

DOCUMENT MICROFILMING IDENTIFICATION

G.I.-30 SEPT. 1976

GEOCRES No. 30M12-61

DIST. 6 REGION

W.P. No. 126-60-00

CONT. No.

W. O. No.

STR. SITE No.

HWY. No. 427

LOCATION REXDALE BLVD.
ADDITIONAL BOREHOLES

No of PAGES -

=====

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT.

REMARKS:

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO *A-10*

JOB _____

LOCATION *5885,366 N, 908,151 E*

ORIGINATED BY *UK*

W.P. *126-60-00*

BORING DATE *Dec. 24 1955*

COMPILED BY *UK*

DATUM *Geodetic*

BOREHOLE TYPE *Auger and sample with CME-15*

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		10	20	30	40	50	W_P	W	W_L		
553.00	Ground level															
544.0	Glacial till		1	S	41	550										
541.0	Heterogeneous		2	S	28	540										
531.0	Brown clayey silt,		3	S	19	530										
523.0	sand + gravel		4	S	12	520										
518.0	(stiff to Hard)		5	S	11	510										
504.0	Silt sand		6	S	14	500										
500.0	(compact)		7	S	12 1/2	490										
490.0			8	S	50	480										
478.0	Silt sand to		9	S	10	470										
475.0	Sandy silt		10	S	10 1/2	460										
471.5	(compact to H. Hard)		11	S	10 1/2	450										
461.5	End of Bore hole					440										
	(Probable Bedrock)					430										

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

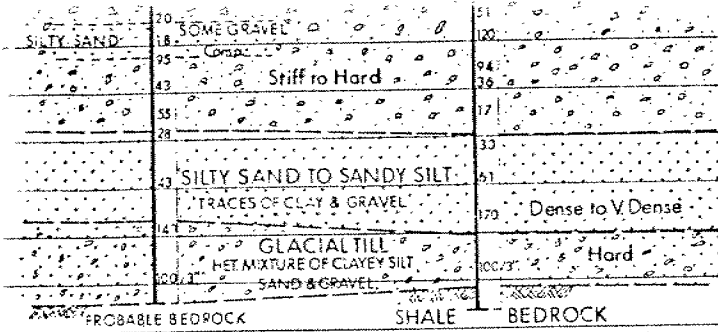
RECORD OF BOREHOLE NO B-11
5885, 241 N, 968, 208 E.

JOB _____
W.P. 126-60-00
DATUM Geodetic

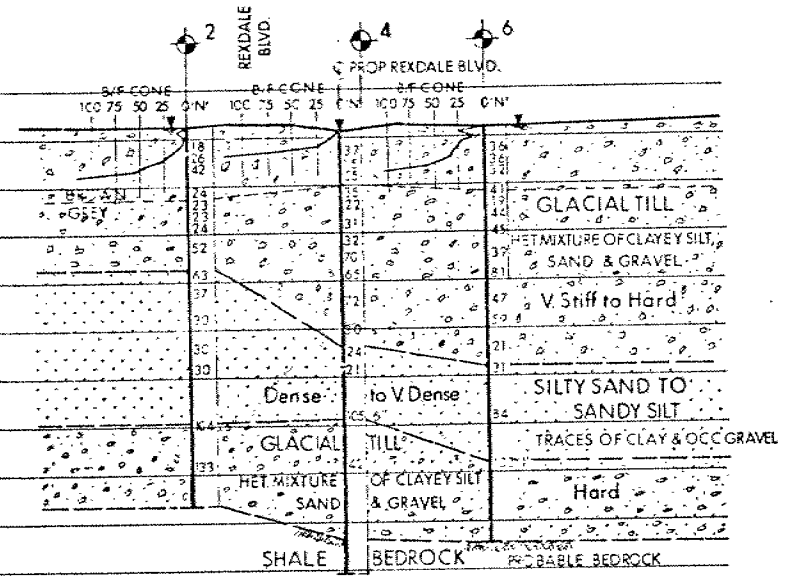
LOCATION Long Point, Ontario
BORING DATE Nov. 25, 1955
BOREHOLE TYPE Auger - sample with CME 55

ORIGINATED BY U.K.
COMPILED BY U.K.
CHECKED BY _____

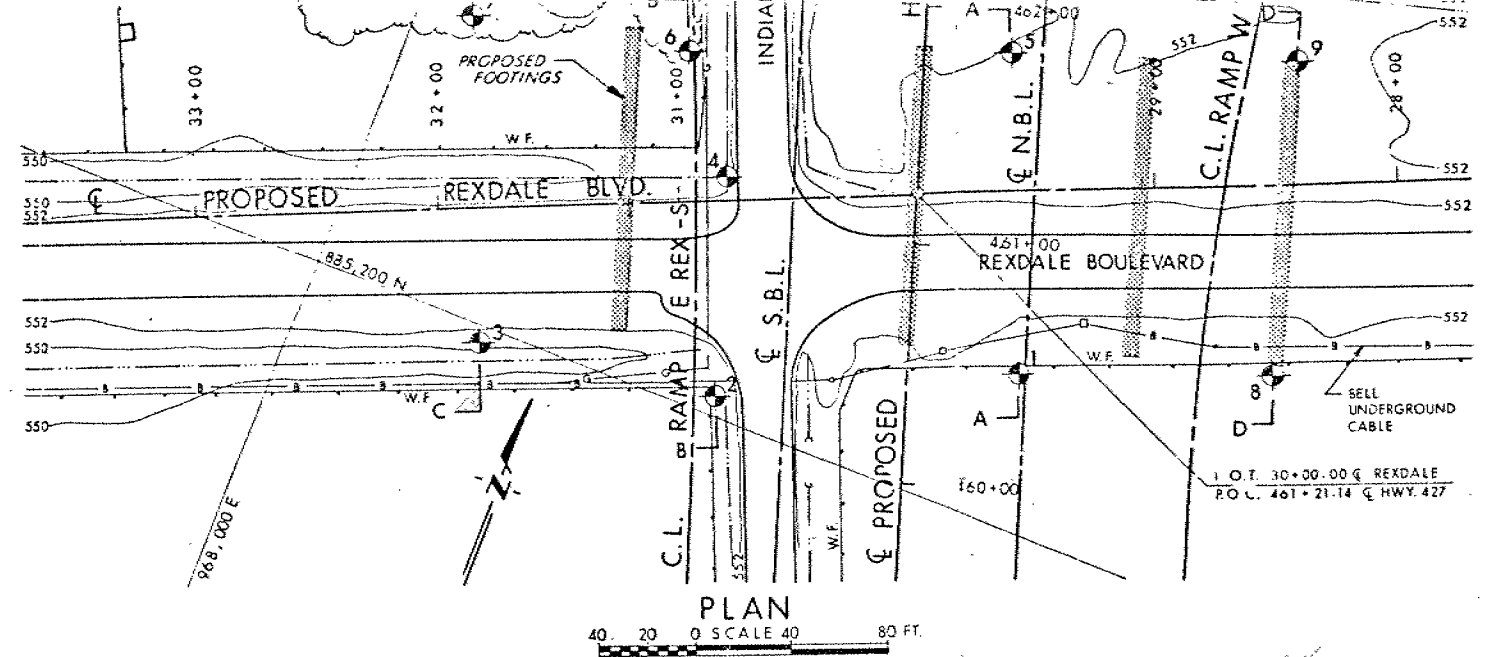
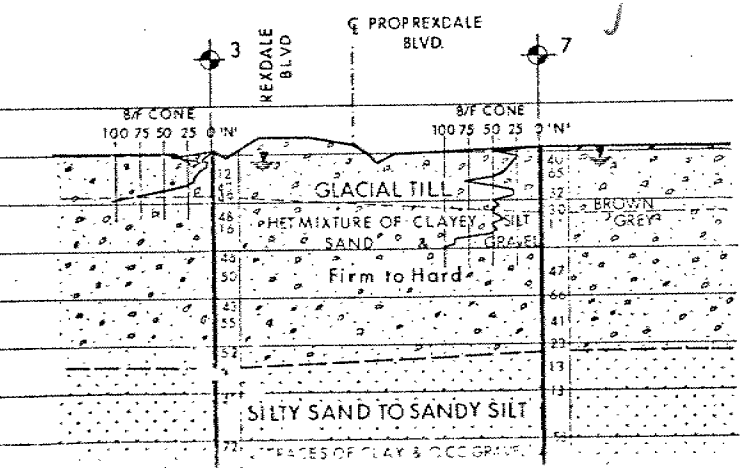
SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT — w_L		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT	SHEAR STRENGTH P.S.F.	PLASTIC LIMIT — w_p	WATER CONTENT — w		
551.8	Ground level											
540.0	Glacial till - Het. Mix. of Brown silt,		1	SS	17	550						
			2	SS	40	540						
			3	SS	10	530						
530.0	Clayey silt, sand and gravel		4	SS	17	530						
			5	SS	52	520						
	(stiff to hard)		6	SS	76	510						
			7	SS	107	500						
501.8			8	SS	32	490						
500.0	Loose		9	SS	27	480						
			10	SS	4	470						
	Silty sand to Sandy silt V. Dense		11	SS	142							
475.0			12	SS	106							
471.3	clayey silt with sand & gravel											
465.0	End of Borehole (probable bedrock)											



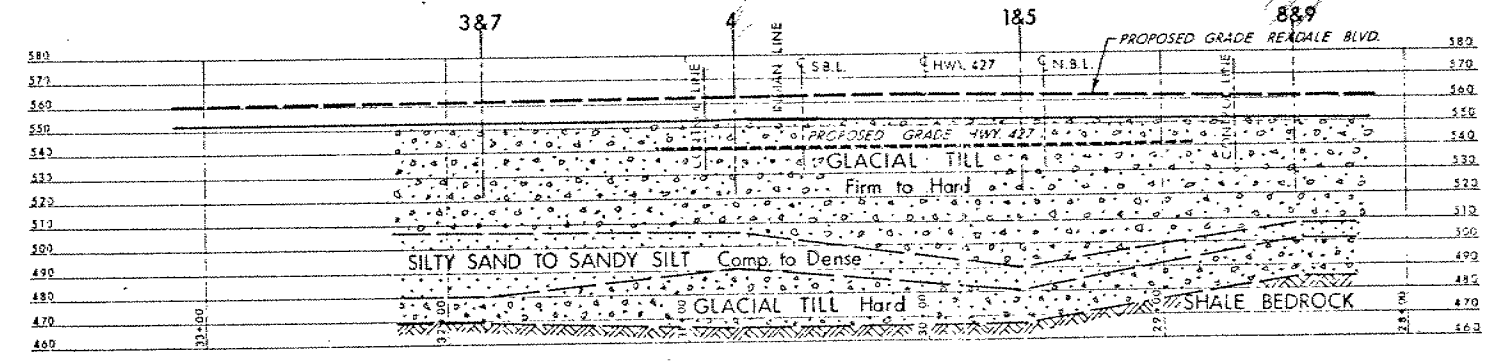
A-A



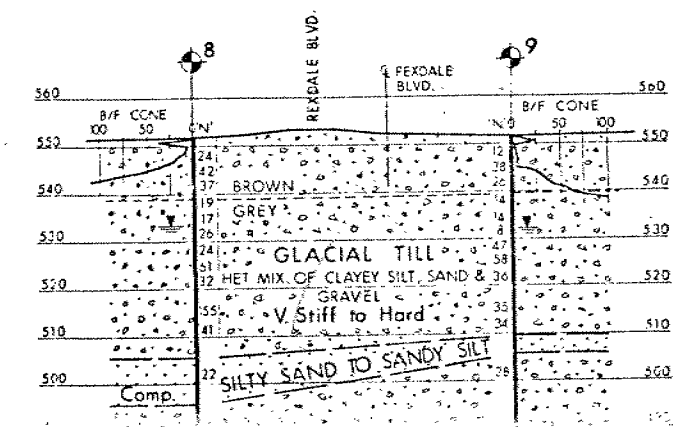
B-B



PLAN



PROFILE



SECTIONS
HORIZ. 40 20 0 SCALE 40 80 FT.
VERT. 20 10 0 20 40 FT.

CONT. 78-111



The bound Bore Hole from ge

REVISIONS	DATE
MARCH 1985	
MARCH 1985	



CURVE 925-927	CURVE
$\Delta - 6^{\circ} 42' 31.815''$	$\Delta s - 3$
$D = 2^{\circ} 0' 0''$	$L_2 - 1$
$R - 2864.789$	$27 - 7$
$T - 167.913$	$ST - 5$
$L - 335.442$	
$E - 4.917$	



FIELD BORING LOG

SOIL MECHANICS SECTION

DRILLING CO. Johnston Co DATUM ELEV. _____ B.H. No. A
 DRILLER George GROUND ELEV. 553.0 JOB No. 126-60-00
 ENGINEER V.K. CASING SIZE _____ DATE Nov. 24/78
 SITE LOCATION Hwy. 427 (Indian Line) + Rexdale Blvd
 HOLE LOCATION _____
 REMARKS 4 1/2' (Nov. 25/78)

W. h. 21' (Nov. 25/75)
20' (Nov. 26/75)

DEPTH FEET		DESCRIPTION	SAMPLE TYPE, No. & RECOVERY	METHOD OR BLOWS & DISTANCE
FROM	TO			
0'	9'	18, 19, 6, 7, 15, 25, 40, 86, 108/ft.		
0'	5'	Auger the hole		
5	6.5	Brown clayey silt, fine sand & fine gravel	SS. 1	6-17-24
5'	10'	Auger the hole		
10	11.5	The same as above	SS. 2	10-16-22
10'	15'	Auger the hole		
15	16.5	@ 12' grey clayey silt, trace of sand & gravel	SS. 3	7-8-9
15'	20'	Auger the hole		
20	21.5	The same as above (19'-22' soft patch)	SS. 4	2-3-9
20'	25'	Auger the hole		
25	26.5	Grey clayey silt, fine sand & gravel	SS. 5	11-21-28
25'	30'	Auger the hole		
30	31.5	@ 31' silt & sand + fine gravel	SS. 6	4-7-12
30'	35'	Auger the hole		
35	36.5	@ 35' Clayey silt, some sand & fine gravel	SS. 7	34-100/5"
35'	40'	Auger the hole		
40	41.5	The same as above	SS. 8	16-21-29
40'	50'	Auger the hole		
50	51.5	@ 49' silt fine sand	SS. 9	3-5-5
50'	60'	Auger the hole (@ 60' silt sand & gravel up about 10 ft)		
60	61.5	Silt & sand + fine gravel	SS. 10	100/5"
60'	75'	Auger the hole		
75	75.5	@ 75' Clayey silt some sand & shale pieces	SS. 11	150/6"
70'	81.5	Auger the hole to refusal		



FIELD BORING LOG

SOIL MECHANICS SECTION

SHEET _____ OF _____

DRILLING CO. Johnston DATUM ELEV. _____ B.H. No. B
DRILLER George GROUND ELEV. 551.8 JOB No. 126-60-00
ENGINEER V.K. CASING SIZE _____ DATE Nov. 25/75
SITE LOCATION Hwy. 427 + Rexdale Blvd.
HOLE LOCATION _____
REMARKS W.H. 16 ft.

DEPTH FEET		DESCRIPTION	SAMPLE TYPE, No. & RECOVERY	METHOD OR BLOWS & DISTANCE
FROM	TO			
0'	11'	5, 4, 17, 18, 19, 22, 29, 40, 51, 73, 110/ft.		
0'	5'	Auger the hole		
5'	6.5'	Brown clay silt + some sand & gravel	SS. 1	4-7-10
5'	10'	Auger the hole		
10'	11.5'	Greyish clayey silt + some sand & gravel	SS. 2	5-19-21
10'	15'	Auger the hole		
15'	16.5'	The same as above	SS. 3	3-5-5
15'	20'	Auger the hole		
20'	21.5'	clayey silt + some sand & few gravel	SS. 4	5-4-13
20'	25'	Auger the hole		
25'	26.5'	The same as above	SS. 5	13-30-22
25'	30'	Auger the hole		
30'	31.5'	The same as above	SS. 6	19-33-4
30'	35'	Auger the hole		
35'	36.5'	The same as above	SS. 7	24-42-56
35'	40'	Auger the hole		
40'	41.5'	The same as above	SS. 8	8-14-18
40'	45'	Auger the hole		
45'	46.5'	The same as above	SS. 9	11-12-15
45'	50'	Auger the hole		
50'	57.5'	@ 56' - Silt fine sand	SS. 10	1-2-2
50'	60'	Auger the hole (Sand pushed up to		
60'	61.5'	coarse sand + few gravel	SS. 11	42-100/6"
60'	76'	Auger the hole		
76'	76.5'	Grey clayey silt, some sand & few gravel	SS. 12	100/6"
76'	80.5'	Auger the hole (Refusal)		



Ontario

Ministry of
Transportation and
Communications

VISUAL CLASSIFICATION SHEET

SOILS MECHANICS OFFICE

PROJECT <u>126-60-00</u>		SITE <u> Hwy. 427 & Rexdale</u>		BOREHOLE NO. <u>A</u>		GROUND ELEVATION _____								
SAMPLE NO.	DEPTH	GRAIN SIZE DISTRIBUTION			DRY STRENGTH	SHINE	DILATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
		LARGEST GRAIN SIZE	SHAPE	PERCENTAGE										
		GRAVEL	SAND	SILT AND CLAY										
1	5-6.5				Med	none	slight	Med.	earthy	Brown	strong		clayey silt. some sand & few gravel	CP
2	10-11.5				"	"	"	"	"	"	"		" " "	CP
3	15-16.5				"	"	"	"	"	gray	"		" " "	CP
4	20-21.5				"	"	"	"	"	"	"		" " "	CP
5	25-26.5				"	"	"	"	"	"	"		" " "	CP
6	30-31.5				-	-	-	-	-	"	"		silty sand (coarse) some gravel	SF
7	35-36.5				"	"	"	"	"	"	"		clayey silt. some sand & few gravel	CP
8	40-41.5				"	"	"	"	"	"	"		" " "	CP
9	50-51.5				-	-	-	-	-	"	"		silty fine sand	SF

NOTE:- VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:-



Ontario

Ministry of
Transportation and
Communications

VISUAL CLASSIFICATION SHEET
SOILS MECHANICS OFFICE

PROJECT <u>126-60-00</u>		SITE <u>Highway 427 + Rexdale</u>		BOREHOLE NO. <u>A</u>		GROUND ELEVATION _____										
SAMPLE NO.	DEPTH	GRAIN SIZE DISTRIBUTION					DRY STRENGTH	SHINE	DIALATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
		LARGEST GRAIN SIZE	SHAPE	PERCENTAGE												
				GRAVEL	SAND	SILT AND CLAY										
10	60-61.5						-	-	-	-	-	gray	strong		coarse silt sand (well)	SC
11	75-76.5							Med none slight		Med. conty		"	"		clayey silt + some sand gravel	CP

NOTE:- VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.
REMARKS:-



Ontario

Ministry of
Transportation and
Communications

VISUAL CLASSIFICATION SHEET

SOILS MECHANICS OFFICE

PROJECT 126-60-00 SITE Line 427-Rexdale BOREHOLE NO. B GROUND ELEVATION _____

SAMPLE NO.	DEPTH	GRAIN SIZE DISTRIBUTION					DRY STRENGTH	SHINE	DIALATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
		LARGEST GRAIN SIZE	SHAPE	PERCENTAGE												
				GRAVEL	SAND	SILT AND CLAY										
1	5-6.5						Med	none	slight	Med	earthy brown strong			clayey silt - some sand & few gravel	cl	
2	10-11.5						"	"	"	"	"	grayish	"	"	"	cl
3	15-16.5						"	"	"	"	"	gray	"	"	"	cl
4	20-21.5						"	"	"	"	"	"	"	"	"	cl
5	25-26.5						"	"	"	"	"	"	"	"	"	cl
6	30-31.5						"	"	"	"	"	"	"	"	"	cl
7	35-36.5						"	"	"	"	"	"	"	"	"	cl
8	40-41.5						"	"	"	"	"	"	"	"	"	cl
9	45-46.5														silt and clayey silt layers	cl / ML

NOTE:- VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:-



Ontario

Ministry of
Transportation and
Communications

VISUAL CLASSIFICATION SHEET

SOILS MECHANICS OFFICE

PROJECT <u>126-60-00</u>		SITE <u>Highway 427 + Rexdale</u>		BOREHOLE NO. <u>B</u>		GROUND ELEVATION _____										
SAMPLE NO.	DEPTH	GRAIN SIZE DISTRIBUTION					DRY STRENGTH	SHINE	DIALATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
		LARGEST GRAIN SIZE	SHAPE	PERCENTAGE												
				GRAVEL	SAND	SILT AND CLAY										
10	58-57.5						-	-	-	-		gray strong			silt fine sand	SF
11	60-61.5						-	-	-	-		" "			coarse sand (mostly)	SC
12	76-76.5						-	-	-	-		" strong			clay with sand gravel	CP

NOTE:- VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.
REMARKS:-

DOCUMENT MICROFILMING IDENTIFICATION

G.1-30 SEPT 1976

GEOCRES No. 30M12-61

DIST. 6 REGION Central

W.P. No. 126-60-04

CONT. No. 78-111

W. O. No. 72-11024

STR. SITE No. _____

HWY. No. _____

LOCATION Proposed U'pass Structure
at Hwy 427 and Rexdale Blvd.

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 4

REMARKS: documents to be unfolded
before microfilming

Mr. C.S. Grebski, Head
Central Section
Structural Office
West Bldg, Downsview
W. Lin

Soil Mechanics Section
Engineering Materials Office
3rd Floor, Central Building

78 03 21

Re: Hwy. 427 at Rexdale Blvd.,
W.P. #126-60 Site #37-982
Highway #427 District #6

We have reviewed the final bridge plan drawings (Drawing #1,3 and 6) dated February, 1978 for the above mentioned structure and submit the following comments.

1. According to the final plan drawing the center pier is founded on spread footings. However, as recommended in our letter dated November 1, 1977, we believe that in order to allow a safe design load of 3 t.s.f., the base of the footings should be placed at or below elevation 530.0 (Ref.B.H 8 & 9).
2. In our letter dated November 1, 1977 we recommended to support the abutments on natural subsoil at elevation 540.0 and use 2.0 t.s.f. safe bearing value. Alternatively, we recommended a #14 timber pile driven to elevation about 490.0 with a safe load of 25.0 tons/pile. According to the final plan drawing the abutments are supported on 12 HP 74 steel H-piles driven to bedrock. However, the final choice should be based on economic or other necessitating considerations.

We have no other comments.

V. Korlu
Project Engineer

For; M. Devata
Supervising Engineer

VK/ig

cc: G.C.E. Burkhardt
Files ✓

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. G.C.E. Burkhardt
Structural Planning Office
Central Region

FROM: Soil Mechanics Section
Geotechnical Office
West Bldg.

ATTENTION:

DATE: January 19, 1976

OUR FILE REF.

IN REPLY TO

SUBJECT:

Hwy. 427 Underpass at
Rexdale Blvd.
Dist. 6, Toronto
W.P. 126-60 Site 37-982

A foundation investigation was carried out by this section and our recommendations were submitted in a report dated October 17, 1972 for the proposed 3 span structure at this location. Subsequently, the scheme has been changed and a 2 span structure is proposed at this location. As a result of this change we have submitted our comments in a memo dated July 31, 1975 and further concluded that additional investigation at the center pier location will be carried out when the design was finalized. Additional boreholes (B.H. 10 and 11) were carried by this section during November 24-25, 1975.

The recent design data indicates that the new Hwy. 427 will underpass Rexdale Blvd. by means of a two span structure. The proposed grade of Hwy. 427 at the intersection will be at approximate elevation 540 ft.

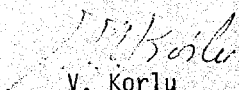
The additional borings revealed similar subsoil conditions to those encountered in the previous investigation.

Based on these results, it is concluded that the recommendations contained in our report W.O. 72-11024 will be, in general, applicable for the revised scheme. However, a softer zone exists between elevations 530 and 533. In order to avoid settlement problems due to the loading of center pier it is recommended that this particular center pier be founded at or below elevation 530 ft. with a safe design load of 3 t.s.f.

..... cont'd

The enclosed Record of Borehole sheets and the revised Drawing together with this memo, should be included with our Foundation Report, W.O. 72-11024.

Should you require any further information with regard to this project, please feel free to contact this Office.


V. Korlu
Project Engineer

For: M. Devata
Supervising Engineer

VK/bp

cc: R.S. Pillar
R.A. Dorton
B.J. Giroux
G.A. Wrong
M.R. Ernesaks
D. Gunter
H. Greenland

R. Hore
J. Anderson)
R. Fitzgibbon) Memo only
G. Sloan)

Files
Record Services

MEMORANDUM

TO: Mr. G.C.E. Burkhardt, (2)
Regional Structural Planning Eng.,
3501 Dufferin St.,
Central Region, Downsview.

FROM: Foundations Office,
Design Services Branch,
West Bldg., Downsview.

ATTENTION:

DATE: March 16, 1973.

OUR FILE REF.

IN REPLY TO

MAR 21 1973

SUBJECT:

ADDENDUM TO THE
FOUNDATION INVESTIGATION REPORT
For
*The Proposed Underpass Structure
At the Crossing of Hwy. #427 and
Rexdale Blvd.
Borough of Etobicoke, County of York
District No. 6 (Toronto)*
W.O. 72-11024 -- W.P. 126-60

Following the submission of our Foundation Investigation Report (W.O. 72-11024, dated October 19, 1972), the proposed alignment of Hwy. 427 was revised. As a result of this, this office was requested to carry out additional foundation investigation at the above-mentioned structure location. An investigation consisting of two sampled boreholes with dynamic penetration test was subsequently carried out by this office.

These borings revealed similar subsoil conditions to those encountered in the previous investigation. Based on these results, it is concluded that the recommendations contained in our Report W.O. 72-11024 will be, in general, applicable for the revised scheme. The piers and the closed-type abutments may be supported on spread footings located within the competent glacial till stratum. Taking into consideration the frost protection requirement and the proposed grade of Hwy. 427, the base of the footings will be located at elevation 537. Footings so founded may be designed using an allowable bearing value of 3 t.s.f. However, a softer zone exists at the east abutment location between elevations 531 and 533. To ensure that this softer zone will not

be overstressed, a lower allowable bearing value of 2 t.s.f. is recommended for footing founded at elevation 537. Alternatively, the east abutment footing can be founded below the softened zone; i.e., at or below elevation 530 using an allowable bearing value of 3 t.s.f.

The enclosed Record of Borehole sheets and the revised Drawing No. 72-11024A, together with this memo, should be included in our Foundation Report (W.O. 72-11024).


Should you require any further information with regard to this project, please feel free to contact this office.

CSP/ao
Encl.

cc: E. J. Orr
B. R. Davis
A. Rutka
R. S. Pillar
H. Greenland
B. J. Giroux
C. Mirza
G. A. Wrong
B. A. Singh
McCormick, Rankin & Associates Ltd.

Foundations Files ✓
Documents

For:


C. S. Poon,
Project Foundations Engineer,
M. Devata,
Supervising Foundations Engineer



Memorandum

To: Mr. C. Mirza,
Head, Soils Mechanics Section,
West Building.

From: G. C. E. Burkhardt,
Structural Planning Office,
3501 Dufferin Street.

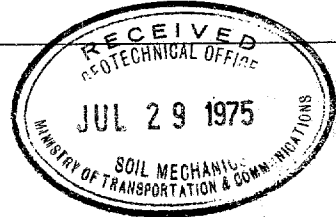
Attention:

Date: July 28, 1975.

Our File Ref.

In Reply to

Subject: Hwy. 427 Underpass at Rexdale Blvd.,
W.P. 126-60, Site 37-982,
District 6, Toronto.



Your Foundation Report W.O. 72-11024, dated October 19, 1972, assumed a two span bridge at subject location. Following a revision of the interchange concept and to comply with the three span arrangement then required, additional information was supplied by your office in memos dated March 21, 1973 and April 19, 1973.

As it is now this Ministry's intention to revert to the two span scheme, we are attaching the following updated information intended to enable the Soils Mechanics Section to carry out possible further studies in the area under consideration.

Two Plans of Hwy. 427 at Rexdale Blvd.

Two Profiles of Hwy. 427

Two Profiles of Rexdale Blvd.

Two Typical Sections of Hwy. 427 &
Rexdale Blvd.

1" = 40'

1" = 100' Horizontal

1" = 10' Vertical

1" = 100' Horizontal

1" = 10' Vertical

1" = 5'

Please note that the Hwy. 427 centreline has been shifted some 20 feet to the east of the original proposal (it now follows close to the east edge of existing Indian Line Road whereas it was before located along the west edge of same road). Rexdale Blvd. centreline is unchanged.

In view of the new planning and present scheduling any additional recommendations and/or revisions you wish to make to the original Foundation Report should be submitted by October 29, 1975.

If any more information becomes necessary please do not hesitate to call on us.

MDB:lm

M. D. Bendayan,
STRUCTURAL PLANNING ENGINEER,
for:
G. C. E. Burkhardt,
REG. STRUCTURAL PLANNING ENG.

c.c. R. Fitzgibbon
J. Anderson
E. Shedler
R. D. Gunter

Mr. G. C. E. Burkhardt, (3)
Regional Structural Planning Eng.,
Central Region,
3501 Dufferin St., Downsview.

Foundations Office,
Design Services Branch,
West Bldg., Downsview.

April 19, 1973.

Mr. M. D. Bendayan.

*Abutment Footing ("Perched" Type)
Proposed Underpass Structure at the
Crossing of Hwy. 487 and Rexdale Blvd.
Site #37-982, Borough of Etobicoke,
Metropolitan Toronto, District #8 (Toronto)
W.O. 72-11024 -- W.P. 126-60*

We have reviewed the subsoil conditions at the above site and submit our recommendations with regard to foundation support of "perched" type of abutments, as requested by your office (memo from Mr. G. C. E. Burkhardt, dated April 13, 1973).

The abutments may be supported on spread footings placed within the fills. The fill material, below the tops of the footings, should consist of well compacted granular 'A' material, and should extend for a horizontal distance of at least 10 feet from the footing edges in the plane of the footing tops. This portion of the fill should be constructed with side slopes no steeper than 2:1. The remainder of the fill should be completed to about profile grade for a distance of 50 feet behind the abutments before re-excavation for the abutment footings. An allowable bearing pressure of 2.5 t.s.f. may be used in design. If the abutments are supported on spread footings, there will be differential settlement between the abutments and the centre pier. Providing the fill, in the immediate vicinity of the abutment footing is well compact, this settlement should not exceed one half inch.

Alternatively, the abutments may be supported on end-bearing piles driven to bedrock. For estimating purposes the pile tips can be assumed to be located at elevations 485 (east abutment) and 470 (west abutment). The piles could be designed for the ultimate capacity of the pile section chosen; e.g., 12 BP 74 steel H-piles could be designed for 95 tons per pile. No rock or bouldery fill should be placed in areas where piles are to be driven.

April 19, 1973.

We believe that the foregoing recommendations will prove adequate for your design requirements. Should additional information be required, please contact this office.



C. S. Poon,
Project Foundations Engineer,
M. Devata,
Supervising Foundations Engineer.

CSP/ao

For:

cc: C. S. Grebski
McCormick, Rankin & Associates Ltd.

Foundations Files ✓
Documents

FOUNDATION INVESTIGATION REPORT
For
The Proposed Underpass Structure
At the Crossing of Hwy. #427 and
Rexdale Blvd.,
Borough of Etobicoke, County of York
District No. 6 (Toronto)
W.O. 72-11024 -- W.P. 126-60

1. INTRODUCTION:

The Foundations Office was requested to carry out a subsurface investigation for the two span cast in place bridge to be constructed at the crossing of proposed Hwy. 427 and Rexdale Blvd., in the Borough of Etobicoke, County of York. The request was contained in a memo from the Bridge Office (Mr. G.C.E. Burkhardt, Regional Structural Planning Engineer, Central Region), dated January 31, 1972. Subsequently, an investigation was carried out by this Office to determine the subsoil, bedrock and groundwater conditions at the site.

The results of the investigation are presented in this report, together with our recommendations for the design of the structure foundations as well as the stability considerations associated with the approaches.

2. DESCRIPTION OF SITE AND GEOLOGY:

The site is located at the intersection of Indian Line Road and Rexdale Blvd., in the Borough of Etobicoke. A major portion of the area is cultivated and being used for farming purposes; the remainder is being developed for industrial purposes. The terrain is flat to undulating in relief between elevations 545 and 555. Both Indian Line and Rexdale Blvd. are two lane paved roadways the profile grade of which are 2 to 3 feet above

the surrounding terrain. There are traffic lights at the level crossing intersection of Indian Line and Rexdale Blvd.

The site is located in the physiographic region known as the "Peel Plain." The characteristic deposit in this region is a ground moraine laid down during the Wisconsinian Glacial Age. In the vicinity of the area under investigation, the moraine is primarily composed of glacial till (Heterogeneous mixture of clayey silt, with sand and gravel) whose thickness generally ranges from 80 to 90 feet. A silt and sand deposit is often interbedded within the glacial till stratum. The overburden is underlain by grey shale bedrock of the Meaford-Dundas formation, Ordovician Period.

3. FIELD AND LABORATORY WORK:

Seven boreholes, each accompanied by a dynamic cone penetration test, were put down during the field investigation phase. The boreholes and the cone penetration tests were advanced by means of a continuous flight auger machine (C.M.E.) adopted for soil sampling purposes.

At required depths samples were obtained by means of a 2" O.D. split spoon sampler. The method of driving the split-spoon conformed to the specifications for the Standard Penetration Test. The same method was used to advance the dynamic cone penetration tests. Bedrock was proven at four of the boring locations by obtaining BX size rock core samples. The groundwater level conditions across the site were determined, during the period of the investigation, by recording the water levels in the open boreholes.

During sampling and drilling operations detailed logs of the borings were made. These logs contain a record of the drilling and sampling techniques used, together with the soil types and bedrock encountered. The location and elevation of all the boreholes are shown on Drawing No. W.O. 72-11024A, together with estimated stratigraphical sections across the site. Surveying at the site was carried out by personnel from the Central Region Engineering Surveys Section. The elevations given in this report are referenced to a Geodetic datum.

All samples were subjected to a careful visual examination

in the field and subsequently in the laboratory. Following this examination, laboratory testing was carried out on selected representative samples to determine the following physical properties of the overburden:

Natural Moisture Content

Atterberg Limit

Grain-Size Distribution

The results of these tests are plotted on the Record of Borelog sheets as well as Figures #1, 2 and 3, all of which are located in Appendix I of this report.

4. SUBSOIL AND BEDROCK CONDITIONS:

4.1) General:

The predominant stratum across the site is a stiff to hard glacial till composed of a clayey silt with sand and gravel, the thickness of which varies from 30 to 51.5 feet. The cohesive till is underlain by a 15.5 to 32 feet thick compact to very dense silty sand to sandy silt deposit. This granular deposit is underlain by a lower hard cohesive glacial till sheet whose thickness varies from 11 to 24.5 feet. This overburden sequence is followed by sound grey shale bedrock.

The boundaries of the various deposits, as determined in the boreholes, are shown on the accompanying Record of Borehole sheets. The stratigraphical sections, shown on Drawing No. 72-11024A, have been inferred from this data. From ground surface downward, the soil types and bedrock.

The boundaries of the various deposits, as determined in the boreholes, are shown on the accompanying Record of Borehole sheets. The stratigraphical sections, shown on Drawing No. 72-11024A, have been inferred from this data. From ground surface downward, the soil types and bedrock encountered are as follows:

4.2) Glacial Till (Upper Sheet):

Directly beneath a nominal topsoil cover (1 to 1.5 feet) is a glacial till stratum composed of a heterogeneous mixture of

clayey silt with sand and gravel. The thickness of this deposit ranges from 30 to 51.5 feet. The upper 9.5 to 14 feet of this stratum is brown in colour which is an indication that this zone has been subjected to desiccation; below this zone the till is grey. Random silt and sand seams, up to 1 inch thick, are present throughout the till. Further, a 7.5 feet thick layer of silty sand was encountered within the glacial till deposit at B.H. #1. Grain-size distribution testing was carried out on samples of the till obtained with 2 inch I.D. sampling equipment; the results are plotted on Figure #1.

Atterberg limit tests were performed on samples of the cohesive glacial till. The results, which are plotted on the Record of Borelog sheets and the plasticity chart (Figure #2), are summarized in tabular form below.

		<u>Range</u>	<u>Average</u>
Liquid Limit (W_L)	(%)	19 - 42	31
Plastic Limit (W_p)	(%)	14 - 23	19
Natural Moisture Content (W)	(%)	7 - 25	17

Based on these values it is estimated that the cohesive deposit has a matrix which is inorganic and of low to intermediate plasticity.

The Standard Penetration Tests, carried out within the glacial till, are plotted on the Record of Borelog sheets. This testing gave 'N' values which range from 11 to 120 blows/ft. Based on this testing it is estimated that the consistency of the till varies from stiff to hard. An exception to this pattern occurs in the western portion of the area under investigation. Here a 1 to 3 feet thick softened zone was encountered in the till at about elevation 533 (refer to B.H.'s #3 and 7). The undrained shear strength within this zone, obtained from field and laboratory testing, was found to range between 800 to 1,200 p.s.f. Based on these values it is estimated that the consistency of this softened zone is in the firm to stiff range.

4.3) Silty Sand to Sandy Silt, With Trace of Clay and Gravel:

The upper glacial till sheet is underlain by a compact to very dense ('N' values 13 to 170 blows/ft.) silty sand to

sandy silt with a trace of clay and gravel. The thickness of this deposit ranges from 15.5 to 32 feet. Random clayey silt seams and layers ranging from a fraction of an inch to up to 1.5 feet in thickness are present throughout this granular material. Grain-size distribution testing was carried out on three representative samples obtained within the deposit, the results are plotted on Figure #3.

4.4) Glacial Till (Lower Sheet):

The granular deposit is underlain by a hard ('N' values 42 blows/ft. to greater than 100 blows/ft.) glacial till whose matrix is composed of a clayey silt with sand and gravel. The thickness of this lower till ranges from 10.5 to 24.5 feet. Random seams of layers of silt and sand, up to 1 foot thick, are present within the deposit. Further, fragments of shale are present in the lower portion of the till.

4.5) Shale Bedrock:

The overburden is underlain by bedrock which was proven in four of the boreholes by obtaining up to 7.5 feet of BX size rock core samples. Further, the surface of the bedrock was inferred to exist, at other boring locations, at the level where the casing met practical refusal. Based on the data obtained it is estimated that the surface of the bedrock across the site varies randomly between elevations 465.5 to 470.

The bedrock is composed of a grey shale. The bedrock is in a sound condition as evidenced by the high percentage of rock core recovered during the drilling operations.

5. GROUNDWATER CONDITIONS:

The groundwater conditions across the site were observed by taking readings in the open boreholes during the period of the field investigation (March 1972). The results of the readings are shown on the borelog sheets, as well as on Drawing No. 72-11024A.

The observations indicate that the groundwater level was located between elevations 548.5 and 553 corresponding to

levels which range from existing ground surface to 2.5 feet below existing ground surface.

6. DISCUSSION AND RECOMMENDATIONS:

6.1) General:

It is proposed to extend the present Airport Expressway northerly toward Finch Avenue, following closely the existing Indian Line Rd. This Expressway will be designated as Hwy. #427. A number of interchange and structure crossings will be required. This report will deal with one of these crossings, namely, the proposed underpass structure at the crossing of Hwy. #427 and Rexdale Blvd., in the Borough of Etobicoke, County of York.

It is understood that the structure at this site will be approximately 135 feet wide and have two spans (112' - 112'), incorporating a central pier and closed-type abutments. The information available at the time of writing this report would indicate that the profile grade of the N.B. and S.B. lanes of Hwy. #427, in the vicinity of the structure, will be at about elevation 541. At this grade Hwy. #427 will be in a cut section extending approximately 10 to 12 feet below the existing ground surface. In this area the proposed grade of Rexdale Blvd. is to range from elevation 562 to 563. At these grades the approaches will have a maximum height of about 21 feet (11 feet of cut, 10 feet of fill) in the longitudinal direction and 10 feet in the transverse direction.

The predominant stratum across the site is a stiff to hard cohesive glacial till which varies from 30 to 51.5 feet in thickness. The till is underlain by a 15.5 to 32 feet thick compact to very dense silty sand to sandy silt deposit. This granular deposit is underlain by a lower hard cohesive glacial till sheet whose thickness varies from 11 to 24.5 feet. This overburden sequence is followed by sound grey shale bedrock.

6.2) Cut and Fill Sections:

6.2.1) Hwy. #427 Cut Section:

The maximum depth of the cut section will be of the order of 11 feet. The excavation will be carried out within the upper cohesive glacial till sheet. The base of the cut will extend well below the groundwater level in the area. However, since the subsoil is relatively impervious no major dewatering problems are anticipated during the excavation period. Any minor groundwater seepage emanating from sources, such as water bearing granular layers located in the glacial till could be controlled using conventional techniques - i.e., pumping from sumps, etc. Positive drainage measures, such as perimeter drainage ditches, will have to be installed to ensure proper performance of the pavement section.

A cut of the depth contemplated will be inherently stable with respect to a deep seated failure within the subsoil, provided standard 2:1 slopes are employed. The cut slopes will have to be protected against erosion caused by uncontrolled surficial runoff. This can be accomplished by either seeding and mulching or alternatively sodding the slopes.

6.2.2) Rexdale Blvd. Fill Sections:

Up to 11 feet of fill will be required along the approaches to the structure (along Rexdale Blvd.). Fills of this height will be inherently stable provided i) standard 2:1 slopes are employed and ii) the fill is properly compacted.

The cohesive glacial till will settle due to the fill loading. This settlement should not exceed 1/2 inch; further, it will occur during or immediately following fill placement.

6.3) Structure Foundations:

6.3.1) Central Pier:

The centre pier can be supported on a spread footing founded within the competent upper glacial till stratum. A minimum of 4 feet of earth cover should be provided above the base of the footing for frost protection purposes. Considering the grade of Hwy. #427 this would place the base of the footing at elevation 537.

A footing so founded could be designed using an allowable bearing pressure of 3.0 t.s.f.

The base of the footing will be located well below the groundwater level recorded during the period of the investigation. In this regard it is recommended that the foundation elements be constructed only after the Hwy. #427 cut has been made and the permanent drainage system installed. This provision would lower the prevailing groundwater level at this location. The excavation will be carried out in the relatively impervious glacial till. No major dewatering problems are, therefore, anticipated. Any minor inflow emanating from sources, such as water bearing granular seams or layers in the till, could be controlled using conventional techniques.

The glacial till subsoil will settle due to the footing pressure. Since the till is highly preconsolidated this settlement will be of a recompression nature; i.e., take place during or immediately following the construction period. This settlement will not exceed 1 inch, providing the foundation soil is not softened by the construction operations or uncontrolled surface runoff. In this regard it would be advantageous to cover the foundation subsoil with a working mat of lean concrete as soon as the footing level is reached.

6.3.2) Closed-Type Abutments:

The abutments can be founded on spread footings located in the glacial till. Taking the frost protection requirements into consideration the base of the footings could be located at or below elevation 537. Under these conditions the east abutment foundation could be designed using an allowable bearing value of 3.0 t.s.f.

An exception occurs at the location of the west abutment here a softer zone exists in the till at about elevation 533. Precautions must be taken to ensure that this zone is not overstressed. This could be accomplished by limiting the allowable bearing value at the west abutment to 1.5 t.s.f.

If a higher bearing value is required for the west abutment

foundation two alternatives exist. The first is to place the abutment footing below the softened zone; i.e., at or below elevation 530. A footing founded at this elevation could be designed using an allowable bearing value of 3.5 t.s.f. Alternatively, the abutment could be founded at the originally proposed elevation and supported on end-bearing piles driven into the lower competent glacial till deposit. For estimating purposes the pile tips can be designed for the ultimate capacity of the pile section chosen; e.g., 12BP 70 steel H-piles could be designed for 95 tons/pile.

The base of the abutment footings will be located below the prevailing groundwater level. As discussed in Subsection 6.3.1) no major dewatering complications are anticipated in this area.

If the abutments are supported on spread footing foundations the glacial till subsoil will settle due to the induced footing pressure. Taking into consideration the aforementioned allowable bearing pressures and the respective founding levels, it is estimated that the settlement could be of the order of 1 inch. For reasons discussed in Subsection 6.3.1) it might be advantageous to cover the foundation subsoil with a working mat of lean concrete as soon as the footing level is reached.

If the structure is designed as a rigid frame, then a coefficient of earth pressure at rest (K_0) of 0.5 should be assumed for the granular fill placed behind the wall, when designing the abutments. However, if some movement of the wall is permitted, then a coefficient of active earth pressure (K_a) of 0.33 can be used.

The granular backfill behind the wall should be allowed to drain in order to prevent the buildup of excess hydrostatic groundwater pressure in this area. This can be accomplished by providing weep holes at the base of the walls. The location and spacing of these weep holes should be determined in accordance with current M.T.C. practices.

For spread footing supported abutments it is recommended that a value of 2500 p.s.f. be used in the computations to determine the sliding resistance between the concrete base of the footing and the underlying cohesive glacial till.

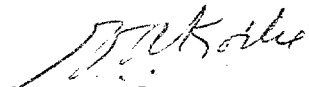
The closed type vertical wall sections will be inherently stable with respect to a deep-seated rotational type of failure in the cohesive subsoil located beneath the abutment foundations.

7. MISCELLANEOUS:

The field work for this project was carried out during the period of March 7 to March 17, 1972, under the supervision of Messrs. V. Korlu, Project Foundations Engineer, and H. Szymanski, Foundation Report Technician.

This report was prepared by Messrs. V. Korlu and B. T. Darch, Senior Foundations Engineer, and reviewed by Mr. M. Devata, Supervising Foundations Engineer.

The equipment was owned and operated by Master Soil Investigation Ltd., Toronto.


V. Korlu, P. Eng.




M. Devata, P. Eng.

VK/ao

Oct. 17, 1972.

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO. 1

JOB 72-11024

LOCATION Coords. 5,885,263 N; 968,288 E.

ORIGINATED BY VK

W.P. 126-60

BORING DATE March 8, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger & sample with C.M.E.

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. PLT	NUMBER	TYPE	BLOWS/FOOT		20	40	60	80	100	W_P	W	W_L		
552.6	Ground Level															GR. SA. SI. CL.
0.0	Het. mix. of clayey silt, sand & gravel		1	SS	71	550										551.6
			2	SS	76											2 19 69 10
			3	SS	78											
	Brown		4	SS	21	540										
	Grey		5	SS	22											0 10 33 57
	Glacial Till		6	SS	21											
	Stiff to Hard		7	SS	43	530										
525.0			8	SS	20											0 18 51 31
27.6	Silty sand with some gravel.		9	SS	18	520										13 83 (4)
517.6	Compact		10	SS	95											
35.0			11	SS	73	510										
			12	SS	55											
502.6			13	SS	28	500										0 42 48 10
50.0	Silty sand to sandy silt, with trace of clay and gravel.		14	SS	43	490										
483.1	Compact to Dense															
69.5	Het. mix. of clayey silt, sand & gravel. (Glacial Till)		15	SS	110	480										
	Hard															
	Fragments of Shale		16	SS	100	470										
466.1																
86.5	End of Borehole Probable Bedrock															

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 2

JOB 72-11024

LOCATION Co-ords. 5,885,208 N; 968,175 E.

ORIGINATED BY WK

W.P. 126-60

BORING DATE March 15, 1972

COMPILED BY WK

DATUM Geodetic

BOREHOLE TYPE Auger & sample with C.M.E.

CHECKED BY LB

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W W_P W W_L WATER CONTENT % 15 30 45	BULK DENSITY γ P.C.F. GR. SA. SI. CL.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT					
552.6	Ground Level									
0.0	Het. mix. of clayey silt, sand & gravel.		1	SS	18	550				0 13 60 27
	Glacial Till		2	SS	26					
			3	SS	42					
	Brown Grey		4	SS	24	540				
	Very Stiff to Hard		5	SS	23					
			6	SS	23					
			7	SS	24	530				
			8	SS	52					
522.6			9	SS	63	520				0 49 50 1
30.0	Silty sand with trace of clay and occasional gravel.		10	SS	37					
	(layer of clayey silt 1.5' thick at el. 512.)		11	SS	30	510				
			12	SS	30					
	Dense to Very Dense		13	SS	30	500				0 55 41 4
490.6			14	SS	104	490				
62.0	Glacial Till									
	Het. mix. of clayey silt, sand & gravel.		15	SS	133	480				
	Grey									
473.6	Hard									
79.0	End of Borehole									

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FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 3

JOB 72-11024

LOCATION Copords. 5,885,193 N; 968,075 E.

ORIGINATED BY VK


W.P. 126-60

BORING DATE March 10, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger & sample with C.M.E.

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	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		20	40	60	80	100	W_P	W	W_L		
550.7	Ground Level															
0.0	Het. mix. of clayey silt, sand & gravel		1	SS	12	550										548.7
	Brown Grey		2	SS	40											1 20 54 25
	Stiff to Hard Glacial Till		3	SS	49	540										
			4	SS	48											
			5	SS	16											
			6	TW	PM	530										
			7	SS	46											
			8	SS	50											
			9	SS	43	520										140
			10	SS	55											
			11	SS	52	510										
505.7			12	SS	33											0 37 62 1
45.0	Silty sand to sandy silt, with trace of clay & occ. gravel.		13	SS	35	500										
	Dense					490										
480.7						480										
70.0	Het. mix. of clayey silt, sand & gravel (Glacial Till) (layers of silt & sand up to 1' thick)		14	SS	72											
470.2	Hard		15	SS	100%	470										
80.5	Shale		16	EXL	75%											
	Bedrock		17	EXL	75%											
464.2	Sound		18	EXL	100%											
86.5	End of Borehole					460										

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 4

JOB 72-11024

LOCATION Co-ords. 5,885,295 N; 968,146 E.

ORIGINATED BY VK

W.P. 126-60

BORING DATE March 16, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger & sample with C.M.E.

CHECKED BY *10*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT w_L		BULK DENSITY γ	REMARKS			
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT		PLASTIC LIMIT w_p						
							20	40	60	80			100	WATER CONTENT w	
							SHEAR STRENGTH P.S.F.						w_p w w_L		
						○ UNCONFINED + FIELD VANE		WATER CONTENT %		P.C.F.					
						● QUICK TRIAXIAL x LAB VANE									
551.5	Ground Level								15	30	45	GR. S. S. CL.			
0.0	Het. mix. of clayey silt, sand & gravel.		1	SS	37	550					133				
			2	SS	115										
540.5	Brown		3	SS	55	540									
11.0	Grey		4	SS	35								124		
	Glacial Till		5	SS	22										
	Very Stiff to Hard		6	SS	31										
			7	SS	32	530									
			8	SS	70										
			9	SS	65	520									
			10	SS	72										
			11	SS	30	510									
506.5				12	SS	24									
45.0			Silty sand to sandy silt, with trace of clay and occ. gravel.	13	SS	21	500							0 34 61 1	
	Compact														
491.0															
60.5	Het. mix. of clayey silt, sand & gravel.	14	SS	105.6"	490										
	(Glacial Till)														
	Hard	15	SS	42	480										
	Fragments of Shale.														
466.5															
85.0	Shale		16	BXL	100%										
	Bedrock														
459.2	Sound		17	BXL	100%	460									
92.3	End of Borehole														

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FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 5

JOB 72-11024

LOCATION Co-ords. 5,885,387 N; 968,237 E.

ORIGINATED BY VK

W.P. 126-60

BORING DATE March 7, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger & sample with C.M.E.

 CHECKED BY *[Signature]*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100	LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W	SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	WATER CONTENT % W_p W W_L	BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT							
551.8	Ground Level											
0.0	Het. mix. of clayey silt with sand and gravel.		1	SS	36	550						
			2	SS	37							
			3	SS	38							
538.8	Brown Grey		4	SS	21	540						
13.0	Glacial Till		5	SS	29							
	Stiff to Hard		6	SS	12							
			7	SS	81	530						
			8	SS	51							
			9	SS	120	520						
			10	SS	94							
			11	SS	36	510						
			12	SS	17							
500.3			13	TW	FM	500						
51.5	Silty sand to sandy silt, with some clay and occ. gravel		14	SS	30							
	Dense to Very Dense		15	SS	61	490						
			16	SS	170							
479.8						480						
72.0	Het. mix. of clayey silt, sand and gravel. (Glacial Till) shale fragments below el. 474.		17	SS	100	470						
468.8	Hard		18	BYL	80%							
83.0	Shale Bedrock		19	BXL	80%							
463.8	Sound											
88.0	End of Borehole											

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE N^o 6

JOB 72-11024

LOCATION Co-ords. 5,885,338 N; 968,112 E.

ORIGINATED BY VK

W.P. 126-60

BORING DATE March 17, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger & sample with C.M.E.

CHECKED BY SO

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — w_L			BULK DENSITY	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT					PLASTIC LIMIT — w_p					
							20	40	60	80	100	WATER CONTENT — w					
							SHEAR STRENGTH P.S.F.					w_p — w — w_L					
							○ UNCONFINED + FIELD VANE					WATER CONTENT %					
								● QUICK TRIAXIAL × LAB VANE					15 30 45				
552.0	Ground Level																
0.0	Het. mix. of clayey silt with sand and gravel.		1	SS	36	550											
			2	SS	36												
			3	SS	32												
539.0	Brown		4	SS	41	540											
13.0	Grey		5	SS	19												
	Glacial Till		6	SS	44												
			7	SS	45	530											
			8	SS	39												
	Very Stiff to Hard		9	SS	81	520											
			10	SS	47												
			11	SS	59	510											
			12	SS	21												
502.0																	
50.0	Silty sand to sandy silt, with some clay and occ. gravel.		13	SS	31	500											
	Dense to Very Dense		14	SS	84	490											
482.5																	
69.5	Het. mix. of clayey silt with sand and gravel (Glacial Till) (Fragments of shale throughout)		15	SS	100	480											
	Hard					470											
465.5																	
86.5	End of Borehole Probable Bedrock																

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 7

JOB 72-11024

LOCATION Co-ords. 5,885,320 N; 968,022 E.

ORIGINATED BY VK

W.P. 126-60

BORING DATE March 13, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger & sample with C.M.E.

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT ——— w_L		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT	20 40 60 80 100	PLASTIC LIMIT ——— w_p	WATER CONTENT ——— w		
551.1	Ground Level							SHEAR STRENGTH P.S.F.		WATER CONTENT %		
								○ UNCONFINED + FIELD VANE		w_p ——— w ——— w_L		
								● QUICK TRIAXIAL × LAB VANE		15 30 45		
								400 800 1200 1600 2000		P.C.F.		
0.0	Het. mix. of clayey silt, sand & gravel.					550						548.6
			1	SS	40							2 19 69 10
			2	SS	65							
			3	SS	32	540						
538.1	Brown		4	SS	30							
13.0	Grey		5	SS	11							0 10 33 57
	Glacial Till		6	TW	PM							
			7	TW	PM	530						
	Firm to Hard		8	SS	47							0 18 51 31
			9	SS	66	520						13 83 (4)
			10	SS	41							
508.6			11	SS	23	510						
42.5	Silty sand to sandy silt, with some clay & occ. gravel.		12	SS	13							
			13	SS	13	500						0 42 48 10
	Compact to Very Dense		14	SS	58	490						
			15	SS	147	480						
478.6			16	SS	100 15"	470						
72.5	Het. mix. of clayey silt with sand & gravel (Glacial Till) (shale fragments throughout)											
467.6	Hard											
83.5	Shale Bedrock		17	EXL	90%							
463.6	Sound											
87.5	End of Borehole					460						

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 8

JOB 72-11024

LOCATION Co-ordinates 5.855,302 N.. 968.388 E.

ORIGINATED BY V.K.

W.P. 126-60

BORING DATE February 15, 1973

COMPILED BY J.B.

DATUM Geodetic

BOREHOLE TYPE Auger & Sample

CHECKED BY

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT — w_L		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS / FOOT	20 40 60 80 100	PLASTIC LIMIT — w_p	WATER CONTENT — w		
551.6	Ground Level									γ	P.C.F. GR SA SI CL
539.1 12.5	Glacial Till		1	SS	24						
	2		SS	42							
	3		SS	37							
	4		SS	19							
	5		SS	17							
	6		SS	26							
	7		SS	24							
	8		SS	61							
	9		SS	32							
	10		SS	55							
	11		SS	41							
505.6	Silty Sand to Sandy Silt										
46.0	Compact		12	SS	22						
495.6	Glacial Till										
56.0	Heterogeneous Mixture of Clayey Silt, Sand & Gravel		13	SS	85						
484.6	Hard		14	SS	100.7						
67.0	End of Borehole										
	Probable Bedrock										

 Elev.
533.3

OFFICE REPORT IN SOIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 9

JOB 72-11024

LOCATION Co-ordinates 5,885,428 N. 968,349 E.

ORIGINATED BY V.K.

W.P. 126-60

BORING DATE February 16, 1973.

COMPILED BY J.B.

DATUM Geodetic

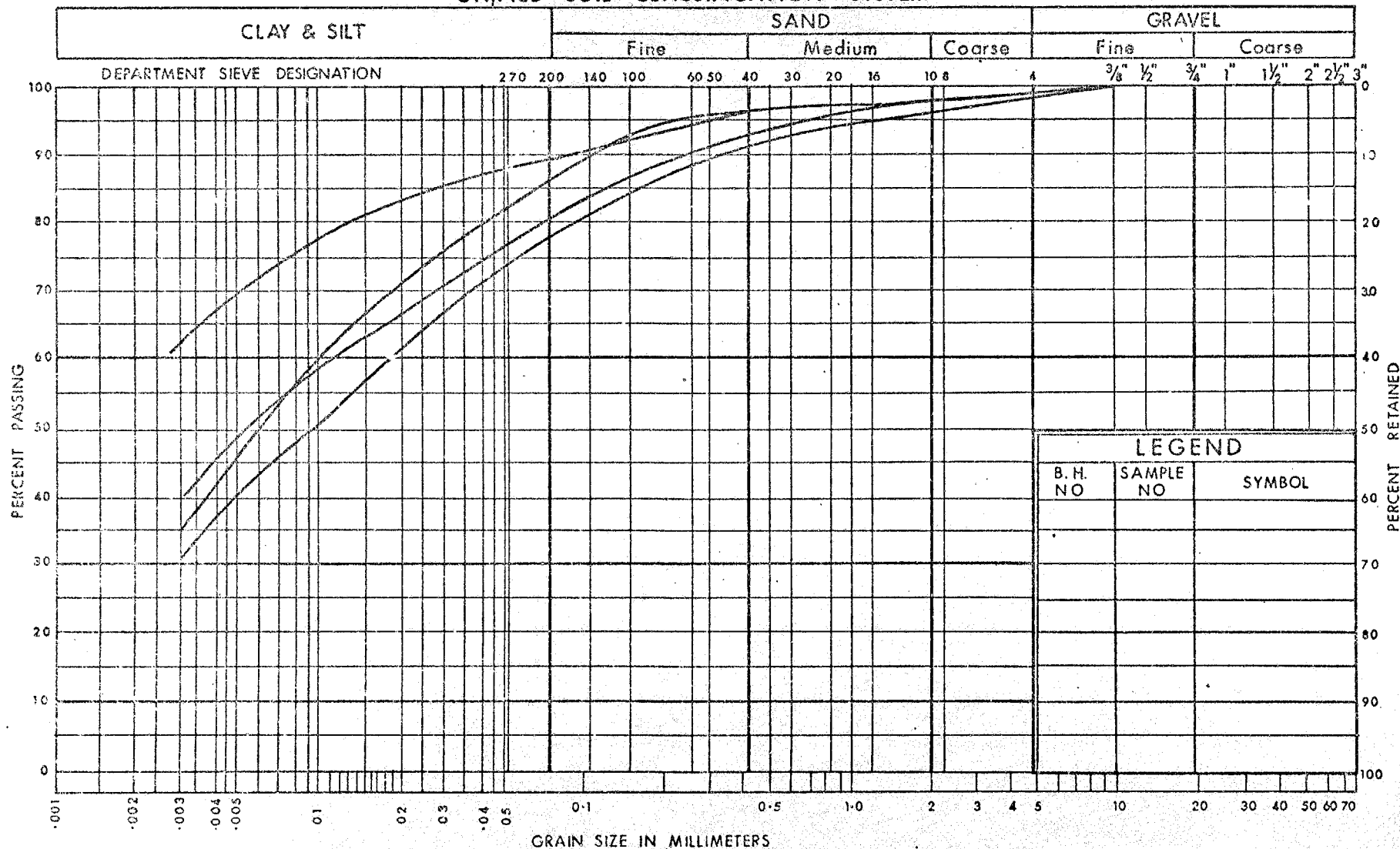
BOREHOLE TYPE Auger & Sample

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		20	40	60	80	100	w_p	w	w_L		
551.5	Ground Level															
	Glacial Till		1	SS	12	550										
			2	SS	38											
	Brown to Grey		3	SS	26	540										
	Grey		4	SS	14											
	Hetrogeneous		5	SS	14											
	Mixture of		6	SS	8											
	Clayey Silt,		7	SS	47	530										
	Sand & Gravel		8	SS	58											
	Stiff to Hard		9	SS	36	520										
			10	SS	35											
			11	SS	34	510										
	Layers of Sandy															
	Silt to Silty															
	Sand															
			12	SS	28	500										
						490										
486.0																
65.5	End of Borehole					480										
	Probable Bedrock															

▼ Elev.
= 532.2

UNIFIED SOIL CLASSIFICATION SYSTEM



DEPARTMENT
OF
TRANSPORTATION AND COMMUNICATIONS



DESIGN SERVICES
BRANCH

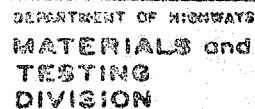
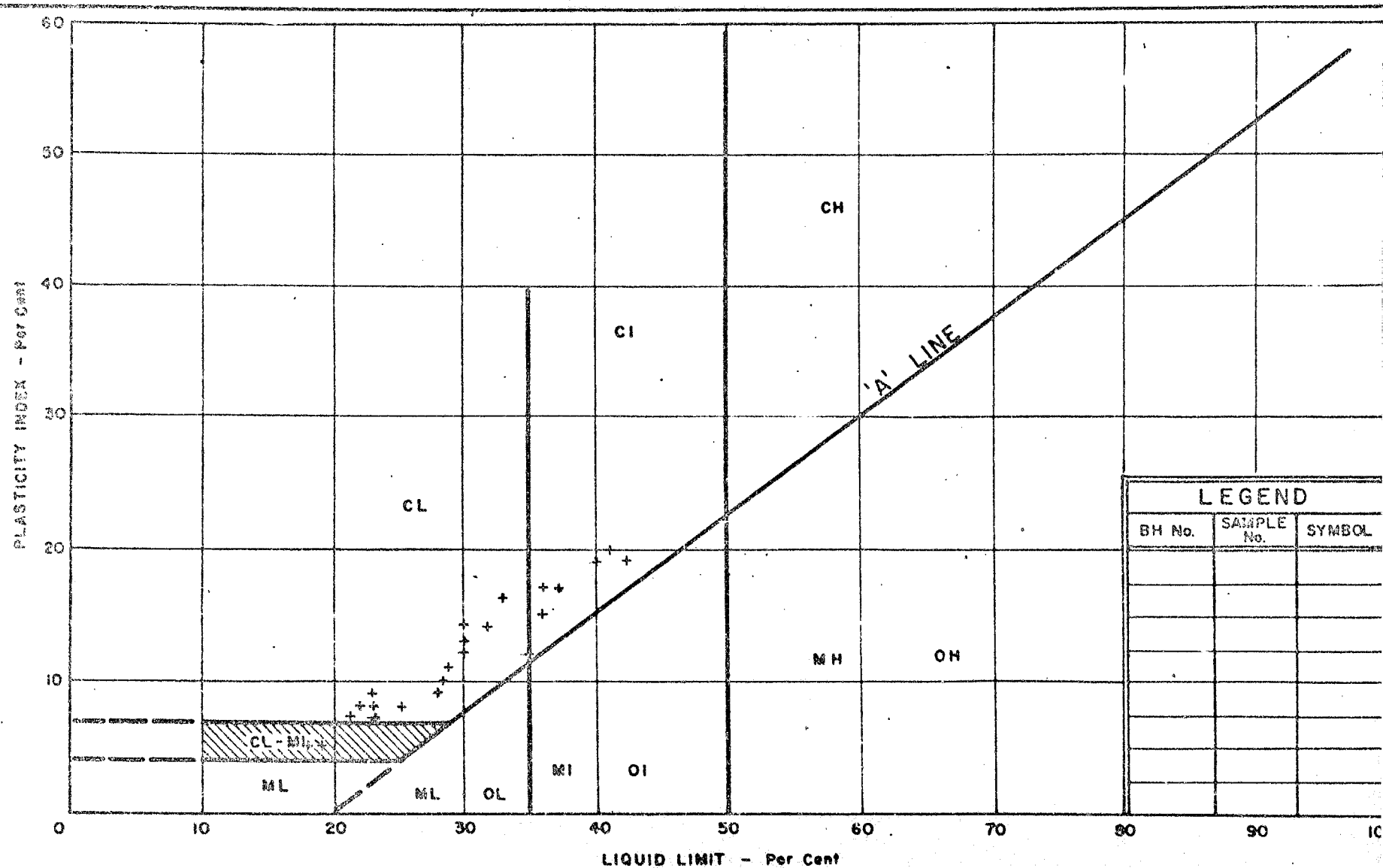
GRAIN SIZE DISTRIBUTION

HET. MIXTURE OF CLAYEY SILT, SAND & GRAVEL
GLACIAL TILL

W.P. No. 126-60

JOB No. 72-11024

FIG. N°1



PLASTICITY CHART

GLACIAL TILL

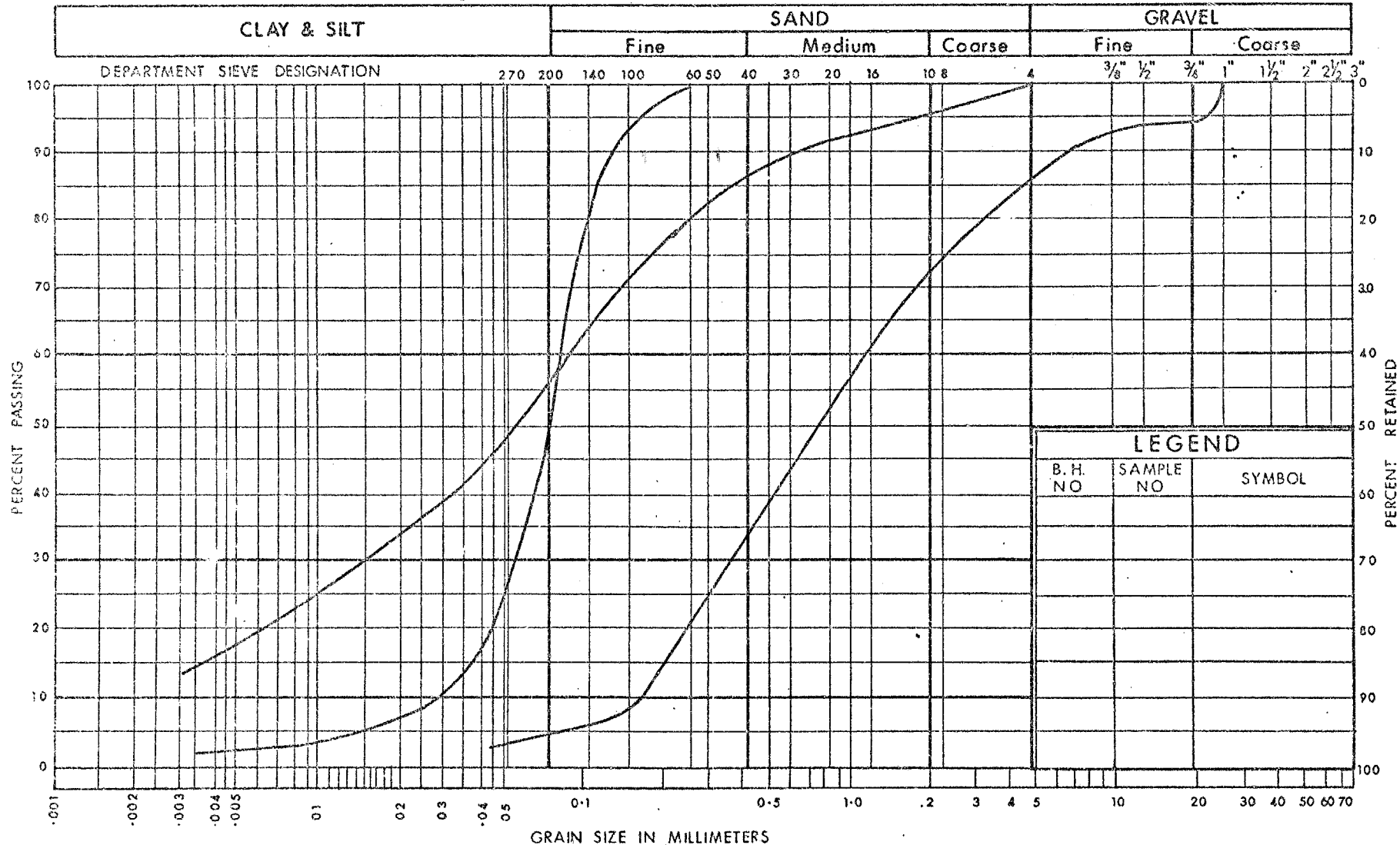
HET: MIXTURE OF CLAYEY SILT, SAND & GRAVEL

W.P. No. 176-60

JOB No. 72-11024

FIG. N° 2

UNIFIED SOIL CLASSIFICATION SYSTEM



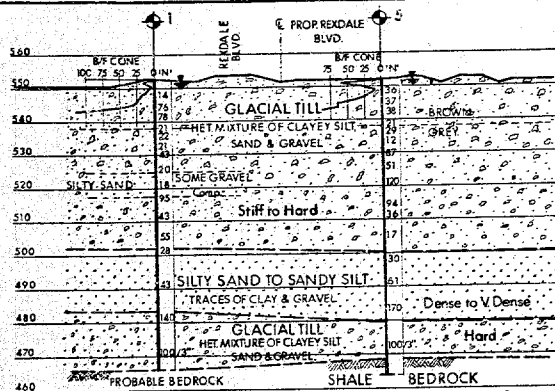
DESIGN SERVICES
BRANCH

GRAIN SIZE DISTRIBUTION
SILTY SAND TO SANDY SILT
TRACES OF CLAY & GRAVEL

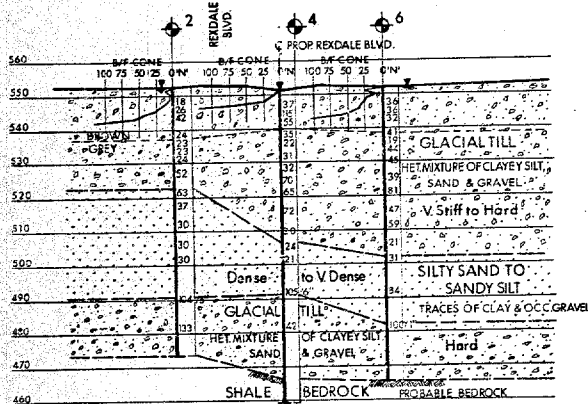
W.P. No. 126-60

JOB No. 72-11024

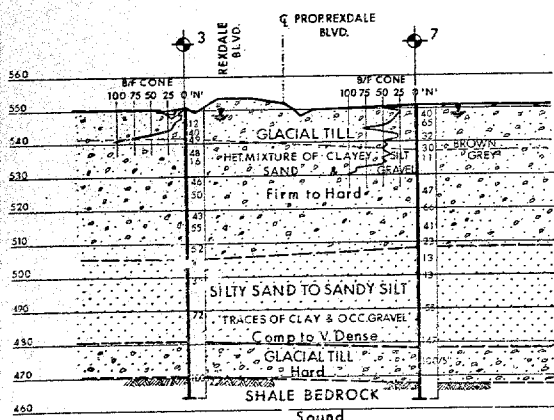
FIG. N°3



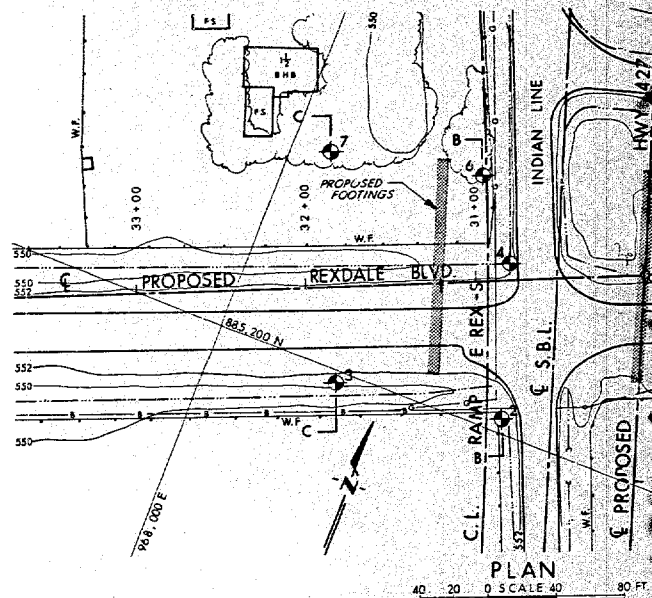
A-A



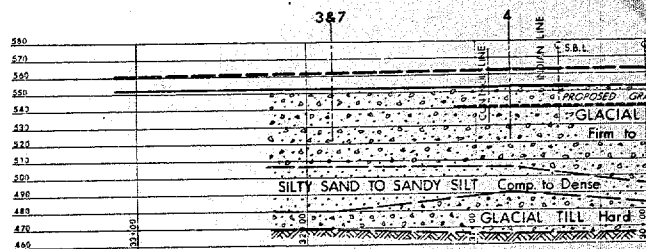
B-B



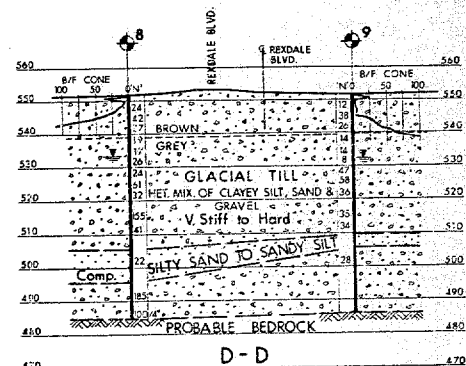
C-C



PLAN



PROFILE



D-D

HORIZ. 40
VERT. 20

DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 30 M.D. - 61

DIST. 6 REGION CENTRAL

W.P. No. 126 - 60 - 64

CONT. No. 78 - III

W. O. No. 72 - 11824

STR. SITE No. _____

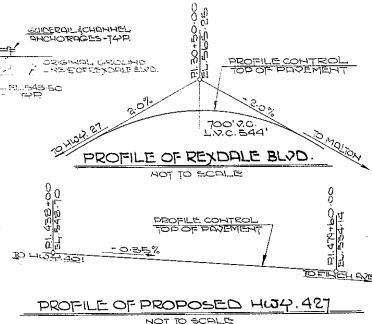
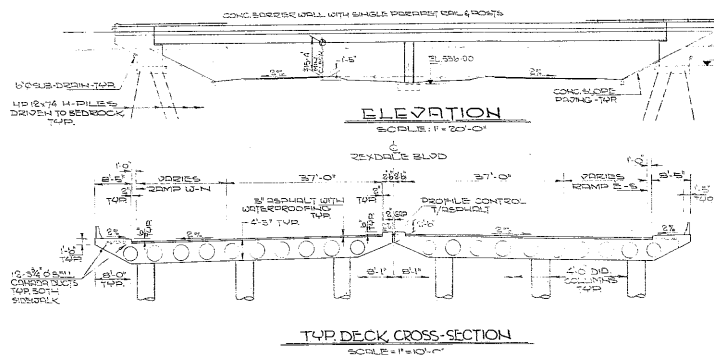
HWY. No. _____

LOCATION PROPOSED D'PAK STRUCTURE

AT UNIT 427 AND REYNOLDS BLVD.

OVERAGE DISCOUNTS TO BE INCURRED WITH THIS PAYOFF 34

REMARKS: _____



(FOR LUMP SUM TENDER ITEMS)

1. CONCRETE IN PIERS	60 CU.YD.	3000 PSI
ABUTMENTS & WINGWALLS	661 CU.YD.	3000 PSI
2. PRESTRESSED CONCRETE BRIDGE DECK	3741 CU.YD.	
3. CONCRETE IN BARRIER WALLS	42 CU.YD.	
4. CONCRETE IN APPROACH SLABS	186 CU.YD.	
5. CONCRETE IN SLOPE PAVING	124 CU.YD.	

DIST. 6	
CONT No	
WP No 126-60	
HWY. 427 U'PASS AT REXDALE BLVD.	SHEET
GENERAL LAYOUT	

CH. PILES OF CONCRETE

DECK, PILES, SIDEWALK, CURBS & BORDER DRAWS	15,000	PS
PIERS, FOOTINGS	4,000	PS
REMAINING	8,000	PS

GRADE OF REINFORCING STEEL (3.4.5.6.7.8.9.10)

COLUMN FEET, BASES	GRADE 60
REINFORCING	GRADE 50

CLERK COVER TO REINFORCING STEEL

DECK, TOP - 2" SLAB W/RE	1/2"
COLUMNS	3/4"
REINFORCING SLABS	1"
REMAINING	5"
OR AS NOTED	

- THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE BEARING SURFACES TO THE SPECIFIED ELEVATIONS WITH A TOLERANCE OF $\pm 1/8"$
- 1:10 CONCRETE SHALL BE PLACED ABOVE THE ABUTMENT BEARING SURFACES UNTIL THE CONCRETE IN BOX HAS BEEN PLACED, STRENGTHENED AND CURED.

- 2-10. 1 CABLE MAST LAYOUT
- 2 BOREHOLE LOCATIONS & SOIL STRATA
- 3 BOOMING LAYOUT
- 4 WEIGHT DISTRIBUTION
- 5 TOWER DISTRIBUTION
- 6 PILES
- 7 DECK LAYOUT
- 8 CABLE LAYOUT
- 9 CABLE DETAILS
- 10 TRANSVERSE CABLES
- 11 DECK REINFORCEMENT I
- 12 DECK REINFORCEMENT II
- 13 BARRIER JOINT WITH SIDEWALK
- 14 STEEL PARAPET RAILING (SINGLE TUBE)
- 15 20 APPROACH SLABS
- 16 DETAILS OF CONC. SLOPE PAVING
- 17 190 CONCRETE JOINT BLS. & DIM.
- 18 STANDARDS I
- 19 STANDARDS II
- 20 STANDARDS III



BANK OF NOVA SCOTIA AT MAIN INTERSECTION IN
MALTON. TABLET IN EAST WALL NEAR SOUTH END OF
BUILDING, 18" DIRECTLY BELOW MOST SOUTHERLY
WINDOW SILL, 7 FT. FROM S.E. CORNER AND 7" ABOVE
SIDEWALK. ELEV. 557.758



USE SCALE BELOW

10 1 2 3

3 INCHES ON ORIGINAL PLAN

DATE BY		DESCRIPTION	
DESIGN GA	CHECK	LOADING HS 20-44	DATE FEB 78
DRAWING A	CHECK JB	SITE No 37-882	DWG 1

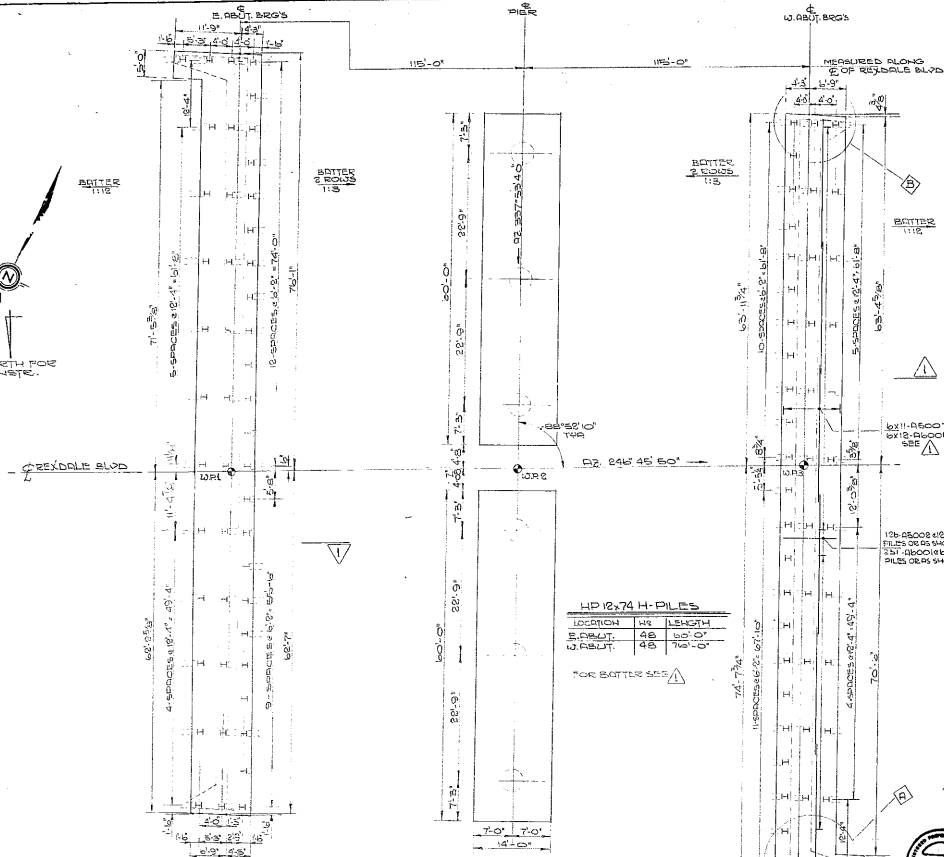
30412-61

CONT No
WP No 125-60

HWY 427 UPRAMP AT REXDALE BVD.

FOOTING LAYOUT

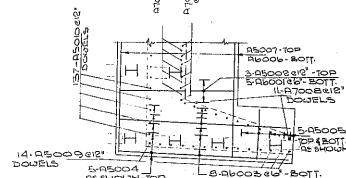
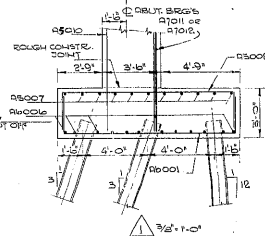
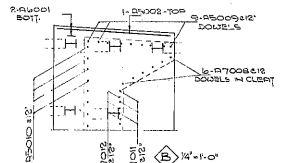
SHEET



WD 2,74 H-PILES

LOCATION	NO.	LENGTH
W. ABUT.	48	100'-0"
W. ABUT.	48	70'-0"

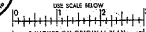
*FOR BATTER SEE 1



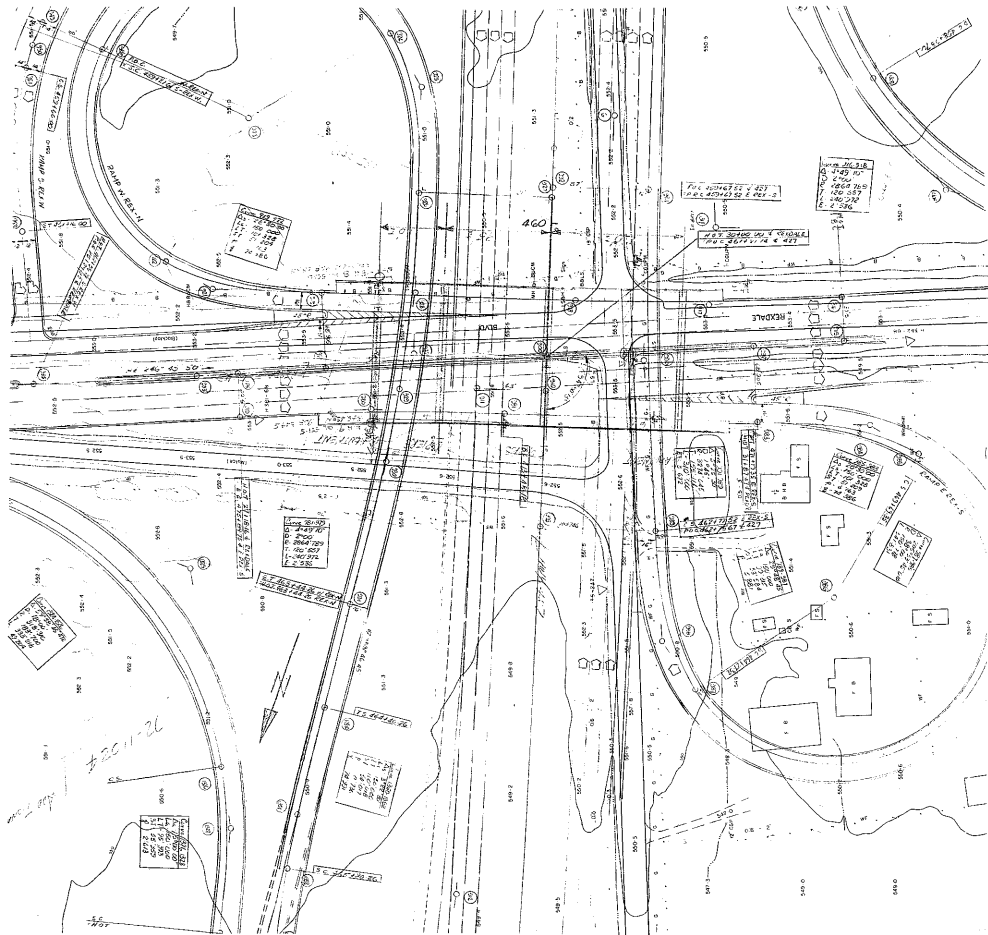
NOTE
REINFORCEMENT SIMILAR
BOTH FOOTINGS

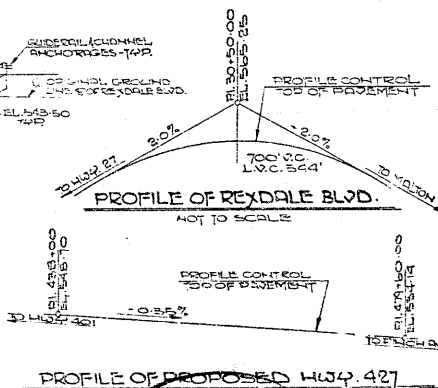
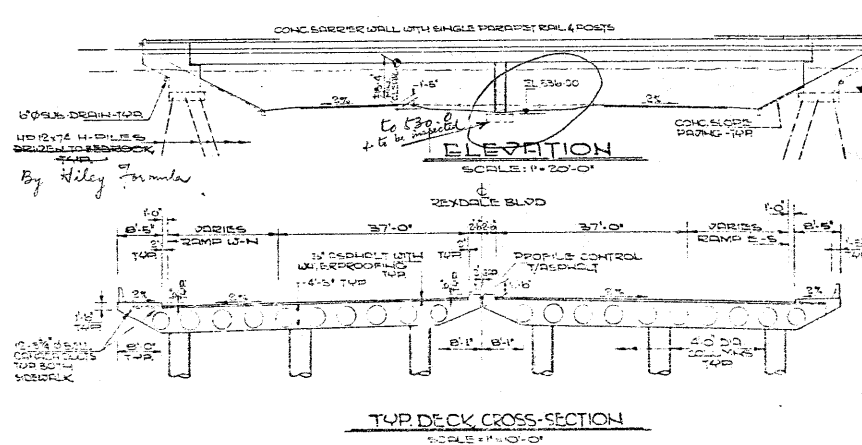
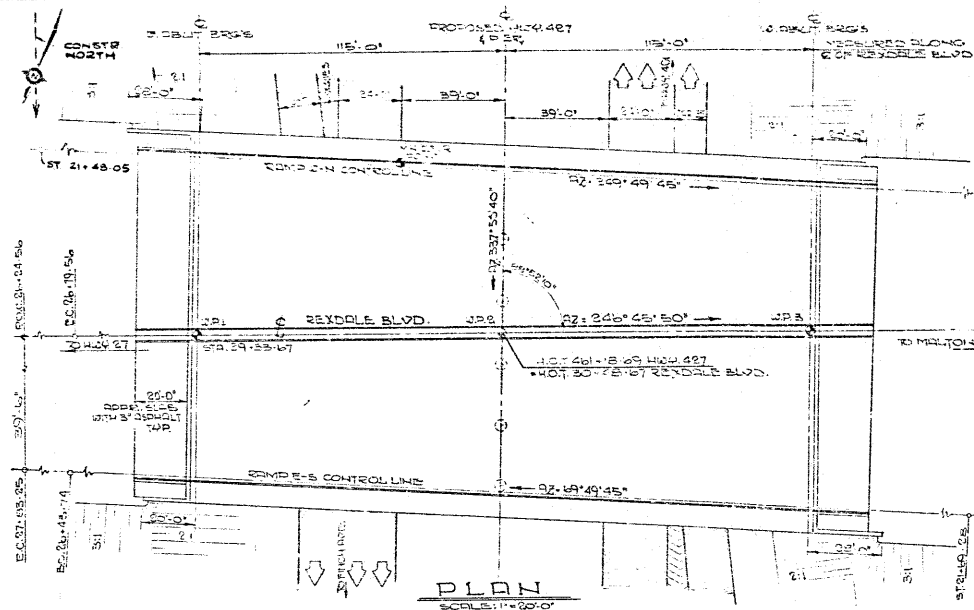


FOR REDUCED PLAN




DATE	BY	DESCRIPTION
DESIGN	BY	CHECK
DATE	BY	DATE
DATE	BY	DATE





CONCRETE QUANTITIES
(FOR LUMP SUM TENDER ITEMS)

1. CONCRETE IN PERS	60 CU YD	5000 PSI
ADJUSTMENTS & WING WALLS	661 CU YD	3000 PSI
2. PRESTRESSED CONCRETE		
82 DGE DECK	3741 CU YD	
3. CONCRETE IN BARRIER WALLS	42 CU YD	
4. CONCRETE IN APPROACH SLABS	156 CU YD	
5. CONCRETE IN SLOPE PAVING	124 CU YD	

DIST. 6 CONT No WP No 126-60	
Hwy. 427 U-PASS AT REXDALE BLVD. GENERAL LAYOUT	SHEET

30M12-61

GENERAL NOTES

CLASS OF CONCRETE

GRADE OF CONCRETE	
TRA 1955-1956	5000 PSI
TRA 1957-1958	4000 PSI
TRA 1959-1960	3000 PSI
GRADE OF REINFORCING STEEL (54-503383)	
TRA 1955-1956	GRADE 60
TRA 1957-1958	GRADE 60

CLERK COVER TO REINFORCING STEEL.

BOX-TOP-2' 2.5x12x13	12'
COLLYIS	21.2'
ROCKWORTH SLABS	2'
REYNOLDS	3'
OR AS NOTED	

CONSTRUCTION NOTES

- THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE BEARING SEATS DEAD LEVEL TO THE SPECIFIED ELEVATIONS WITH A TOLERANCE OF $\pm 1/8"$.
- NO CONCRETE SHALL BE PLACED ABOVE THE ABUTMENT BEARING SEATS UNTIL THE CONCRETE FLOOR HAS BEEN PLACED, STRESSED AND GROUTED.

LIST OF DRAWINGS

10. DUG. 1. GENERAL LAYOUT
2. BOREHOLE LOCATIONS & SOIL STRATA
3. FOOTING LAYOUT
4. WEST CABLE TOWER
5. EAST CABLE TOWER
6. PIER
7. DECK LAYOUT
8. CABLE LAYOUT
9. CABLE DETAILS
10. TOWER SUPPORT CABLES
11. DECK STEEL WORKSHEET 1
12. DECK REINFORCEMENT 1
13. BARRIER WALL WITH S.D. WALL
14. STEEL BARBED RAILING (SINGLE TUBE)
15. 20 APPROXIMATE SLABS
16. DETAILS OF CABLE SLIDE BRACING
17. APPROXIMATE SLAB 4 DIM.
18. STANDARD 1
19. STANDARD 2
20. STANDARD 3
21. STANDARD 4



GEODETIC B.M.

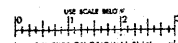
BANK OF AMERICA BLDG. 401 WEST INTERSECTION 4TH
WILTON, TRAILER NEARST BLDG. 401 SOUTH END OF
BUILDING, 2ND FLOOR, 2ND FLOOR SOUTH-2ND
WILSON, 1ST FLOOR, 2ND FLOOR 2ND FLOOR
SIDEWALK. 512.567.7543

PROFILE OF ~~PROPOSED~~ HW4.427

APR 07 1978

SOIL MECHANICS
TRANSPORTATION & CO.

FOR REDUCED PLAN

[illegible]