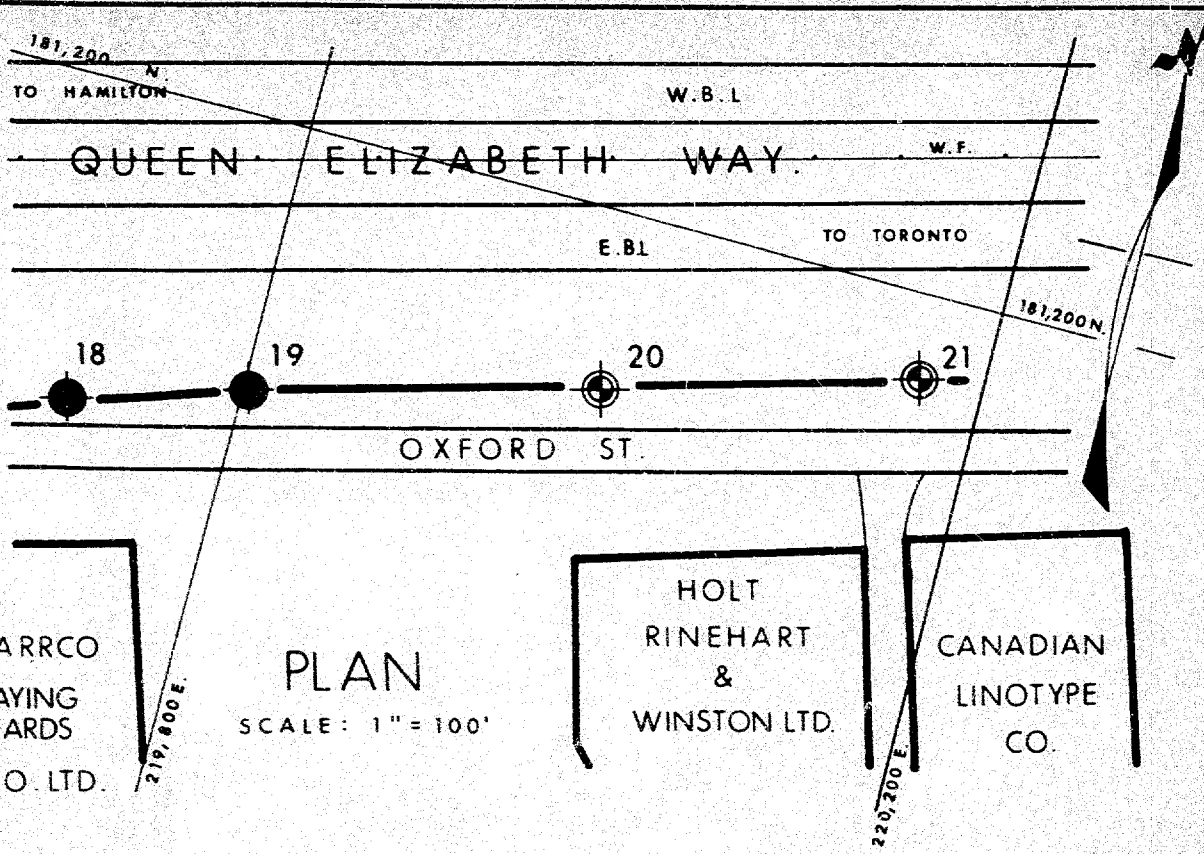
WP 47 - 65-1

JOB 66-F-14

DATE 24 AUG 1966

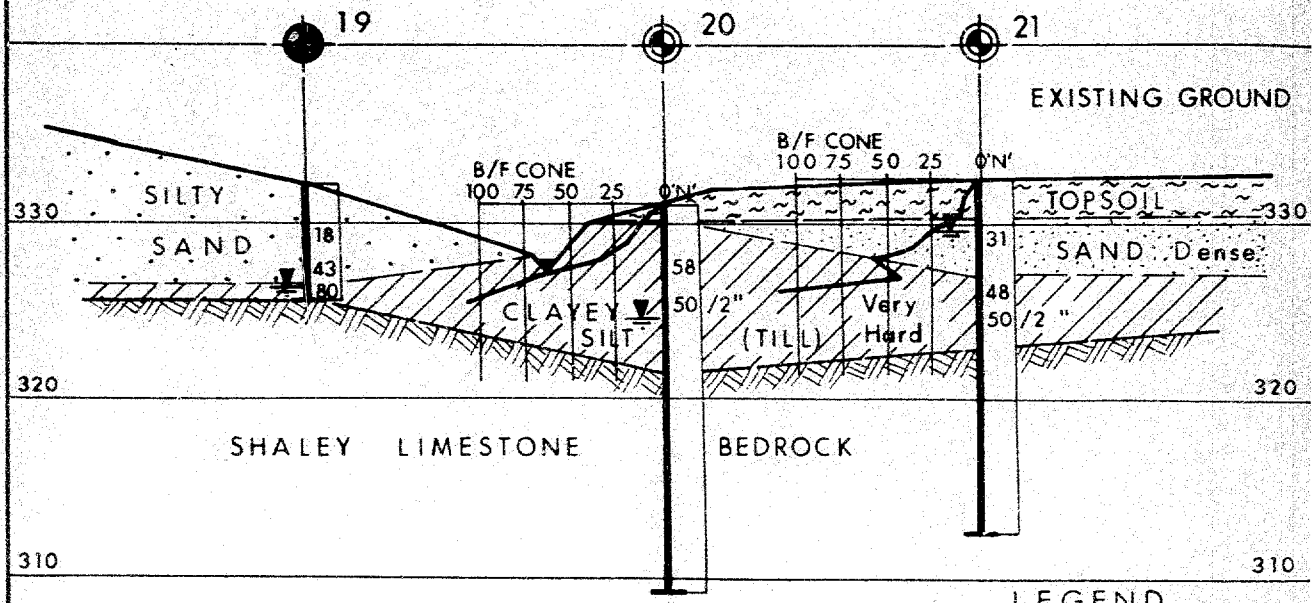
APPROVED A. L. Brown

DRAWING NO. 66-F-14B



PLAN

SCALE: 1" = 100'



SECTION 'E'

SCALE: 1" = 100'

LEGEND

- BORE HOLE (D.H.O.)
- BORE & CONE (DOM. SOIL)
- WATER LEVEL

DEPARTMENT OF HIGHWAYS
MATERIALS and TESTING DIVISION
ONTARIO

Q.E.W. & ISLINGTON AVE. INTERCHANGE

RETAINING WALL (E) EXTENSION

WP 47 - 65-1

JOB 66-F-14

DATE 24 AUG 1966

APPROVED A. Strauss

DRAWING NO. 66-F-14B

GEOTECHNICAL DATA SHEET FOR BOREHOLE . . 20 . .

OUR REFERENCE NO. 6-6-28
YOUR REF. W.J.66-F-14
CLIENT: D.H.O. **ISLINGTON AVE.**
PROJECT: Q.E.W. & ~~HWY. No. 27~~ INTERCHANGE
LOCATION: 181,105 N ; 219,993 E
DATUM ELEVATION: G.S.C.

METHOD OF BORING: WASHBORING
DIAMETER OF BOREHOLE: 3"
DATE: AUG. 2. 1966.
W.P. 47-65-1

ENCLOSURE NO.

ELEVATION ft.	DEPTH ft.	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES N or Advancement of Sampler	PENETRATION RESISTANCE blows per foot 20 40 60 80 100 / SHEAR STRENGTH lbs/sq ft	CONSISTENCY water content % PL W LL	REMARKS
330.9	0	GROUND SURFACE							
		12" TOPSOIL Very Hard CLAYEY SILT with embedded Brown GRAVEL Grey and SHALE fragments (GLACIAL TILL)		1	SS	58			
	5			2	SS	50/2"			
325.0									W.L. 324.5 Ft. AUG. 4. 1966.
321.4	9.5								
320.0	10	Grey SHALEY LIMESTONE BEDROCK		3	RC	51%			
	15			4	RC	33%			
315.0									
				5	RC	57%			
	20								
310.0		END OF BOREHOLE							
	25								
305.0									

VERTICAL SCALE: 1 IN TO 5 FT.

DOMINION SOIL INVESTIGATION LIMITED

MADE: V.G.H. CH'D:

GEOTECHNICAL DATA SHEET FOR BOREHOLE 21

OUR REFERENCE NO. 6-6-28
YOUR REF. W.J. 66-F-14
CLIENT: D.H.O. **ISLINGTON AVE.**
PROJECT: Q.E.W. & ~~HWY. No. 27~~ INTERCHANGE
LOCATION: 181,152 N ; 220,163 E
DATUM ELEVATION: G.S.C.

METHOD OF BORING: WASHBORING
DIAMETER OF BOREHOLE: 3"
DATE: JULY 29. 1966.
W.P. 47-65-1

ENCLOSURE NO.

ELEVATION ft.	DEPTH ft.	STRATIFICATION DESCRIPTION	STRATIFICATION SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES N or Advancement of Sampler	PENETRATION RESISTANCE blows per foot 20 40 60 80 100 / SHEAR STRENGTH lbs/sq ft	CONSISTENCY water content % PL W LL	REMARKS
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		Black Organic TOPSOIL							
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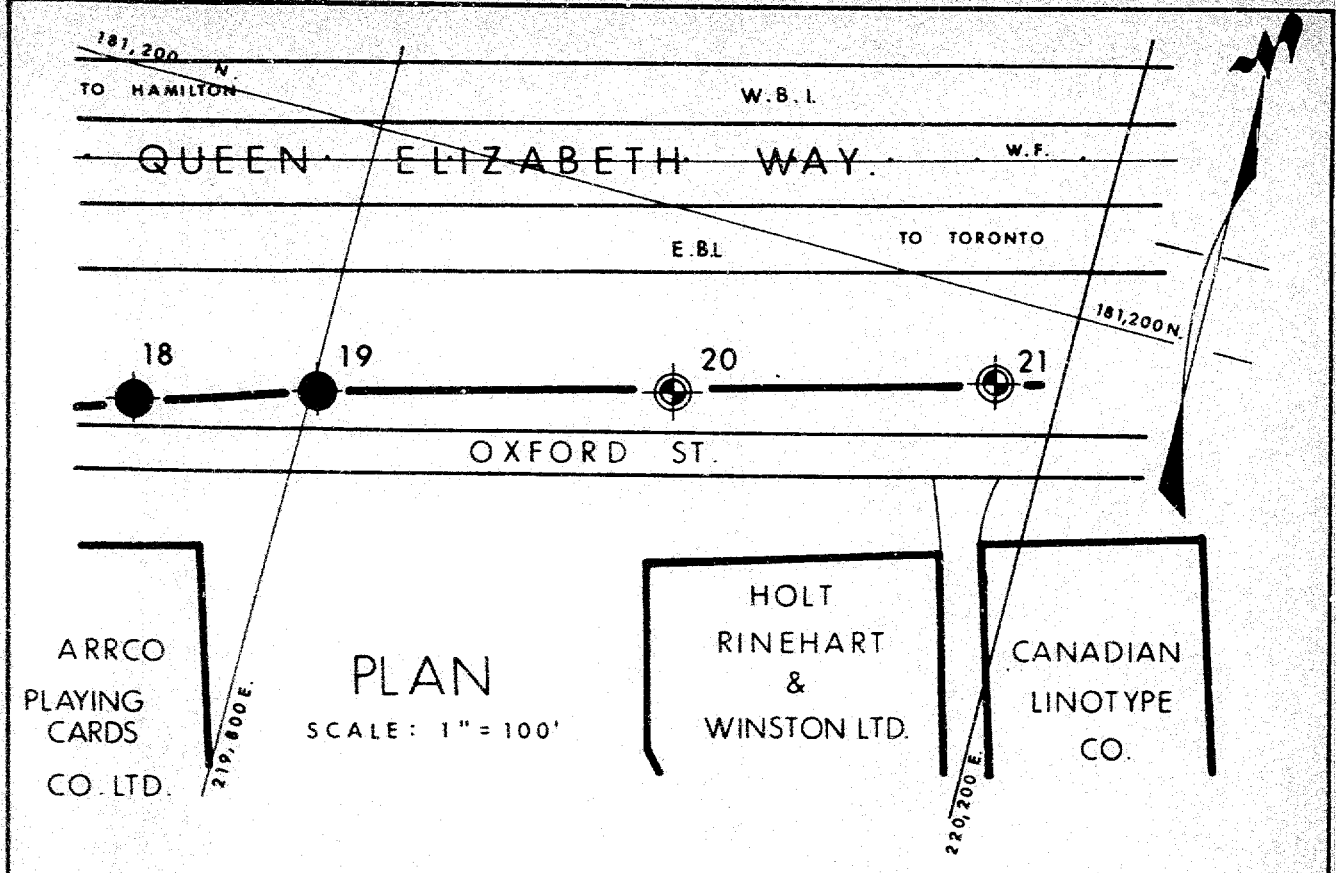
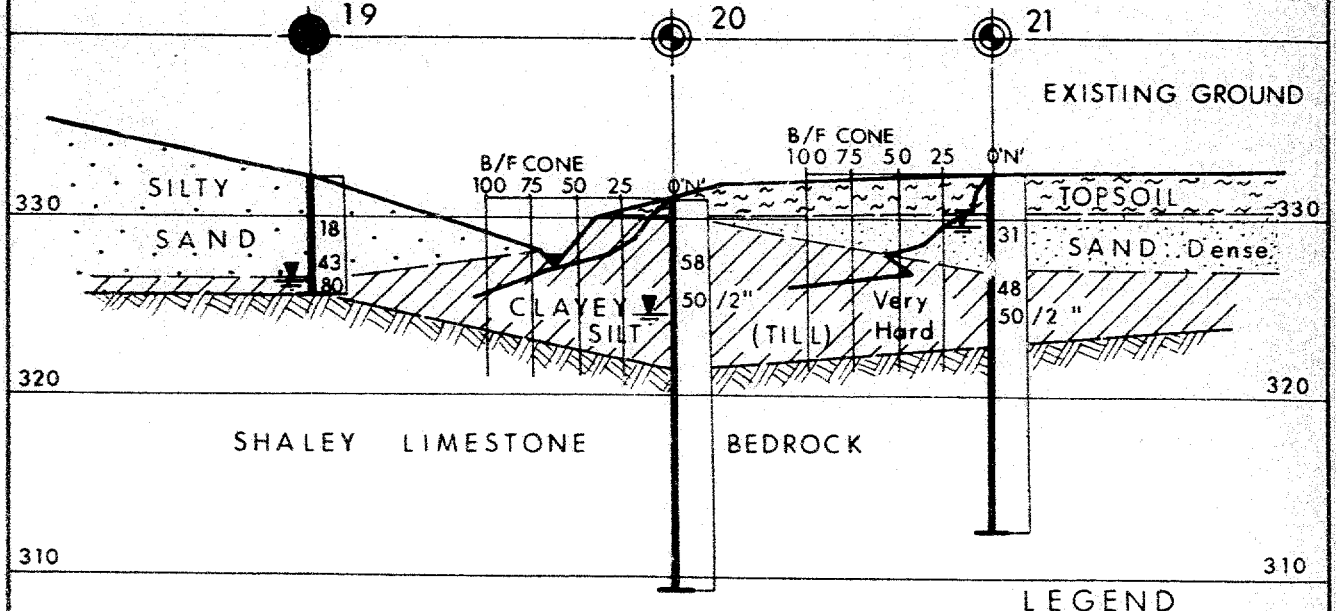
330.0		Dense Brown FINE SAND (wet)		1	SS	31			HOLE DRY CAVE-IN EL. 329.7 Ft. AUG. 2. 1966.
	5			2	SS	48			
325.0		Very Hard Grey CLAYEY SILT (GLACIAL TILL)		3	SS	50/2"			
	10								
320.0		Grey SHALEY LIMESTONE BEDROCK		4	RC	62%			
	15								
315.0				5	RC	82%			
	20	END OF BOREHOLE							
310.0									
	25								

VERTICAL SCALE: 1 IN. TO 5 FT.

DOMINION SOIL INVESTIGATION LIMITED

MADE: V. G. H. CH'D:





SECTION 'E'

SCALE: 1" = 100'

LEGEND

- BORE HOLE (D.H.O.)
- BORE & CONE (DOM. SOIL)
- WATER LEVEL

DEPARTMENT OF HIGHWAYS
MATERIALS and TESTING DIVISION
ONTARIO

Q.E.W. & ISLINGTON AVE. INTERCHANGE

RETAINING WALL (E) EXTENSION

WP 47 - 65-1

JOB 66-F-14

DATE 24 AUG 1966

APPROVED

DRAWING NO. 66-F-14B

66-F-

Mr. A. Stermac,
Principal Foundation Engineer,
Room 107, Lab. Bldg.

Bridge Division,
Downsview, Ontario.

January 13, 1966.

Retaining Walls at Q.E.W. and
Wickman Road Overpass,
W.P. 47-65-1, District 6.

In order to keep the scheduled award date (June 29,1966) a foundation investigation of utmost urgency would be required for the four retaining walls adjacent to above mentioned structure.

The bridge design section is prepared to go ahead immediately after the receipt of the final geometrics for these walls. We would appreciate it very much if you could arrange for some preliminary, possibly verbal information at your earliest convenience.

A plan showing all retaining walls on the Q.E.W. west of Hwy. 27 was handed to Mr. Devata this morning. The top priority exists only for the four walls mentioned above. However, a foundation report for all walls shown on the plan will be required eventually.

EBJ/ag

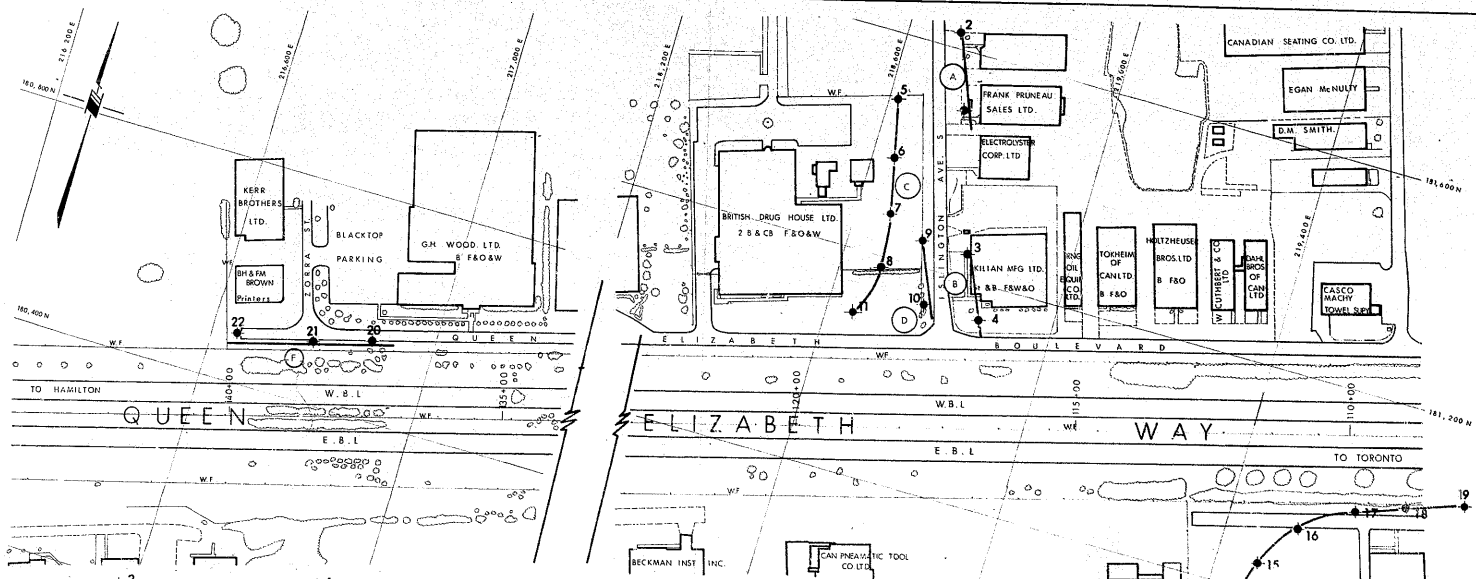
J. B.Curtis,
Regional Bridge Location Engineer.

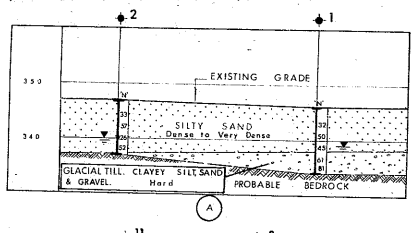
#66-F-14

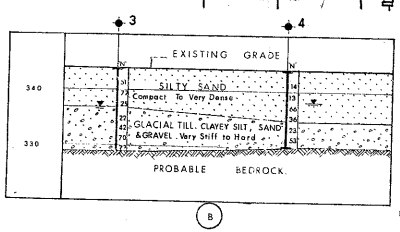
W.P.#47-65-1

Q.E.W. &

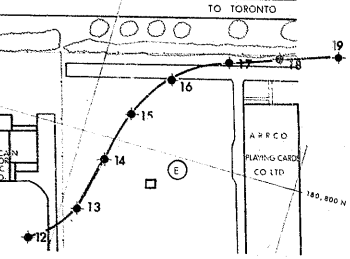
ISLINGTON AVE.

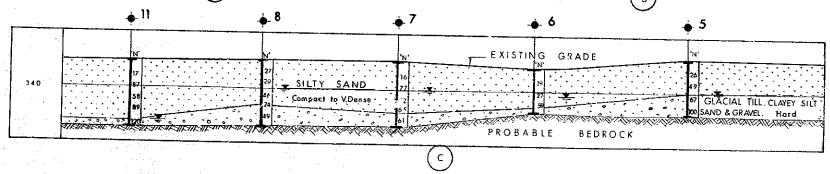


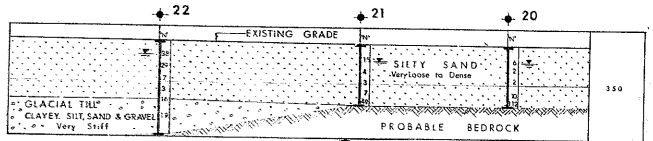


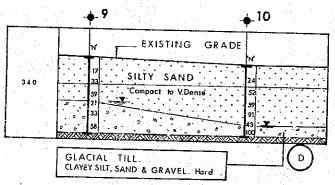


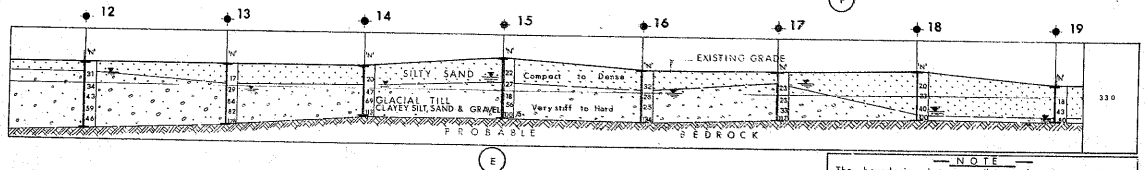
SECTIONS
SCALE IN FEET
VERT 10 5 0 10 20 30
HORIZ 40 20 0 40 80 120



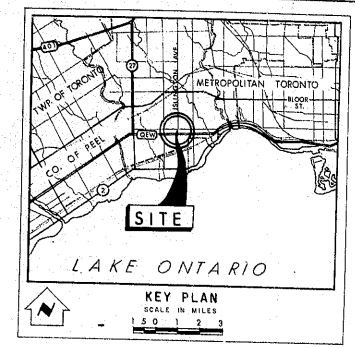








— NOTE —
The boundaries between soil strata have been established only at Bore Hole locations. Between BoreHoles the boundaries are assumed from geological evidence, and may be subject to considerable error



LEGEND

- Bore Hole
- Cone Penetration Hole
- Bore & Cone Penetration Hole
- Water Levels established at time of field investigation. Feb 1966
- (A) Retaining Walls

NO.	ELEVATION	CO-ORDINATES NORTH	EAST
1	346·0	181,490	218,740
2	347·0	181,629	218,690
3	344·0	181,245	218,816
4	344·0	181,131	218,847
5	345·0	181,183	218,617
6	344·0	181,375	218,643
7	345·0	181,275	218,662
8	345·0	181,178	218,672
9	345·0	181,265	218,730
10	344·0	181,133	218,766
11	345·0	181,084	218,648
12	334·0	180,583	219,362
13	334·0	180,660	219,433
14	334·0	180,758	219,463
15	336·0	181,855	219,484
16	334·0	180,937	219,536
17	334·0	180,988	219,618
18	334·5	181,019	219,730
19	332·0	181,053	219,803
20	357·0	180,561	216,887
21	357·0	180,513	216,783
22	357·5	180,482	216,643

REVISIONS		
DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING DIVISION - FOUNDATION SECTION

RETAINING WALLS
(ISLINGTON AVE. VICINITY)

KING'S HIGHWAY NO. Q.E.W. DIST. NO. 6
CO. METROPOLITAN TORONTO
TWP. ETOBICOKE LOT CON.

BORE HOLE LOCATIONS & SOIL STRATA

SUBM'D. V.K.	CHECKED	W.P. NO. 47-65-1	M.B.T. DRAWING NO. 66-F-14 A
DRAWN J.N.	CHECKED	JOB NO. 66-F-14	
DATE L.APRIL.1966		SITE NO.	BRIDGE DRAWING NO.
APPROVED		CONT. NO.	

PRINT RECORD

NO.	FOR	DATE