

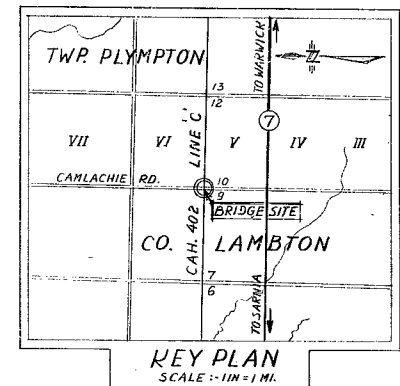
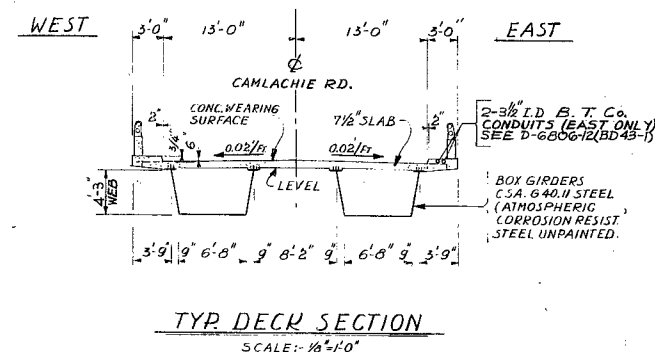
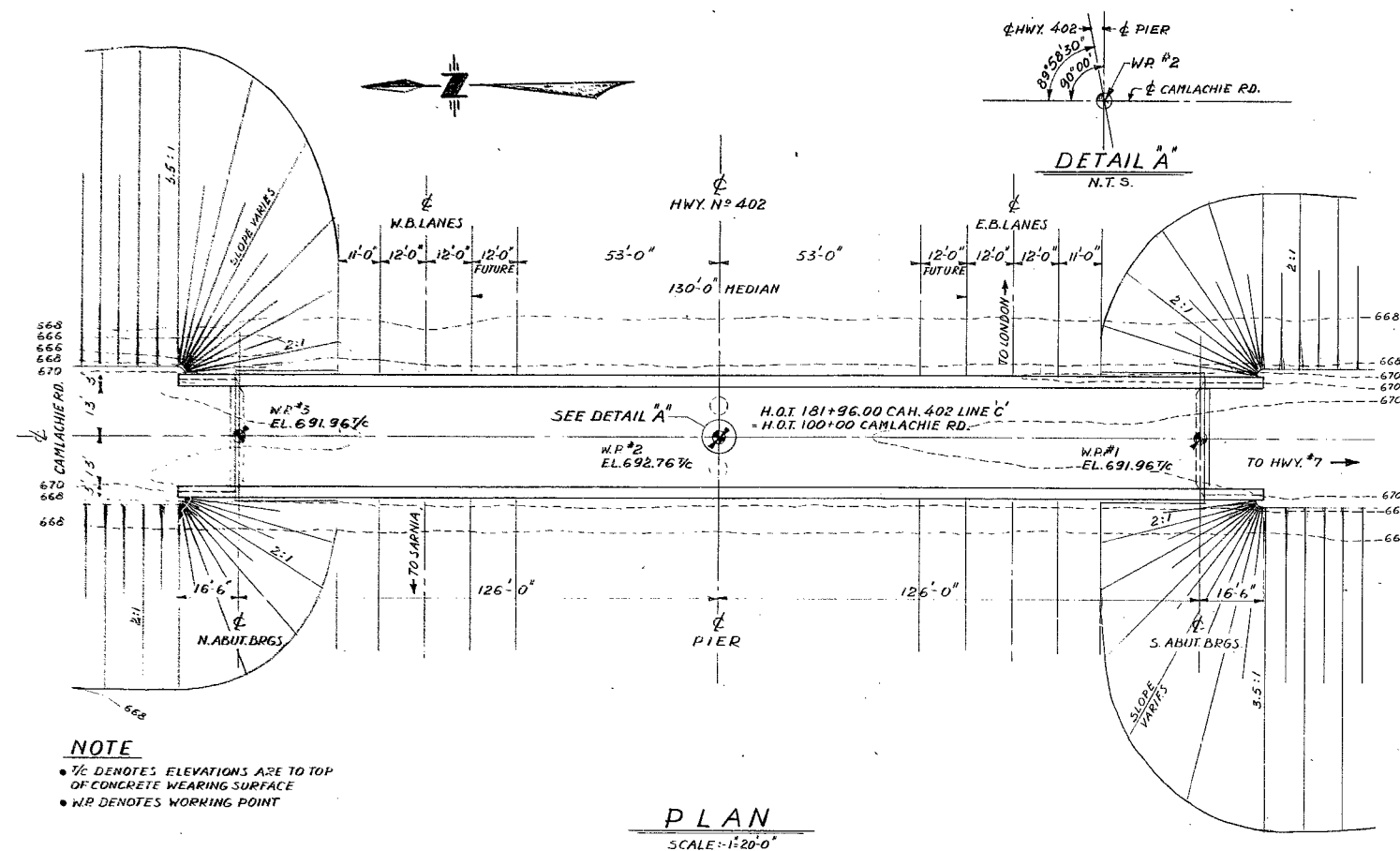
#69-F-98

W.P. 43-66-11

H.W.Y. #402, LINE 'C',

AND C.A.H.

CAMLACHIE ROAD



NOTES

CLASS OF CONCRETE

DECK, CURBS AND PARAPET WALLS	4000 p.s.i.
PIER COLUMNS	4000 p.s.i.
REMAINDER	3000 p.s.i.

AND GRAS NOTED ON DRAWINGS

AND/OR AS NOTED ON DRAWINGS
CLEAR COVER ON REIN STEEL

CLEAR COVER ON REINF. STEEL.

FOOTINGS, ABUTMENTS, PIER COLUMNS, DECK: TOP, BOT.

3" 3" 3"
CURBS PARAPET WALLS APPROACH SLABS

CURBS, PARAPET WALLS, APPROACH S

AND/OR AS NOTED ON DR

CONSTRUCTION NOTES

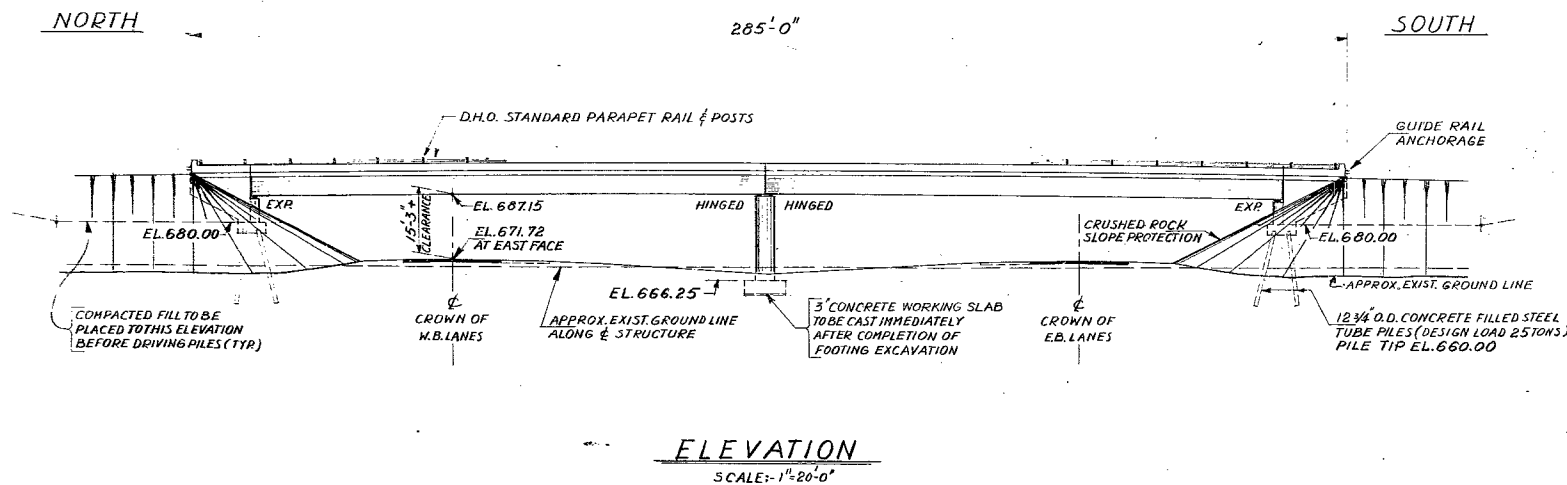
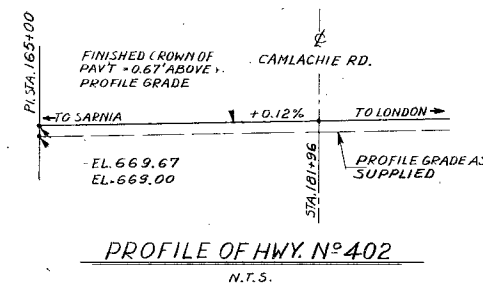
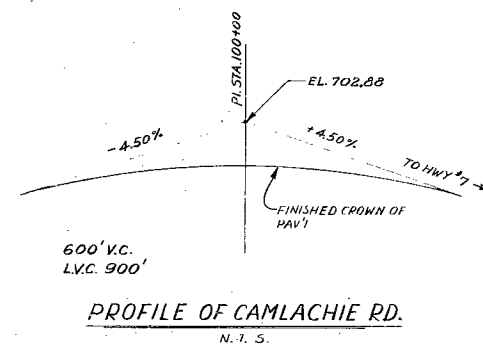
THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE
READING SEATS HEAD LEVEL TO THE SPECIFIED ELEVATIONS

BEARING SEATS DEAD LEVEL TO THE
WITH A TOLERANCE OF $\pm 1/4$ INCH

WITH A TOLERANCE OF $\pm 1/8$ INCH
NO CONCRETE SHALL BE PLACED ABOVE THE ABUTMENT

NO CONCRETE SHALL BE PLACED ABOVE THE JOINTS
BEARING SEATS UNTIL THE CONCRETE IN THE DECK HAS
BEEN PLACED.

BEEN PLACED.

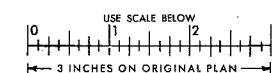


LIST OF DRAWINGS.

- D-6806- 1 GENERAL LAYOUT
- 1- -2 BOREHOLE LOCATIONS AND SOIL STRATA
- 1- -3 FOUNDATION LAYOUT
- 1- -4 ABUTMENTS
- 1- -5 PIER
- 1- -6 STRUCTURAL STEEL I
- 1- -7 STRUCTURAL STEEL II AND BEARING DETAILS
- 1- -8 DECK
- 1- -9 PARAPET WALL DETAILS
- 1- -10 STANDARD STEEL PARAPET RAIL
- 1- -11 STANDARD DETAILS I
- 1- -12 STANDARD DETAILS II



FOR REDUCED PLAN



REVISIONS		
DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO

BRIDGE DIVISION

69-F-98

CAMLACHIE ROAD UNDERPASS

3.4 MILES EAST OF COUNTY ROAD # 26

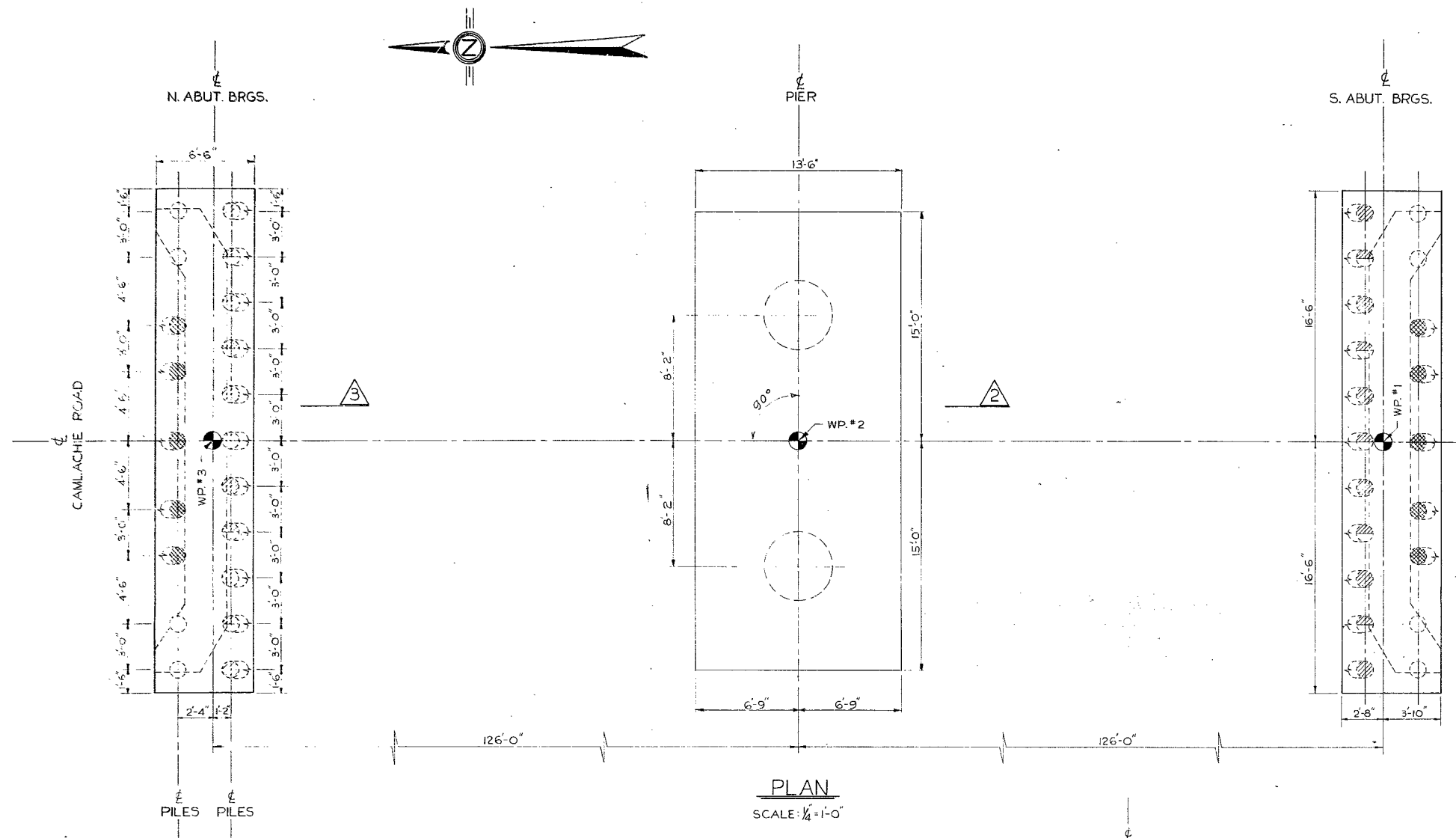
KING'S HIGHWAY No. 402 LINE 'C' DIST. No. 1

CO. LAMBTON

TWP. PLYMPTON LOT 9 & 10 CON. 5

GENERAL LAYOUT

APPROVED _____ BRIDGE ENGINEER			SITE No. 14-348	W.P. No. 43-66-11
DESIGN J. L. K.	CHECK		CONTRACT Nos.	
DRAWING J. Sz.	CHECK	J. L. K.	DRAWING No.	D-6806-1
DATE DEC, 370	LOADING	H520-44		



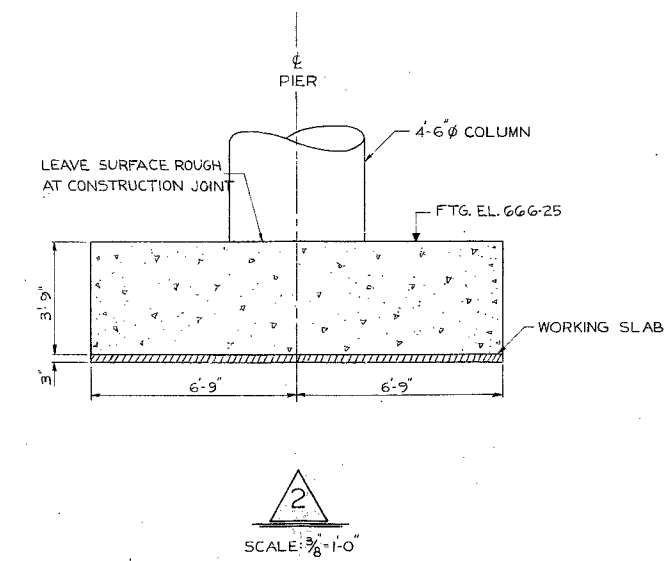
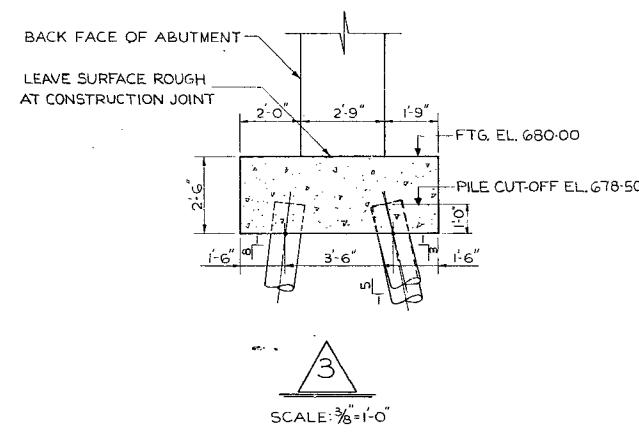
PILES SUPPLIED			
LOCATION	NO.	LENGTH	TYPE
N. ABUTMENT	20	20'-0"	12 3/4" O.D. x 250' WALL
S. ABUTMENT	20	20'-0"	STEEL TUBE PILES

LEGEND

- PILE BATTER 3:1
- PILE " 5:1
- PILE " 8:1
- PILE DRIVEN VERTICALLY

NOTES

DIMENSIONS AND PILE LAYOUT SIMILAR FOR BOTH ABUTMENT FOOTINGS.
 ABUTMENT PILE SPACING TO BE MEASURED AT UNDERSIDE OF FOOTING.
 ALL PILES ARE 12 3/4" O.D. x 250' WALL, STEEL TUBE PILES.
 TUBE PILES TO BE FILLED WITH 3000 P.S.I. CONCRETE AFTER INSTALLATION AND INSPECTION.
 PILES SHALL BE DRIVEN IN ACCORDANCE WITH BD86-7 BUT IN NO CASE SHALL BE DRIVEN BELOW EL. 660.00.
 FOR BD STANDARDS SEE D-6806-11

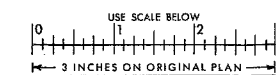


REVISIONS		
DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO BRIDGE DIVISION			
69-12-28			
CAMLACHIE ROAD UNDERPASS 3.4 MILES EAST OF COUNTY ROAD #26			
KING'S HIGHWAY No. 402 LINE 'C'		DIST. No. 1	
CO. LAMBTON		CON. 5	
TWP. PLYMPTON		LOT 9 & 10	
FOUNDATION LAYOUT			
APPROVED		SITE No. 14-348 W.P. No. 43-66-11	
DESIGN	J. S. Z.	CHECK	J. L. K.
DRAWING	C. G. T.	CHECK	J. S. Z.
DATE	DEC. 1970	LOADING	HS20-44
CONTRACT No.		DRAWING No. D-6806-3	



FOR REDUCED PLAN



PRINT RECORD		
No.	FOR	DATE

MS

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

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

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

Attention: Mr. S. McCombie

Date: January 13, 1970

Our File Ref.

In Reply To

110-110-110

Subject:

FOUNDATION INVESTIGATION REPORT
For
Proposed Crossing at
Camlachie Road and C.A.H. #402
Line 'C', Lots 9 & 10, Conc. V
Twp. of Plympton - Co. of Lambton
District #1 (Chatham, Ont.)
W.J. 69-F-98 -- W.P. 43-66-11

Attached please find our detailed foundation investigation report on the subsoil conditions existing at the above structure site.

We believe that the factual data and recommendations contained therein, will prove adequate for your design requirements. Should additional information be required, please feel free to contact our Office.

AGS/ndeP
Attach.

cc: Messrs. B. R. Davis (2)
H. A. Tregaskes
D. W. Farren
W. Zonnenberg
F. C. Brown
A. P. Watt
J. Roy
B. A. Singh

Foundations Files ✓
Gen. Files

A. G. Stermac
A. G. Stermac
PRINCIPAL FOUNDATION ENGINEER

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 2. DESCRIPTION OF THE SITE.
 3. FIELD AND LABORATORY INVESTIGATION PROCEDURES.
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 - 4.2) Clayey Silt with some Sand and Traces of Gravel.
 - 4.3) Shale Bedrock.
 5. GROUNDWATER CONDITIONS.
 6. DISCUSSION AND RECOMMENDATIONS:
 - 6.1) General.
 - 6.2) Foundations:
 - a) Spread Footings in Original Ground.
 - b) Spread Footings on Compacted Fill.
 - c) Perched Abutments on Short Piles.
 - d) End-Bearing Piles.
 - 6.3) Approach Embankments.
 7. MISCELLANEOUS.
-

FOUNDATION INVESTIGATION REPORT
For
Proposed Crossing at
Camlachie Road and C.A.H. #402
Line 'C', Lots 9 & 10, Conc. V
Twp. of Plympton - Co. of Lambton
District #1 (Chatham, Ont.)
W.J. 69-F-98 -- W.P. 43-66-11

1. INTRODUCTION:

A request for a foundation investigation at the crossing of the proposed C.A.H. #402, Line 'C' and Camlachie Road, was received from Mr. A. P. Watt, Regional Bridge Planning Engineer, in a memorandum dated October 29, 1969.

A field investigation was subsequently carried out by the Foundation Section to determine the subsoil conditions existing at the site. This report contains the results of this investigation and our recommendations pertaining to the design of the proposed structure foundations and approach embankments.

2. DESCRIPTION OF THE SITE:

The site of the proposed underpass structure is situated approx. 3.4 miles east of County Road #26, and approx. 3/4 mile north of Ewy. #7.

The surrounding area is flat and cultivated farm land.

An approx. 20-ft. wide and 5-ft. deep drainage ditch runs in an east-west direction at the north side of the proposed north abutment. The distance between the existing culvert and the proposed abutment location is approx. 45 ft.

Physiographically, the site is located in the region referred to as the St. Clair Clay Plain.

3. FIELD AND LABORATORY INVESTIGATION PROCEDURES:

A total of nine sampled boreholes and fourteen dynamic cone penetration tests was carried out during the course of the field work. Boring was achieved by means of continuous flight auger machines, and conventional diamond drilling equipment adapted for soil sampling purposes. During the field work, disturbed samples were obtained by means of a standard split-spoon sampler; the energy used in driving it, conformed to the requirements of the Standard Penetration Test.

'Undisturbed' samples were recovered using 2-inch Shelby tubes which were pushed into the soil hydraulically, or by hand. Where possible, field vane tests were carried out at elevations 12 inches below sample depths.

Dynamic cone penetration tests were carried out adjacent to each borehole and, also, at 5 other locations. Driving energy to advance the cone was 350 ft.-lbs. per blow.

The bedrock was proved at two borehole locations using BXL rock coring equipment.

All boreholes were surveyed in the field by personnel from London Region Engineering Surveys Section. The locations and elevations of the borings are shown on Drawing 69-F-98A which accompanies this report.

All samples were visually examined and classified at the site as well as in the laboratory. Following this inspection, laboratory tests were carried out on selected samples to determine the following physical properties:

- Atterberg Limits
- Moisture Content
- Grain-Size Distribution
- Undrained Shear Strength
- Bulk Density

The test results are summarized on the Record of Borehole sheets contained in the Appendix of this report.

4. SOIL TYPES AND SOIL CONDITIONS:

4.1) General:

Generally uniform subsoil conditions were found to prevail over the site area. The subsoil consists of a deep deposit of cohesive material with some sand and traces of gravel, followed by black-coloured shale bedrock. The boundaries of the deposits are shown on the Record of Borehole sheets attached to the Appendix. The estimated stratigraphical profile of Drawing 69-F-98A is based upon this information.

4.2) Clayey Silt with some Sand and Traces of Gravel:

This deposit was intersected in all borings and extends from immediately below the topsoil down to the surface of the bedrock. The material in the deposit consists of clayey silt with some sand and traces of gravel. A plot of Plasticity Index versus Liquid Limit (Fig. 1) shows the great majority of the points to fall within the CL zone.

In Borehole #1, a dense layer of silty sand with some gravel was discovered between El. 656.0 and El. 660.5.

At or around El. 620, occasional layers of silty clay with some sand were found within the main deposit. The moisture content of these layers averaged 28% and the bulk density 124 lbs./cu.ft.

Although there are, in general, only minor variations in soil properties of the main deposit with depth, the undrained shear strengths show considerable variation. The extreme upper 4 - 5 ft. of the material is weathered and somewhat softer than the remaining portion. Standard Penetration Test 'N' values ranged from 5 to 29 blows per foot.

Below the weathered zone at approx. El. 665, the shear strength sharply increases. Based on the Standard Penetration tests, the consistency may be classified as hard. From El. 659 downward, the shear strength is fairly uniform, the average 'N' value being in the order of 25 blows per foot.

4. SOIL TYPES AND SOIL CONDITIONS: (cont'd.) ...

4.2) Clayey Silt with some Sand and Traces of Gravel:(cont'd.)..

Physical properties of the deposit (silty clay layers excluded), as determined from field and laboratory tests, are as follows:

Natural Moisture Content (%)	12 to 20
Liquid Limit (%)	22 to 34
Plastic Limit (%)	14 to 18
Bulk Density (PCF)	130 to 135
Field Vane Test (PSF)	>2000
Unconfined Shear Strength (PSF)	2300 to 5740
Quick Triaxial Shear Strength	2445 to 4070
'N' Values (Blows/ft.)	21 to 66

Typical grain-size distribution curves are included in the Appendix of this report.

The consistency of the overall deposit may be described as firm to hard.

4.3) Shale Bedrock:

Bedrock at this site was found to consist of generally sound black-coloured shale at El. 554.2 (B.H.'s #1 and #12)

5. GROUNDWATER CONDITIONS:

The following groundwater levels were observed during the field investigation:

B.H. #2	.....	El. 668.6
#3	.....	El. 669.4
#4	.....	El. 668.6
#6	.....	El. 669.4
#10	.....	El. 659.8
#13	.....	Dry
#14	.....	Dry

5. GROUNDWATER CONDITIONS: (cont'd.) ...

It is pointed out, that the foregoing quoted figures may not represent the true groundwater levels, due to the relatively impermeable nature of the subsoil and the short duration of the field work.

6. DISCUSSION AND RECOMMENDATIONS:

6.1) General:

It is proposed to build a five-span (35'-67'-08"-67'-08"-67'-08"-35') underpass structure at the crossing of new Hwy. #402, Line 'C' and Camlachie Road. The proposed profile grade of Camlachie Road will be approximately 21.5' above the proposed Hwy. #402 grade of El. 671.0'.

As described in the previous paragraphs of this report, the subsoil at the site consists of a deep deposit of clayey silt containing some sand and traces of gravel. The upper 4 - 5 feet of the deposit is weathered. Below this depth the undrained shear strength of the material increases sharply until a maximum value is reached, then decreases again with depth. The hard zone between El. 665 and El. 659 appears to be suitable for spread footing type foundations.

Because of the compressible nature of the subsoil, it is inevitable that consolidation settlements will occur over a long-term period due to the imposed loads of structure and embankment. Past experience, however, indicates that these settlements will be of a minor nature.

6.2) Foundations:

a) Spread Footings in Original Ground -

The entire structure may be supported on spread footings placed within the hard zone of the subsoil at or below El. 665. A safe net pressure of 2.0 TSF may be assumed for design purposes.

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

6.2) Foundations: (cont'd.) ...

a) Spread Footings in Original Ground - (cont'd.) ...

The hard zone is susceptible to softening on contact with water, therefore, it is recommended that the base of the footing excavations be protected by a concrete working slab, immediately on exposure.

All foundations should be protected against frost action by at least 4 feet of earth cover. No dewatering problems are anticipated.

The estimated maximum settlement will be in the order of 1.0 to 1.5 inches under the pier footings, and 4 to 5 inches under the abutment footings.

b) Spread Footings on Compacted Fill -

As an alternative, the abutments may be supported on spread footings placed on well compacted, suitable granular material within the approach fills. A safe design load of 2.0 TSF may be assumed. The granular material should consist of G.B.C. Class 'A' and should be fully compacted according to the current D.H.O. Standards. A detailed construction scheme is outlined on Figure 3 of the Appendix. Settlements under the abutments will be as in Case a).

c) Perched Abutments on Short Piles -

As a second alternative, the abutments may be constructed within the approach fills and supported on short piles driven through the fill to approx. El. 660. In the case of 12-3/4" O.D. steel tube piles, a safe design load of 25 tons per pile may be used.

It should be pointed out, that this latter proposal is based on experience with similar structures and similar subsoil conditions in the general area. To obtain more detailed information about pile lengths, pile types and design loads, a full-scale pile loading test would be advantageous and it is intended that

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

6.2) Foundations: (cont'd.) ...

c) Perched Abutments on Short Piles - (cont'd.) ...

such tests be carried out. Therefore, the recommendations given for this type of foundation are subject to change, depending on the results of the future pile loading tests. Settlements in this case are anticipated to be as for Case a).

Regardless of which method is adopted, the structure should be built to accommodate the differential settlement between the abutments and piers - i.e., 3 - 4 inches.

d) End-Bearing Piles -

As another alternative, the abutments and piers may be supported on steel H-piles driven to bedrock. For 12 BP @ 53, a safe design load of 70 tons per pile may be assumed.

6.3) Approach Embankments:

The shear strength of the subsoil is such that it will be able to safely support the 21.5-ft. high approach embankments constructed with 2:1 side slopes. The fill should consist of well compacted acceptable material. Care should be taken to ensure that no bouldery fill is placed within the approaches through which piles have to be driven, and it is recommended that this portion of the fill contain no larger grain sizes than 3 inches.

Based on the performance of structures and embankments built in the same general area and under somewhat similar subsoil conditions, it is our opinion that the maximum settlement will be in the order of 4 to 5 inches. To minimize the effect of differential settlements between the abutments and pier footings, it is recommended that the approach embankments be built in advance of the structure for as long a period as possible. The topsoil and the soft organic material should be removed in accordance with the pertinent D.H.O. Standards within the construction area.

7. MISCELLANEOUS:

The field investigation was carried out during the period November 7 - 13, 1969, under the supervision of Messrs. G. Allen, A. Prakash, and P. Payer, Project Foundation Engineers.

Equipment was owned and operated by Dominion Soil Investigation Ltd., and G. Wimpey, Canada, Ltd.

This report was prepared by Mr. P. Payer, and was reviewed by Mr. K. G. Selby, Supervising Foundation Engineer.

January 1970

APPENDIX I

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 2

FOUNDATION SECTION

JOB	69-F-98	LOCATION	Sta. 98 + 63 15' Rt.	ORIGINATED BY	GA
W.P.	43-66-11	BORING DATE	November 11, 1969	COMPILED BY	PP
DATUM	Geodetic	BOREHOLE TYPE	Cont. Flight Auger	CHECKED BY	✓

SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION BLOWS / FOOT	RESISTANCE	LIQUID LIMIT ——— w _L PLASTIC LIMIT ——— w _P WATER CONTENT ——— w	BUICK DENSITY P.C.F.	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER TYPE	BLOWS / FOOT	SHEAR STRENGTH P.S.F. ELEV SCALE	WATER CONTENT % w _p ——— w _L		
					25 50 75 100 125			
					○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL = LAB. VANE			
					1000 2000			
670.1	Ground Level							
0.0	Clayey silt with some sand and trace of gravel		1 SS	29				
			2 SS	51				
			3 SS	30				
	Very stiff to hard.		4 SS	24				
			5 SS	25				
648.6			6 SS	33				
21.5	End of Borehole							

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 3

FOUNDATION SECTION

JOB 69-F-98 LOCATION Sta. 98 + 98 15' Lt. ORIGINATED BY GA
 W.P. 43-66-11 BORING DATE November 11, 1969 COMPILED BY PP
 DATUM Geodetic BOREHOLE TYPE Cone Test Only CHECKED BY AL

SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w		BULK DENSITY Y P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. UNIT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	25	50	75	100			125
669.9 0.0	Ground Level												
	Probably Clayey Silt												
657.9						660							
12.0	End of Cone Test					650							

CHECKED BY

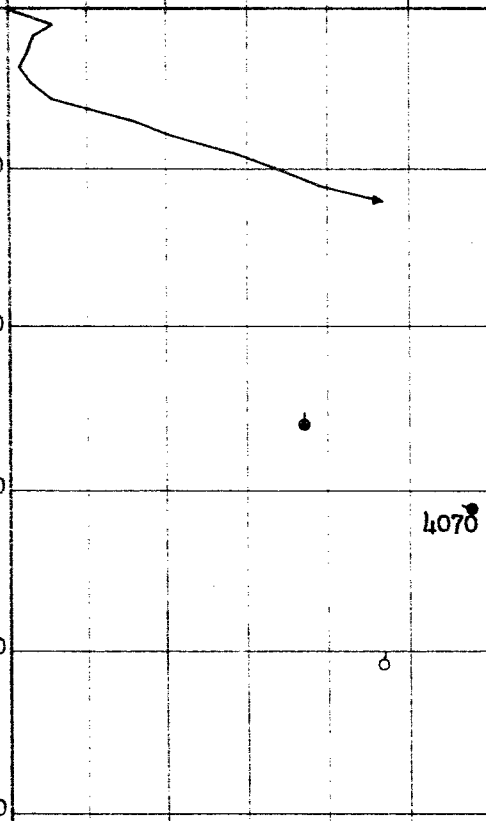
617.1	
53.0	End of Borehole

FOUNDATION SECTION

ORIGINATED BY GA

COMPILED BY PP

CHECKED BY *[Signature]*

SOIL PROFILE		SAMPLES	DYNAMIC PENETRATION BLOWS / FOOT	RESISTANCE	LIQUID LIMIT ———— w _L PLASTIC LIMIT ———— w _p WATER CONTENT ———— w	BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT PLOT NUMBER TYPE BLOWS/FOOT	ELEV SCALE	SHEAR STRENGTH PSF ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE	w _o ————— w _c ————— w _L WATER CONTENT % 10 20 30	P.C.F.	GR.SA.SI.CL.
669.8 0.0	Ground Level						
	Clayey silt with some sand and traces of gravel	1 SS 5					
		2 SS 44					
		3 SS 41					
		4 SS 30					
		5 SS 36					
		6 TW PH					
		7 TW PH					
		8 SS 53					
		9 SS 39					
		10 TW PH					
618.3 51.5	End of Borehole	11 TW PH					

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 6

FOUNDATION SECTION

JOB 69-F-98

LOCATION

Sta. 99 + 66 o/s 15' Rt.

ORIGINATED BY PP

W.P. 43-66-11

BORING DATE

November 10, 1969

COMPILED BY GA

DATUM Geodetic

BOREHOLE TYPE

Cone Penetration Test Only

CHECKED BY

SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT ——— * PLASTIC LIMIT ——— * WATER CONTENT ——— *		BULK DENSITY Y	REMARKS	
ELEV. DEPTH	DESCRIPTION	SERIAL NO.	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	25	50	75	100			125
669.9	Ground Level												
0.0													
657.1													
12.8	End of Cone Test												

SHEAR STRENGTH PSF
 ○ UNCONFINED + FIELD VANE
 ● QUICK TRIAXIAL x LAB VANE

WATER CONTENT %

GR. S. & CL.

669.4

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 7

FOUNDATION SECTION

JOB 69-F-98

LOCATION

Sta. 100 + 34 o/s 15' Lt.

ORIGINATED BY GA

W.P. 43-66-11

BORING DATE

November 10, 1969

COMPILED BY GA

DATUM Geodetic

BOREHOLE TYPE

Cone Test Only

CHECKED BY

GA

SOIL PROFILE

SAMPLES

DYNAMIC PENETRATION RESISTANCE
BLOWS / FOOT

25 50 75 100 125

LIQUID LIMIT — %
PLASTIC LIMIT — %
WATER CONTENT — %

SHEAR STRENGTH PSF

○ UNCONFINED — FIELD VANE
● QUICK TRIAXIAL — LAB VANE

WATER CONTENT %

BULK
DENSITY

REMARKS

ELEV
DEPTH

DESCRIPTION

STRAT. POS.

NUMBER

TYPE

BLOWS / FOOT

ELEV. SCALE

P.C.F. GR. SA. SI. CL.

669.7

Ground Level

0.0

660

657.5

12.2 End of Cone Test

650

FOUNDATION SECTION

ORIGINATED BY GA

COMPILED BY PP

CHECKED BY *[Signature]*

SOIL PROFILE		SAMPLER			DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT ——— % PLASTIC LIMIT ——— % WATER CONTENT ——— %			BULK DENSITY Y P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS / FOOT	25	50	75	100	125	WATER CONTENT % 10 20 30				
669.8	Ground Level													
	Clayey silt with some sand and traces of gravel	1	SS	7										
		2	SS	29										
		3	SS	27										
		4	SS	41										
		5	SS	43										
	Firm to hard	6	SS	36										
		7	TW	PH										
		8	SS	24										
628.3		9	SS	42										
41.5	End of Borehole													

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 9

FOUNDATION SECTION

JOB 69-F-98

LOCATION Sta. 101 + 02 o/s 15' Lt.

ORIGINATED BY AP

W.P. 43-66-11

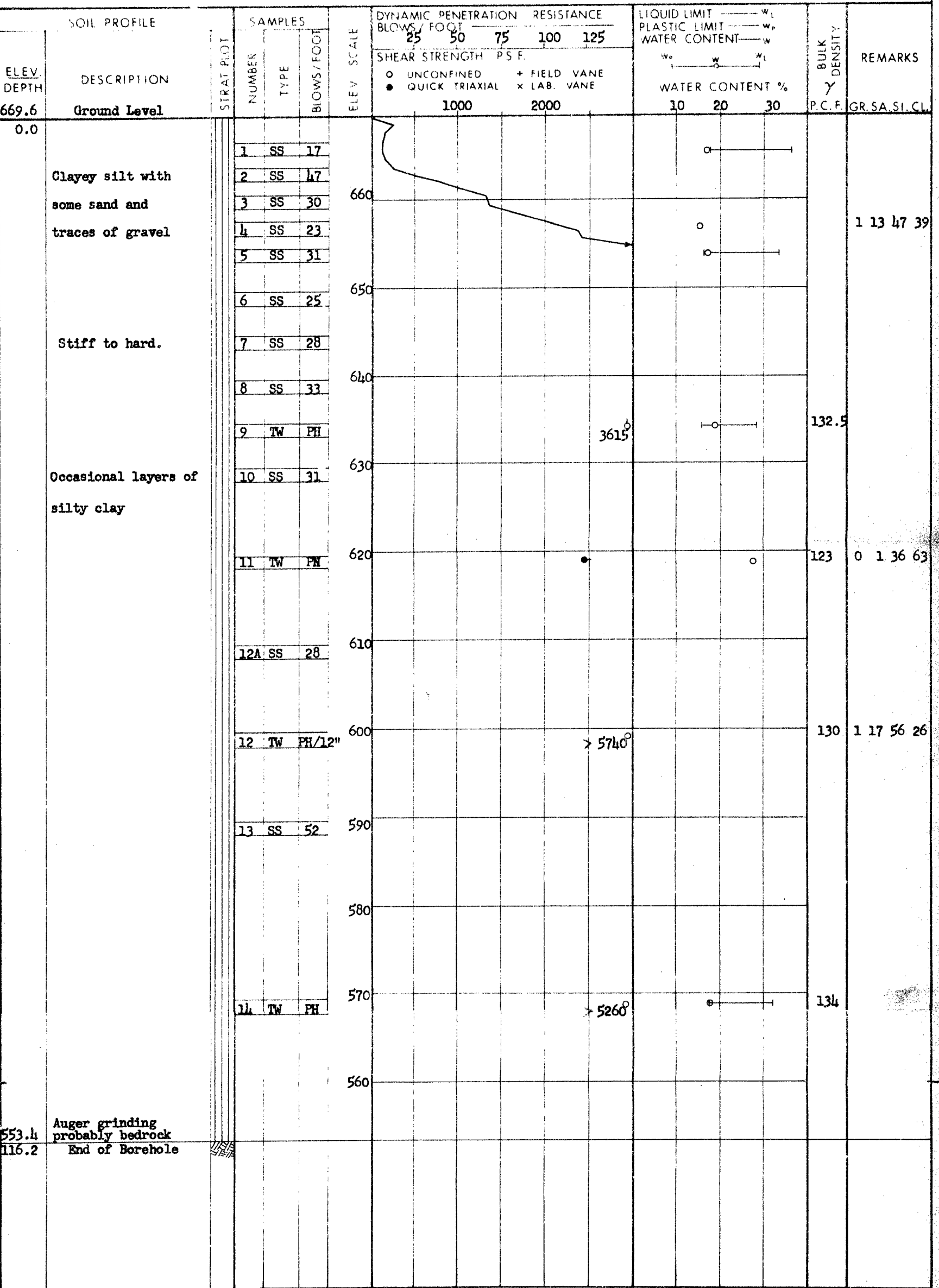
BORING DATE Nov. 6, 7 & 10, 1969

COMPILED BY QA

DATUM Geodetic

BOREHOLE TYPE Cont. Flight Auger

CHECKED BY



DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 10

FOUNDATION SECTION

JOB 69-F-98 LOCATION Sta. 101 + 02 15' Rt.
W.P. 43-66-11 BORING DATE November 11, 1969
DATUM Geodetic BOREHOLE TYPE Cone Test only

ORIGINATED BY GA

COMPILED BY PP

CHECKED BY

SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — %		BULK DENSITY	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. NO.	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	BLOWS / FOOT	RESISTANCE	PLASTIC LIMIT — %	WATER CONTENT — %			
								25 50 75 100 125					
							SHEAR STRENGTH PSF						
							○ UNCONFINED — FIELD VANE						
							● QUICK TRIAXIAL x LAB VANE						
							WATER CONTENT %						
669.8	Ground Level												
0.0													
656.8						660							▼ 659.8
13.0	End of Cone Test					650							

FOUNDATION SECTION

ORIGINATED BY GA

COMPILED BY GA

CHECKED BY *21*

SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	LIQUID LIMIT ——— % PLASTIC LIMIT ——— % WATER CONTENT ——— %	BULK DENSITY PC =	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. UNIT	NUMBER TYPE	BLOWS / FOOT	ELEV. SCALE		
669.6 0.0	Ground Level						
657.7 11.9	End of Cone Test						

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

JOB 69-F-98

LOCATION Sta. 101 + 37 15' Rt.

ORIGINATED BY PP

W.P. 43-66-11

BORING DATE November 10 & 11, 1969

COMPILED BY GA

DATUM Geodetic

BOREHOLE TYPE Cont. Flight Auger

CHECKED BY

RECORD OF BOREHOLE No. 12

FOUNDATION SECTION

ELEV. DEPTH	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER TYPE	BLOWS/FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS/FOOT					LIQUID LIMIT PLASTIC LIMIT WATER CONTENT			BULK DENSITY γ _p	REMARKS
					25	50	75	100	125	W _p	W _L	W		
670.0	Ground Level				SHEAR STRENGTH PSF					WATER CONTENT %				
0.0					○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE					10 20 30				
	Clayey silt with some sand and traces of gravel	1 SS 7												0 19 51 30
		2 SS 41												
		3 SS 32		660										
		4 SS 31												
		5 SS 27												
	occasional layers of silty clay	6 TW PH		650					4230				134	
		7 SS 45												
		8 TW PH		640					3400				134	
	Firm to hard													
		9 SS 32		630										1 9 53 37
		10 TW PH		620									127 124	
				610										
		11 SS 66		600										
				590										
		12 TW PH		580					3880				134	1 12 57 30
				570										
				560										
554.2	Black Shale Bedrock	13 RC 100%		550										
549.0														
121.0	End of Borehole													

FOUNDATION SECTION

ORIGINATED BY GA

COMPILED BY GA


CHECKED BY

SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION BLOWS / FOOT	RESISTANCE	LIQUID LIMIT — % PLASTIC LIMIT — % WATER CONTENT — %	BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	SIRAL FOOT	NUMBER TYPE	BLOWS/FOOT	ELEV SCALE	SHEAR STRENGTH P.S.F.		
						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE	W _p ——— W _L WATER CONTENT % 10 20 30	
669.0	Ground Level							
0.0								
	Clayey silt with some sand and trace of gravel		1 SS 15					
			2 SS 34					
			3 SS 34		660			
	occasional layers of silty clay		4 SS 31					
			5 SS 26					
	Stiff to hard		6 SS 28		650			
			7 SS 30					
			8 SS 34		640			
637.5								
31.5	End of Borehole							

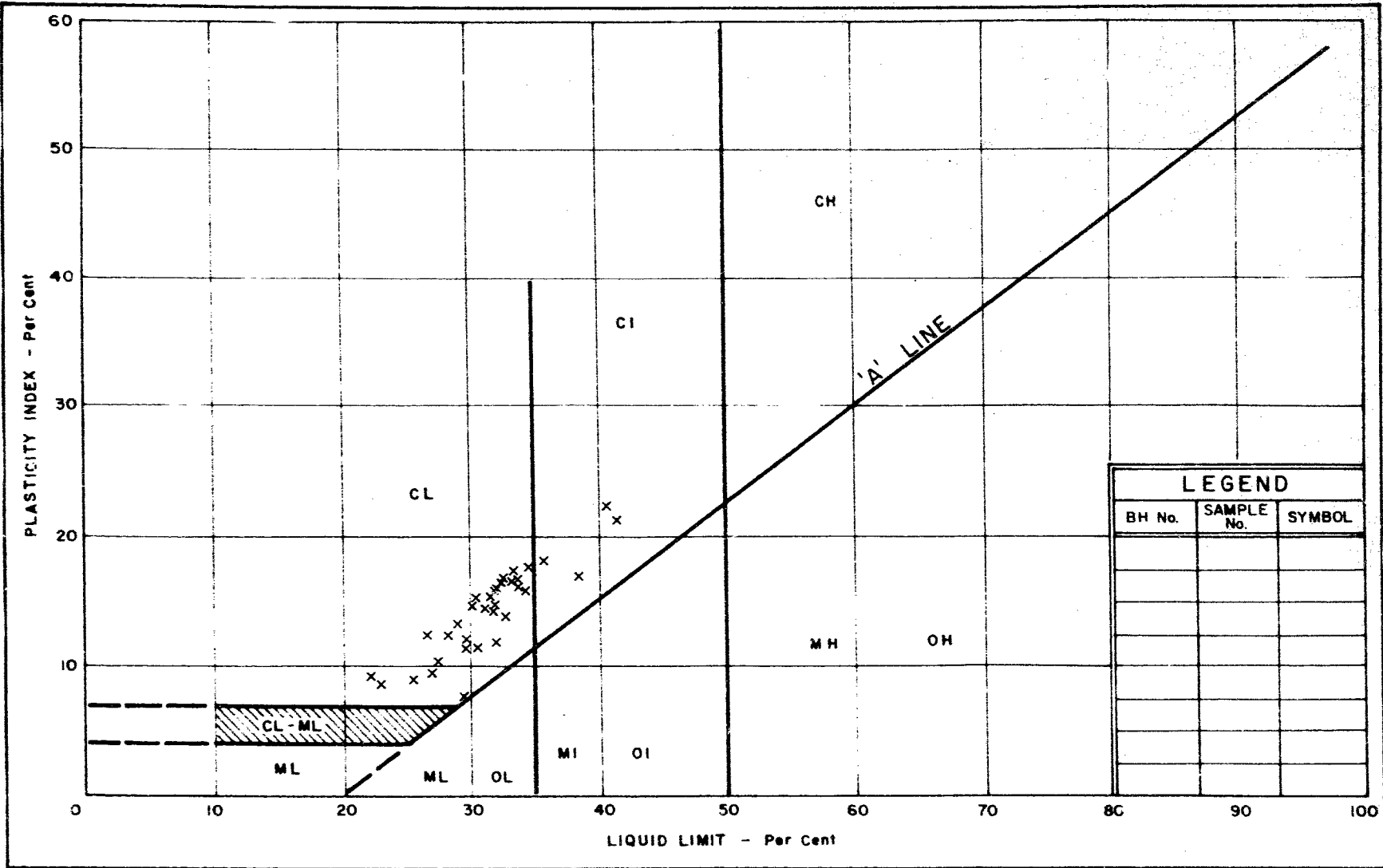
FOUNDATION SECTION

ORIGINATED BY GA

COMPILED BY GA

CHECKED BY 

SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT ——— % PLASTIC LIMIT ——— % WATER CONTENT ——— %			BULK DENSITY P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS/FOOT	25	50	75	100	125	W _p	W _L			W
668.4	Ground Level				SHEAR STRENGTH PSF					WATER CONTENT %				
					○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE									
0.0	Clayey silt with some sand and trace of gravel occasional layers of silty clay Stiff to hard	1	SS	20									2 17 54 27	
		2	SS	30										
		3	SS	32										
		4	SS	25										
		5	SS	27										
		6	SS	26										
		7	SS	29										
636.9		8	SS	28									1 11 53 35	
31.5	End of Borehole													



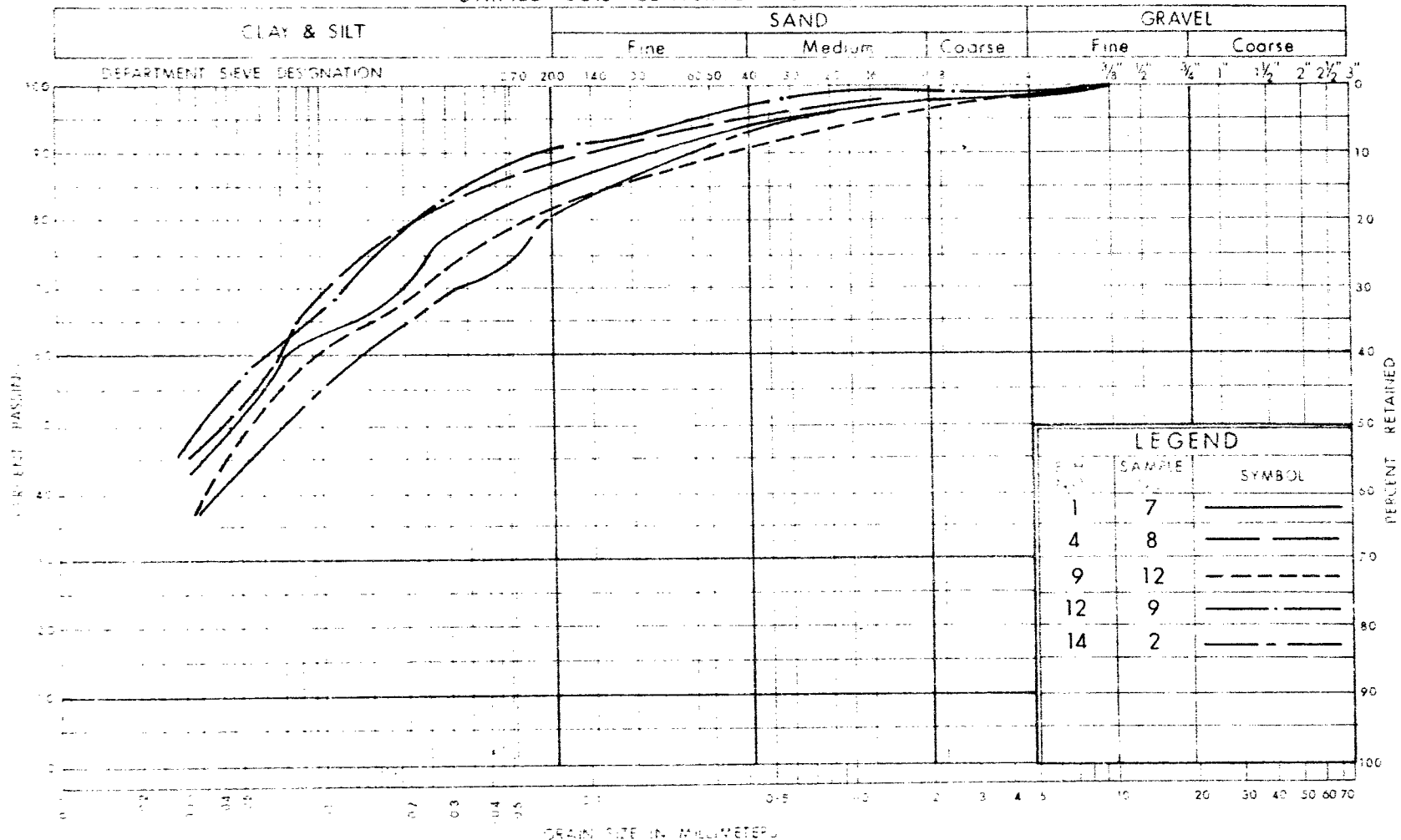
DEPARTMENT OF HIGHWAYS
MATERIALS and
TESTING
DIVISION

PLASTICITY CHART

CLAYEY SILT

WP No.	43-66-11
JOB No.	69 - F - 98
FIG. 1	

UNIFIED SOIL CLASSIFICATION SYSTEM



DEPARTMENT OF HIGHWAY
MATERIALS and
TESTING
DIVISION

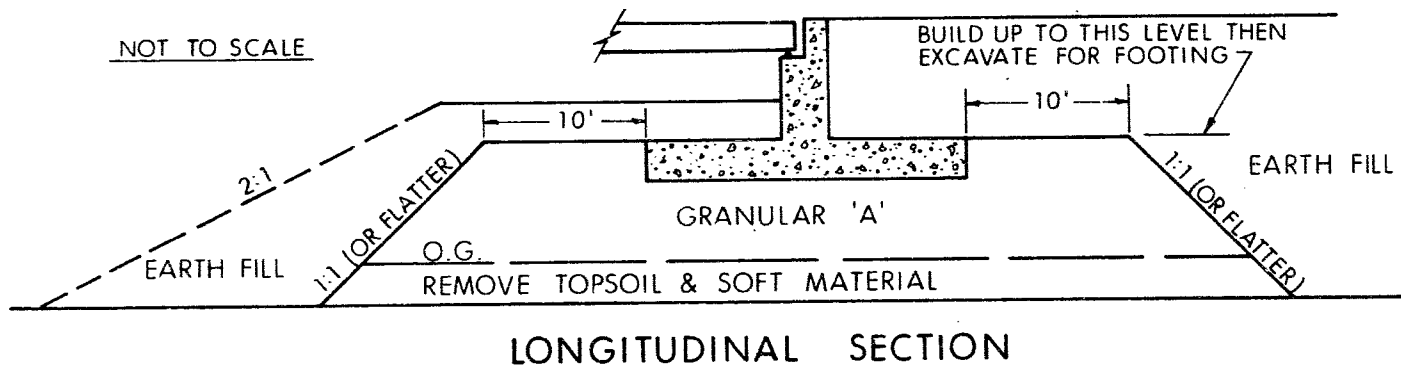
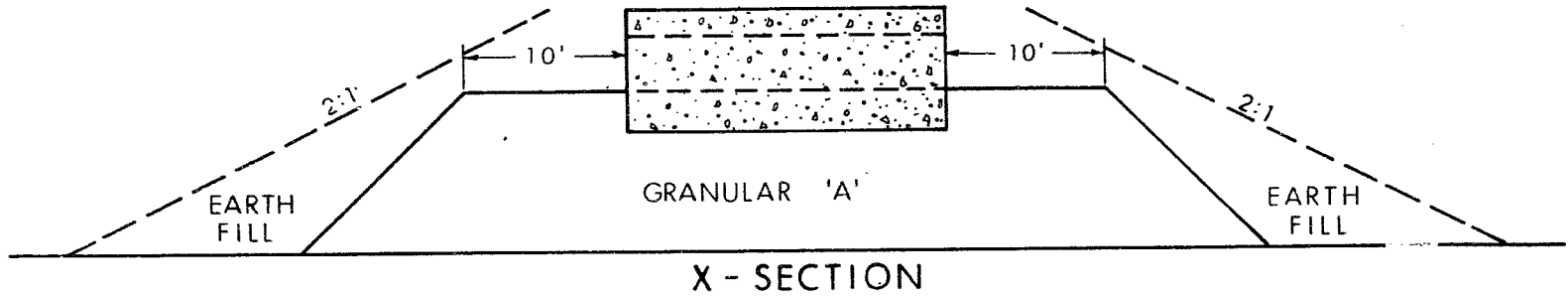
GRAIN SIZE DISTRIBUTION
CLAYEY SILT

WP No. 43-66-11

JOB No. 69-F-98

FIG 2

ABUTMENT ON COMPACTED FILL SHOWING GRANULAR 'A' CORE



NOTES

- 1 - REMOVE TOPSOIL &/OR SOFT SUBSOIL UNDER AREA OF COMPACTED GRANULAR 'A'.
- 2 - PLACE GRANULAR 'A' TO TOP OF FOOTING LEVEL, COMPACTED ACCORDING TO CURRENT D.H.O. STANDARDS.
- 3 - EXCAVATE COMPACTED GRANULAR 'A' MATERIAL FOR FOOTING.

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 - 230	VERY LOOSE	0 - 4
SOFT	2 - 4	250 - 500	LOOSE	4 - 10
FIRM	4 - 8	500 - 1000	COMPACT	10 - 30
STIFF	8 - 15	1000 - 2000	DENSE	30 - 50
VERY STIFF	15 - 30	2000 - 4000	VERY DENSE	> 50
HARD	> 30	> 4000		

TYPE OF SAMPLE

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

SOIL TESTS

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

ABBREVIATIONS USED IN THIS REPORT

SOIL PROPERTIES

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

GENERAL

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

STRESS AND STRAIN

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

EARTH PRESSURE

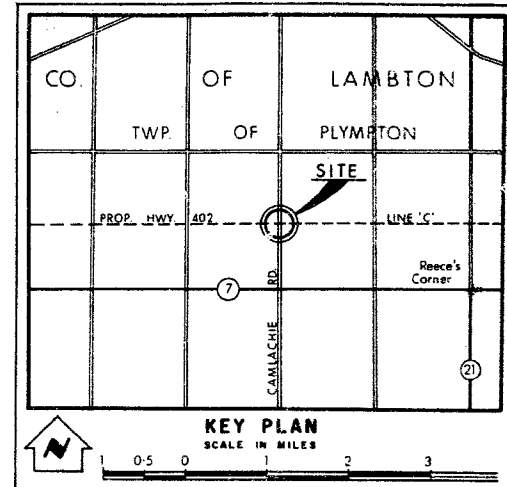
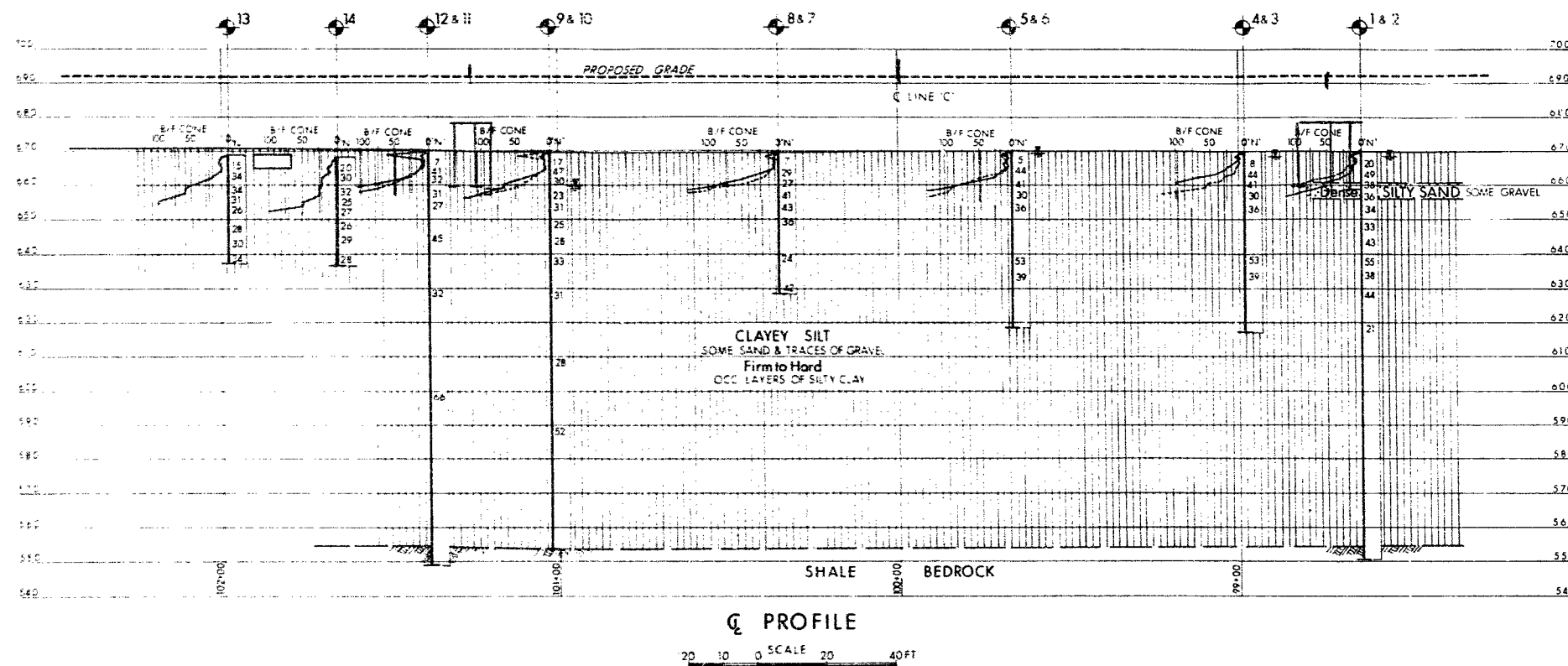
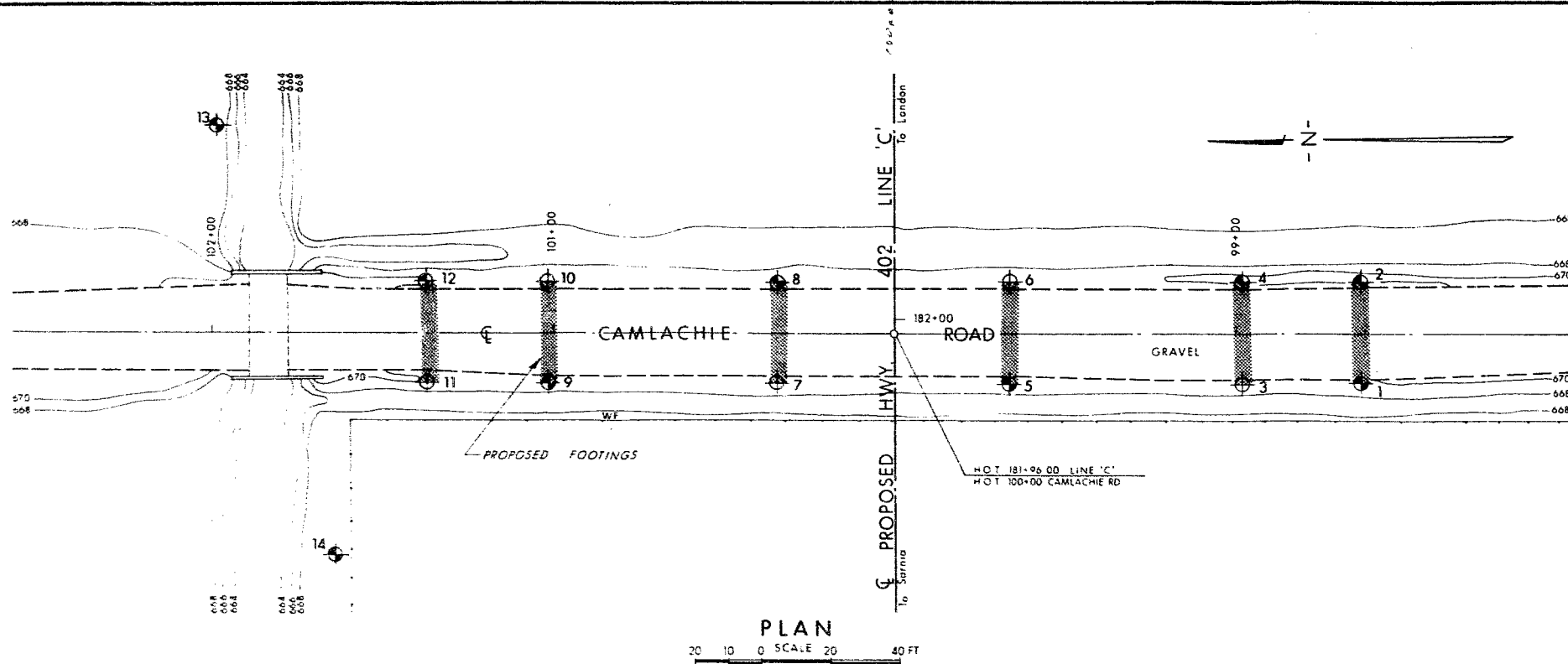
d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
δ	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
K_0	COEFFICIENT OF EARTH PRESSURE AT REST

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
β	ANGLE OF SLOPE TO HORIZONTAL



LEGEND

- Bore Hole
- Cone Penetration Hole
- Bore & Cone Penetration Hole
- Water Levels established at time of field investigation, NOV 1969

NOTE - Water Levels not established in Bore Holes 8, 12, 13 & 14 at time of field investigation.

NO.	ELEVATION	STATION	OFFSET
1	670.0	98+63	15' LT
2	670.1	98+63	15' RT
3	669.9	98+98	15' LT
4	670.1	98+98	15' RT
5	669.8	99+66	15' LT
6	669.9	99+66	15' RT
7	669.7	100+34	15' LT
8	669.8	100+34	15' RT
9	669.6	101+02	15' LT
10	669.8	101+02	15' RT
11	669.6	101+37	15' LT
12	670.0	101+37	15' RT
13	669.0	101+98	61' RT
14	668.4	101+64	66' LT

NOTE

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

REVISIONS	DATE	BY	DESCRIPTION

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

CAMLACHIE ROAD

KING'S HIGHWAY NO. 402 LINE 'C' DIST. NO. 1
CO. LAMBTON
TWP. PLYMPTON LOT 9 & 10 CON. 5

BORE HOLE LOCATIONS & SOIL STRATA

SUBM'D. P.P.	CHECKED	W.P. NO. 43-66-11	M.T. DRAWING NO.
DRAWN	50	CHECKED	JOB NO. 69-F-98
DATE	8 JAN. 1970	SITE NO.	69-F-98A
APPROVED	CONT. NO.		BRIDGE DRAWING NO.

SUMMARY OF PILE DRIVING RECORDS

W.O. 69-11098 W.P. 43-66-11 CONT. 73-86 DIST. 1
SITE CANLACHIE RD & PROP. HWY# 402
DATE DRIVEN DEC. 11-13/73 WEIGHT OF ANVIL 1100 lb
HAMMER TYPE REVISED B-225 WEIGHT 3750 lb ENERGY 32500 FT/lb

[illegible]

OVER

BRIDGE CONSTRUCTION - PILE DRIVING RECORD

DISTRICT NO. 1 CONTRACT NO. 73-86 STRUCTURE CAMLACHIE ROAD UNDERPASS
 CONTRACTOR BERMINGHAM DESIGN LOAD OF PILE 25 TONS/PILE
 HAMMER DETAILS: TYPE REVISED B.225 WEIGHT 3750 lb HEIGHT OF FALL OR ENERGY 32,500 FT-LB
 TYPE OF ANVIL OR CAP _____ WEIGHT OF ANVIL OR CAP 1100 lb
 PILE DETAILS 1 3/4" O.D. x .250" WALL STEEL TUBE PILES - 33.38 LB/FT
 BATTER PILE NO. 18 LOCATION NORTH ABUTMENT CAML. RD. UNDERPASS DATE DRIVEN DEC. 12, 1973

TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.
22'-7"	1	3		26			51			76	
	2	3		27			52			77	
	3	3		28			53			78	
	4	3		29			54			79	
	5	4		30			55			80	
	6	3		31			56			81	
	7	4		32			57			82	
	8	4		33			58			83	
	9	7		34			59			84	
	10	7		35			60			85	
	11	7		36			61			86	
	12	11		37			62			87	
	13	10		38			63			88	
	14	11		39			64			89	
	15	14		40			65			90	
	16	16		41			66			91	
	17	20		42			67			92	
	18	26		43			68			93	
	19	26		44			69			94	
	20			45			70			95	
	21			46			71			96	
	22			47			72			97	
	23			48			73			98	
	24			49			74			99	
	25			50			75			100	

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH	2	2	2	2	3	3
MEASURED REBOUND IN INCHES	.312	.312	.312	.312	.312	.312
FINAL LENGTH OF PILE	20'-5"					FINAL CUT OFF ELEVATION 678.50

REPORT TO BE SENT TO: - PRINCIPAL FOUNDATION ENGINEER
 MATERIALS & TESTING DIVISION
 DEPARTMENT OF HIGHWAYS
 DOWNSVIEW, ONTARIO

SIGNED Jan PetipasNAME (PRINT) JAN PETIPASDATE DEC 12, 1973

ATTACH SKETCH OF PILE NUMBERING SYSTEM

678.5
19.3

659.2

TIF

Notes:-

In general this form should be completed for every tenth pile in a group, but at least one is required for every pier and abutment.

Piles driven vertically should be selected where possible.

Pile Details must include type, dimensions and weight per foot, details of shoe, and slope of batter: e.g. $12\frac{1}{2}$ " O.D. steel tube x 0.251" @ 33 lbs. per ft. Vertical. $12\frac{1}{2}$ " x $\frac{1}{2}$ " steel plate shoe.

Details for the final six inches of penetration must be completed for all piles except in the case of an end bearing pile driven to bedrock. Final length of pile, and final cut off elevation must always be given.

The total length being driven is the full length of the pile and remains unchanged until a length is cut off or spliced on.

The penetration in blows per foot must be recorded for every foot of penetration of the pile.

Measured rebounds recorded on this form must be the average for each individual inch for the final six inches of penetration.

ONTARIO DEPARTMENT OF HIGHWAYS - ONTARIO

Form OH-MT-285

MATERIALS AND TESTING OFFICE FOUNDATION SECTION

BRIDGE CONSTRUCTION - PILE DRIVING RECORD

DISTRICT NO. 1 CONTRACT NO. 73-86 STRUCTURE CAMLACHIE ROAD UNDERPASS
 CONTRACTOR BERMINGHAM DESIGN LOAD OF PILE 25 TONS/PILE
 HAMMER DETAILS: TYPE REVISED B. 225 WEIGHT 3750 lb HEIGHT OF FALL OR ENERGY 32,500 Ft lb
 TYPE OF ANVIL OR CAP _____ WEIGHT OF ANVIL OR CAP 1100 lb
 PILE DETAILS 12 3/4" O.D. X 250" WALL STEEL TUBE PILES - 33.38 LBS/FT.
 PILE NO. 5 LOCATION NORTH ABUTMENT CAML. RD UNDERPASS DATE DRIVEN DEC. 12, 1973

TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS/FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS/FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS/FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS/FT.
40'-8"	1	1		26			51			76	
	2	1		27			52			77	
	3	2		28			53			78	
	4	3		29			54			79	
	5	2		30			55			80	
	6	3		31			56			81	
	7	3		32			57			82	
	8	3		33			58			83	
	9	7		34			59			84	
	10	8		35			60			85	
	11	7		36			61			86	
	12	7		37			62			87	
	13	8		38			63			88	
	14	12		39			64			89	
	15	17		40			65			90	
	16	20		41			66			91	
	17	24		42			67			92	
	18	25		43			68			93	
	19	27		44			69			94	
	20			45			70			95	
	21			46			71			96	
	22			47			72			97	
	23			48			73			98	
	24			49			74			99	
	25			50			75			100	

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH	2	2	2	2	3	3
MEASURED REBOUND IN INCHES	.312	.312	.312	.312	.312	.312
FINAL LENGTH OF PILE <u>20'-0"</u>	FINAL CUT OFF ELEVATION <u>678.50</u>					

REPORT TO BE SENT TO: - PRINCIPAL FOUNDATION ENGINEER
 MATERIALS & TESTING DIVISION
 DEPARTMENT OF HIGHWAYS
 DOWNSVIEW, ONTARIO

SIGNED Ian Petipas
 NAME (PRINT) IAN PETIPAS
 DATE DEC. 12, 1973

ATTACH SKETCH OF PILE NUMBERING SYSTEM

678.5
 19.8
 658.7

TIP

Notes:-

In general this form should be completed for every tenth pile in a group, but at least one is required for every pier and abutment.

Piles driven vertically should be selected where possible.

Pile Details must include type, dimensions and weight per foot, details of shoe, and slope of batter: e.g. 12 $\frac{1}{2}$ " O.D. steel tube x 0.251" @ 33 lbs. per ft. Vertical. 12 $\frac{1}{2}$ " x $\frac{1}{2}$ " steel plate shoe.

Details for the final six inches of penetration must be completed for all piles except in the case of an end bearing pile driven to bedrock. Final length of pile, and final cut off elevation must always be given.

The total length being driven is the full length of the pile and remains unchanged until a length is cut off or spliced on.

The penetration in blows per foot must be recorded for every foot of penetration of the pile.

Measured rebounds recorded on this form must be the average for each individual inch for the final six inches of penetration.

OVER

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND TESTING OFFICE

FOUNDATION SECTION

BRIDGE CONSTRUCTION - PILE DRIVING RECORD

DISTRICT NO. 1 CONTRACT NO. 73-86 STRUCTURE CAMLACHIE ROAD UNDERPASS
 CONTRACTOR BERMINGHAM DESIGN LOAD OF PILE 25 TONS / PILE
 HAMMER DETAILS: TYPE REVISED B.225 WEIGHT 3750 lb HEIGHT OF FALL OR ENERGY 32,500 FT-LB
 TYPE OF ANVIL OR CAP _____ WEIGHT OF ANVIL OR CAP 1100 lb
 PILE DETAILS 12 3/4" O.D. x .250" WALL STEEL TUBE PILES - 33.38 LBS/FT
 PILE NO. 8 LOCATION NORTH ABUTMENT CAML. RD. UNDERPASS DATE DRIVEN DEC 12, 1973

 PILE
DRIVEN
VERTICALLY

TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.
21'-3"	1	3		26			51			76	
	2	3		27			52			77	
	3	3		28			53			78	
	4	3		29			54			79	
	5	3		30			55			80	
	6	4		31			56			81	
	7	4		32			57			82	
	8	4		33			58			83	
	9	5		34			59			84	
	10	7		35			60			85	
	11	6		36			61			86	
	12	7		37			62			87	
	13	9		38			63			88	
	14	10		39			64			89	
	15	12		40			65			90	
	16	13		41			66			91	
	17	18		42			67			92	
	18	19		43			68			93	
	19	21		44			69			94	
	20			45			70			95	
	21			46			71			96	
	22			47			72			97	
	23			48			73			98	
	24			49			74			99	
	25			50			75			100	

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH	2	2	2	2	2	2
MEASURED REBOUND IN INCHES	.312	.312	.312	.312	.312	.312
FINAL LENGTH OF PILE	20'-3"			FINAL CUT OFF ELEVATION		
				678.50		

REPORT TO BE SENT TO: - PRINCIPAL FOUNDATION ENGINEER
 MATERIALS & TESTING DIVISION
 DEPARTMENT OF HIGHWAYS
 DOWNSVIEW, ONTARIO

SIGNED Jan PetipasNAME (PRINT) JAN PETIPASDATE DEC. 12, 1973

ATTACH SKETCH OF PILE NUMBERING SYSTEM

 678.5
20.2

658.3

714

Notes:-

In general this form should be completed for every tenth pile in a group, but at least one is required for every pier and abutment.

Piles driven vertically should be selected where possible.

Pile Details must include type, dimensions and weight per foot, details of shoe, and slope of batter: e.g. 12 $\frac{1}{2}$ " O.D. steel tube x 0.251" @ 33 lbs. per ft. Vertical. 12 $\frac{1}{2}$ " x $\frac{1}{2}$ " steel plate shoe.

Details for the final six inches of penetration must be completed for all piles except in the case of an end bearing pile driven to bedrock. Final length of pile, and final cut off elevation must always be given.

The total length being driven is the full length of the pile and remains unchanged until a length is cut off or spliced on.

The penetration in blows per foot must be recorded for every foot of penetration of the pile.

Measured rebounds recorded on this form must be the average for each individual inch for the final six inches of penetration.

1 2 3 4 5 6

1918

1918

1918

1918

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND TESTING OFFICE

OVER

FOUNDATION SECTION

BRIDGE CONSTRUCTION - PILE DRIVING RECORD

DISTRICT NO. 1 CONTRACT NO. 73-26 STRUCTURE CAMLACHIE ROAD UNDERPASS
 CONTRACTOR BERMINGHAM DESIGN LOAD OF PILE 25 TONS / PILE
 HAMMER DETAILS: TYPE REVISED B.225 WEIGHT 3750 lb HEIGHT OF FALL OR ENERGY 32,500 Ft. lb.
 TYPE OF ANVIL OR CAP _____ WEIGHT OF ANVIL OR CAP 1100 lb
 PILE DETAILS 12 3/4" O.D. x 250" WALL STEEL TUBE PILES 33.38 LBS/FT
 PILE NO. 20 LOCATION SOUTH ABUTMENT CAML. RD. UNDERPASS DATE DRIVEN DEC 11, 1973

TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.
30'-5"	1	2		26			81			76	
	2	2		27			82			77	
	3	3		28			83			78	
	4	4		29			84			79	
	5	4		30			85			80	
	6	5		31			86			81	
	7	6		32			87			82	
	8	6		33			88			83	
	9	8		34			89			84	
	10	11		35			90			85	
	11	12		36			91			86	
	12	12		37			92			87	
	13	14		38			93			88	
	14	15		39			94			89	
	15	19		40			95			90	
	16	20		41			96			91	
	17	22		42			97			92	
	18	26		43			98			93	
	19	29		44			99			94	
	20			45			100			95	
	21			46						96	
	22			47						97	
	23			48						98	
	24			49						99	
	25			50						100	

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH	2	2	3	3	3	3
MEASURED REBOUND IN INCHES	.25	.25	.25	.25	.25	.25
FINAL LENGTH OF PILE	26'-0"		FINAL CUT OFF ELEVATION			
			678.50			

REPORT TO BE SENT TO: - PRINCIPAL FOUNDATION ENGINEER
 MATERIALS & TESTING DIVISION
 DEPARTMENT OF HIGHWAYS
 DOWNSVIEW, ONTARIO

SIGNED Jan PetitpasNAME (PRINT) JAN PETITPASDATE DEC. 11, 1973

ATTACH SKETCH OF PILE NUMBERING SYSTEM

678.5

19.2

659.5

TIP

Notes:-

In general this form should be completed for every tenth pile in a group, but at least one is required for every pier and abutment.

Piles driven vertically should be selected where possible.

Pile Details must include type, dimensions and weight per foot, details of shoe, and slope of batter: e.g. 12 $\frac{1}{2}$ " O.D. steel tube x 0.251" @ 33 lbs. per ft. Vertical. 12 $\frac{1}{2}$ " x $\frac{1}{2}$ " steel plate shoe.

Details for the final six inches of penetration must be completed for all piles except in the case of an end bearing pile driven to bedrock. Final length of pile, and final cut off elevation must always be given.

The total length being driven is the full length of the pile and remains unchanged until a length is cut off or spliced on.

The penetration in blows per foot must be recorded for every foot of penetration of the pile.

Measured rebounds recorded on this form must be the average for each individual inch for the final six inches of penetration.

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND TESTING OFFICE

OVER

FOUNDATION SECTION

BRIDGE CONSTRUCTION - PILE DRIVING RECORD

DISTRICT NO. 1 CONTRACT NO. 73 86 STRUCTURE CAMLACHIE ROAD UNDERPASS
 CONTRACTOR BERMINGHAM DESIGN LOAD OF PILE 25 TONS / PILE
 HAMMER DETAILS: TYPE REVISED B. 225 WEIGHT 3750 lb HEIGHT OF FALL OR ENERGY 32,500 FT. lbs
 TYPE OF ANVIL OR CAP _____ WEIGHT OF ANVIL OR CAP 1100 lbs.
 PILE DETAILS 12 3/4" O.D. x 2.50" WALL STEEL TUBE PILES 33.38 LB/FT
 PILE NO. 15 LOCATION SOUTH ABUTMENT CAMLACHIE ROAD UNDERPASS DATE DRIVEN DEC. 11, 1973

TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.
20'-9"	1	2		26			51			76	
	2	3		27			52			77	
	3	3		28			53			78	
	4	5		29			54			79	
	5	00		30			55			80	
	6	00		31			56			81	
	7	00		32			57			82	
	8	00		33			58			83	
	9	00		34			59			84	
	10	9		35			60			85	
	11	13		36			61			86	
	12	14		37			62			87	
	13	16		38			63			88	
	14	22		39			64			89	
	15	30		40			65			90	
	16	31		41			66			91	
	17	33		42			67			92	
	18	29		43			68			93	
	19	29		44			69			94	
	20	30		45			70			95	
	21			46			71			96	
	22			47			72			97	
	23			48			73			98	
	24			49			74			99	
	25			50			75			100	

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH	3	3	3	3	3	3
MEASURED REBOUND IN INCHES	.312	.312	.312	.312	.312	.312
FINAL LENGTH OF PILE	20'-9"		FINAL CUT OFF ELEVATION 678.50			

REPORT TO BE SENT TO: - PRINCIPAL FOUNDATION ENGINEER
 MATERIALS & TESTING DIVISION
 DEPARTMENT OF HIGHWAYS
 DOWNSVIEW, ONTARIO

SIGNED Ian Pettipas
 NAME (PRINT) IAN PETTIPAS
 DATE DEC 11, 1973

ATTACH SKETCH OF PILE NUMBERING SYSTEM

678.5
 20.4
 658.1

TIP

BRIDGE CONSTRUCTION - PILE DRIVING RECORD

CONTRACT NO. 1
DISTRICT NO. 1
SECTION NO. 1
Pier No. 1

DATE OF PILE DRIVING: 10/1/12
Pile No. 1

Notes: 1. Pile driven vertically. 2. Pile driven horizontally.

Notes:-

In general this form should be completed for every tenth pile in a group, but at least one is required for every pier and abutment.

Piles driven vertically should be selected where possible.

Pile Details must include type, dimensions and weight per foot, details of shoe, and slope of batter: e.g. 12 $\frac{1}{2}$ " O.D. steel tube x 0.251" @ 33 lbs. per ft. Vertical. 12 $\frac{1}{2}$ " x $\frac{1}{2}$ " steel plate shoe.

Details for the final six inches of penetration must be completed for all piles except in the case of an end bearing pile driven to bedrock. Final length of pile, and final cut off elevation must always be given.

The total length being driven is the full length of the pile and remains unchanged until a length is cut off or spliced on.

The penetration in blows per foot must be recorded for every foot of penetration of the pile.

Measured rebounds recorded on this form must be the average for each individual inch for the final six inches of penetration.

2 8 2 2 2 2
10/1/12 10/1/12 10/1/12 10/1/12 10/1/12 10/1/12

10/1/12

10/1/12

10/1/12

10/1/12

10/1/12

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND TESTING OFFICE
FOUNDATION SECTION

OVER

BRIDGE CONSTRUCTION - PILE DRIVING RECORD

DISTRICT NO. 1 CONTRACT NO. 73-86 STRUCTURE CANLACHIE ROAD UNDERPASSCONTRACTOR BERMINGHAM DESIGN LOAD OF PILE 25 TONS / PILEHAMMER DETAILS: TYPE REVISED B.225 WEIGHT 3750 lbs HEIGHT OF FALL OR ENERGY 52.50 FT.-lbsTYPE OF ANVIL OR CAP _____ WEIGHT OF ANVIL OR CAP 1100 lbsPILE DETAILS 12 3/4" O.D x .850" WALL STEEL TUBE PILES 33.38 LBS/FTPILE NO. 6 LOCATION SOUTH ABUTMENT CANL. RD. UNDERPASS DATE DRIVEN DEC. 11, 1973

TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.	TOTAL LENGTH BEING DRIVEN	LENGTH IN GROUND	PENETRATION BLOWS / FT.
41'-3"	1	20		26			51			76	
	2	22		27			52			77	
	3	22		28			53			78	
	4	4		29			54			79	
	5	4		30			55			80	
	6	4		31			56			81	
	7	7		32			57			82	
	8	7		33			58			83	
	9	9		34			59			84	
	10	10		35			60			85	
	11	11		36			61			86	
	12	12		37			62			87	
	13	14		38			63			88	
	14	15		39			64			89	
	15	19		40			65			90	
	16	24		41			66			91	
	17	28		42			67			92	
	18	34		43			68			93	
	19	35		44			69			94	
	20			45			70			95	
	21			46			71			96	
	22			47			72			97	
	23			48			73			98	
	24			49			74			99	
	25			50			75			100	

DETAILS FOR FINAL SIX INCHES OF PENETRATION	1	2	3	4	5	6
BLOWS PER INCH	3	3	3	4	4	4
MEASURED REBOUND IN INCHES	.25	.25	.25	.25	.25	.25
FINAL LENGTH OF PILE <u>20'-0"</u>	FINAL CUT OFF ELEVATION <u>678.50</u>					

REPORT TO BE SENT TO: - PRINCIPAL FOUNDATION ENGINEER
MATERIALS & TESTING DIVISION
DEPARTMENT OF HIGHWAYS
DOWNSVIEW, ONTARIOSIGNED San PetipasNAME (PRINT) IAN PETIPASDATE Dec. 11, 1973

ATTACH SKETCH OF PILE NUMBERING SYSTEM

678.5
19.8

TIP

6587

In general this form should be completed for every tenth pile in a group, but at least one is required for every pier and abutment.

File Details must include type, dimensions and weight per foot, details of shoe, and slope of batter: e.g. 12 $\frac{1}{2}$ " O.D. steel tube x 0.251" @ 33 lbs. per ft. Vertical. 12 $\frac{1}{2}$ " x $\frac{1}{2}$ " steel plate shoe.

The total length being driven is the full length of the pile and remains unchanged until a length is cut off or spliced on.

Measured rebounds recorded on this form must be the average for each individual inch for the final six inches of penetration.

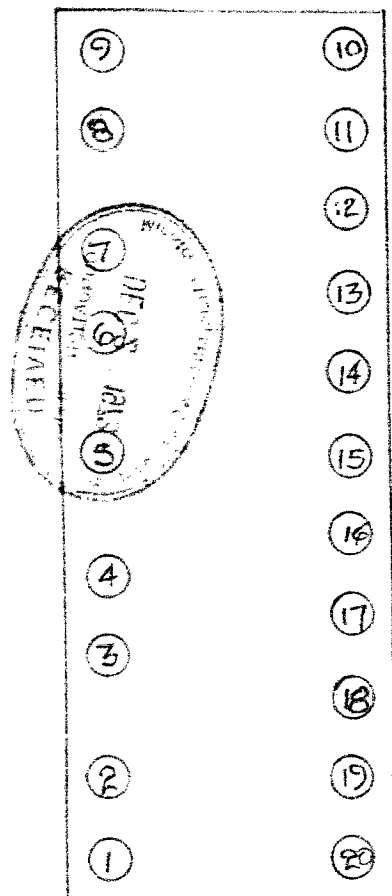
14	1	1	1	1	1
25	25	25	25	25	25

"O-102"

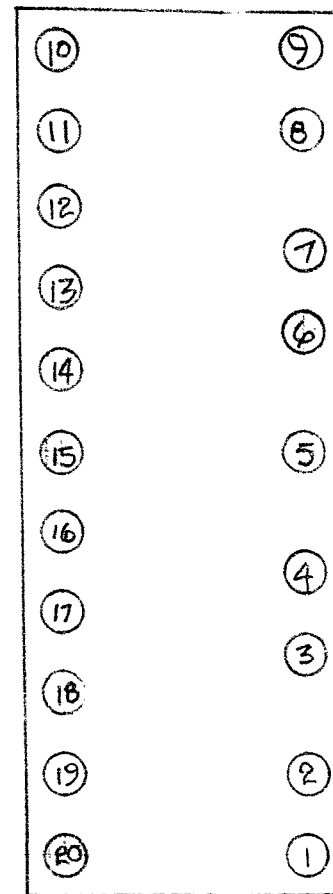
OUTSIDE 11.05.11
EAGLESTON 11.05.11
2781 11.05.11

FILE NUMBERING SYSTEM

CAMLACHIE ROAD UNDERPASS



NORTH ABUTMENT



SOUTH ABUTMENT

Department of Highways Ontario

Copy for the information of

Foundation Office

Mr. A. Stermac,

Principal Foundation Engineer,

Room 107, Lab. Bldg.

C.S. Grebski,
Bridge Office

December 21, 1970

Camlachie Road Underpass
3.4 Miles East of County Rd. #26
W.P. 43-66-11, Site No. 14-348
Highway 402, District No. 1

60-F-98

Attached herewith we are submitting the final
bridge drawings which show the foundation design for
this structure.

Kindly give us your comments at your earliest
convenience.

C.S. Grebski,
Bridge Design Engineer

CSG:rd

Attach.

c.c. Foundation Office

cc Dec 70

*Pile loads and design loads on the pile
should be recorded as conditional only, subject to the
results of pile loading tests in early 1971*

A. L. B.

HL 20 Jan 71

MEMORANDUM

To: Mr. A.G. Stermac,
Principal Foundation Engr.,
Mat. and Testing Office,
Lab Bldg., DOWNSVIEW.

FROM: A.P. Watt,
Reg. Br. Planning Engr.,
London Regional Office.

ATTENTION:

DATE: October 29th, 1969.

OUR FILE REF.

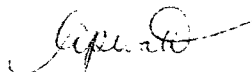
IN REPLY TO

SUBJECT:

W.P. 43-66-11, Bridge Site 14-348,
Camlachie Road Underpass,
3.4 miles east of County Road #26,
Highway 402,
District 1 - Chatham.

Would you kindly arrange to have a foundation investigation conducted at the above location.

I have enclosed two copies of the bridge site plan number E- -1 with the probable footing locations marked in red.



A.P. WATT
Reg. Bridge Planning Engineer,
London Regional Office.

APW/ss
Atch.

c.c. S. McCombie.
A. Crowley.

DOWN CHAT 8 DEC 16/69 4:31

K SELBY FOUNDATIONS, MATERIALS AND TESTING
HIGHWAY 402, VICINITY OF HWY 21 INTERCHANGE

HAVE REVIEWED DAMAGE INCURRED TO HIGHWAY RIGHT OF WAY IN VICINITY OF
NEW HWY 402 ON HWY 21, 3/4 MILE NORTH OF HIGHWAY 7 AND HAVE FOUND THAT
THE DAMAGE IS NEGLIGIBLE. OUR MAINTENANCE FORCES WILL CORRECT THE SITE
AND NO BILLING WILL BE FORWARDED TO M & T FOR THIS WORK.

W KATARYNCZUK MTCE ENGR

21P
TELETYPE

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

PROJECT <u>69-F-98</u>		SITE <u>CAMLACHIE RD</u>		BOREHOLE No. <u>1</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 & CLAY										
10	40-44.5"	1/8"	SUB ANG	15	5	90	HIGH	SHINE	NONE	MED	EARTH	BROWN	STRONG		CLAYEY SILT TO SILT; CLAY WITH TRACES OF SAND.	
11	50-54.5"	—				100	"	"	"	"	"	"	"		CLAYEY SILT TO SILT-CLAY	

NOTES:— VISUAL CLASSIFICATION MUST BE CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:—

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

PROJECT 69-F-98 SITE CAMLACHIE BOREHOLE No. 2 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 & CLAY										
1	4-5.5	1/4"	SUBANG.	5	5	90	HIGH	SHINE	NONE	MED	EARTHY	BROWN	STRONG		CLAYEY SILT WITH TRACES OF SA. & Gr.	
2	8-9.5	1/8"	"	5	5	90	"	"	"	"	"	"	"		CLAYEY SILT TRACES OF SA & Gr.	
3	11-12.5	1/8"	"	5	5	90	"	MED	"	"	"	GRAY BROWN	"		CLAYEY SILT WITH TRACES OF SA. & Gr.	
4	14-15.5	1/8"	"	5	5	90	"	SHINE	"	"	"	"	"		CLAYEY SILT WITH TRACES OF SAND & Gr.	
5	17-18.5	1/4"	"	5	5	90	"	MED	"	"	"	"	"		CLAYEY SILT WITH TRACES OF SA. & Gr.	
6	20-21.5	1/4"	"	6	4	90	"	SHINE	"	"	"	"	"		CLAYEY SILT WITH TRACES OF SA & Gr.	

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

REMARKS:-

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

PROJECT <u>69-F-98</u>		SITE <u>CANLACHIE</u>		BOREHOLE No. <u>4</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 & CLAY											
1	3-4.5	—	—			10							DARK BROWN			ORGANIC CLAYEY SILT	
2	6-7.5	1/4"	SUBANG	5	5	90	HIGH	LIGHT	NONE	MED	EARTH	BROWN	STAIN			CLAYEY SILT WITH TRACES OF SA. & G.	
3	9-10.5	1/4"	"	5	5	90	"	SHINE	"	"	"	"	"			CLAYEY SILT WITH TRACES OF SA. & G.	
4	12-13.5	1/8"	"	5	5	90	"	"	"	"	"	GRAY BROWN	"			CLAYEY SILT WITH TRACES OF SA & G.	
5	15-16.5	1/4"	"	5	5	90	"	"	"	"	"	"	"			CLAYEY SILT WITH TRACES OF SA. & G.	
8	30-31.5	1/4"	"	5	5	90	"	"	"	"	"	"	"			CLAYEY SILT TO SILTY CLAY WITH TRACES OF G.	
9	35-36.5	1/2"	"	5	5	90	"	"	"	"	"	"	"			CLAYEY SILT TO SILTY CLAY WITH TRACES OF G.	

NOTES:— VISUAL CLASSIFICATION MUST BE CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:—

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

PROJECT 69-F-98 SITE CANLACHIE BOREHOLE No. 5 GROUND ELEVATION _____

SAMPLE NO.	DEPTH	GRAIN SIZE DISTRIBUTION			DRY STRENGTH	SHINE	DIALTANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
		LARGEST GRAIN SIZE	SHAPE	PERCENTAGE										
				GRAVEL	SAND	SILT & CLAY								
1	3-4.5	1/4"	SUBANG	8	2	90	HCH	DULL	NONE	MED	EARTHY	BROWN	CLAYEY SILT WITH TRACES OF SA. & G.	
2	6-7.5	1/4"	"	10	2	88	"	SLIGHT TO DULL	"	"	"	"	CLAYEY SILT WITH TRACES OF SAND & G.	
3	9-10.5	1/4"	"	8	2	90	"	MED	"	"	"	"	CLAYEY SILT WITH TRACES OF SAND & G.	
4	12-13.5	1/2"	"	8	2	90	"	MED	"	"	"	GRAY BROWN	CLAYEY SILT WITH TRACES OF SA. & G.	
5	15-16.5	1/2"	"	8	2	90	"	"	"	"	"	"	CLAYEY SILT WITH TRACES OF SA & G.	
6			MISSING											

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

REMARKS:-

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

PROJECT 69-F-98 SITE CANLACHIE BOREHOLE No. 8 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 & CLAY										
1	3-4.5	1/2"	SUBANG.	5	5	90		SLIGHT	NONE						CLAYEY SILT WITH SOME ORG. & TRACES OF SA. & G.	(FILL)
2	6-7.5	1/4"	"	5	5	90	HIGH	"	NONE	MED	EARTHY	BROWN	STRONG		CLAYEY SILT WITH TRACES OF SA, G. & ORG.	
3	9-10.5	1/4"	"	5	5	90	"	"	"	"	"	"	"		CLAYEY SILT WITH TRACES OF SA. & G.	
4	12-13.5	1/2"	"	5	5	90	"	"	"	"	"	GRAY	"		CLAYEY SILT WITH TRACES OF SA. & G.	
5	15-16.5	1/2"	"	5	5	90	"	"	"	"	"	"	"		CLAYEY SILT WITH TRACES OF SA. & G.	
6	20.0-21.	1/2"	"	3	3	94	"	"	"	"	"	"	"		CLAYEY SILT WITH TRACES OF SA. & G.	
8	30-31.5	3/4"	"	5	5	90	"	"	"	"	"	"	"		CLAYEY SILT WITH TRACES OF SA. & G.	
9	40-41.5	1/2"	"	5	5	90	"	"	"	"	"	"	"		CLAYEY SILT WITH TRACES OF SA. & G.	

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

REMARKS:-

VISUAL CLASSIFICATION SHEET

PROJECT 69-F-98 SITE CALMACHIE RD. BOREHOLE No. 9 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 & CLAY											
1	3-4.5	1/4"	SUBANG	5	5	90	High	RIGHT	NONE	MED	EARTHY	BROWN	STAIN			CLAYEY SILT WITH TRACES OF SA. & G.	
2	6-7.5	1/4"	"	5	5	90	"	MED	"	"	"	"	"			CLAYEY SILT WITH TRACES OF SA & G.	
3	9-10.5	1/4"	"	5	5	90	"	"	"	"	"	"	"			CLAYEY SILT WITH TRACES OF SA & G.	
4	12-13.5	1/4"	"	5	5	90	"	SLIGHT	"	"	"	"	"			CLAYEY SILT WITH TRACES OF SA & G.	
5	15-16.5	1/2"	"	5	5	90	"	MED	"	"	"	"	"			CLAYEY SILT WITH TRACES OF SA. & G.	
6	20-21.5	1/4"	"	5	5	90	"	"	"	"	"	"	"			CLAYEY SILT WITH TRACES OF SA & G.	
7	25-26.5	1/4"	"	5	5	90	"	"	"	"	"	"	"			CLAYEY SILT WITH TRACES OF SA & G.	
8	30-31.5	1/4"	"	5	5	90	"	"	"	"	"	"	"			CLAYEY SILT WITH TRACES OF SA & G.	
10	40-41.5	1/4"	"	5	5	90	"	"	"	"	"	"	"			CLAYEY SILT WITH TRACES OF SA. & G.	

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

REMARKS:-

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

PROJECT <u>69-F-98</u>		SITE <u>CALMACHIE RD</u>		BOREHOLE No. <u>9</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 & CLAY										
12	60-61.5	-	-			100	HIGH	SHINE	None	1/2	EARTHY	GREY	STABLE		CLAYEY SILT TO SILTY CLAY	
13	80-81.5	1/2"	SUBANG.	5	2	93	11	"	"	"	"	"			CLAYEY SILT TO SILTY CLAY WITH TRACES OF SAND.	

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

REMARKS:-