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GEOCRES No. 316-59

DIST. 9 REGION

W.P. No. 33-66-07 & 14

CONT. No. 71-47

W. O. No.

STR. SITE No.

HWY. No. 417

LOCATION Scotch River (West Bank)

No. of PAGES -

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OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT.

REMARKS:

## MEMORANDUM

31 G-59

71-047

TO: Mr. B. R. Davis,  
Bridge Engineer,  
Bridge Office,  
Admin. Bldg.

ATTENTION: Mr. S. McCombie

FROM: Foundation Section,  
Materials & Testing Office,  
Room 107, Lab. Bldg.

DATE: December 18, 1970

OUR FILE REF.

IN REPLY TO

**JAN 11 1971**

SUBJECT:

ADDENDUM TO  
FOUNDATION INVESTIGATION REPORT

For  
Proposed Structures at the Crossing  
Of the Scotch River (West Branch)  
And Hwy. #417  
Kenyon Township -- Glengarry County  
District No. 9 (Ottawa)  
W.O. 70-11027 - W.P. 36-66-07 (E.B.L.)  
W.P. 36-66-14 (W.B.L.)

1. INTRODUCTION:

In April and May, 1970, this Section carried out a subsurface investigation at the proposed locations for the East and Westbound lane structures at the crossing of Hwy. #417 and the Scotch River (West Branch). A detailed report, containing all the factual information obtained, as well as recommendations pertaining to the design of the foundations and related earth works, was submitted on June 5, 1970 (Report No. W.O. 70-11027).

The proposed structure locations have recently been revised; the new locations will be approximately 260 feet east of the original ones. The Foundation Section was subsequently requested, by Mr. T. C. Kingsland, Regional Bridge Planning Engineer, to carry out a supplementary subsurface investigation for the revised structure locations (memo dated July 9, 1970). This investigation was carried out.

1. INTRODUCTION: (cont'd.) ...

This addendum presents the factual data obtained from this supplementary investigation, together with recommendations pertaining to foundation design, as well as the stability and settlement considerations associated with the approach fills.

2. SUBSOIL, BEDROCK AND GROUNDWATER CONDITIONS:

Eleven sampled boreholes (No. 1 to 11) were put down during the course of the original investigation carried out in April and May, 1970. Thirteen additional borings were carried out for this supplementary investigation. The stratigraphical sequence, encountered at the latest boring locations are plotted on the Record of Borehole sheets appended to this memorandum.

The locations and elevations of the borings put down, are plotted on the following drawings:

W.O. 70-11027A - borings from original investigation -  
(April and May, 1970).

W.O. 70-11027B - borings from most recent investigation -  
(July, 1970).

Strategic stratigraphic sections across the site, inferred from the borelog sheets, are plotted on the aforementioned drawings.

Laboratory testing has been performed on typical samples. This testing is plotted on the Record of Borelog sheets. Further, the results have been added to Figures No. 1 to 6, inclusive, all of which were presented in the original report. These amended figures are enclosed.

The subsoil sequence, encountered in the vicinity of the revised structure locations, will be briefly described in the paragraphs to follow (refer to Drawing W.O. 70-11027B).

2. SUBSOIL, BEDROCK AND GROUNDWATER CONDITIONS: (cont'd.) ...

2.1) Surficial Deposits:  
- - - - -

The terrain is surficially covered with a mantle of topsoil, approximately 2 feet thick. Beneath the creek there is a deposit of soft organic silt mixed with sand, which is up to 5 feet thick (refer to Sub-section 4.2), Report No. W.O. 70-11027).

2.2) Clay to Silty Clay: (Refer to Sub-section 4.3) -  
- - - - -

Directly beneath the surficial deposits is the predominant stratum across the site, composed of a sensitive, grey, marine clay to silty clay. In general, the thickness of the stratum varies from 12 feet to 21.5 feet, which is similar to that encountered at the originally proposed location. The upper 2 to 8 feet of this stratum has been subjected to desiccation forming a crust.

The consistency of the lower portion of the stratum, as determined by the undrained shear strength testing carried out (refer to Figure #1), varies from soft to stiff, generally being in the firm range. The upper desiccated zone, however, has a consistency in the stiff to very stiff range. The consolidation characteristics are similar to those presented in the original report - i.e., the lower zone is preconsolidated by from 0.95 to 1.05 t.s.f. in excess of the existing overburden pressure. The upper desiccated zone, however, is preconsolidated to a much greater degree.

2.3) Glacial Till: (Refer to Sub-section 4.4) ) -  
- - - - -

The cohesive stratum is generally underlain by a 1 to 8.5 foot thick deposit of glacial till, which is heterogeneous in composition. The glacial till is primarily cohesive in nature, that is, a matrix of clayey silt binding sand and gravel. In localized areas, however, it is basically granular in nature.

2. SUBSOIL, BEDROCK AND GROUNDWATER CONDITIONS: (cont'd.) ...

2.3) Glacial Till: (Refer to Sub-section 4.4) ) -  
- - - - -

Standard penetration testing, carried out within the deposit, gave 'N' values which range from 19 blows/ft. to 125 blows for 4 inches, being typically greater than 50 blows/ft. Based on these values, it is estimated that the consistency of the cohesive portions of the glacial till varies from very stiff to hard. The granular zones have a relative density in the compact to very dense range.

2.4) Bedrock:  
- - - - -

The overburden is underlain by sound limestone bedrock which has occasional shaley seams. The elevation of the bedrock varies from 189.5 to 197.5 - i.e., from 9 to 22 feet below existing ground surface.

2.5) Groundwater Conditions:  
- - - - -

The groundwater level, in the vicinity of the revised structure locations, varies between elevations 202.5 and 205.5, which corresponds to depths of from 1.5 to 11.5 feet below existing ground surface. The water level in the Scotch River (West Branch), during the period of the investigation, was at about elevation 214.5.

3. DISCUSSION AND RECOMMENDATIONS:

The revised locations for the twin parallel (E.B.L. and W.B.L.) Hwy. #417 structure crossings of the realigned Scotch River (West Branch) are to be at Stations 115+17 and 114+52, respectively. The structures are to have a single span (102 feet).

3. DISCUSSION AND RECOMMENDATIONS: (cont'd.) ...

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

The profile grade of Hwy. #417, in the vicinity of the structures, will be at about elevation 222. Further, the invert of the channel will be at elevation 200. The associated approach fills will, therefore, have a maximum height of about 16 feet above ground surface in the transverse direction. In the forward direction, however, the crest of the fills will be 22 feet above the invert of the channel. The approaches are to spill through in the forward direction.

3.2) Approach Fills:

The revised structure locations, like those originally proposed, are underlain by soft compressible clay. Similar to the former proposal, a berm will be required, along each approach, in order to ensure the stability of the sections (refer to Sub-section 6.2 (1) in report). Geometric configurations for the approaches have been proposed by Wyllie and Ufnal Limited, Consulting Engineers, Toronto, Ontario; these are shown on Bridge Drawings No. D-6862-1 (E.B.L.) and D-6863-1 (W.B.L.), dated September, 1970. The proposed berm details, at either structure location, are as follows:

	<u>Location of Berm</u>	<u>Length of Berm</u>
West Approach	Elev. 207	15 ft.
East Approach	Elev. 214	15 ft.

Analyses have been carried out to check the stability of the aforementioned sections. The results indicate that, in the forward direction, these approaches will be stable with respect to a deep-seated rotational failure, provided standard 2:1 slopes are used.

3. DISCUSSION AND RECOMMENDATIONS: (cont'd.) ...

3.2) Approach Fills: (cont'd.) ...

In the transverse direction, fills up to 16 feet in height (the maximum proposed), with standard 2:1 slopes, will be stable.

The underlying compressible clay stratum will undergo settlement due to consolidation under the weight of the approach fills. Based on computations, it is estimated that the maximum consolidation settlement could be of the order of 3 to 5 inches. The total settlement should take place within a period of 25 to 30 months, with about 50% occurring within 6 to 10 months.

Since the predicted settlement will occur relatively quickly, it would be advantageous to place the fills prior to construction of the structures, in order to minimize post-construction maintenance. This aspect was discussed in Sub-section 6.2 (2), Report W.O. 70-11027.

3.3) Abutment Foundations:

The abutments can be supported on piles driven to bedrock. For estimating purposes, the pile tip elevations can be assumed to be as follows:

<u>Structure Location</u>		<u>Approach</u>	<u>Estimated Pile Tip Elevation</u>
Westbound Lane	-	West	187
	-	East	195
Eastbound Lane	-	West	195
	-	East	192

The allowable pile load would be dependent upon the section chosen - for example, 12 BP 74 steel H-piles may be designed for 95 tons per pile.

3. DISCUSSION AND RECOMMENDATIONS: (cont'd.) ...

3.3) Abutment Foundations: (cont'd.) ...

No bouldery or rock fill should be placed in that portion of the fill through which piles are to be driven.

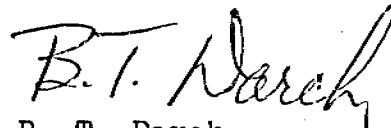
3.4) Other Considerations:

As indicated on the Bridge drawings, a rip-rap cover will be placed over the slopes, in the vicinity of the channel, in order to protect these areas against the scour action of the river. Further, some minor sub-excavation of undesirable organic material may be required in the existing river basin. This was discussed in Sub-section 6.4) of the original report.

We trust that this addendum presents all the factual data obtained from the supplementary investigation, as well as the recommendations pertaining to the foundation design of the structures to be located at the revised locations. If we can be of any further assistance on this project, please contact this Office.

BTD/MdeF  
Attach.

cc: Messrs. B. R. Davis  
H. A. Tregaskes  
D. W. Farren  
S. J. Markiewicz  
T. C. Kingsland (2)  
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Foundations Files  
Gen. Files

  
B. T. Darch,  
SENIOR FOUNDATION ENGR.  
For:  
A. G. Stermac,  
PRINCIPAL FOUNDATION ENGR.



**APPENDIX I**

DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE

## RECORD OF BOREHOLE No. 12

FOUNDATION SECTION

JOB 70-11027

LOCATION Hwy. 417(WBL) Sta 114 + 70 ½

ORIGINATED BY F.P.

W.P. 36-66-07

BORING DATE July 1, 1970

COMPILED BY F.P.

DATUM Geodetic

BOREHOLE TYPE Washboring, NX, BX casing; AXT rock core

CHECKED BY *MR.*

## Dynamic Cone Penetration Test

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 ——— $w$		
213.0	Ground Level															
0.4	Topsoil		1	SS	16											
	Desiccated Zone		2	SS	22	210										
	clay		3	SS	25											
	very stiff		4	TW	PM											
	Clay to silty clay		5	TW	PM											
	sensitive, grey		6	TW	PM	200										
196.1	firm to stiff		7	TW	PM											
16.9	shale, till, hard on		8	SS	77	10"										
17.9	shale, limestone		9	AXT	100%	Rec										
	bedrock, calcareous				80%											
	shale interbeds up		10	AXT	Rec.	190										
22.9	to 1/2 sound															
						180										

W.L.  
202.5

DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE

## RECORD OF BOREHOLE No. 13

FOUNDATION SECTION

JOB 70-11027 LOCATION Hwy. 417 (EBL) Sta 115 + 65 0 ORIGINATED BY F.P.  
 W.P. 36-66-07 BORING DATE June 30 and July 1 COMPILED BY F.P.  
 DATUM Geodetic BOREHOLE TYPE Washboring-NX, BX casing; AXT rock core, CHECKED BY SK  
Dynamic cone, Penetration Test

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$				BULK DENSITY $\gamma$ P.C.F.	REMARKS				
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT					SHEAR STRENGTH P.S.F.						WATER CONTENT %			
							20	40	60	80	100	400 800 1200 1600 2000						$w_p$ — $w$ — $w_L$ 20 40 60			
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE														
213.7	Ground Level																GR. SA. SI. CL.				
0.5	Topsoil		1	SS	18	210											Elev. ▼203.4 in open BH on July 2/70				
	Desiccated zone		2	SS	20																
	brown very stiff		3	SS	23																
			4	TW	PM																
	Clay to silty clay trace of sand, sen- sitive, grey, soft to firm		5	TW	PM	200															
			6	TW	PM																
			7	TW	PM																
195.0																					
18.0	Het. mix clay silt, sand & gr. glacial		8	SS	40	190															
192.4	till, hard or very dense		9	SS	72/8"																
21.3	Shaley limestone bedrock		10	AXT	80% REC																
	Calcareous shaley interbeds up to 1' sound		11	AXT	95% REC																
183.0																					
30.7	End of borehole					180															

Elev.  
 ▼203.4  
 in open  
 BH on  
 July 2/70

DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE

## RECORD OF BOREHOLE No. 114A

FOUNDATION SECTION

JOB 70-11027 LOCATION Hwy. 417 (WBL) Sta. 114 + 67 o/s 19' Rt. ORIGINATED BY AN  
 W.P. 36-66-07 BORING DATE July 30, 31, 1970 COMPILED BY FP  
 DATUM Geodetic BOREHOLE TYPE Washboring, NX, BX, AX, Casing, AXT Rock Core; Cone 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 $\gamma$ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		SHEAR STRENGTH P.S.F.					WATER CONTENT %				
213.3	Ground Level					20	40	60	80	100	$w_p$	$w$	$w_L$			
0.0	Topsoil					400	800	1200	1600	2000						
2.0	Clay to silty clay - brown		1	SS	18											
	Stiff		2	SS	8											
	Clay (sensitive) (brown to grey)		3	TW	PM											
			4	TW	PM											
			5	TW	PM											
197.3	Firm to Stiff		6	SS	45											
16.0	Glacial Till - dense		7	AXT	100%											
195.3	Shaley Limestone Bedrock		8	AXT	93%											
18.0																
184.8	Sound															
28.5	End of Borehole															

202.8  
 in open BH  
 Aug. 8/70  
 65 26 ( 9 )

DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE

## RECORD OF BOREHOLE No. 114B

FOUNDATION SECTION

JOB 70-11027

LOCATION Hwy. 417 (WBL) Sta. 114 + 72 o/s 19' Rt.

ORIGINATED BY AN

W.P. 36-66-07

BORING DATE August 4, 1970

COMPILED BY FP

DATUM Geodetic

BOREHOLE TYPE Washboring-NX Casing

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$			BULK DENSITY $\gamma$ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		SHEAR STRENGTH P.S.F.					WATER CONTENT % $w_p$ — $w$ — $w_L$				
213.3	Ground Level						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE 400 800 1200 1600 2000					20 40 60				
0.0	Topsoil					210										
2.0	Reddish mottled clay Stiff		1	TW	PM											
	Clay to silty clay (sensitive)		2	TW	PM											
			3	TW	PM	200										
196.0	Soft to Stiff		4	TW	PM											
17.3	End of Borehole Probably Glacial Till					190										

$\nabla$  202.8  
in open BH  
Aug. 8/70

202.8  
in open BH  
Aug. 8/70

DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE

# RECORD OF BOREHOLE No. 15

FOUNDATION SECTION

JOB 70-11027 LOCATION Hwy. 417 (WBL) Sta. 114 + 67 o/s 23' Lt. ORIGINATED BY AN  
W.P. 36-66-07 BORING DATE Aug. 4-5, 1970 COMPILED BY FP  
DATUM Geodetic BOREHOLE TYPE Washboring, NX, BX, AX Casing, AXT Rock Core; Cone CHECKED BY SK

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$			BULK DENSITY $\gamma$ P.C.F.	REMARKS			
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT					SHEAR STRENGTH P.S.F.					WATER CONTENT %		
							20	40	60	80	100	UNCONFINED + FIELD VANE					WATER CONTENT %		
												QUICK TRIAXIAL x LAB. VANE							
212.5	Ground Level						400	800	1200	1600	2000								
0.0	Topsoil																		
2.0	Clay to silty clay (brown) Very Stiff		1	SS	20														
			2	TW	PM														
	Clay (sensitive) grey		3	TW	PM														
			4	TW	PM														
198.0	Soft to Stiff		5	TW	PM														
14.5	Het. mix. of silt, sand & gravel, trace of clay (glacial till)		6	SS	84														
194.5																			
18.0	Fractured Zone		7	AXT	50%														
	Shaley Limestone		8	AXT	100%														
	Bedrock																		
181.0	Sound		9	AXT	100%														
31.5	End of Borehole																		

210

200

190

180

170

400 800 1200 1600 2000

400 800 1200 1600 2000

20 40 60

20 40 60

202.9

in open BH

Aug. 8/70

34 43 21 2

▼ 202.9  
in open BH  
Aug. 8/70  
34 43 21 2

DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE

## RECORD OF BOREHOLE No. 16

FOUNDATION SECTION

JOB 70-11027

LOCATION Hwy. 417 (WBL) Sta. 114 + 27 o/s 19' Rt.

ORIGINATED BY AN

W.P. 36-66-07

BORING DATE July 31, Aug. 4, 1970

COMPILED BY

DATUM Geodetic

BOREHOLE TYPE Washboring, NX, BX, AX Casing, AXT Rock Core; Cone

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 $\gamma$ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		20	40	60	80	100	$w_p$ — $w$ — $w_L$				
							SHEAR STRENGTH P.S.F.					WATER CONTENT %				
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE									
							400	800	1200	1600	2000	20	40	60		
212.1	Ground Level															
0.0	Topsoil		1	SS	30	210										
1.5	Clay (mottled brown) Very Stiff		2	SS	27											
			3	TW	PM											
			4	TW	PM											
	Clay to silty clay, trace of gravel (sensitive) (brown to grey)		5	TW	PM	200										
			6	TW	PM											
	Soft to Firm		7	TW	PM											
192.1	Het. mix. clayey silt		8	SS	53	190										
20.0	sand & grav. (Giac. Till)															
190.1																
22.0	Shaley Limestone Bedrock		9	AXT	100%											
			10	AXT	100%											
180.3	Sound					180										
31.8	End of Borehole					170										

108

98

 ▼ 202.3  
 in open BH  
 Aug. 8/70

## FOUNDATION SECTION

JOB 70-11027 LOCATION Hwy. 417 (WBL) Sta. 114 + 27 o/s 35' Lt. ORIGINATED BY AN  
W.P. 36-66-07 BORING DATE Aug. 4, 1970 COMPILED BY FP  
DATUM Geodetic BOREHOLE TYPE Washboring, NX, BX, AX, Casing; AXT Rock Core; Cone CHECKED BY HR

[illegible]



DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE

# RECORD OF BOREHOLE No. 18

FOUNDATION SECTION

JOB 70-11027 LOCATION Hwy. 417 (EBL) Sta. 115 + 37 o/s 19' Lt. ORIGINATED BY AN  
W.P. 36-66-07 BORING DATE July 30, 1970 COMPILED BY EP  
DATUM Geodetic BOREHOLE TYPE Washboring, NX, AX Casing, AXT Rock Core, Cone CHECKED BY SR

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$			BULK DENSITY $\gamma$ P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT					SHEAR STRENGTH P.S.F.					WATER CONTENT %
							20	40	60	80	100	P.S.F.					
											UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE						
						400 800 1200 1600 2000								20 40 60			
214.0	Ground Level																
0.0	Topsoil																
1.5	Clay with some sand (Grey - Brown)		1	SS	20	210											
			2	TW	PM												
			3	TW	PM												
	Stiff to Very Stiff		4	TW	PM												
			5	TW	PM												
	Clay with some sand & gravel (sensitive)		6	SS	6	200											
	(grey)		7	SS	14												
196.0	Firm to Stiff																
18.0	Het. mix. of clay, silt, sand & grav. (Glac. Till)		8	SS	85/9"												
192.4																	
21.6	Shaley limestone bedrock		9	AXT	90%	190											
			10	AXT	100%												
182.5	Sound		11	AXT	100%												
31.5	End of Borehole					180											

202.7  
in open BH  
Aug. 8/70

46 37 (17)

DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE

## RECORD OF BOREHOLE No.19

FOUNDATION SECTION

JOB 70-11027 LOCATION Hwy.417 (EBL) Sta. 115 + 37 o/s 23' Rt. ORIGINATED BY AN  
W.P. 36-66-07 BORING DATE July 30, 1970 COMPILED BY FP  
DATUM Geodetic BOREHOLE TYPE Washboring; NX,BX,AX Casing; AXT Rock Core; Cone CHECKED BY AK

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT ——— $w_L$ PLASTIC LIMIT ——— $w_p$ WATER CONTENT ——— $w$			BULK DENSITY $\gamma$ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT 20 40 60 80 100					$w_p$ ——— $w$ ——— $w_L$				
							SHEAR STRENGTH P.S.F. 400 800 1200 1600 2000					WATER CONTENT % 20 40 60				
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE									
211.3	Ground Level						400	800	1200	1600	2000	20 40 60				GR, SA, SI, CL
0.0	Topsoil	SS				210										
1.5	Clay to silty clay Stiff	TW	1	SS	22											
	Clay to silty clay with some sand and gravel (brown to grey) Firm to very Stiff		2	TW	PM											
			3	TW	PM											
199.3				4	TW	PM										
12.0	Het. mix. of silt, sand & gravel with trace of clay & some boulders (Glacial Till)	SS				200										
191.0	Very Dense		5	SS	72/9"											
20.3	Shaley Limestone Bedrock	AXT	6	AXT	95%	190										
183.6	Sound	AXT	7	AXT	100%											
27.7	End of Borehole					180										

0 22 31 47  
 202.7  
 in open BH  
 Aug. 8/70




DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE

## RECORD OF BOREHOLE No. 20

FOUNDATION SECTION

JOB 70-11027 LOCATION Hwy. 417 (EHL) Sta. 114 95 o/s 30' Lt.  
 W.P. 36-66-07 BORING DATE July 29, 1970  
 DATUM Geodetic BOREHOLE TYPE Washboring, NX, BX, AX Casing; Art Rock Core; Cone

ORIGINATED BY AN  
 COMPILED BY FP  
 CHECKED BY SL

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — $w_L$			BULK DENSITY $\gamma$ P.C.F.	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.					WATER CONTENT %				
206.5	Ground Level															
0.0	Topsoil															
1.5	Clay & some silt (brown trace organics. Stiff		1	SS	8										110	202.8 in open BH Aug. 4/70
	(Clay (sensitive) Grey		2	TW	PM											
	Firm to Stiff		3	TW	PM		200									
193.5			4	TW	PM											
13.0	Het. mix. silt, sand, gravel, clay & boulders (glacial till)		5	TW	PM											
191.0			6	SS	100											
15.5	Fractured Zone		7	AXT	68%	190										
			8	AXT	46%											
	Shaley Limestone Bedrock		9	AXT	100%											
178.6	Sound		10	AXT	100%	180										
27.9	End of Borehole					170										

202.8  
 in open BH  
 Aug. 4/70

DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE

## RECORD OF BOREHOLE No. 21

FOUNDATION SECTION

JOB 70-11027

LOCATION Hwy. 417 (EHL) Sta. 114 + 97 o/s 23' Rt.

ORIGINATED BY AN

W.P. 36-66-07

BORING DATE July 29, 1970

COMPILED BY FF

DATUM      Geodetic

BOREHOLE TYPE Washboring, NX, BX Casing; AXT Rock Core; Cone

CHECKED BY

[illegible]

DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE

## RECORD OF BOREHOLE No.22

FOUNDATION SECTION

JOB 70-11027 LOCATION Hwy. 417 (WBL) Sta. 115 + 50 @ ORIGINATED BY AN  
W.P. 36-66-07 BORING DATE July 28, 1970 COMPILED BY FP  
DATUM Geodetic BOREHOLE TYPE Washboring, NX, BX, AX Casing, AXT Rock Core: Cone CHECKED BY SL  
BX Rock Core

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$			BULK DENSITY $\gamma$ P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		20	40	60	80	100	WATER CONTENT % 20 40 60					
214.6	Ground Level						SHEAR STRENGTH P.S.F.										
0.0	Topsoil						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE										
1.5	Clay with trace of sand and gravel (mottled)		1	SS	29												
	Very Stiff to Hard		2	TW	PM												
	Clay, trace of sand & gravel (sensitive) (Grey)		3	TW	PM												
	Firm to Stiff		4	TW	PM												
			5	TW	PM												
197.0	Shaley Limestone Bedrock		6	BX	75%												
17.6			7	AXT	100%												
185.7	Sound		8	AXT	100%												
23.9	End of Borehole																

210  
 200  
 190  
 180


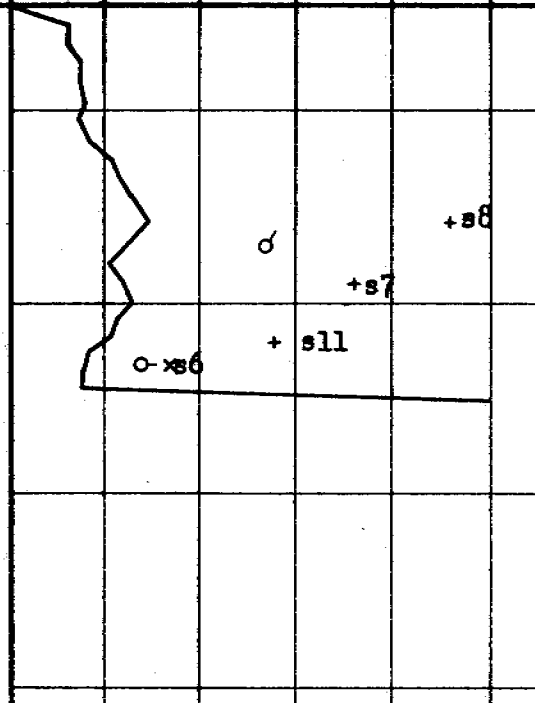

+s3  
 x s7  
 +s8  
 +s12

112  
 104

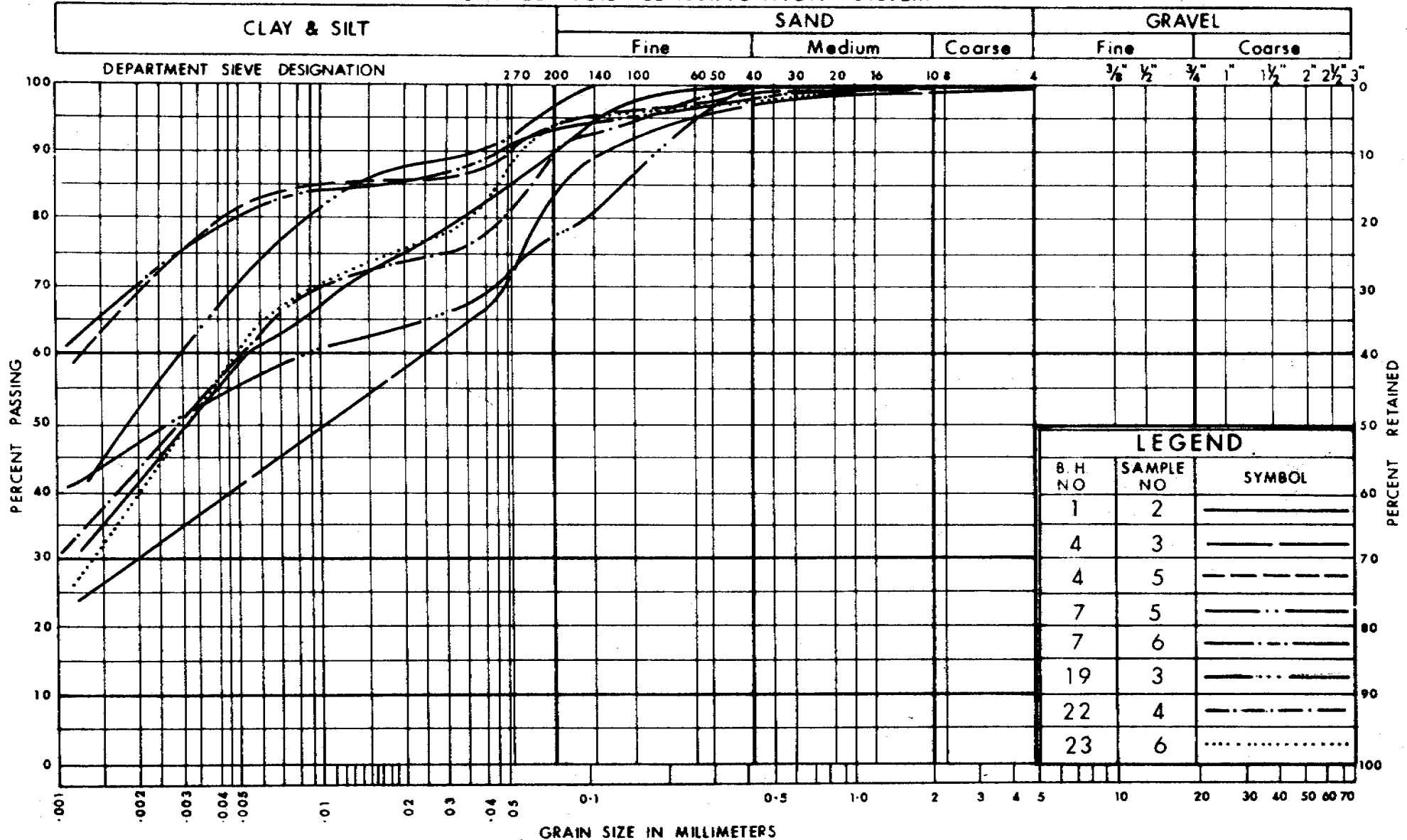
0 9 49 42  
 202.6  
 WL in open  
 BH Aug. 8/70

**FOUNDATION SECTION**

**CHECKED BY**

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$			BULK DENSITY $\gamma$ P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT					WATER CONTENT %					
							20	40	60	80	100	20	40	60			
							SHEAR STRENGTH P.S.F.					$w_p$ — $w$ — $w_L$					
215.7	Ground Level																
0.0	Topsoil																
1.5	Clay with some gravel (mottled)		1	SS	29	210										118	WL in open BH Aug. 8/70  202.7  0 6 5 4 40
	Very Stiff		2	TW	PM												
			3	TW	PM												
	Clay to silty clay with trace of gravel (sensitive) (grey)		4	TW	PM												
			5	TW	PM												
			6	TW	PM												
	Firm to Stiff		7	TW	PM												
194.4			8	SS	17	200										103	
21.3	Shaley Limestone Bedrock	9	AXT	100%													
		10	AXT	90%													
184.8	Sound		11	AXT	95%	190										99	
30.9	End of Borehole																
						180											

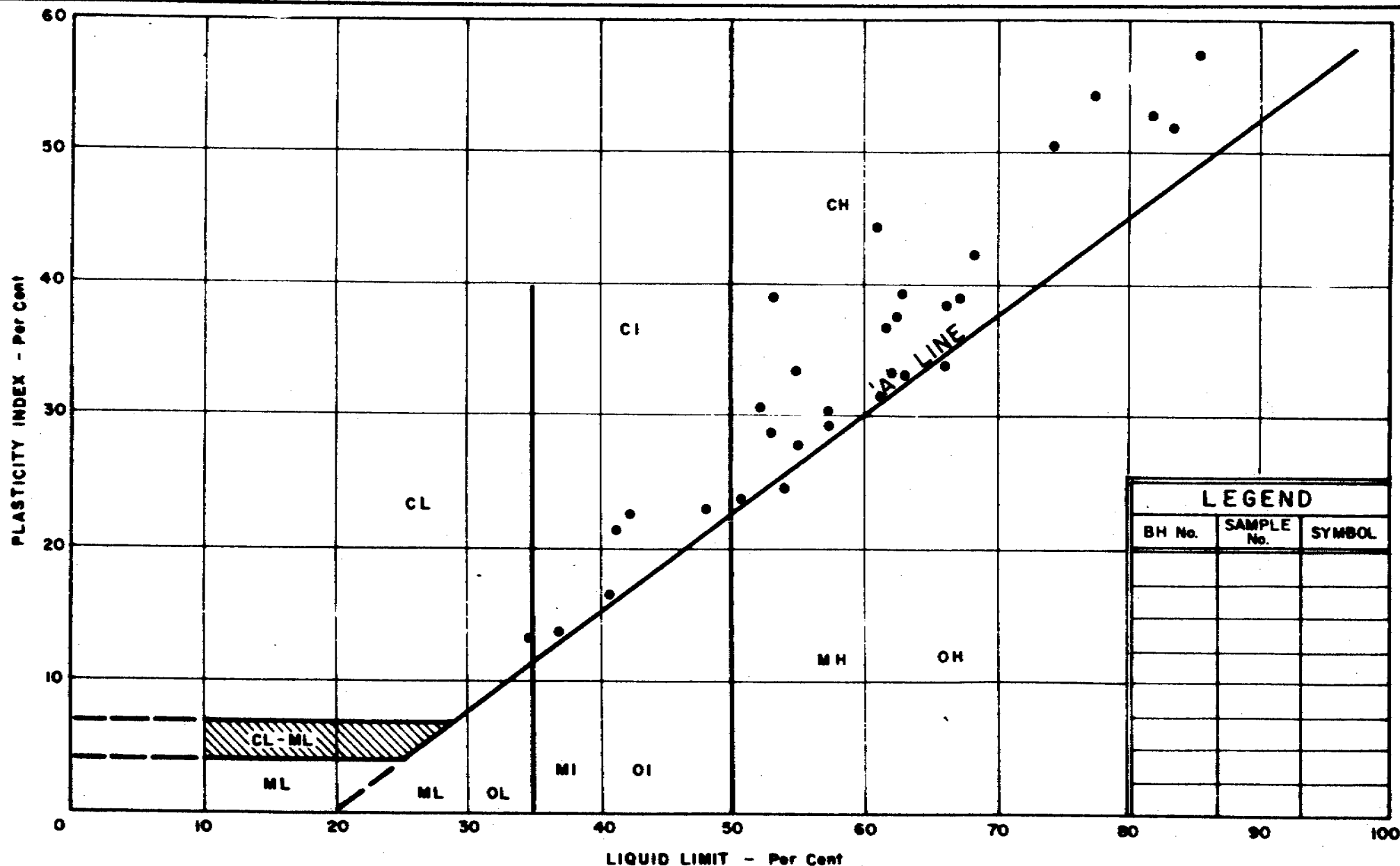
# UNIFIED SOIL CLASSIFICATION SYSTEM



DEPARTMENT OF HIGHWAYS  
MATERIALS and  
TESTING  
DIVISION

## GRAIN SIZE DISTRIBUTION CLAY TO SILTY CLAY (SENSITIVE)

W.P. No. 36-66-07  
JOB No. 70-11027  
FIG. No 2



DEPARTMENT OF HIGHWAYS  
MATERIALS and  
TESTING  
DIVISION

# PLASTICITY CHART CLAY TO SILTY CLAY (SENSITIVE)

WP. No. 36-66-07

JOB No. 70-11027

FIG. NO. 3



# VOID RATIO - PRESSURE CURVES

JOB NO. 70 - 11027

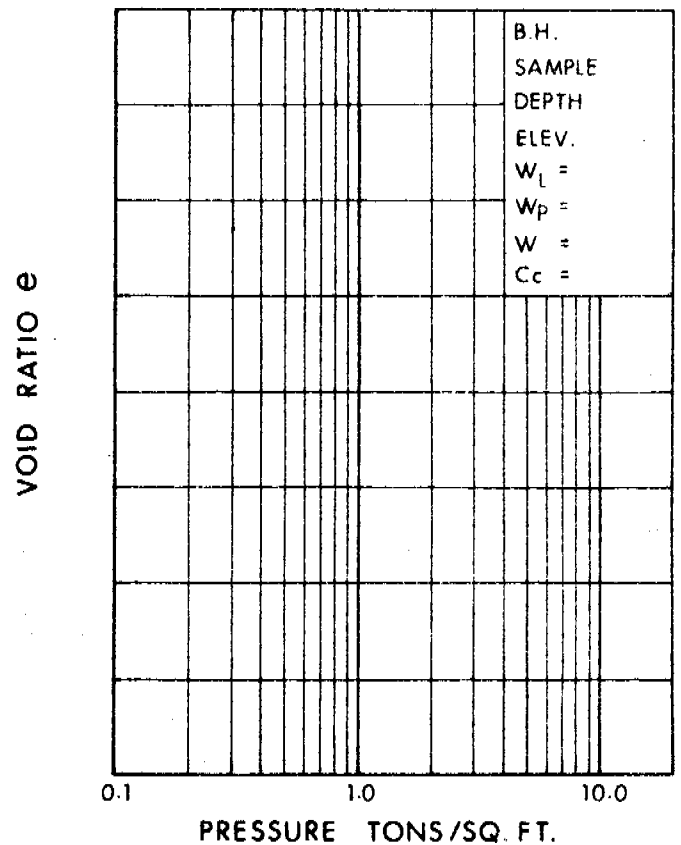
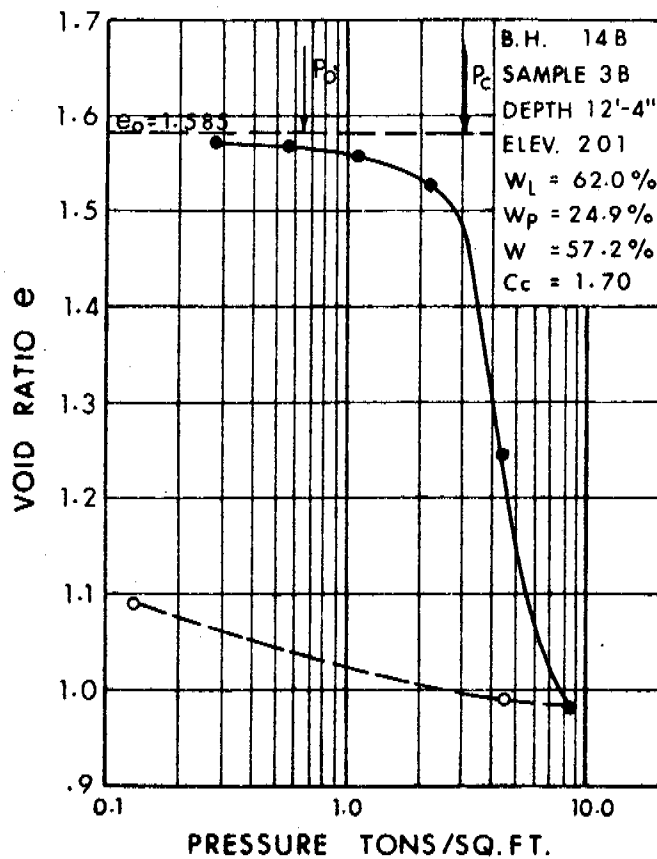
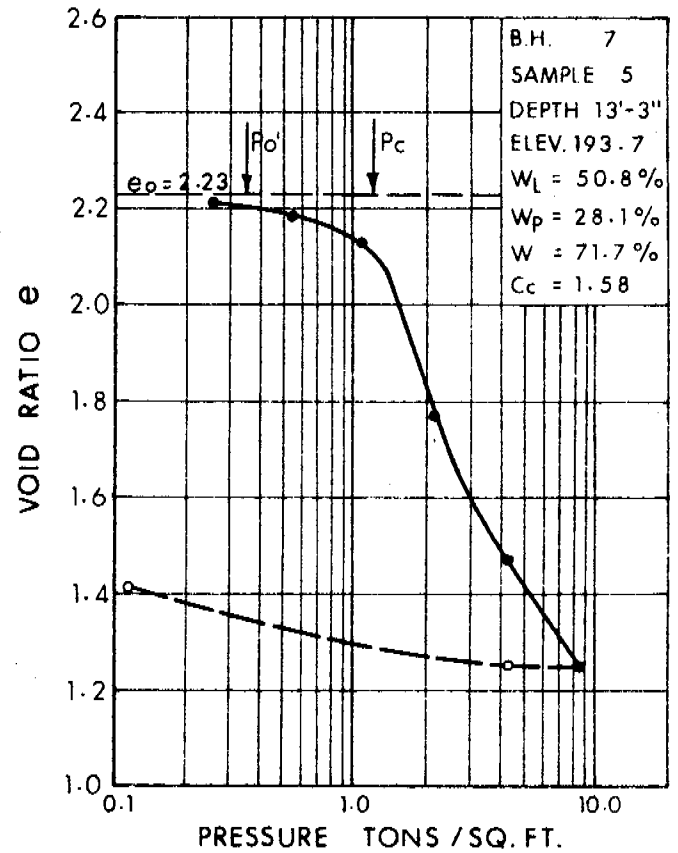
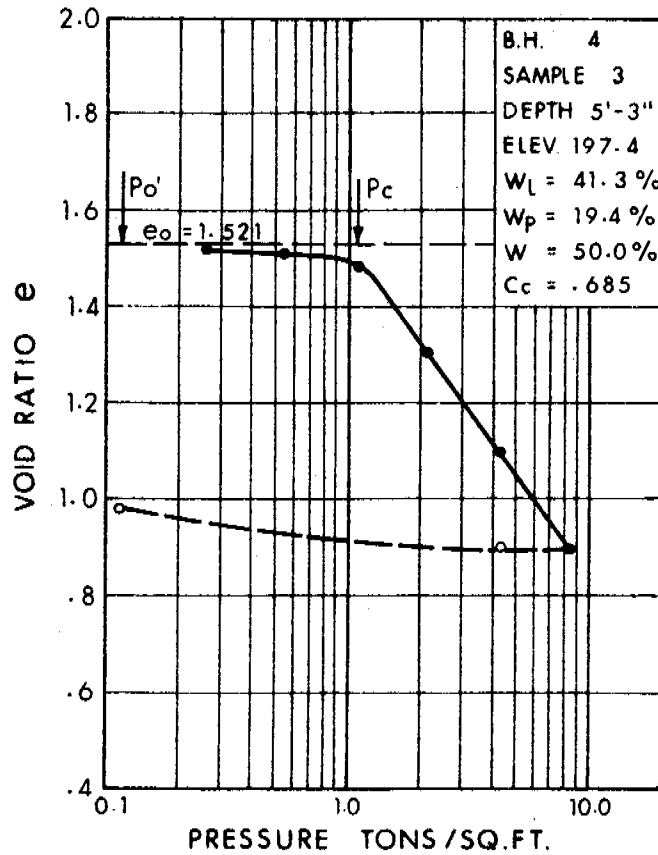
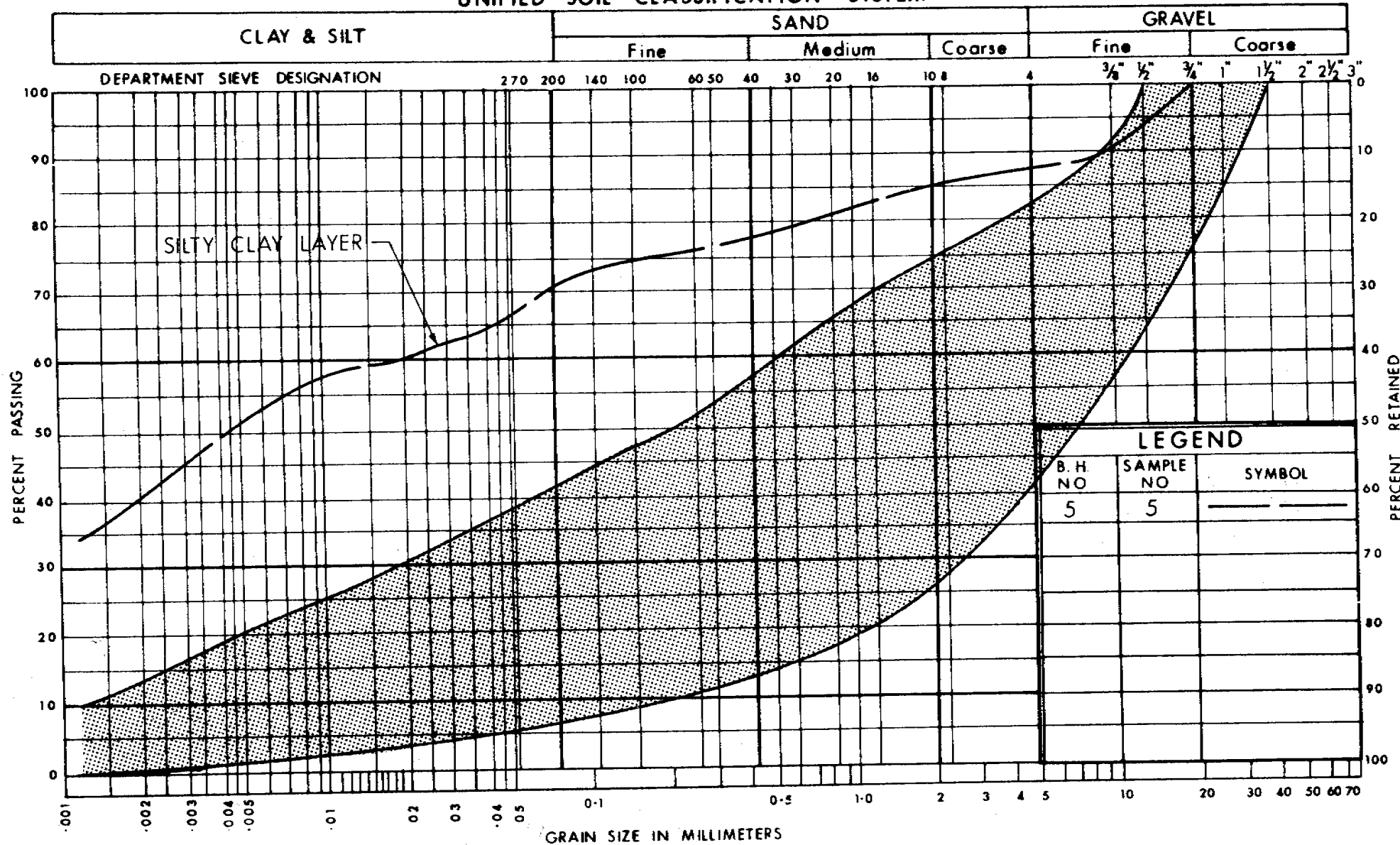


FIG. 4

# UNIFIED SOIL CLASSIFICATION SYSTEM



DEPARTMENT OF HIGHWAYS  
MATERIALS and  
TESTING  
DIVISION

## GRAIN SIZE DISTRIBUTION GLACIAL TILL

W.P. No. 36-66-07

JOB No: 70-11027

FIG. NO. 5

## ABBREVIATIONS USED IN THIS REPORT

### PENETRATION RESISTANCE

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

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

### DESCRIPTION OF SOIL

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

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

### TYPE OF SAMPLE

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

### SOIL TESTS

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

# ABBREVIATIONS USED IN THIS REPORT

## SOIL PROPERTIES

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

## GENERAL

$\pi$	= 3.1416
e	BASE OF NATURAL LOGARITHMS 2.7183
$\log_e \sigma$ OR $\ln \sigma$	NATURAL LOGARITHM OF $\sigma$
$\log_{10} \sigma$ OR $\log \sigma$	LOGARITHM OF $\sigma$ TO BASE 10
t	TIME
g	ACCELERATION DUE TO GRAVITY
V	VOLUME
W	WEIGHT
M	MOMENT
F	FACTOR OF SAFETY

## STRESS AND STRAIN

u	PORE PRESSURE
$\sigma$	NORMAL STRESS
$\sigma'$	NORMAL EFFECTIVE STRESS ( $\bar{\sigma}$ IS ALSO USED)
$\tau$	SHEAR STRESS
$\epsilon$	LINEAR STRAIN
$\gamma$	SHEAR STRAIN
$\nu$	POISSON'S RATIO ( $\mu$ IS ALSO USED)
E	MODULUS OF LINEAR DEFORMATION (YOUNG'S MODULUS)
G	MODULUS OF SHEAR DEFORMATION
K	MODULUS OF COMPRESSIBILITY
$\eta$	COEFFICIENT OF VISCOSITY

## EARTH PRESSURE

d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
$\delta$	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
$K_0$	COEFFICIENT OF EARTH PRESSURE AT REST

## FOUNDATIONS

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

## SLOPES

H	VERTICAL HEIGHT OF SLOPE
D	DEPTH BELOW TOE OF SLOPE TO HARD STRATUM
$\beta$	ANGLE OF SLOPE TO HORIZONTAL

G.I.-30 SEPT. 1976

DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 31G-59

DIST. 9 REGION EASTERN

W.P. No. 36-66-07

CONT. No. 71-47

W. O. No. 70-F-27

STR. SITE No. 31-288

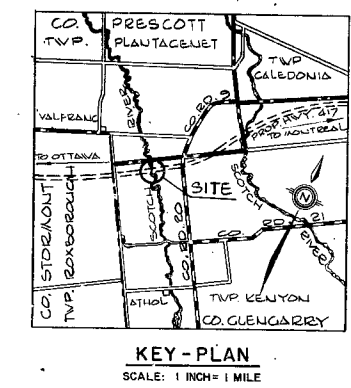
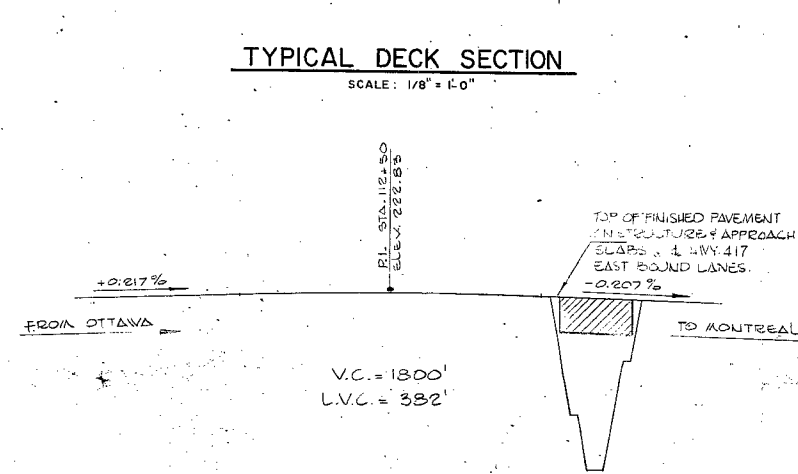
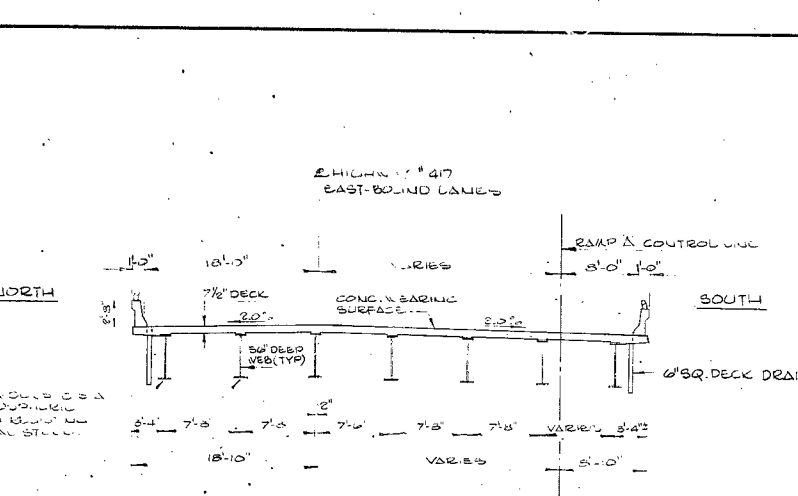
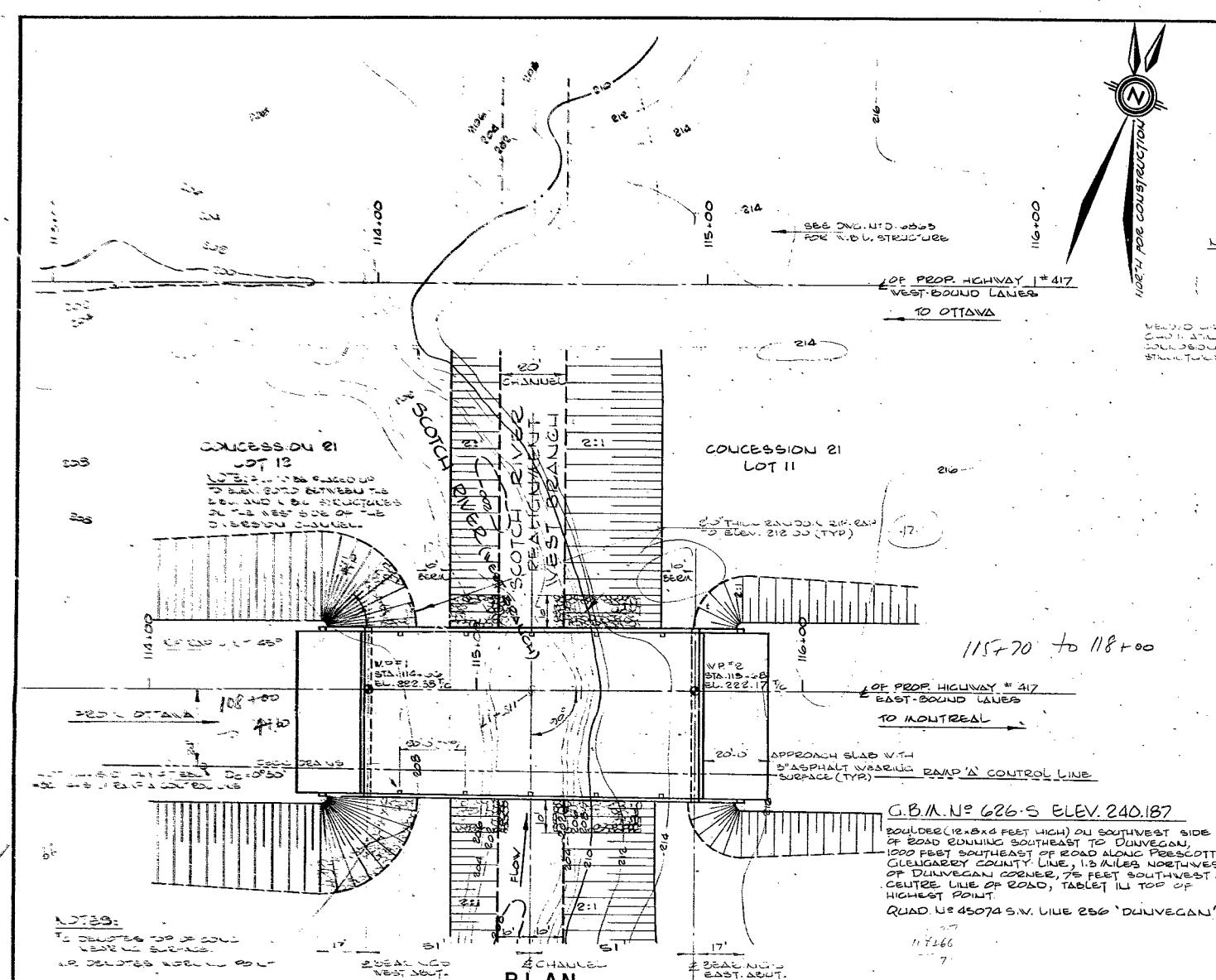
HWY. No. 417

LOCATION HWY. 417; SCOTCH RIVER

W.B

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 4

REMARKS: DOCUMENTS TO BE UNFOLDED  
BEFORE MICROFILMED



**GENERAL NOTES:**

1. CLASS OF CONCRETE:  
DECK AND BARRIER WALLS - 4000 P.S.I.  
REMAINDER - 3000 P.S.I.

2. CLEAR COVER ON REINFORCING STEEL:  
FOOTINGS AND ABUTMENTS - 3"  
BARRIER WALLS AND DECK TOP - 1 1/2"  
DECK BOTTOMS - 1"

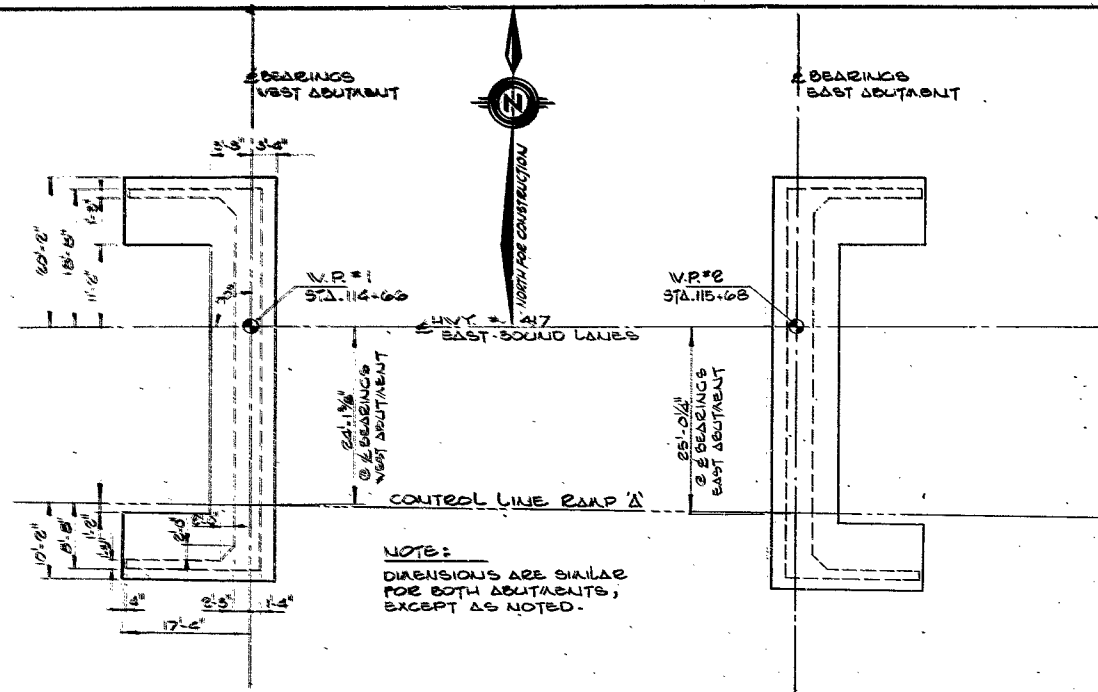
3. CONSTRUCTION NOTES:  
THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE BEARING SEATS DEAD LEVEL TO THE SPECIFIED ELEVATIONS WITH A TOLERANCE OF ± 1/8". NO CONCRETE SHALL BE PLACED ABOVE THE ABUTMENT BEARING SEATS, UNTIL CONCRETE HAS BEEN PLACED.

- LIST OF DRAWINGS:**
- D-6862-1 GENERAL LAYOUT
  - 2 BORE HOLE LOCATION & SOIL STRATA
  - 3 FOUNDATION LAYOUT & DETAILS
  - 4 WEST ABUTMENT
  - 5 EAST ABUTMENT
  - 6 STRUCTURAL STEEL DETAILS
  - 7 DECK DETAILS
  - 8 APPROACH SLABS
  - 9 CONCRETE BARRIER WALLS
  - 10 DETAILS OF 9" HIGH STEEL PARAPET RAILING
  - 11 STANDARD DETAILS

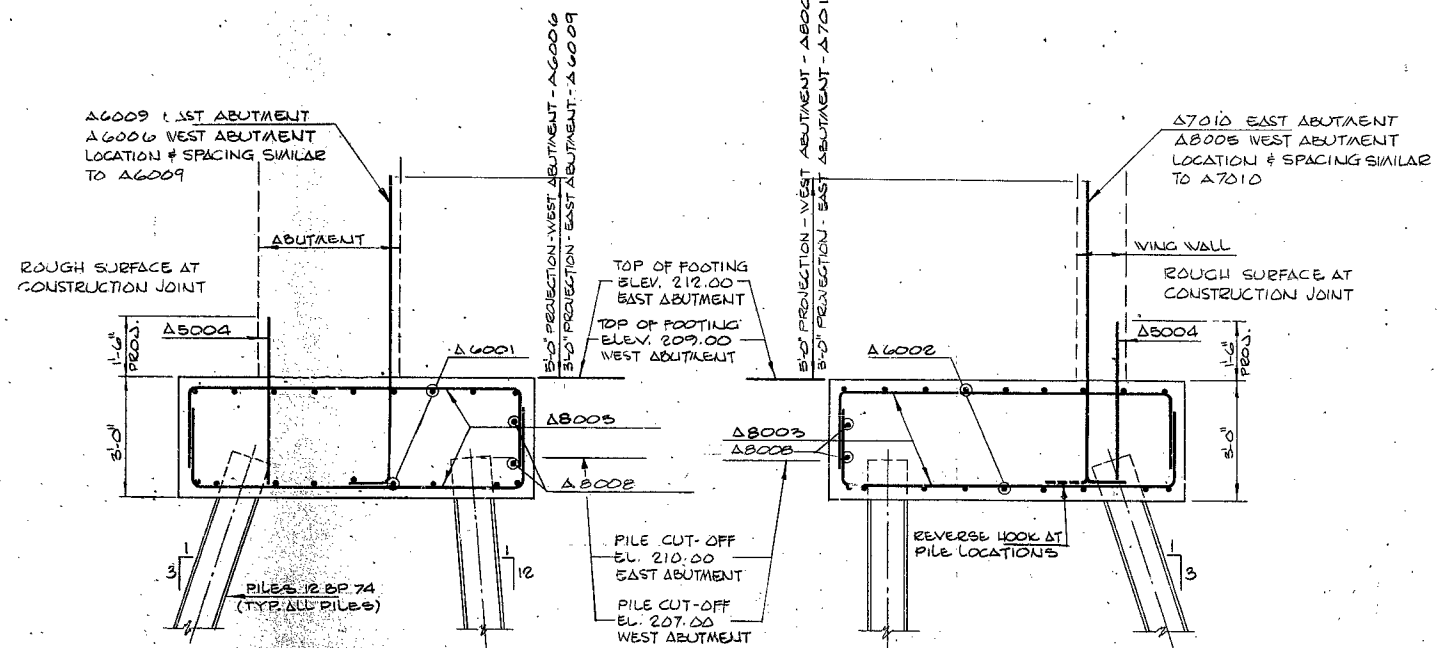
REVISIONS	DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO BRIDGE DIVISION			
WYLLIE & UNFAL LIMITED CONSULTING ENGINEERS TORONTO			
<b>SCOTCH RIVER (WEST BRANCH) BRIDGE EAST-BOUND LANES</b>			
2 MILES SOUTH OF ST. ISIDORE DE PRESCOTT			
KING'S HIGHWAY No. 417		DIST. No. 9	
CO. GLENGARRY		TWP. KENYON	
LOT 11 & 12		CON. 21	
<b>GENERAL LAYOUT</b>			
APPROVED _____		SITE No. 31-288 W.P. No. 36-66-07	
DESIGN	D.C.B. CHECK W.V.A.	CONTRACT	No.
DRAWING	G.S. CHECK D.C.B.	DRAWING	No.
DATE	SEPT, 1970	LOADING	MS 20-44
D-6862 - 1			



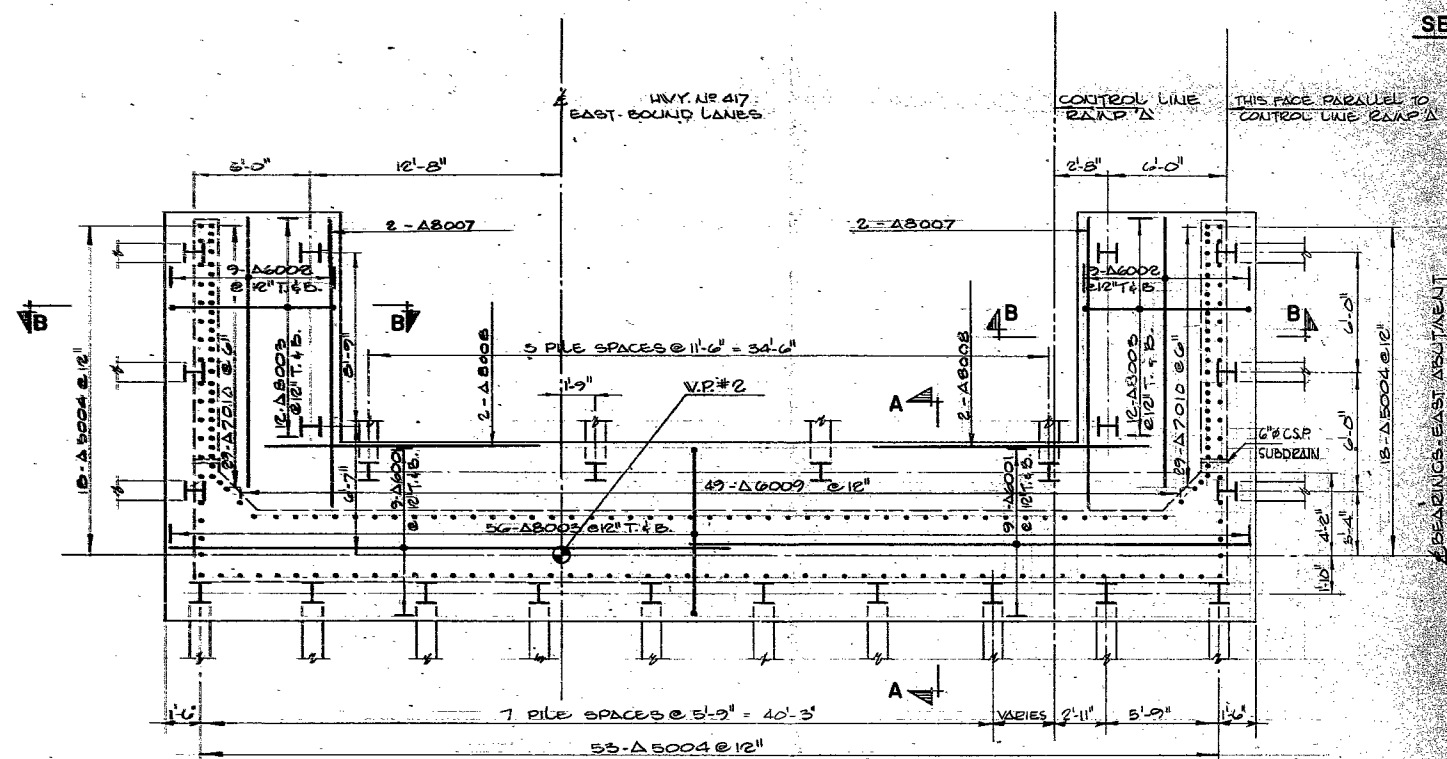


**FOOTING LAYOUT**  
SCALE: 3/32" = 1'-0"



**SECTION A-A**  
SCALE: 1/2" = 1'-0"

**SECTION B-B**  
SCALE: 1/2" = 1'-0"



**PLAN OF EAST ABUTMENT FOOTING**  
SCALE: 1/4" = 1'-0"  
REINFORCING STEEL & PILE LAYOUT SIMILAR FOR WEST ABUTMENT

PILE DATA (12 BP 74 - DESIGN LOAD 95-TONS)					
LOCATION	NO.	LENGTH	LOC. ON	NO.	LENGTH
EAST P.C.	16	0' 20" 0"	WEST P.C.	16	14' 0"
"	"	3' 00" 0"	"	3	14' 0"

**NOTE:**  
• PILES TO BE DRIVEN TO REFUSAL IN ACCORDANCE WITH  
PILE DRIVING STD. 60-62-7 ON DNG. NO. 6862-11  
• SPACING OF PILES TO BE MEASURED AT  
UNDERSIDE OF FOOTINGS

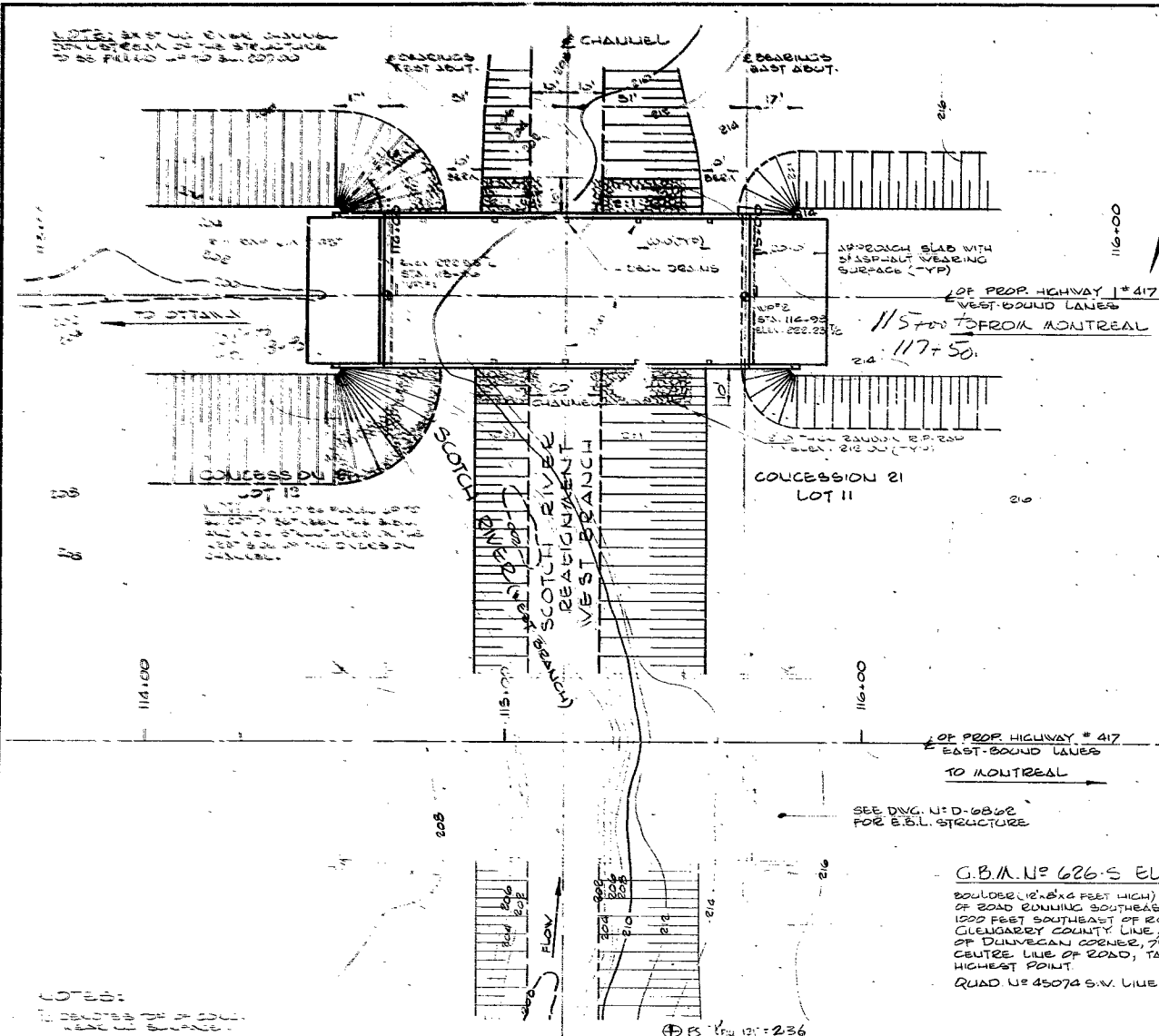
319-59  
GEOCRE No.

REVISIONS	DATE	BY	DESCRIPTION

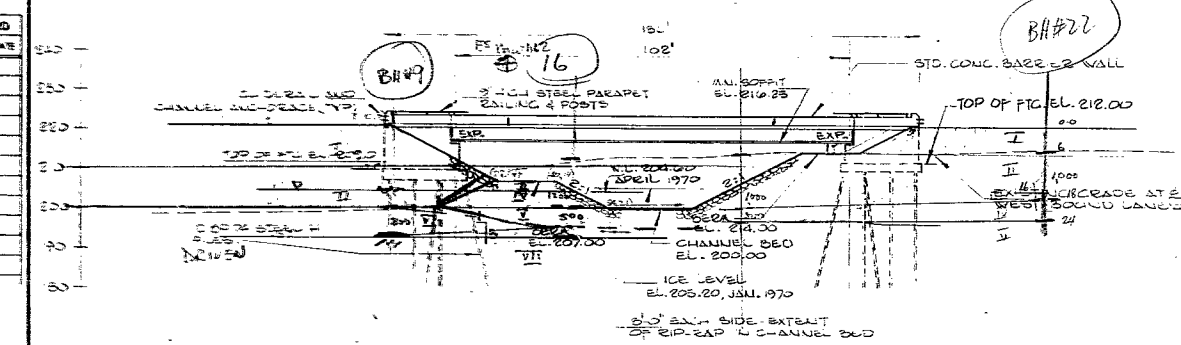


FOR REDUCED PLAN  
USE SCALE BELOW  
0 1 2 3  
1" = 3' INCHES ON ORIGINAL PLAN

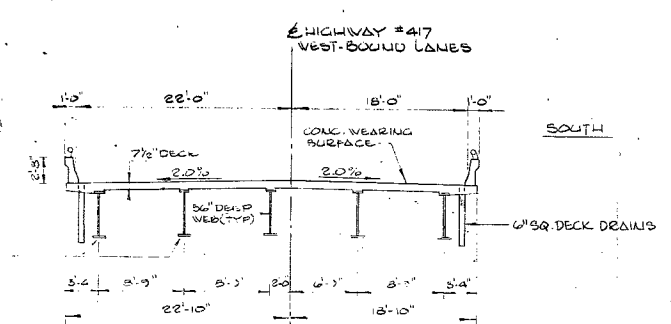
DEPARTMENT OF HIGHWAYS ONTARIO BRIDGE DIVISION			
WYLLIE & UFNAL LIMITED CONSULTING ENGINEERS TORONTO			
<b>SCOTCH RIVER (WEST BRANCH) BRIDGE EAST-BOUND LANES</b>			
2 MILES SOUTH OF ST. ISIDORE DE PRESCOTT			
KING'S HIGHWAY No. 417		DIST. No. 9	
CO. GLENGARRY		CON. 21	
TWP. KENYON		LOT 11 & 12	
<b>FOUNDATION LAYOUT &amp; DETAILS</b>			
APPROVED		SITE No. 31-288 W.P. No. 36-66-07	
DESIGN	D.C.B. CHECK	W.V.A.	CONTRACT
DRAWING	G.S. CHECK	D.C.B.	No.
DATE	OCT, 1970	LOADING	H.S. 20-44
			<b>D 6862-3</b>



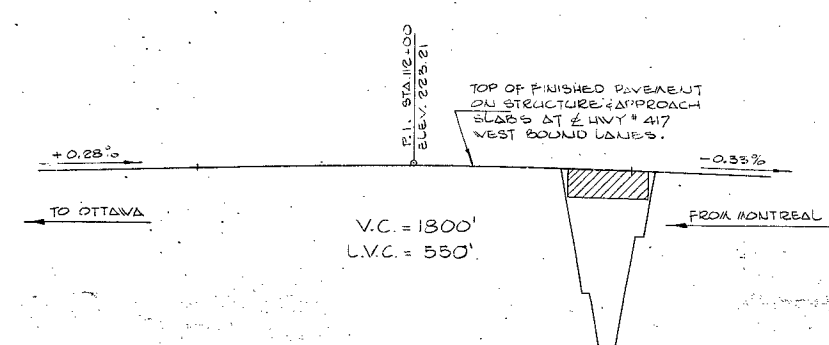
**PLAN**  
SCALE: 1" = 20'-0"



**ELEVATION**  
SCALE: 1" = 20'-0"

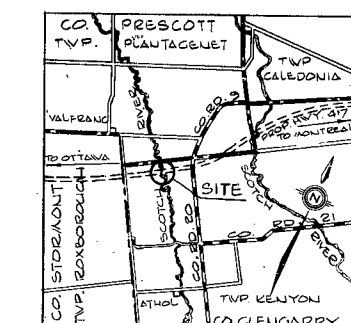


**TYPICAL DECK SECTION**  
SCALE: 1/8" = 1'-0"



**PROFILE ON E HIGHWAY No. 417**  
**WEST-BOUND LANES**  
NOT TO SCALE

- LIST OF DRAWINGS:**
- D-6863-1 GENERAL LAYOUT
  - 2 BORE HOLE LOCATION & SOIL STRATA
  - 3 FOUNDATION LAYOUT & DETAILS
  - 4 WEST ABUTMENT
  - 5 EAST ABUTMENT
  - 6 STRUCTURAL STEEL DETAILS
  - 7 DECK DETAILS
  - 8 APPROACH SLABS
  - 9 CONCRETE BARRIER WALL
  - 10 DETAILS OF 9" HIGH STEEL PARAPET RAILING
  - 11 STANDARD DETAILS



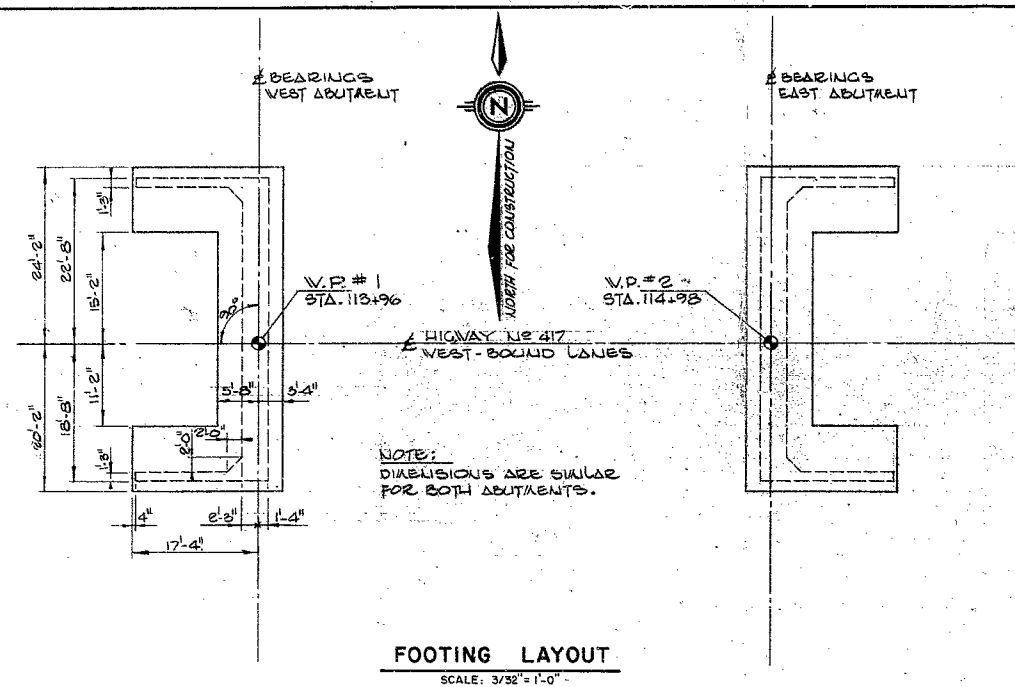
**KEY-PLAN**  
SCALE: 1 INCH = 1 MILE

- GENERAL NOTES:**
1. CLASS OF CONCRETE:  
DECK AND BARRIER WALLS - 4000 P.S.I.  
REINFORCING - 3000 P.S.I.
  2. CLEAR COVER ON REINFORCING STEEL:  
FOOTING AND ABUTMENTS - 3"  
BARRIER WALLS AND DECK TOP - 1 1/2"  
DECK BOTTOM - 1"
  3. CONSTRUCTION NOTES:  
THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE BEARING SEATS DEAD LEVEL TO THE SPECIFIED ELEVATIONS WITH A TOLERANCE OF ± 1/4".  
NO CONCRETE SHALL BE PLACED ABOVE THE ABUTMENT BEARING SEATS, UNTIL CONCRETE IN DECK HAS BEEN PLACED.

REVISIONS	
DATE	DESCRIPTION
DEPARTMENT OF HIGHWAYS ONTARIO BRIDGE DIVISION <b>WYLLIE &amp; UFNAL LIMITED</b> CONSULTING ENGINEERS TORONTO	
<b>SCOTCH RIVER (WEST BRANCH) BRIDGE</b> <b>WEST-BOUND LANES</b> 2 MILES SOUTH OF ST. ISIDORE DE PRESCOTT KING'S HIGHWAY No. 417 DIST. No. 9 CO. GLENGARRY TWP. KENYON LOT 11 & 12 CON. 21	
<b>GENERAL LAYOUT</b> SITE No. 31-288 W.P. No. 36-66-14	
APPROVED _____ BRIDGE ENGINEER	
DESIGN	D.C.B. CHECK W.V.A.
DRAWING	G.S. CHECK D.C.B.
DATE	SEPT. 1970
LOADING	HS 20-44
DRAWING No.	D-6863 - 1

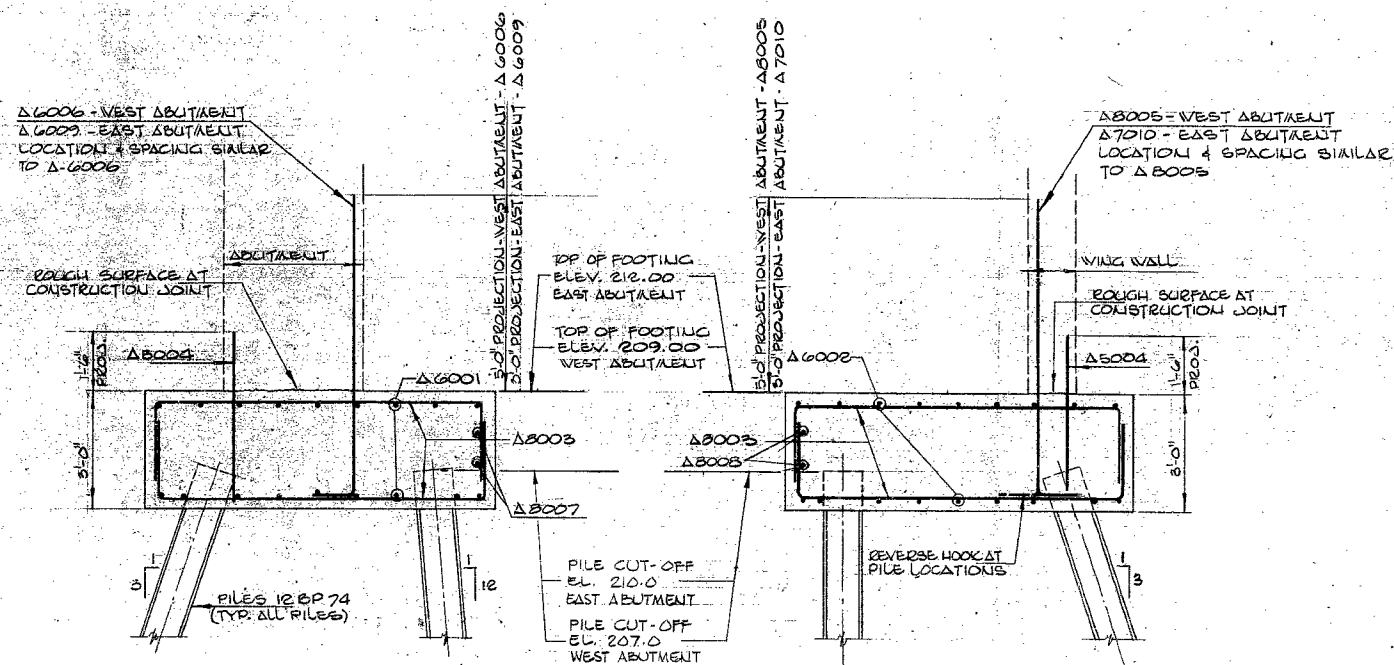






## FOOTING LAYOUT

SCALE -  $3/32" = 1'-0"$

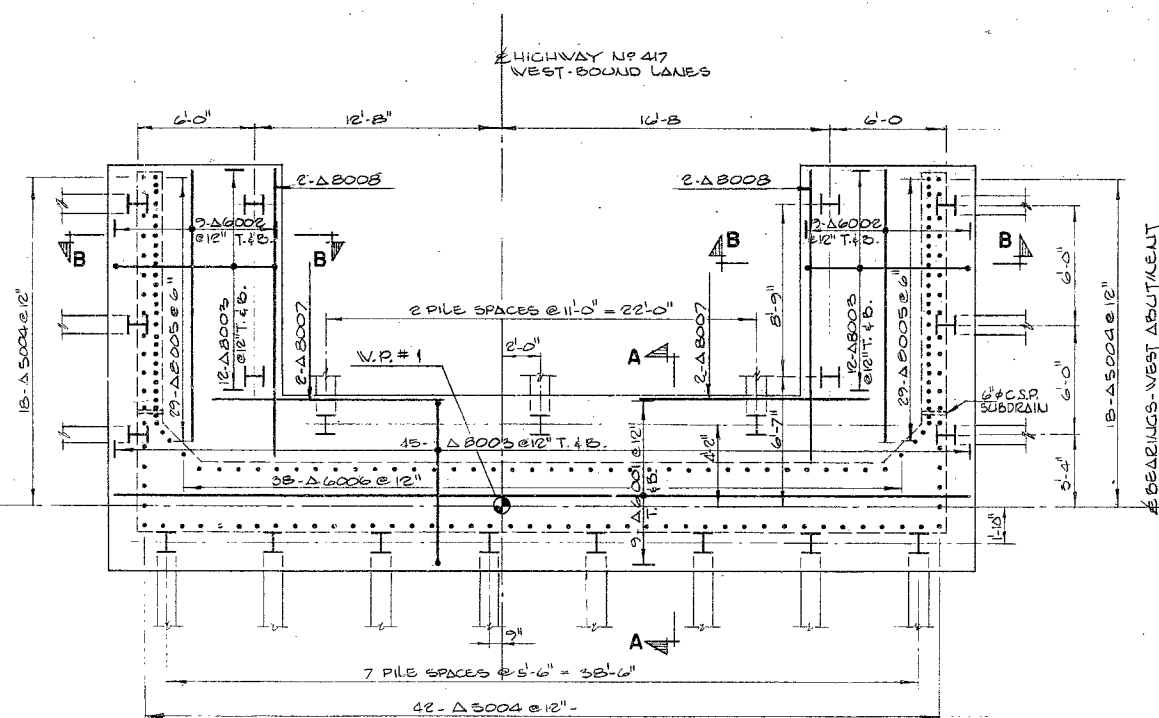


SECTION A-A

SCALE: 1/2" = 1'-0"

SECTION B-B

SCALE: 1/8"=1'-0"



PLAN OF WEST ABUTMENT FOOTING

SCALE: 1/4" = 1'-0"

REINFORCING STEEL & PILE LAYOUT SIMILAR FOR EAST ABUTMENT

PILE DATA (R2 BP 74 - DESIGN LOAD 95-TONS)					
LOCATION	Nº.	LENGTH	LOCATION	Nº.	LENGTH
EAST FTG.	14	18'-0"	WEST FTG.	14	20'-0"
" "	7	16'-0"	" "	7	20'-0"

NOTE:

- PILES TO BE DRIVEN TO REFUSAL IN ACCORDANCE WITH PILE DRIVING STD. BD 82-7 AND DNG. NR 6363-11
- SPACING OF PILES TO BE MEASURED AT UNDERSIDE OF FOOTINGS.

319-50

[illegible]

DEPARTMENT OF HIGHWAYS ONTARIO  
BRIDGE DIVISION

WYLLIE & UFNAL LIMITED  
CONSULTING ENGINEERS TORONTO

SCOTCH RIVER (WEST BRANCH) BRIDGE  
WEST - BOUND LANES

2 MILES SOUTH OF ST. ISIDORE DE PRESCOTT  
KING'S HIGHWAY No. 417 DIST. No.

KING'S HIGHWAY NO.		417	DIST. NO.	
CO.	GLENGARRY			
TWP.	KENYON	LOT	11 & 12	CON. 21

## FOUNDATION LAYOUT & DETAILS

APPROVED _____ BRIDGE ENGINEER				SITE No. 31-288		W.P. No. 36-66-14	
				CONTRACT No.			
DESIGN	D.C.B.	CHECK	W.V.A.	DRAWING No. <b>D 6863-3</b>			
DRAWING	G.S.	CHECK	D.C.B.				
DATE	OCT 1970		LOADING		MS 20-44		

FOR REDUCED PLAN

USE SCALE BELOW

