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DIST. 6 REGION CENTRAL

W.P. No. 44-71-08

CONT. No. 77-133

W. O. No. 73-11022

STR. SITE No. 22-175

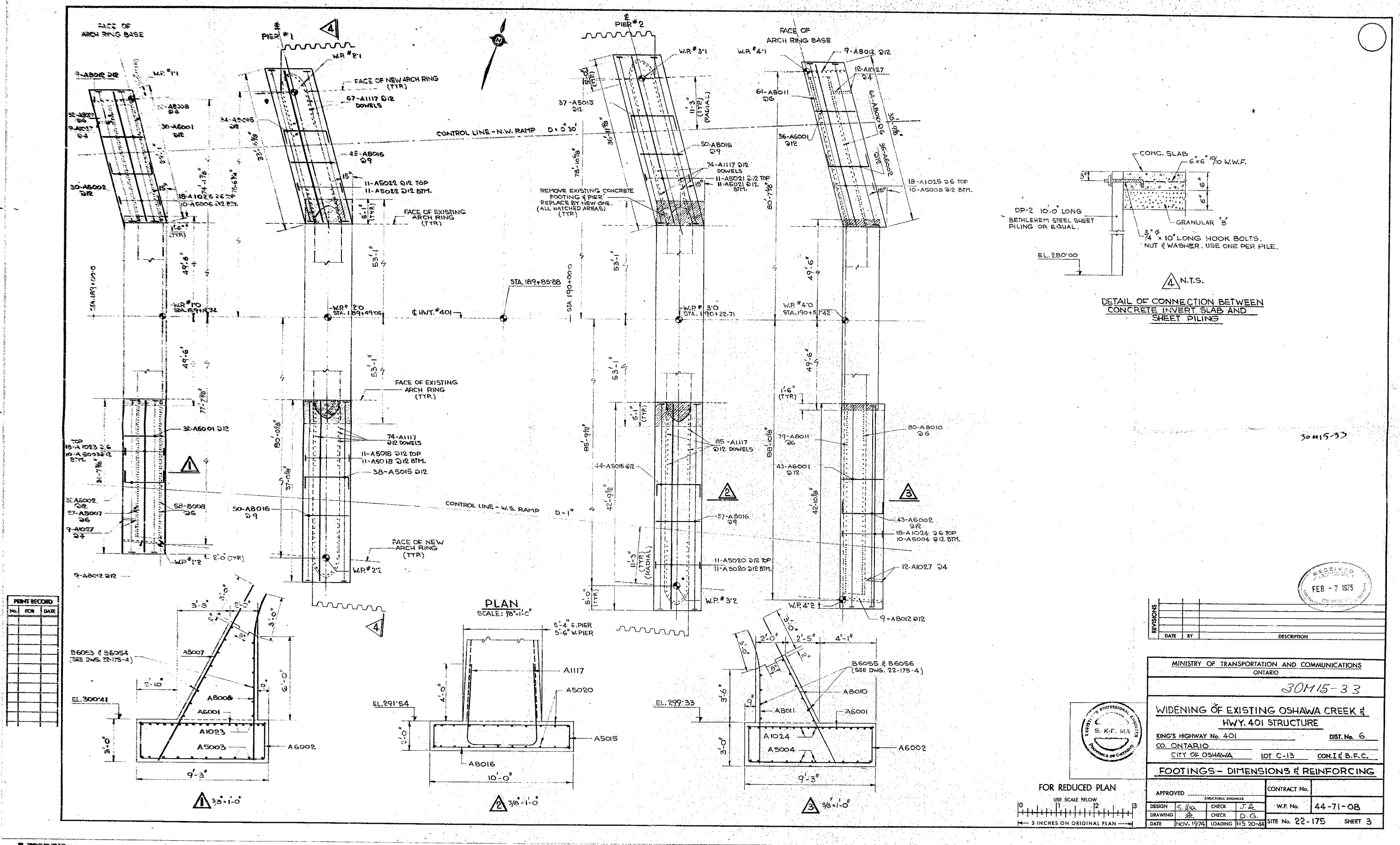
HWY. No. _____

LOCATION WIDENING OSHAWA

CREEK BRIDGE

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 2

REMARKS: _____



FOUNDATION INVESTIGATION REPORT
For
Widening Oshawa Creek Bridge
Hwy. 401, Oshawa
District #6, Site 22-175
W.P. 44-71-08 - W.O. 73-11022

1. INTRODUCTION:

On receiving a request from Mr. G. C. E. Burkhardt, Regional Structural Planning Engineer for the Central Region, dated November 9, 1972, a foundation investigation was undertaken for the proposed widening of Oshawa Creek Bridge on Hwy. 401. The proposal consists of widening the existing structure some 30 ft. on both sides. Presented in this report are the results of that investigation together with recommendations concerning the structure's foundations.

2. DESCRIPTION OF SITE AND GEOLOGY:

The site is located in the City of Oshawa where Hwy. 401 crosses over Oshawa Creek. The general area is gently rolling landscape. The creek cuts a 6 to 10 foot valley through the surrounding area. The river is about 40 ft. wide and 1 to 3 feet deep at the crossing. The land use near the site is mainly residential with some industrial areas.

Geologically, the site is part of the physiographic region known as the Iroquois Plain. This area consists of the old shorelines of Lake Iroquois which includes cliffs, bars, beaches, and boulder pavement above a till plain.

3. FIELD WORK AND LABORATORY INVESTIGATION:

The field work consisted of twelve sampled boreholes and six dynamic cone penetration tests, with four of the cones being adjacent to four of the boreholes. The boreholes were advanced by both washboring and augering. Split-spoon samples were taken at regular intervals and standard penetration "N" values were obtained in driving the split spoon. Driving energy to advance the cones and split spoons was 350 ft.-lbs. per blow. The resulting penetration "N" values are recorded in the Appendix.

Soil samples were identified in the field and again upon arrival in the laboratory. Laboratory tests to determine moisture content and grain size were carried out on representative samples.

The locations and elevations of the boreholes and cones as well as a stratigraphical profile are plotted on Drawing 73-11022A attached at the end of this report. The surveying of the site was carried out by personnel from the Central Region Engineering Surveys Section.

4. SUBSOIL CONDITIONS:

4.1) General:

No uniform subsoil layer was found to extend across the site other than a sandy silt till. The subsoil conditions at the site are somewhat irregular because of the disturbance of the original soil by the creek and the placing of fill material for the bridge approaches.

A description of the different deposits is given on the Record of Borehole sheets contained in the Appendix. The estimated stratigraphical profile shown on Drawing 73-11022A, is based on this information. From ground level downwards the various soil types are described as follows:

4.2) Sand with Gravel, Some Silt:

This deposit was found in eight of the twelve boreholes.

Also included under this heading is the fill material found in the upper portion of some of the boreholes. The actual extent of the deposit can best be seen by referring to the stratigraphical profile. The "N" values within this material were observed to range between 9 to greater than 100 blows per foot corresponding to a loose to very dense relative density. Grain-size distribution and natural moisture content of this deposit was found to be as follows:

Gravel	19 - 50%
Sand	30 - 56%
Silt and Clay	6 - 27%
Moisture Content	8 - 33%

Traces of organics were found in this deposit in B.H. #1. A typical grain size envelope is included in the Appendix as Fig. 1.

4.3) Sand With Silt, Traces of Gravel:

This material was found in 6 of the 12 boreholes. The stratigraphical profile best shows the location of this deposit. Traces of organics were found within this layer between elevation 300 and elevation 290 in B.H.'s #3, 4, 5, 7 and 9. An organic content of 1.4% was measured in B.H. #9, Sample 4. The colour of the material in this deposit ranges from brown to dark brown to dark grey; the darkness being due to the presence of organics. The moisture content varied between 9 and 43%. The grain size distribution was found to be as follows:

Gravel	0 - 12%
Sand	51 - 71%
Silt and Clay	24 - 43%

The standard penetration "N" values varied from 7 to more than 100 blows per foot, corresponding to a loose to very dense relative density. A typical grain size envelope is included in the Appendix as Fig. 2.

4.4) Silt With Sand, Traces of Gravel:

The silt with sand and traces of gravel was found in

B.H. #10, 7, 15 and 16. In B.H. #10 between elevation 300 and elevation 290 traces of organics were found in the samples. An organic content of 8.5 was measured in B.H. #10, Sample 7. The moisture content of this deposit was measured to be between 9 and 55% with the 55% occurring in B.H. #10, Sample 7. Mechanical grain size analysis yielded the following results:

Gravel	0 - 8%
Sand	26 - 47%
Silt and Clay	52 - 71%

The standard penetration "N" values were measured to be between 7 and 41 blows per foot corresponding to a relative density of loose to dense. Included in the Appendix as Fig. 3 is a typical grain size envelope.

4.5) Silt With Sand, Traces of Gravel (Glacial Till):

Underlying the previously mentioned soils is a very dense silt with sand, traces of gravel (glacial till). This subsoil is similar in grain size distribution to the subsoil described in Section (4.4) but different in relative density, moisture content and method of deposition. The till was encountered around elevation 294 to 288 in all boreholes except 15 and 16. Mechanical grain size analysis and moisture content is as follows:

Gravel	1 - 8%
Sand	33 - 54%
Silt & Clay	44 - 64%
Moisture Content	8 - 25%

The "N" values were measured to be 100 to greater than 100 blows per foot corresponding to a very dense relative density. A typical grain size envelope is included in the Appendix as Fig. 4.

5. GROUNDWATER CONDITIONS:

The following groundwater levels were observed in the boreholes during the field investigation.

<u>B.H. #</u>	<u>Elevation</u>
4	293.4
5	293.8
6	294.2
7	307.6
9	294.1
10	298.6
12	294.6
14	294.7
15	295.3
16	300.4

The water level in the river on May 8, 1973, was 294.7 ft. at the north end of the bridge and 292.9 ft. at the south end. In B.H.'s #1 and 5 artesian water was encountered at about elevation 273 and rose to about elevation 300.

6. DISCUSSION AND RECOMMENDATIONS:

6.1) General:

In conjunction with the widening of Hwy. 401 through Oshawa the bridge over Oshawa Creek is to be widened on both sides. The dimensions of the widening are shown on Drawing 73-11022A.

Subsoil at the site consists of sand with gravel, some silt, sand with silt, traces of gravel, silt with sand traces of gravel and silt with sand, traces of gravel (glacial till).

6.2) Foundations:

6.2.1) Piers:

The glacial till deposit is considered to have competent load bearing capacities. For the piers the footing extensions may be founded at the same elevation as the existing footings, which is within the glacial till, at about elevation 289.5. A

design load of 5 t.s.f. may be used for spread footings. In excavating for the extensions extreme care must be taken to avoid boiling of the material near the existing footing, as boiling will cause the footing to settle. A dewatering scheme employing sheet piling driven about 6 ft. into the till may be used for the pier footing extension excavations to prevent any possibility of boiling.

6.2.2) Abutments:

The extensions of the abutment footings should be founded at elevation 297.4, one foot below the existing footings. This is to avoid the sandy silt to silty sand with organics deposit that occurs at about this elevation. A design load of 5.0 t.s.f. may be used. Dewatering of the excavations does not seem to be necessary as the water level is below the bottom of the excavation.

Between the new and old construction, vertical expansion joints should be used.

Four feet of cover should be provided above the underside of all the footings for frost protection. The Hydrology Office may be contacted concerning the depth and need of scour protection.

No stability problems are foreseen for the approach fills, provided they are built with two horizontal to one vertical slopes.

Erosion control should be provided by rip-rap or similar means, covering the forward slopes as some washout and erosion was observed around the piers during this investigation.

Artesian water conditions were encountered at elevation 273 but this should cause no problems for the proposed construction.

7. MISCELLANEOUS:

The field work was carried out from December 5 to December 12, 1972, under the supervision of Mr. E. A. Wood, Project Foundations Engineer and from May 3 to May 11, 1973, under the supervision of Mr. P. Korgemagi, Project Foundations Engineer.

The equipment used was owned and operated by Canadian Longyear Limited, Rexdale, Ontario.

This report was written by Mr. P. Korgemagi and reviewed by Mr. K. G. Selby, Supervising Foundations Engineer.

P. Korgemagi
P. Korgemagi, P. Eng.

K. G. Selby

K. G. Selby, P. Eng.

PK/ao
June 21, 1973.



RECORD OF BOREHOLE NO 1

JOB 73-11022

LOCATION Co-ords. 15,945,138 N; 1,169,162 E.

ORIGINATED BY EAW

W.P. 44-71-08

BORING DATE Dec. 5, 1972

COMPILED BY: PK

DATUM Geodetic

BOREHOLE TYPE Washboring

CHECKED BY

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT ——— w _L		BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	BLOWS / FOOT 25 50 75 100 125	PLASTIC LIMIT ——— w _p	WATER CONTENT ——— w		
295.9	Ground Level									P.C.F.	G.S.A.SI.CL
0.0	Sandy gravel, some silt.		1	SS	28						47 45 (8)
	Brown		2	SS	41	290					44 30 (26)
288.7	Compact to Dense		3	SS	100						
7.2	Silt with sand, traces of gravel.		4	SS	100						
	Very Dense		5	SS	100	280					3 37 (60)
	Grey		6	SS	100						
271.4	(Till)		7	SS	100						49 (44)
24.5	End of Borehole		8	SS	100	270					Artesian water encountered

OFFICE REPORT SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE No 2

JOB 73-11022

LOCATION Co-ords. 15,945,108 N; 1,169,192 E.

ORIGINATED BY EAW

W.P. 44-71-08

BORING DATE Dec. 8, 1972

COMPILED BY PK

DATUM Geodetic

BOREHOLE TYPE Cone Test

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE				LIQUID LIMIT —WL PLASTIC LIMIT —WP WATER CONTENT —W			BULK DENSITY Y P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT	25	50	75	100	125	Wp		
294.7	Ground Level														
0.0	Probable sandy gravel														
286.0	Probable Till														
8.7	End of Cone Test														

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 3

JOB 73-11022 LOCATION Co-ords. 15,945,116 N; 1,169,228 E.
 W.P. 44-71-08 BORING DATE December 8, 1972
 DATUM Geodetic BOREHOLE TYPE Washboring

ORIGINATED BY EAW
 COMPILED BY FK
 CHECKED BY JK

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. O UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE			W_P W W_L				
										WATER CONTENT %				
304.7	Ground Level													GR. SA. SI. CL.
0.0	Brown Sand with silt, traces of organics. Loose to Very Dense		1	SS	10	300								WL Estimated ▼ 294.4
			2	SS	11									
			3	SS	7									
			4	SS	33									
287.7			5	SS	100/6"	290								0 71 (29)
17.0	(Till)													
283.7	Silty sand, trace of gravel. Grey. V. Dense		6	SS	100/6"									2 50 (48)
21.0	End of Borehole													
	Water level not established					280								

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 4

JOB 73-11022 LOCATION Co-ords. 15,945,156 N; 1,169,224 E. ORIGINATED BY PK
 W.P. 44-71-08 BORING DATE May 2 to 3, 1973 COMPILED BY PK
 DATUM Geodetic BOREHOLE TYPE Auger CHECKED BY PK

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F.			WATER CONTENT %				
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE			w_p — w — w_L 10 20 30				
320.4	Ground Level													GR.SA.SI.CL
0.6	Topsoil		1	SS	75	320								24 49 (27)
	Brown (Fill)		2	SS	77	310								
	Sand, some gravel and silt.		3	SS	53									29 53 (18)
302.6	Very dense		4	SS	16									5 52 (13)
17.8	Silty sand, traces of gravel & organics. Compact.		5	SS	11	300								
294.1	Grey to Dark Grey		6	SS	31									38 52 (10)
26.3	Sand with gravel, some silt. Grey		7	SS	61	290								50 44 (6)
288.4	Dense to Very Dense (Till)		8	SS	100.4"									19 56 (25)
32.0	Silt with sand, traces of gravel. Grey		9	SS	100.6"									
280.1	Very Dense		10	SS	100.4"									4 33 (63)
40.3	End of Borehole													

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 5

JOB 73-11022 LOCATION Co-ords. 15,945,118 N; 1,169,118 E.
 W.P. 44-71-08 BORING DATE May 4 and May 10, 1973
 DATUM Geodetic BOREHOLE TYPE Auger and Washboring

ORIGINATED BY PK
 COMPILED BY PK
 CHECKED BY JK

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w			BULK DENSITY γ P.C.F.	REMARKS			
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F.			w_p w w_L WATER CONTENT % 10 20 30							
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE										
299.1	Ground Level																
0.0	Brown Sand, some silt, gravel, traces of organics. Compact		1	SS	22	290								8 71 (21)			
292.2			2	SS	13										8 35 (57)		
6.9	Silt with sand, traces of gravel. Compact to Very Dense Grey (Till)		3	SS	140											4 37 (59)	
			4	SS	105.9"												Artesian water encountered
			5	SS	100.9"												
			6	SS	151	280							Artesian water encountered				
			7	SS	155										Artesian water encountered		
272.6						270										Artesian water encountered	
26.5	End of Borehole																
																	Artesian water encountered
														Artesian water encountered			
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														Artesian water encountered			

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 6

JOB 73-11022

LOCATION Co-ords. 15,945,090 N; 1,169,118 E.

ORIGINATED BY PK

W.P. 44-71-08

BORING DATE May 9 and 10, 1973

COMPILED BY PK

DATUM Geodetic

BOREHOLE TYPE Washboring

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT			BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT					PLASTIC LIMIT				
						25	50	75	100	125	WATER CONTENT %					
						SHEAR STRENGTH P.S.F.					WATER CONTENT %					
						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE					W _L — W _P — W _L W _L — W — W _L					
											10 20 30					
299.0	Ground Level															
0.6	Top of soil															
	Sand with gravel, some silt.		1	SS	26											
	Brown		2	SS	21											
289.0	Compact		3	SS	100/10"											
10.0	Sandy silt, traces of gravel.		4	SS	100/10"											
	Very Dense		5	SS	100/75"											
	Grey (Till)		6	SS	100/10"											
275.7																
23.3	End of Borehole															

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 7

JOB 73-11022 LOCATION Co-ords. 15,945,102 N; 1,169,066 E.
 W.P. 44-71-08 BORING DATE May 3 and 4, 1973
 DATUM Geodetic BOREHOLE TYPE Washboring

ORIGINATED BY PK
 COMPILED BY PK
 CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE			WATER CONTENT % 10 20 30				
324.9	Ground Level													GR. SA. SI. CL.
0.0	Gravelly sand. Compact Fill					320								
319.4 5.5	Silt with sand, traces of gravel (fill) Brown		1	SS	18									
			2	SS	35									
			3	SS	7	310								3 26 (71)
306.9	Loose to Dense.													
18.0	Sand with silt, traces of gravel & organics.		4	SS	7									
	Loose to Dense		5	SS	14	300								3 62 (35)
			6	SS	31									
294.9	Dark Grey		7	SS	12									
30.0	Silt with sand, traces of gravel. Grey (Till)		8	SS	100/2"	290								2 39 (59)
287.9	Very Dense		9	SS	141/5"									
37.0	End of Borehole													
						280								

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 8

JOB 73-11022

LOCATION Co-ords. 15,945,068 N; 1,169,084 E.

ORIGINATED BY PK

W.P. 44-71-08

BORING DATE May 4, 1973

COMPILED BY PK

DATUM Geodetic

BOREHOLE TYPE Cone Test

CHECKED BY

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 25 50 75 100 125	LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w w_p — w — w_L	BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE					
304.4	Ground Level								
0.0									
288.6									
15.8	End of Cone Test								

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 9

JOB 73-11022

LOCATION Co-ords. 15,945,232 N; 1,169,030 E.

ORIGINATED BY PK

W.P. 44-71-08

BORING DATE May 8 and 9, 1973

COMPILED BY PK

DATUM Geodetic

BOREHOLE TYPE Washboring

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 25 50 75 100 125	LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W W_P — W — W_L WATER CONTENT % 10 20 30	BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS/FOOT					
311.1	Ground Level									
0.0	Sand, some silt and gravel.					310				
	Loose Brown Fill		1	SS	4					
301.1			2	SS	10	300				
10.0	Sand with silt, traces of organics.		3	SS	10					
	Dark Brown Compact		4	SS	13					
294.1			5	SS	17	290				
17.0	Silt with sand, traces of gravel.		6	SS	100.8"					
	Very Dense Grey (Till)		7	SS	157	280				
277.8			8	SS	100.9"					
33.3	End of Borehole									

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 10

JOB 73-11022 LOCATION Co-ords. 15,945,202 N; 1,169,038 E.
 W.P. 44-71-08 BORING DATE May 3, 1973
 DATUM Geodetic BOREHOLE TYPE Auger

ORIGINATED BY PK
 COMPILED BY PK
 CHECKED BY PK

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w			BULK DENSITY γ	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE			WATER CONTENT % w_p — w — w_L					
324.7	Ground Level										10	20	30	P.C.F.	GR.SA.SI.CL
0.0	Silt with sand, traces of gravel. Loose to Dense Brown (Fill)		1	SS	6	320						○			8 36 (56)
			2	SS	11										
			3	SS	12	310						○			5 38 (57)
			4	SS	32										
300.7			5	SS	11	300						○			
24.0	Sandy silt, traces of gravel & organics. Compact Grey		6	SS	18										
293.7			7	SS	9										5 43 (52) organic content
31.0	Silt with sand, traces of gravel. Grey Very Dense (Till)		8	SS	100/2"	290						○			
			9	SS	100/6"										
283.4			10	SS	100/9"										1 35 (64)
41.3	End of Borehole					280									

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE No 12

JOB 73-11022 LOCATION Co-ords. 15,945,220 N; 1,169,082 E.
 W.P. 44-71-08 BORING DATE May 10, 1973
 DATUM Geodetic BOREHOLE TYPE Auger

ORIGINATED BY PK
 COMPILED BY PK
 CHECKED BY PK

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT		LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE		WATER CONTENT % W_P — W — W_L 10 20 30				
294.6	Ground Level												
0.0	Silty sand, traces of gravel. Grey		1	SS	100	290							
287.3	Very Dense (Till)		2	SS	100	290							1 54 (45)
7.3	End of Borehole												
						280							

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 13

JOB 73-11022

LOCATION Co-ords. 15,945,270 N; 1,169,136 E.

ORIGINATED BY PK

W.P. 44-71-08

BORING DATE May 8, 1973

COMPILED BY PK

DATUM Geodetic

BOREHOLE TYPE Cone Test

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		25	50	75	100	125	SHEAR STRENGTH P.S.F. O UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE					WATER CONTENT % w_p — w — w_L
304.2	Ground Level																
0.0	Probable gravelly sand					300											
289.7	Probable Till					290											
14.5	End of Cone Test					260											

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 14

JOB 73-11022

LOCATION Co-ords. 15,945,240 N; 1,169,136 E.

ORIGINATED BY PK

W.P. 44-71-08

BORING DATE May 10, 1973

COMPILED BY PK

DATUM Geodetic

BOREHOLE TYPE Auger

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 25 50 75 100 125	LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W W_P — W — W_L	BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS/FOOT					
295.7	Ground Level									
293.7	Gravelly sand. Grey Fill	X								
292.0	Silt with sand, traces of gravel. Grey		1	SS 100		290				4 33 (63)
			2	SS 100	26"					
			3	SS 100	27"					
	Very Dense		4	SS 100	28"					4 33 (63)
277.4	(Till)		5	SS 100	30"	280				
18.3	End of Borehole					270				

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 15

JOB 73-11022

LOCATION Co-ords. 15,945,280 N; 1,169,175 E.

ORIGINATED BY PK

W.P. 14-71-08

BORING DATE May 7 and 8, 1973

COMPILED BY PK

DATUM Geodetic

BOREHOLE TYPE Washboring

CHECKED BY PK

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 25 50 75 100 125	LIQUID LIMIT — W _L PLASTIC LIMIT — W _P WATER CONTENT — W W _P — W — W _L	BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE					
305.3	Ground Level								
0.0	Sandy silt.		1	SS	8				0 47 (53)
293.3	Loose Brown		2	SS	9				
12.0	Sand with gravel, traces of silt. Compact		3	SS	17				32 55 (13)
290.3	Sand with silt, some gravel. (Till)		4	SS	72				12 51 (37)
15.0	Grey		5	SS	100.5"				
280.3	Very Dense		6	SS	100.6"				9 90 (1)
25.0	Sand, traces of gravel		7	SS	100.8"				
277.0	& silt. Very Dense								
28.3	End of Borehole								

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 16

JOB 73-11022

LOCATION Co-ords. 15,945,252 N; 1,169,188 E.

ORIGINATED BY PK

W.P. 44-71-08

BORING DATE May 4 to May 7, 1973

COMPILED BY PK

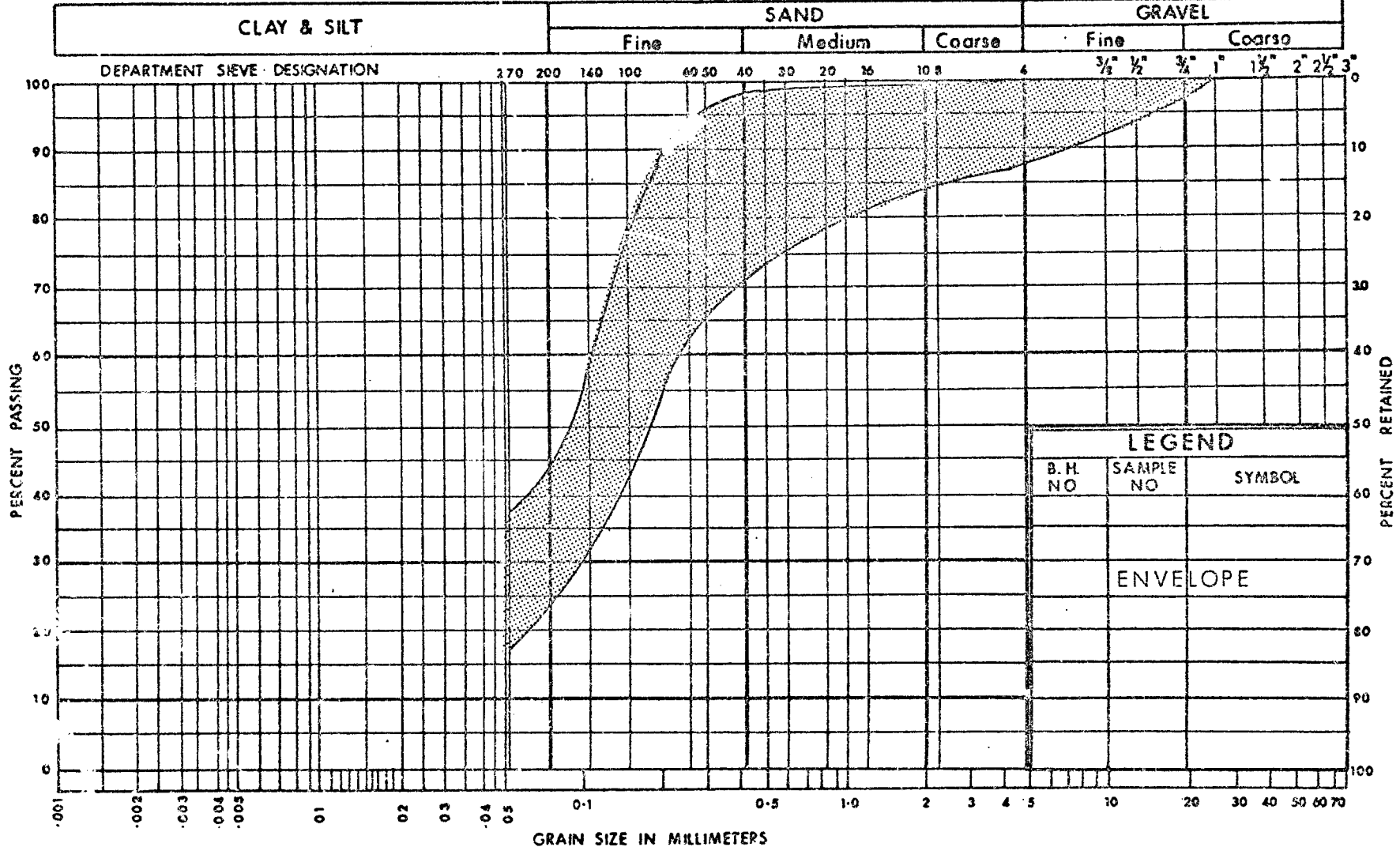
DATUM Geodetic

BOREHOLE TYPE Washboring

CHECKED BY *PK*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE			WATER CONTENT % 10 20 30					
320.7	Ground Level					320									
0.0	Sand with gravel, some silt. (Fill) Brown Compact		1	SS	28										
			2	SS	10										34 48 (18)
			3	SS	9										
303.7															
17.0	Sandy silt, traces of gravel. Compact		4	SS	17	300									
295.7			5	SS	14										 3 43 (54)
25.0	Sand with gravel, traces of silt. Grey		6	SS	57										
			7	SS	100 1/2"	290									36 54 (10)
287.6	Very Dense		8	SS	100 1/2"										
33.1	End of Borehole					280									

UNIFIED SOIL CLASSIFICATION SYSTEM



DEPARTMENT
OF
TRANSPORTATION AND COMMUNICATIONS



DESIGN SERVICES
BRANCH

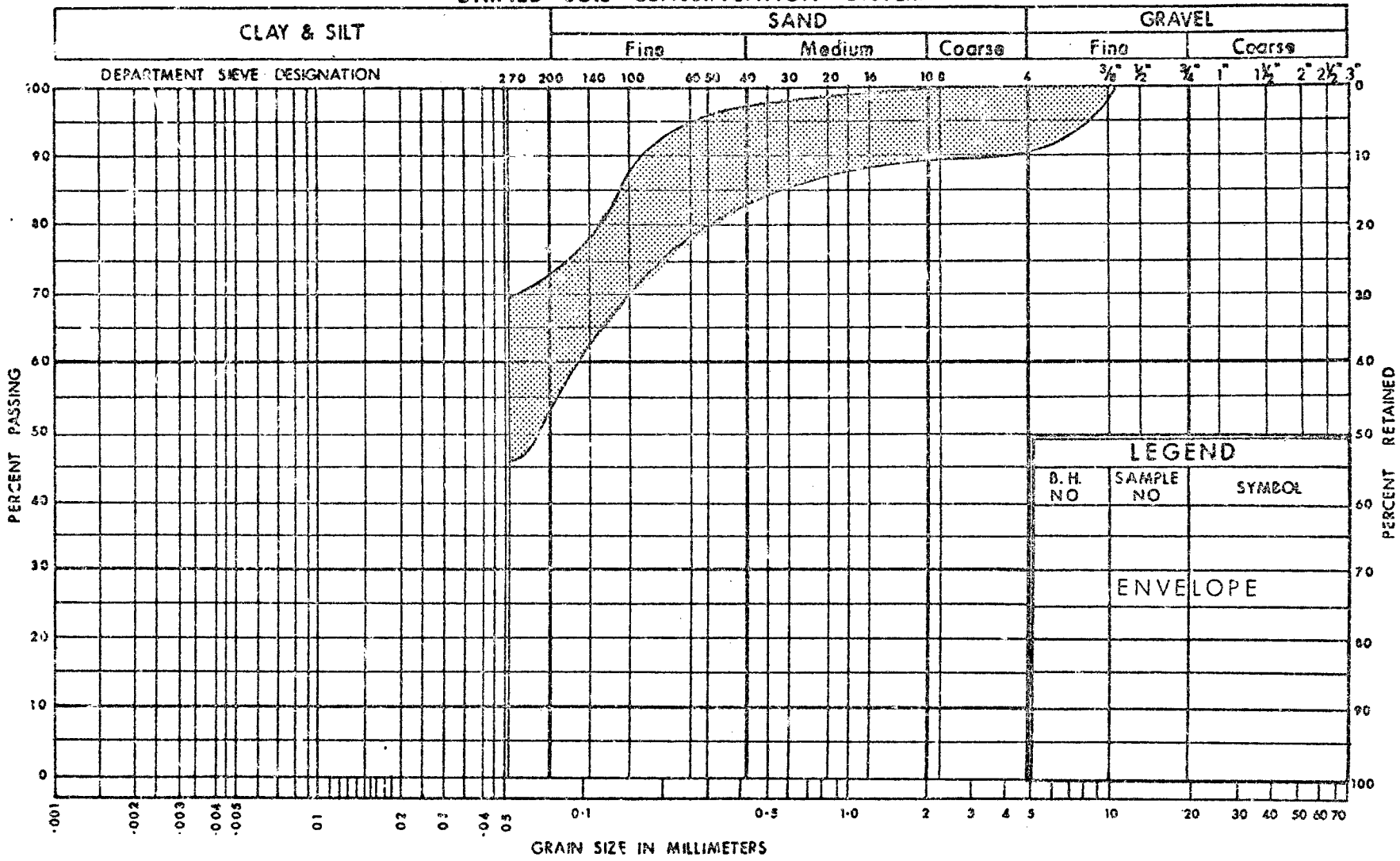
GRAIN SIZE DISTRIBUTION
SAND
WITH SILT, TRACES OF GRAVEL

W.P. No. 44-71-08

JOB No. 73-11022

FIG.2

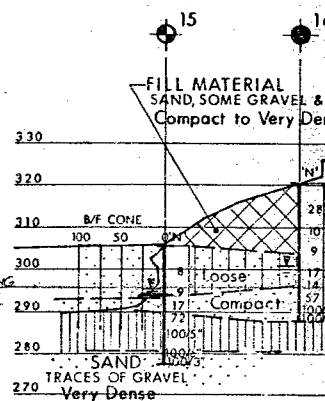
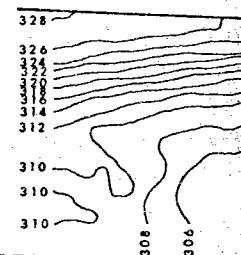
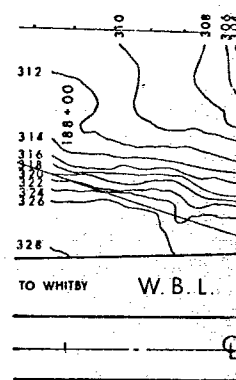
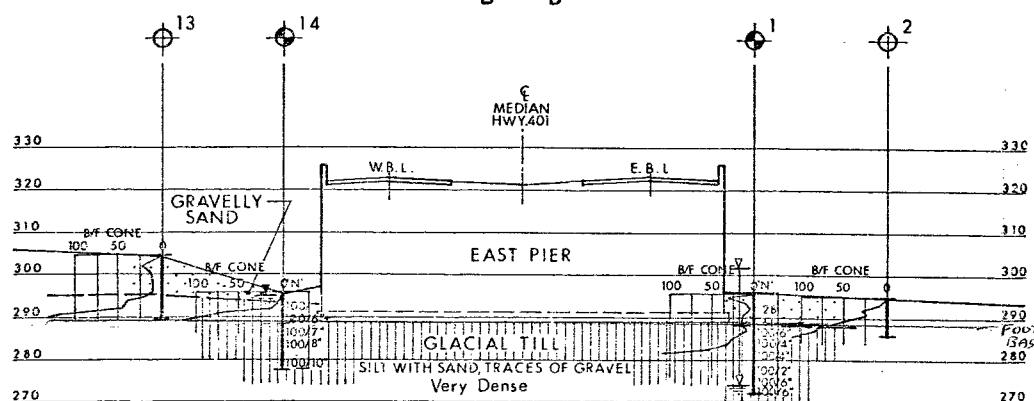
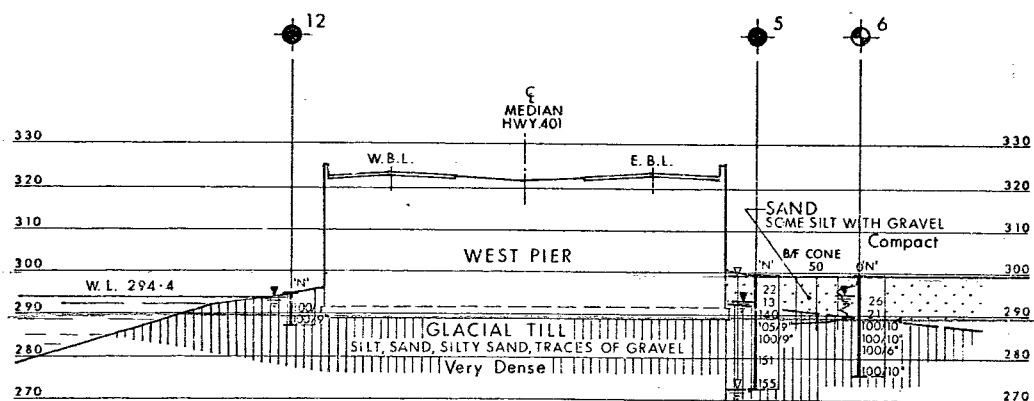
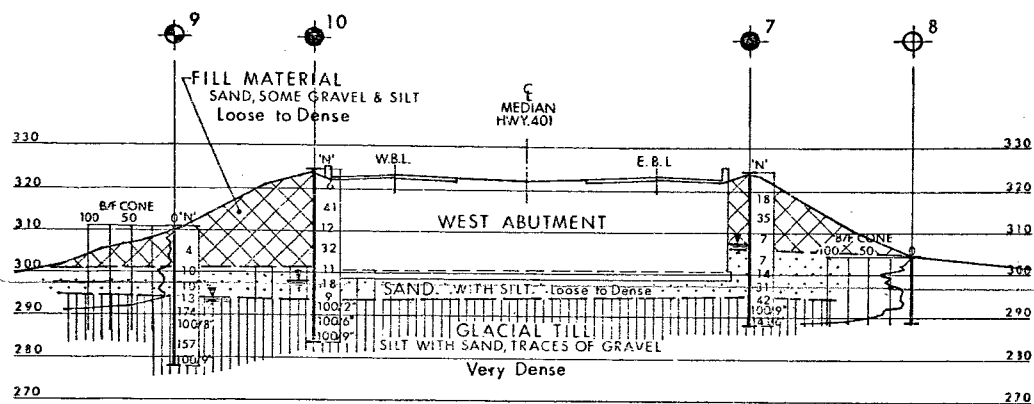
UNIFIED SOIL CLASSIFICATION SYSTEM



DEPARTMENT
OF
TRANSPORTATION AND COMMUNICATIONS
DESIGN SERVICES
BRANCH

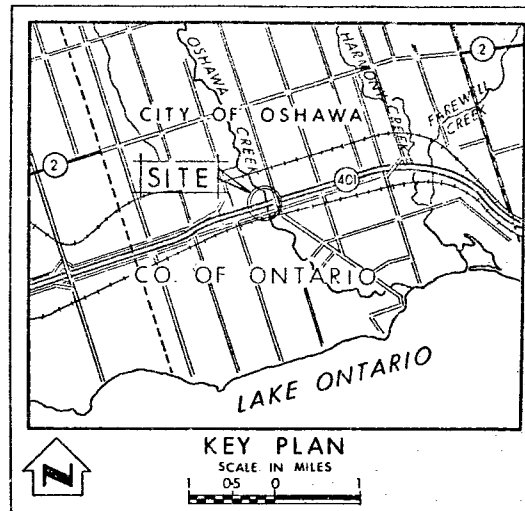
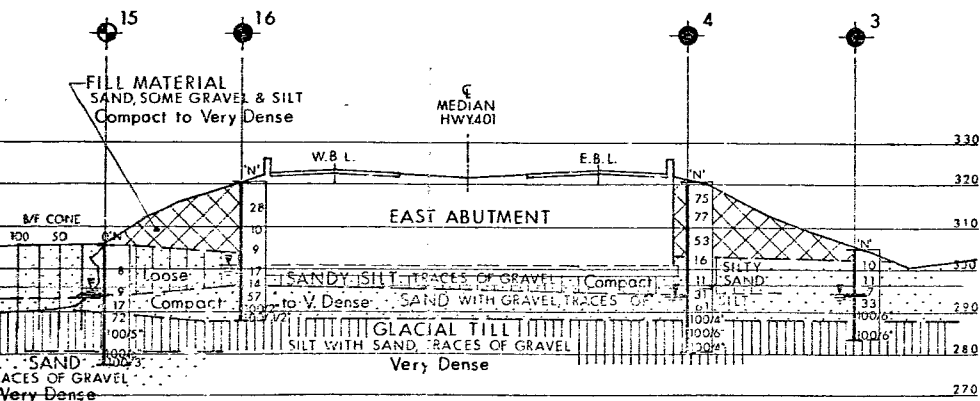
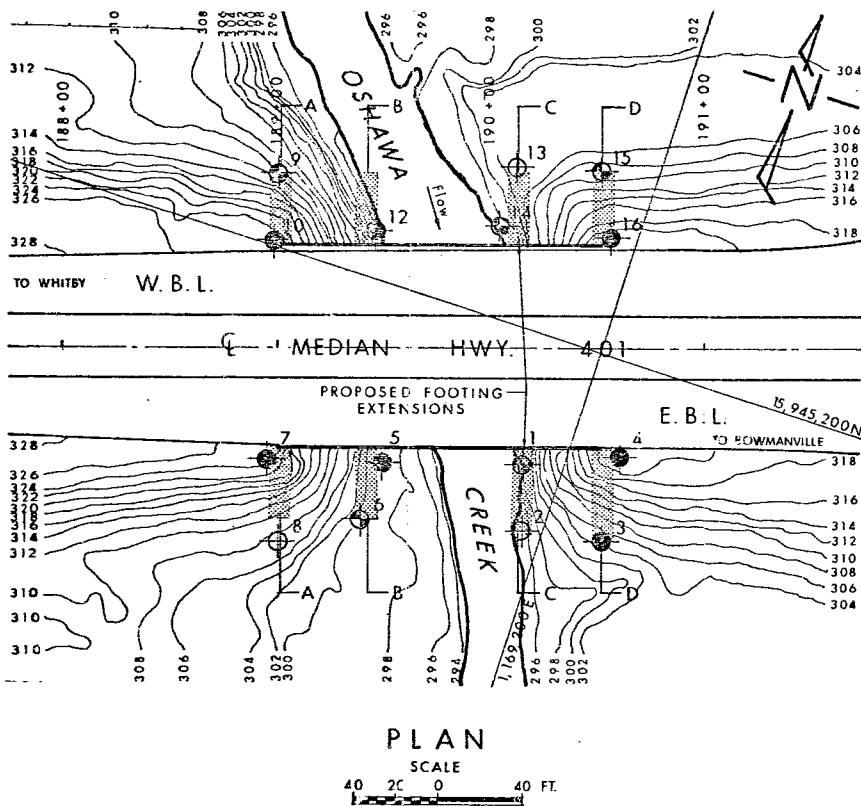
GRAIN SIZE DISTRIBUTION
SILT
WITH SAND, TRACES OF GRAVEL

W.D. No. 44-71-08
JOB No. 73-11022
FIG.3



SECTIONS

SCALE
20 10 0 20 FT.



LEGEND			
	Bore Hole		
	Cone Penetration Test		
	Bore Hole & Cone Test		
	Water Levels established at time of field investigation, Dec. 1972		
NO.	ELEVATION	CO-ORDINATES	
		NORTH	EAST
1	295.9	15,945,138	1,169,182
2	294.7	15,945,108	1,169,192
3	304.7	15,945,116	1,169,228
4	320.4	15,945,156	1,169,224
5	299.1	15,945,118	1,169,118
6	299.0	15,945,090	1,169,118
7	324.9	15,945,102	1,169,066
8	304.4	15,945,068	1,169,084
9	311.1	15,945,232	1,169,030
10	324.7	15,945,202	1,169,038
12	294.6	15,945,220	1,169,082
13	304.2	15,945,270	1,169,136
14	295.7	15,945,240	1,169,136
15	305.3	15,945,280	1,169,175
16	320.7	15,945,252	1,169,188

— NOTE —

The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence.

REVISIONS	DATE	BY	DESCRIPTION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS—ONTARIO
DESIGN SERVICES BRANCH—FOUNDATIONS OFFICE

OSHAWA CREEK

HIGHWAY NO. 401 DIST. NO. 6
CO. ONTARIO CITY OF OSHAWA
TWP. WHITBY LOT CON

BORE HOLE LOCATIONS & SOIL STRATA

SUBMD. P. X. CHECKED <input checked="" type="checkbox"/>	WP NO. 44-71-08	DRAWING NO.
DRAWN OL. J. CHECKED <input checked="" type="checkbox"/>	WO NO. 73-11022	73-11022A
DATE 22 JUNE 1973	SITE NO.	BRIDGE DRAWING NO.
APPROVED <i>[Signature]</i>	CONT. NO.	



REF. B-4-18

Mr. C. S. Grebski
Structural Design Engineer
West Building, Downsview

Soil Mechanics Section
Geotechnical Office
West Building, Downsview

May 8, 1975

H.P. 44-71-08

WIDENING OF EXISTING OSHAWA CREEK STRUCTURE
Hwy. 401, District 6, Toronto
H.P. 44-71-08, Site 22-175

Further to our memo of February 28, 1975, we have now completed the investigation to determine the elevations of the existing abutment footings at the above-mentioned location.

Two test pits were dug in the middle and adjacent to the forward face of the footings. These test pits revealed the following:

<u>Footing location</u>	<u>Elev. Top of Footing</u>	<u>Elev. Bottom of Footing</u>
East abutment	299.49 ft.	294.17 ft.
West abutment	300.50 ft. c	296.85 ft.

In the test pit adjacent to the east abutment, the water level in the excavation rose to a level about 1.2 ft. above the footing base in the last 48 hours. At the time of excavation the bottom was wet. No water was encountered in the excavation for the west abutment.

The surveying was carried out by the District 6 Personnel.

A. PRAKASH
Senior Engineer.
for: M. DEVATA
Supervising Engineer.

c.c. D. MacDonald
G. C. E. Burkhardt
J. Anderson

Files
Record Services

Mr. C. S. Grebski
Structural Design Engineer
West Building, Downsview

Soil Mechanics Section
Geotechnical Office
West Building, Downsview

Mr. W. McFarlane

February 28, 1975

W.P. 44-71-08

WIDENING OF EXISTING OSHAWA CREEK STRUCTURE
Hwy. 401, District 6, Toronto
W.P. 44-71-08, Site 22-175

We have reviewed the final bridge drawings for this structure, and we concur with the suggestion contained in your letter of January 9, 1975 that the footing elevations of the existing abutments should be investigated, as this will have a great influence on the decision regarding the founding elevations of the extensions. We shall undertake the necessary investigation and shall forward to you the complete information by May 8, 1975, as requested by you.

The foundation drawing No. 73-11022-A for this project will be retained in this Office until all information is obtained.

A. Prakash

A. PRAKASH
Senior Engineer

for: M. DEVATA
Supervising Engineer

C.C. J. Anderson
C. E. E. Burkhardt

Files
Record Services