

INTRODUCTION

This report contains the results of a foundation investigation carried out at the site of the following project:

W.P. 42-66-12 - Township Road Underpass
2.3 Miles East of Hwy. 79
Hwy. 402, Line 'C'
District 1, Chatham

For purposes of the contract all other Foundation Investigation Reports prepared by or for the Ministry in connection with the above mentioned project are superceded by this report.

SITE DESCRIPTION

The site is situated in Lots 24 and 25, Cons. 1 and 2, Twp. of Warwick, County of Lambton.

The surrounding area is flat with cultivated farm land.

Physiographically, the site is located in the region referred to as the Horseshoe Moraines.

SUBSURFACE CONDITIONS

General

Generally, uniform subsoil conditions were found to prevail over the area investigated. The subsoil consists of a deep deposit of clayey silt with traces of sand, overlying bedrock.

The boundaries between various soil types are shown on the Record of Borehole Sheets contained in the Appendix of this report. The locations and elevations of borings, together with the inferred subsoil stratigraphy, are shown on Drawing No. D-7064-2 of the Contract Drawings.

From ground level downward, the various strata are described in some detail with regard to soil types and soil properties, as follows:

Fill, Sand and Gravel

This material was found in borehole 2 only, and constitutes the fill placed for the gravel road. It consists of sand and gravel. Its depth in borehole 2 was 1.5 feet.

Clayey Silt

This was the predominant soil deposit and was found in all boreholes. All boreholes were terminated in this deposit. It is believed that bedrock

was encountered at the bottom of borehole 1, when refusal to penetration of the split-spoon was met at a depth of 100.8 feet.

The material, in general, consists of clayey silt with small amounts (varying from traces to some) of sand. However, the percentage of sand and gravel gradually increases with depth. There were occasional seams of silt and/or fine sand, varying from a fraction of an inch to a few inches in thickness. These seams were apparently randomly distributed and could possibly act as water bearing seams.

The consistency of the material varies from very stiff to hard as indicated by 'N' values ranging from 11 to 59 blows per foot. Field vane tests and unconfined compression tests indicate the undrained shear strength everywhere is greater than 2,000 psf.

Physical properties of the deposit as determined from laboratory tests are as follows and are plotted on Fig. 1.

		<u>Min.</u>	<u>Max.</u>	<u>Average</u>
Liquid Limit	(%)	22	40	30
Plastic Limit	(%)	15	21	18
Natural Moisture Content	(%)	12	25	19

Grain-size analyses indicate the following distributions, and are plotted on Fig. 2.

		<u>Min.</u>	<u>Max.</u>	<u>Average</u>
Gravel	(%)	0	6	3
Sand	(%)	7	61	11
Silt	(%)	24	69	57
Clay	(%)	20	34	29

Colour of the material was gray, except for the upper 8 feet, where it was brown.

Bedrock

No bedrock was proven, but in borehole 1, the bedrock surface was assumed to be the level at which refusal to driving the split-spoon was reached. In borehole 1 the refusal was met at a depth of 100.8 feet, i.e., at elevation 704.6.

Groundwater

The following water levels were observed during the field work:

Borehole #1	Elevation 802.4
2	801.1
3	802.7

Because the clayey silt material itself is relatively impermeable, the seepage of water into the boreholes indicates that the silt and/or fine sand seams act as water bearing seams.

A. Prakash

A. PRAKASH, P. Eng.
Senior Engineer



K.G. SELBY, P. Eng.
Supervising Engineer

April, 1976

ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 1

W.P. 42-66-12 LOCATION Sta. 101 + 27 15' Lt. E Twp. Rd. ORIGINATED BY AP
 DIST 1 HWY 402 BORING DATE June 12, 1971 COMPILED BY KW
 DATUM Geodetic BOREHOLE TYPE CME Flight Auger and Cone CHECKED BY 6

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT				LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			UNIT WEIGHT γ PCF	REMARKS % GR SA SI CL
FLEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	N' VALUES		20	40	60	80	100	w_p	w		
805.4	Ground Level						400	800	1200	1600	2000	20	40	60	
0.0			1	SS	13	800									
	Brown		2	SS	45										0 11 69 20
	Grey		3	SS	20										
			4	SS	24	790									
			5	TW	PH										
	Clayey silt, traces to some sand, traces of gravel. Occ. silt and/or fine sand seams		6	TW	PH	780									2 10 62 26
	(Glacial Till)		7	SS	21										8 14 53 25
	Very stiff to hard		8	SS	15	770									
			9	SS	27	760									7 18 53 22
			10	SS	36	750									
			11	SS	150.3"	740									
704.6	Silty sand, traces of gravel & clay					730									6 61 24 9
100.8	End of Borehole					720									
						710									

20
15 5 % STRAIN AT FAILURE
10

ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE No 2

WP 42-66-12 LOCATION Sta. 100 + 00 E' Rt. 6 Twp. Rd. ORIGINATED BY AP
 DIST 1 HWY 402 BORING DATE May 31, 1971 COMPILED BY KW
 DATUM Geodetic BOREHOLE TYPE CME Flight Auger and Cone CHECKED BY Lo

SOIL PROFILE			SAMPLES			GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			UNIT WEIGHT γ PCF	REMARKS % GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	N' VALUES		20	40	60	80	100	w_p	w	w_L		
804.6	Ground Level															
802.6	Fill. Sand & Gravel															
2.0			1	SS	11	800										
			2	SS	20											
	Brown Grey		3	SS	24											1 5 63 31
			4	SS	18	790										
			5	SS	13											
	Clayey silt, traces to some sand, traces of gravel		6	TW	PH	780									135	3 9 54 34
	Occ. silt and/or fine sand seams		7	SS	19											
	(Glacial Till)					770										
	Very stiff to hard		8	SS	30	760										1 14 64 21
			9	SS	39	750										
			10	SS	59	740										3 12 58 27
			11	SS	42	730										
						720										
						710										
707.6																
97.0	End of Borehole															

20
15 \diamond 5 % STRAIN AT FAILURE
10

ENGINEERING SERVICES BRANCH-GEOTECHNICAL OFFICE-SOIL MECHANICS SECTION

RECORD OF BOREHOLE NO 3

WP 42-66-12

LOCATION Sta. 98 + 75 12' Lt. C Twp. Rd.

ORIGINATED BY AP

DIST 1 HWY 402

BORING DATE June 1, 1971

COMPILED BY KW

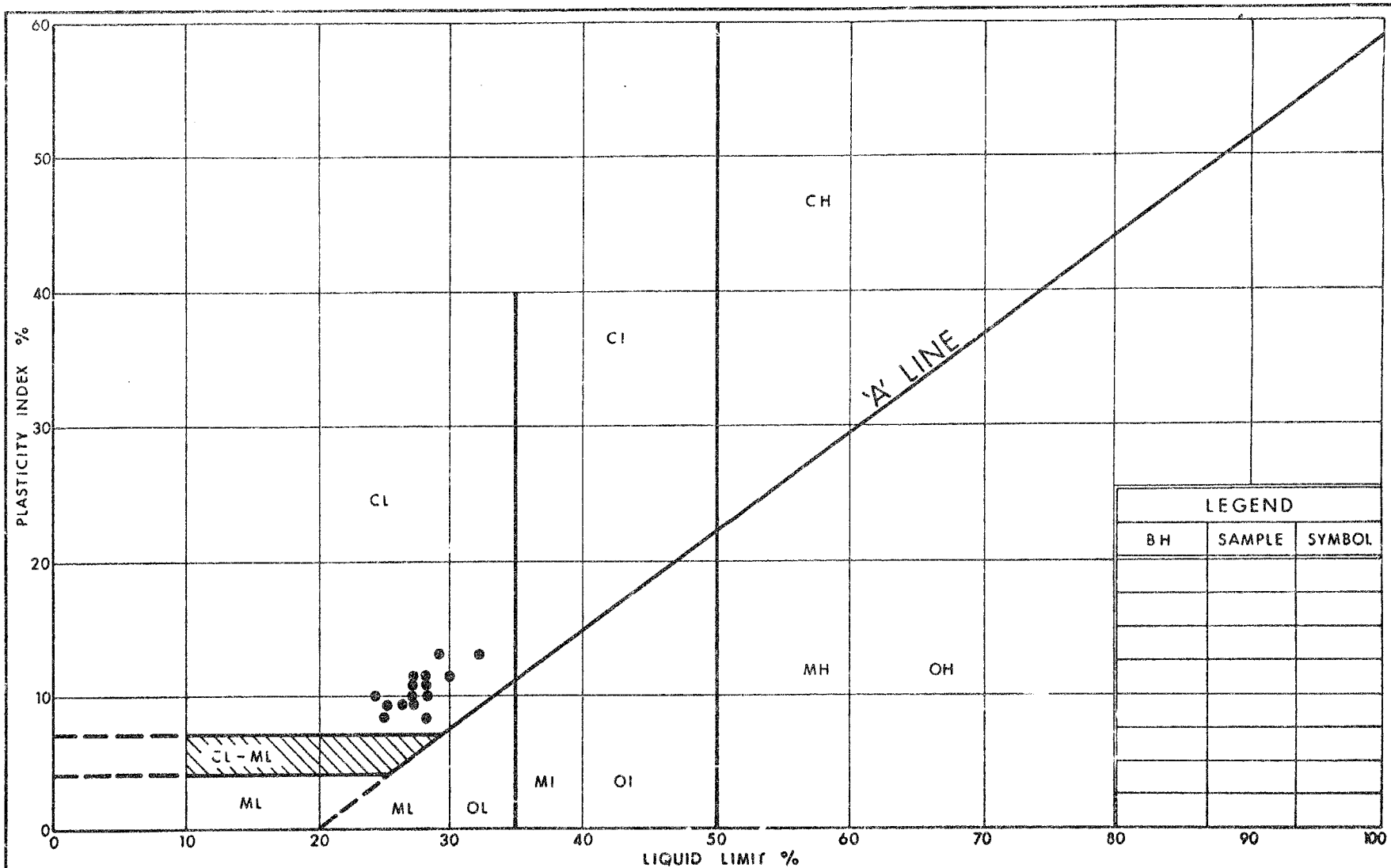
DATUM Geodetic

BOREHOLE TYPE CME Flight Auger & Cone

CHECKED BY

SOIL PROFILE		SAMPLES		GROUND WATER ELEV	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE	LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w w_p — w — w_L WATER CONTENT % 20 40 60	UNIT WEIGHT γ	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER TYPE VALUES					
805.0	Ground Level							
	brown Grey Clayey silt, traces to some sand, traces of gravel. Occ. silt and/or sand seams (Glacial Till) Very stiff to hard		1 SS 19	800				3 7 60 30
			2 SS 20					
			3 SS 20					
			4 SS 18	790				2 9 59 30
			5 TW PH					
			6 TW H	780				
			7 SS -					1 8 61 30
			8 SS 12	770				
			9 SS 37	750				8 20 45 27
733.5				10 SS 50	740			
71.5	End of Borehole			730				

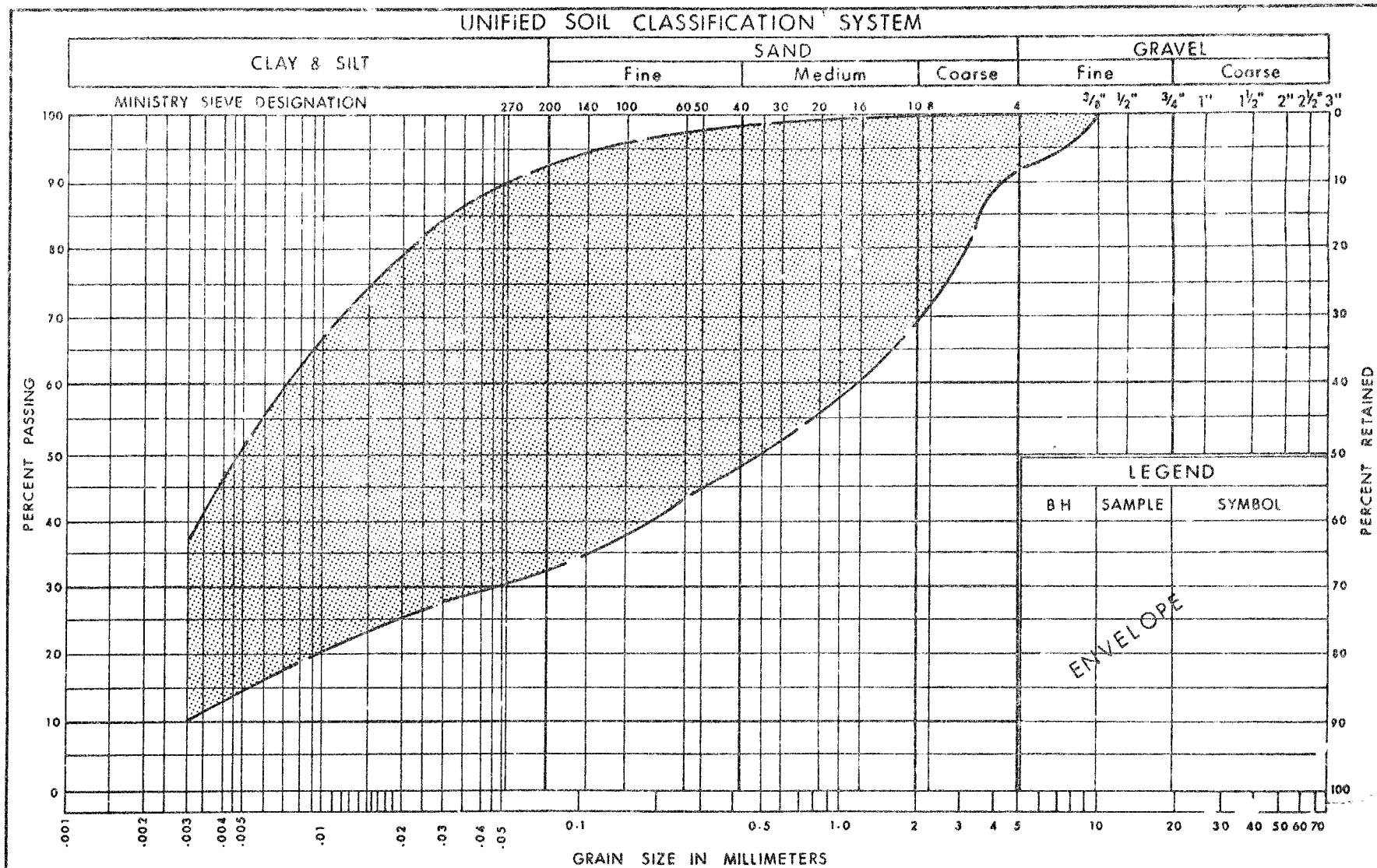
 20
 15 \diamond 5 % STRAIN AT FAILURE
 10



Ministry of
Transportation and
Communications
Ontario
ENGINEERING SERVICES BRANCH

PLASTICITY CHART CLAYEY SILT (GLACIAL TILL)

FIG No 1
W P 42-66-12



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Communications
Ontario
ENGINEERING SERVICES BRANCH

GRAIN SIZE DISTRIBUTION
CLAYEY SILT
(GLACIAL TILL)

FIG No 2
W P 42-66-12

FOUNDATION INVESTIGATION REPORT
For
Proposed Crossing at
C.A.H. 402 and Twp. Road
2.4 miles East of Hwy. 79
Twp. of Warwick Co. of Lambton
District #1 (Chatham)
W.O. 71-11043 --- W.P. 42-66-12

1. INTRODUCTION:

A request for a foundation investigation at the crossing of the proposed C.A.H. 402, Line 'C' and Township Road (2.4 miles east of Hwy. 79), was received from Mr. A.P. Watt, Regional Bridge Planning Engineer, in a memorandum dated April 13, 1971.

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 structure is situated about 5.5 miles east of Warwick, approx. 3/4 miles south of Hwy. 7.

The surrounding area is flat with cultivated farm land.

Physiographically, the site is located in the region referred to as the Horseshoe Moraines.

3. FIELD AND LABORATORY INVESTIGATION PROCEDURES:

A total of three sampled boreholes and three dynamic cone penetration tests were carried out during the course of the

3. FIELD AND LABORATORY INVESTIGATION PROCEDURES: (cont'd) ... field work. Boring was achieved by means of a continuous flight auger machine. 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 I.D. 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. Driving energy used to advance the cone was 350 ft.-lbs. per blow.

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 No. 71-11043A 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

Consolidation Characteristics

3. FIELD AND LABORATORY INVESTIGATION PROCEDURES: (cont'd) ...

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

4. SUBSOIL CONDITIONS:

4.1) General:

Generally, uniform subsoil conditions were found to prevail over the area investigated. The subsoil consists of a deep deposit of clayey silt with traces of sand, overlying bedrock.

The boundaries between various soil types are shown on the Record of Borehole sheets. The estimated stratigraphical profile shown on Drawing No. 71-11043A is based upon this information.

From ground level downward, the various strata are described in some detail with regard to soil types and soil properties, as follows:

4.2) Fill, Sand and Gravel:

This material was found in Borehole 2 only, and constitutes the fill placed for the gravel road. It consists of sand and gravel. Its depth in Borehole 2 was 1.5 feet.

4.3) Clayey Silt:

This was the predominant soil deposit, and was found in all boreholes. All boreholes were terminated in this deposit. It is believed that bedrock was encountered at the bottom of Borehole 1, when refusal to penetration of the split-spoon was met at a depth of 100.8 feet.

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

4.3) Clayey Silt: (cont'd) ...

The material, in general, consists of clayey silt with small amounts (varying from traces to some) of sand. However, the percentage of sand and gravel gradually increases with depth. There were occasional seams of silt and/or fine sand, varying from a fraction of an inch to a few inches in thickness. These seams were apparently randomly distributed and could possibly act as water bearing seams.

The consistency of the material varies from very stiff to hard as indicated by 'N' values ranging from 11 to 59 blows per foot. Field vane tests and unconfined compression tests indicate that undrained shear strength everywhere is greater than 2,000 p.s.f.

Physical properties of the deposit as determined from laboratory tests are as follows, and are plotted on Fig. 1.

	(%)	<u>Min.</u>	<u>Max.</u>	<u>Average</u>
Liquid Limit		22	40	30
Plastic Limit		15	21	18
Natural Moisture Content		12	25	19

Grain size analyses indicate the following distributions, and are plotted on Fig. 2.

	(%)	<u>Min.</u>	<u>Max.</u>	<u>Average</u>
Gravel		0	6	3
Sand		7	61	11
Silt		24	69	17
Clay		20	34	29

Colour of the material was gray, except for the upper 8 feet, where it was brown.

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

4.4) Bedrock:

No bedrock was proven, but in Borehole 1, the bedrock surface was assumed to be the level at which refusal to driving the split-spoon was reached. In Borehole 1 the refusal was met at a depth of 100.8 feet, i.e., at Elevation 704.6

5. GROUNDWATER CONDITIONS:

The following water levels were observed during the field work:

Borehole	1	Elevation	802.4
	2		801.1
	3		802.7

Because the clayey silt material itself is relatively impermeable, the seepage of water into the boreholes indicates that the silt and/or fine sand seams act as water bearing seams.

6. DISCUSSION AND RECOMMENDATIONS:

6.1) General:

It is proposed to construct a two-span (126'-126') underpass structure at the crossing of new Hwy. 402, Line 'C' and Township Road, 2.4 miles east of Hwy. 79. The proposed grade of Hwy. 402 will be approx. Elevation 805.0, i.e. the same as the present grade of the Township Road. The future grade of the Township Road will be at approximate Elevation 827.0, resulting in a maximum approach height of about 22 ft.

In general, the subsoil at the site consists of about

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

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

100 ft. of very stiff to hard clayey silt with traces of sand, overlying bedrock.

6.2) Foundations:

a) Spread Footings in Original Ground:

As described earlier, the shear strength of the subsoil is in general greater than 2,000 p.s.f. Therefore, it is recommended that the entire structure be supported on spread footings. A safe net pressure of 2.0 tons/sq. ft. may be assumed for design purposes.

The upper zone of the subsoil is slightly desiccated and is, therefore, 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. Any seepage into the excavations can be handled by pumping.

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.

c) Perched Abutments on Short Piles:

As a second alternative, the abutments may be

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

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

c) Perched Abutments on Short Piles: (cont'd) ...
constructed within the approach fills and supported on short piles driven through the fill and some 10.0 ft. into the original ground. In the case of 12-3/4" O.D. and 1/4" thick wall steel tube piles, a safe design load of 25 tons per pile may be used.

It is estimated that the following maximum settlements will occur in the subsoil at various locations over a long period of time following the end of construction.

Pier -	Spread footings in original ground	1.0 - 1.5 inches
Abutment -	Spread footings in original ground	} 3.0 - 4.0 inches
	Spread footings on compacted fill	
	Perched abutments on short piles	

Regardless of which of the above methods is adopted, the structure should be built to accomodate the 3.0 inches differential settlements between the abutments and the pier.

d) End-Bearing Piles:

As another alternative, the abutments and pier may be supported on steel H-piles driven to refusal into the bedrock. For design purposes the maximum allowable design load may be used for the particular steel section used. Because the lengths of the piles required will be about 100 ft., it may not be the most economical method.

All foundations and pile caps should be protected against frost action by at least 4 ft. of earth cover.

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

6.3) Approach Embankments:

The shear strength of the subsoil is such that it will be able to safely support the 22-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 with somewhat similar subsoil conditions, it is estimated that maximum settlements of 3 to 4 inches will occur beneath the abutment locations. 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 May 31 to June 3, 1971, under the supervision of Mr. A. Prakash, Project Foundation Engineer, who also prepared this report.

Equipment was owned and operated by Dominion Soil Investigation Ltd.

7. MISCELLANEOUS: (cont'd) ...

This report was reviewed by Mr. K. G. Selby, Supervising Foundation Engineer.

June, 1971

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 1

FOUNDATION SECTION

JOB 71-11043 LOCATION Trp. Rd. Sta. 101 + 27 15' Lt. E Twp. Rd. ORIGINATED BY AP
W.P. 42-66-12 BORING DATE June 12, 1971 COMPILED BY KW
DATUM Geodetic BOREHOLE TYPE CME Flight Auger and Cone CHECKED BY [Signature]

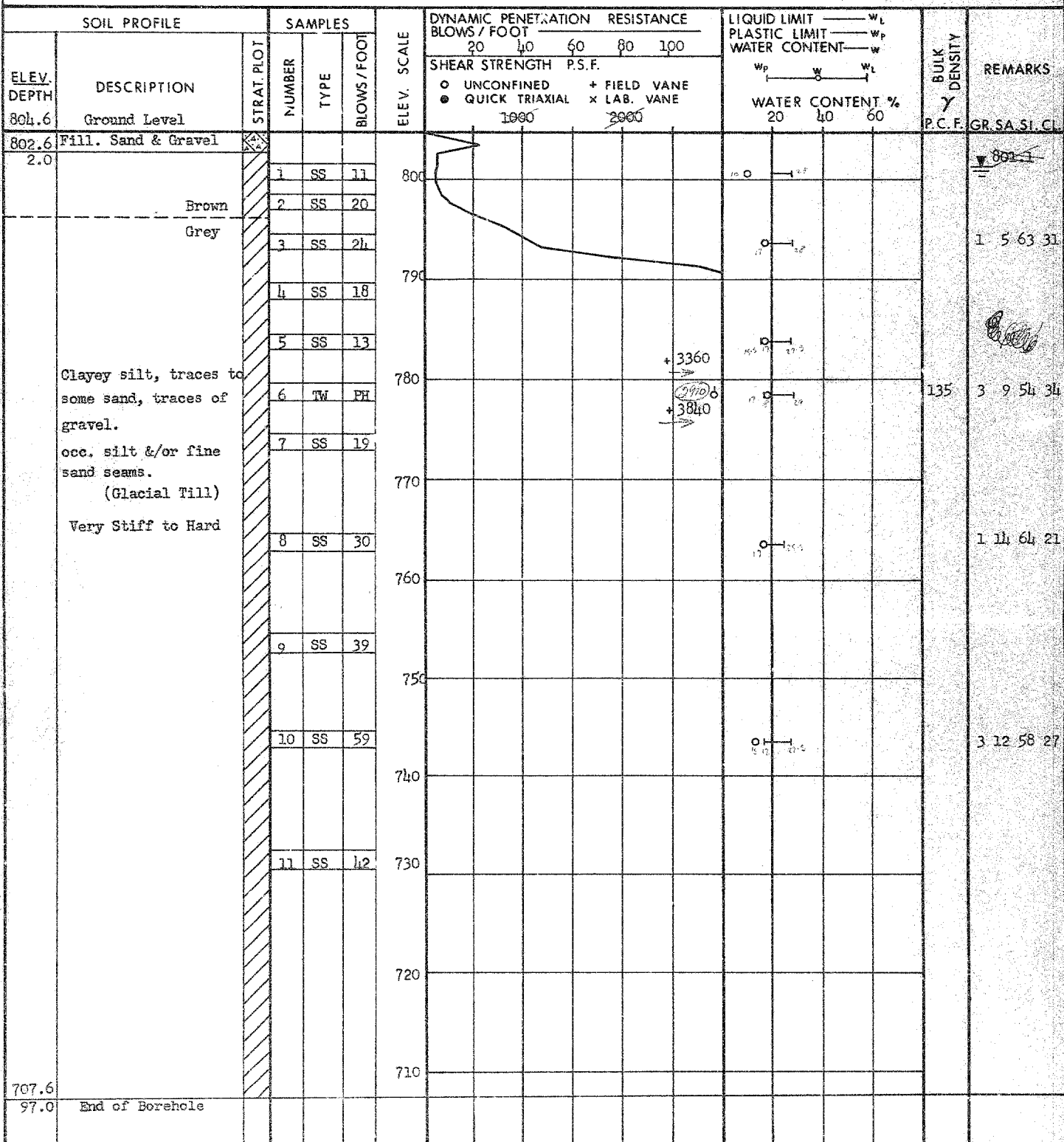
SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT				LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	20	40	60	80	100	Wp	WL	
805.4 0.0	Ground Level													
			1	SS	13	800								
			2	SS	15									
	Brown Grey		3	SS	20									0 11 69 20
			4	SS	24	790								
			5	TW	PH									133 2 10 62 26
	Clayey silt, traces to some sand, traces of gravel.		6	TW	PH	780								
	Occ. silt &/or fine sand seams.		7	SS	21									8 14 53 25
	(Glacial Till)		8	SS	15	770								
	Very Stiff to Hard		9	SS	27	760								
			10	SS	36	750								7 18 53 22
						740								
						730								
						720								
						710								
704.6 100.8	Silty sand, traces of gravel & clay End of Borehole		11	SS	150/3"									6 61 24 9

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 2

FOUNDATION SECTION

JOB 71-11043 LOCATION Trp. Rd. Sta. 100 + 00 8' Rt. 2 Twp. 20 ORIGINATED BY AP
W.P. 42-66-12 BORING DATE May 31, 1971 COMPILED BY KW
DATUM Geodetic BOREHOLE TYPE CME Flight Auger & Cone CHECKED BY KL

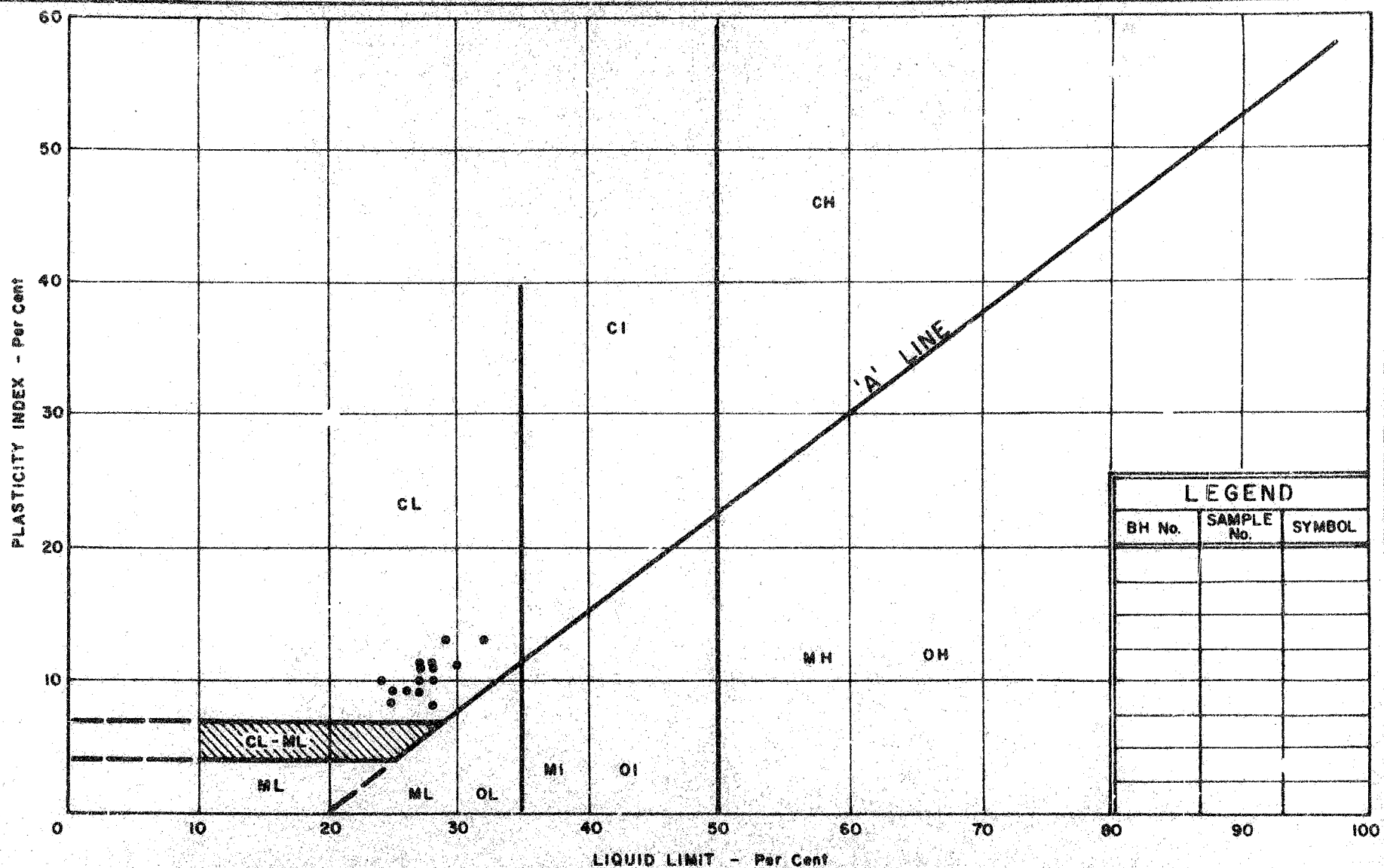


RECORD OF BOREHOLE No. 3

FOUNDATION SECTION

JOB 71-11043 LOCATION Ap. Rd. Sta. 98 + 75 12' Lt. E Twp Rd. ORIGINATED BY AP
W.P. 42-66-12 BORING DATE June 1, 1971 COMPILED BY KW
DATUM Geodetic BOREHOLE TYPE CME Flight Auger & Cone CHECKED BY ML

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION 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		BLOWS / FOOT	20	40	60	80	100	w_p	w		
805.0	Ground Level															
			1	SS	19											
			2	SS	20											
	Brown Grey		3	SS	20											
			4	SS	18											
	Clayey silt, traces to some sand,		5	TW	PH											
	traces of gravel.		6	TW	PH											
	occ. silt &/or fine sand seams.		7	SS	-											
	(Glacial Till)															
	Very Stiff to Hard		8	SS	12											
			9	SS	37											
733.5			10	SS	50											
71.5	End of Borehole															



DEPARTMENT OF HIGHWAYS
MATERIALS and
TESTING
DIVISION

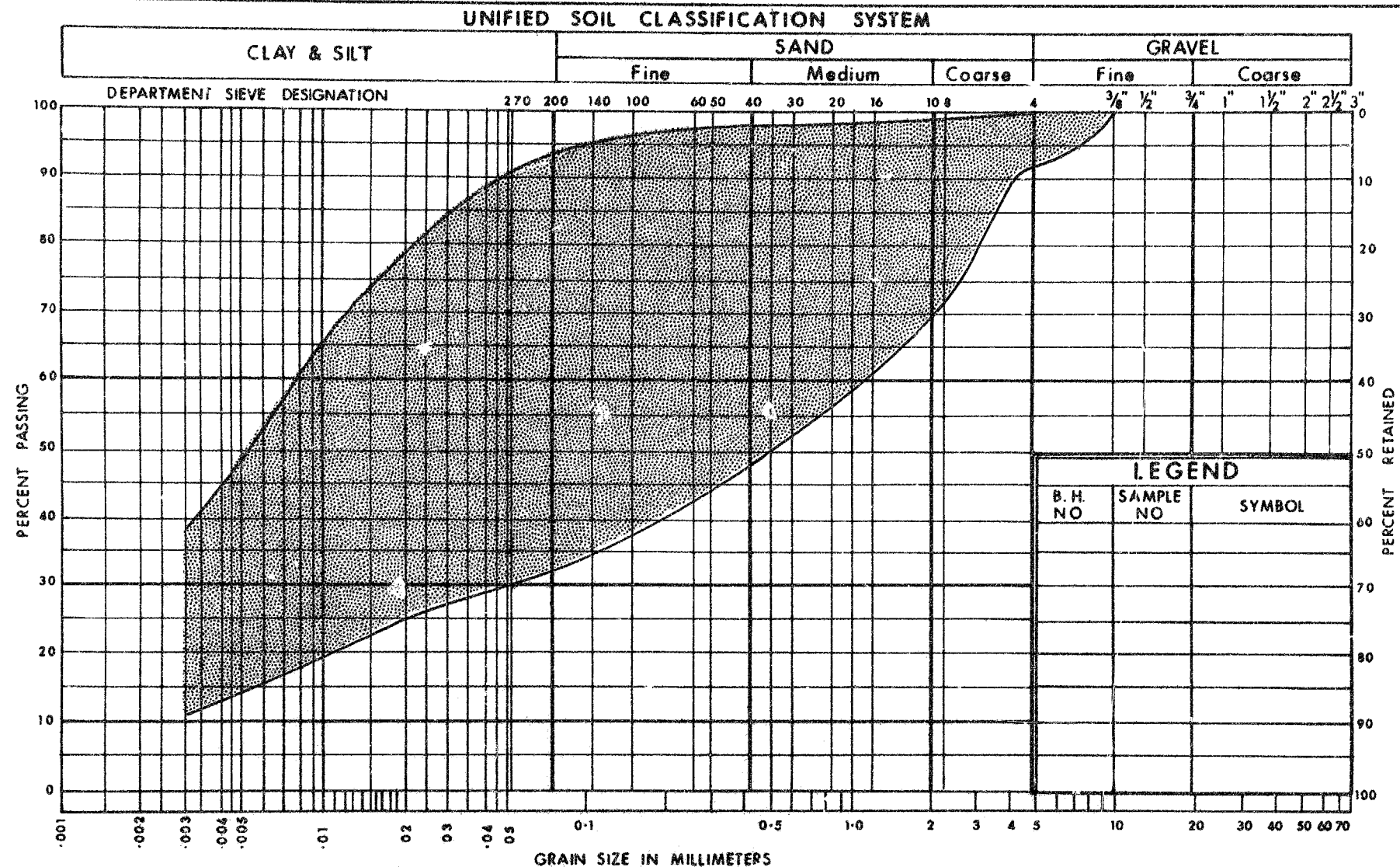
PLASTICITY CHART

CLAYEY SILT
(GLACIAL TILL)

W.P. No. 42-66-12

JOB No. 71-11043

FIG. 1



DEPARTMENT OF HIGHWAYS
MATERIALS and
TESTING
DIVISION

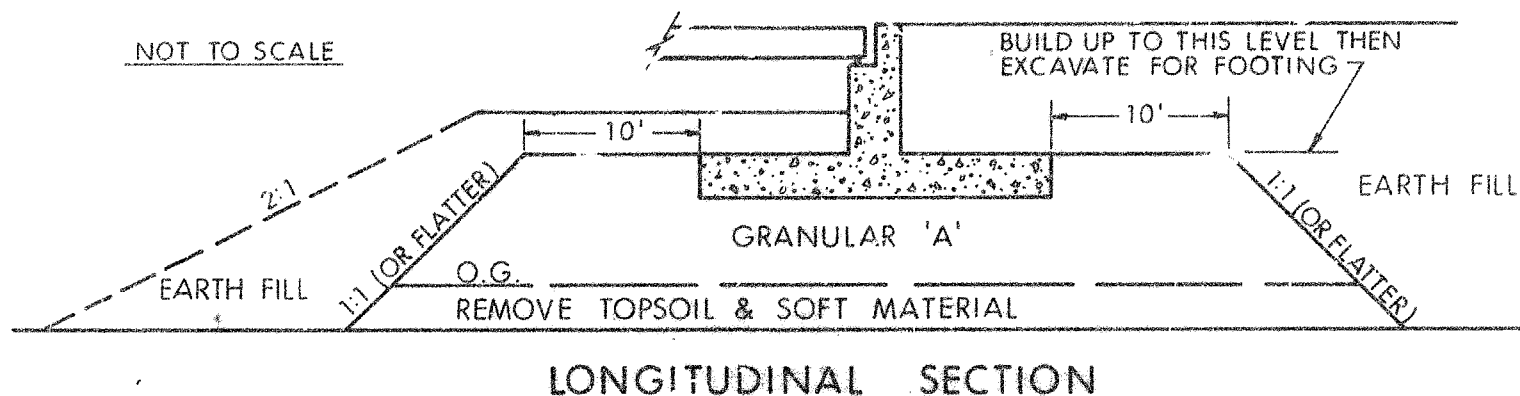
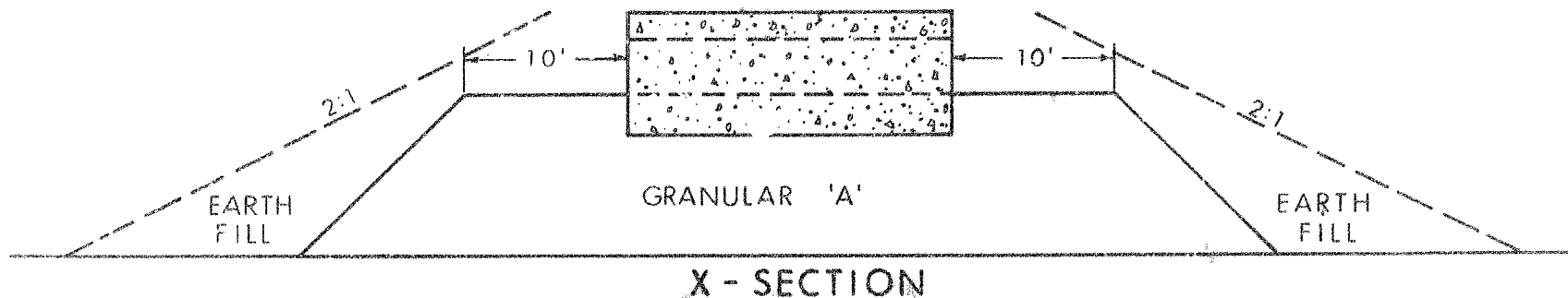
GRAIN SIZE DISTRIBUTION
CLAYEY SILT
(GLACIAL TILL)

W.P. No. 42-66-12

JOB No: 71-11043

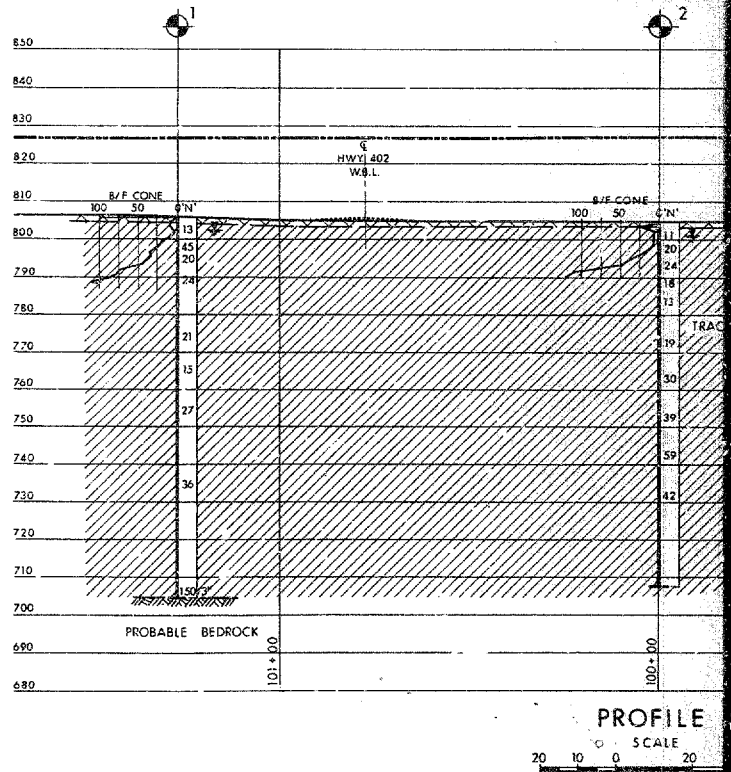
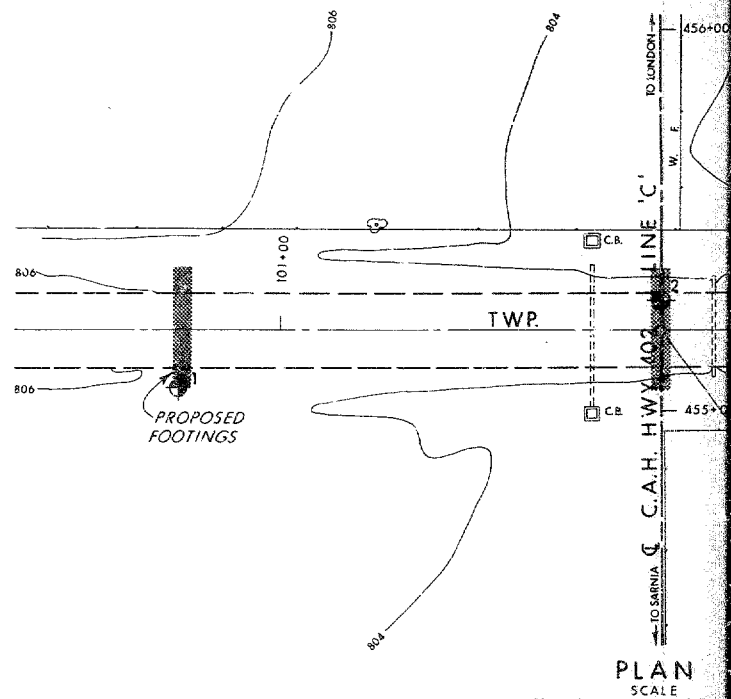
FIG. 2

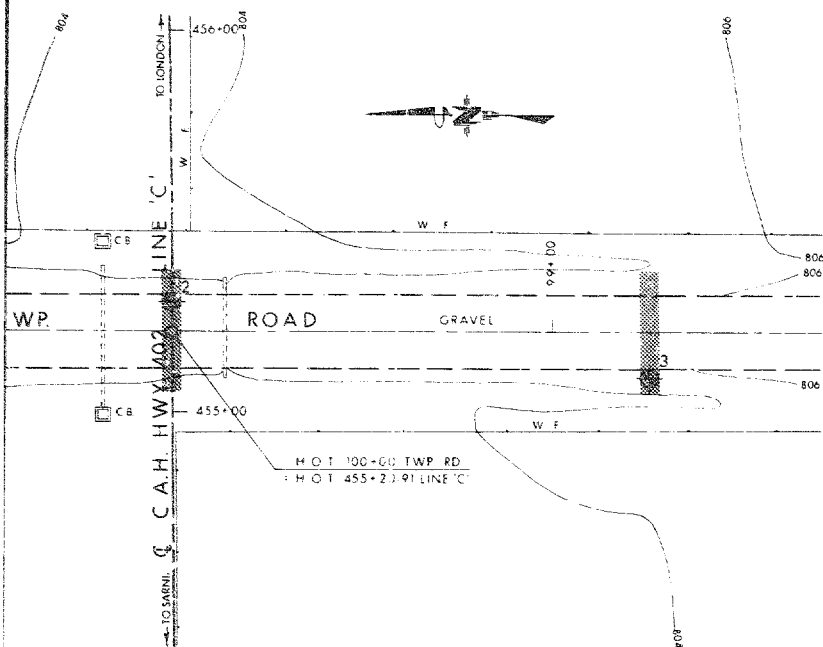
ABUTMENT ON COMPACTED FILL SHOWING GRANULAR 'A' CORE



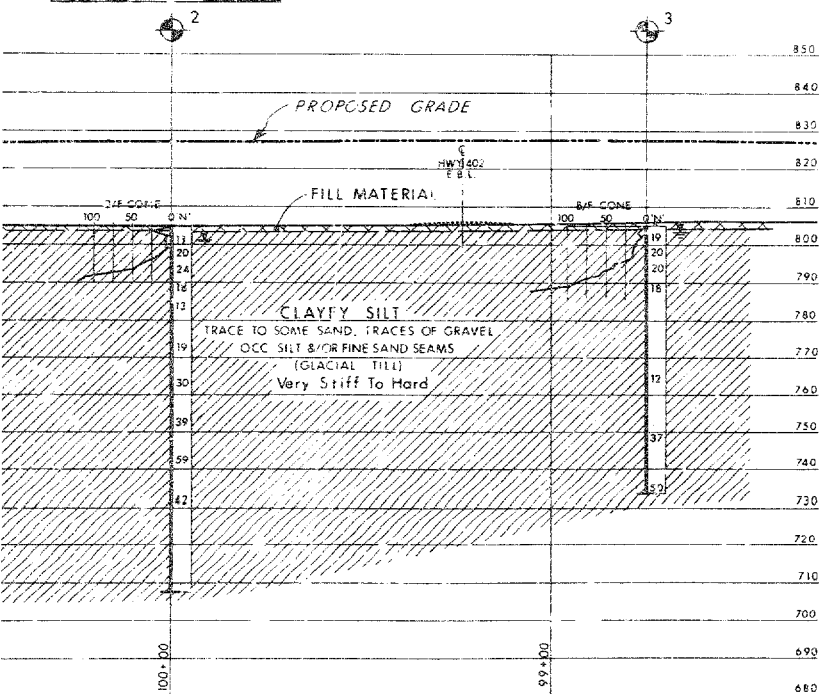
NOTES

- 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.

[illegible]

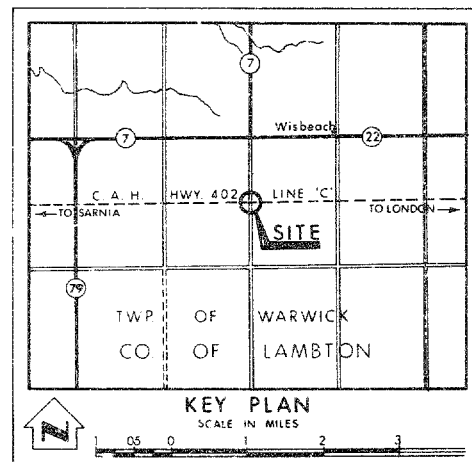


PLAN
SCALE
20 10 0 20 40 FT



PROFILE

SCALE
20 10 0 20 40 FT



KEY PLAN

SCALE IN MILES

LEGEND			
	Bore Hole		
	Cone Penetration Test		
	Bore Hole & Cone Test		
	Water Levels established at time of field investigation, JUNE, 1971.		
NO.	ELEVATION	STATION	OFFSET
1	805.4	101+27	15' LT.
2	804.6	100+00	8' RT.
3	805.0	98+75	12' 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.

REVISION:	DATE	BY	DESCRIPTION

DEPARTMENT OF TRANSPORTATION & COMMUNICATIONS
DESIGN SERVICES BRANCH — FOUNDATION SECTION

TOWNSHIP ROAD

2.4 MILES EAST OF HWY. 79

HIGHWAY NO. 402 LINE 'C' DIST. NO. 1

CO. LAMBTON

TWP. WARWICK LOT 24 & 25 CON. 1 & 2

BORE HOLE LOCATIONS & SOIL STRATA

SUBMIT. A P	CHECKED	WF NO. 42-65-12	M.T. DRAWING NO.
DRAWN	CHECKED	JOB NO. 71-11043	71-11043A
DATE JUNE 28, 1971	SITE NO.	BRIDGE DRAWING NO.	
APPROVED	PRINCIPAL FOUNDATION ENGINEER	CONT. NO.	

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

MEMORANDUM

TO:

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

FROM:

Structural Office,
West Bldg., Downsview.

ATTENTION:

DATE: January 19, 1972.

OUR FILE REF.

IN REPLY TO

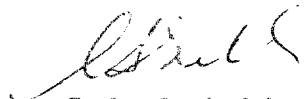
SUBJECT:

Re: Township Road Underpass,
2.3 Mi. East of Hwy. 79,
W.P. #42-66-12, Site 14-356,
Hwy. No. 402, District #1.

71-11-043

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,
Structural Design Engineer.

CSG:sr
Attach.

C.C. Foundation Office

Foundation piles should not be
driven below el. 792.0 since the soil strength
decreases with depth below this elevation.

K.L. Gully

Feb. 10th 1972

Department of Highways Ontario

Copy for the information of

Mr. A. Stermac

Mr. A. F. Watt,

Regional Bridge Planning
Engineer,

Southwestern Region, London.

Structural Office,
West Building,
Downsview.

October 12, 1971.

Township Road Underpass,
2.3 Miles East of Highway #79,
W.P. #42-66-12, Site No. 14-356,
Highway #402, District #1.

71-11-043

Attached herewith are prints of the Preliminary
Bridge Plan Drawing O-7964-P1 for the above-mentioned
structure.

The estimated cost of the proposed structure is
\$192,000 which includes tender, materials, engineering
and sundry construction.

Any comments or revisions you may have should be
submitted within three weeks.

C. S. Grabski,
Structural Design Engineer.

CSC/zh

ENCL*

cc: A. McKim,
B. Davis,
A. Stermac (2),
J. Anderson,
A. Crowley.

19. OCT. 71

10. 10. 71

A. F. Watt

Ch. 8

MEMORANDUM

To: Mr. A. Stermac,
Principal Foundation Engineer,
DONESVIEW, Ontario.

FROM: Bridge Planning,
Southwestern Region,
London, Ontario.

ATTENTION:

DATE: April 13, 1971.

OUR FILE REF.

IN REPLY TO

SUBJECT:

W.P. 42-66-12, Bridge Site 14-356
Township Road Underpass
2.4 miles east of Hwy. 79
Hwy. 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 E-4874-1 with the probable footing locations marked in red.

I have also enclosed a field reconnaissance report for the above site for your use.

S. Jants

SJ/fs
Encls. (3)

S. Jants,
Bridge Planning Technician,
Southwestern Region.

cc: Mr. G. McCombie
Mr. A. Crowley

July 7
JUL 30 1971

DOCUMENT NO. 40 E 13 - 32

GEOCRES No. 40 E 13 - 32

DIST. 1 REGION SOUTHWESTERN

W.P. No. 42-66-12

CONT. No. 76-47

W. O. No.

STR. SITE No. 14-356

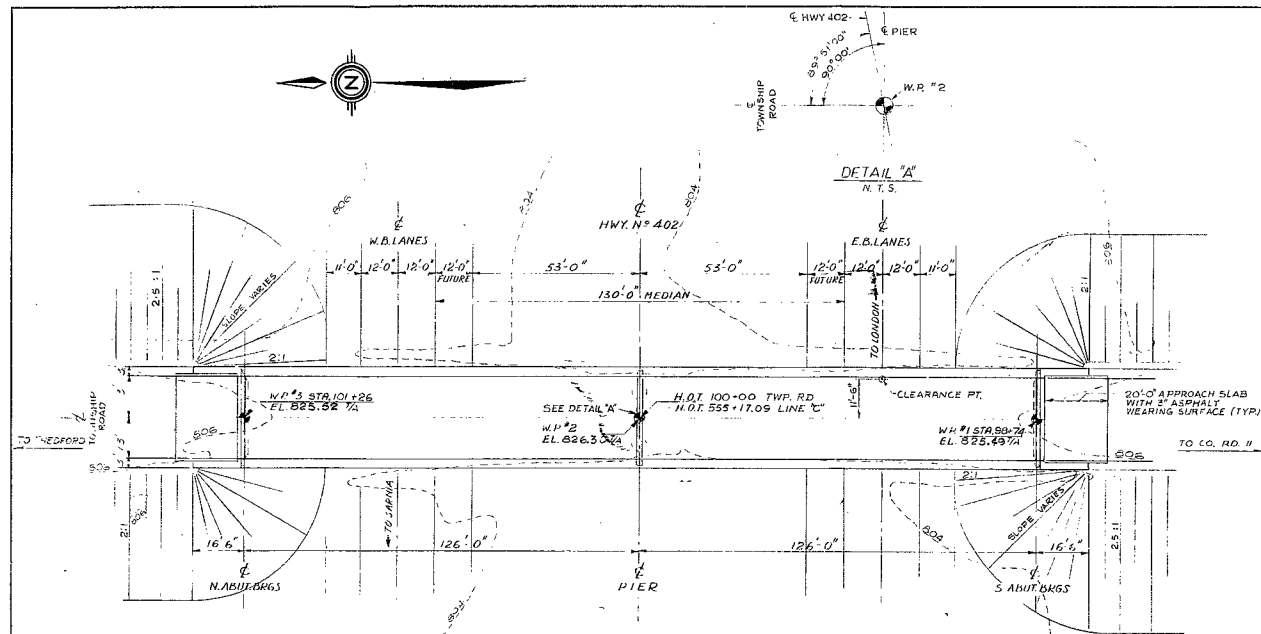
HWY. No.

LOCATION Twp. Rd. 24 MILES

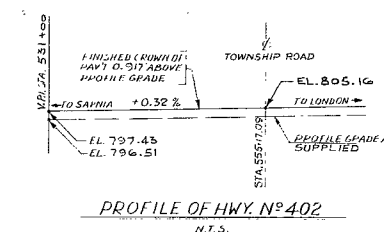
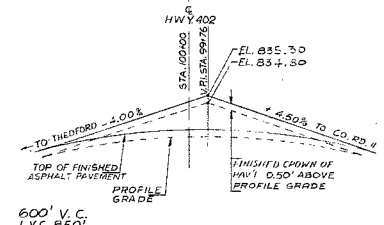
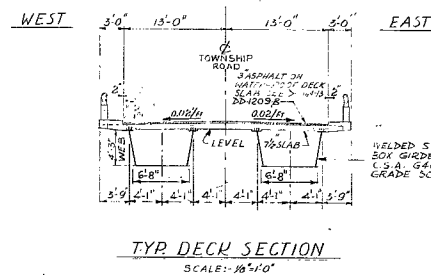
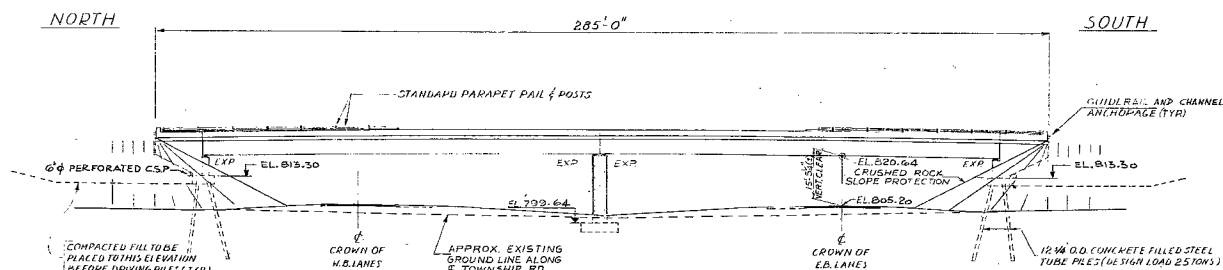
EAST OF HWY. 79

OVERALL DISTANCE TO BE BOULET TO THE POINT 2

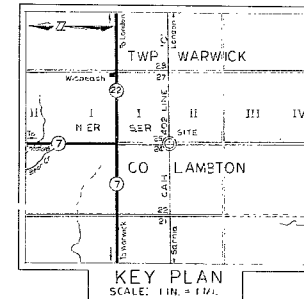
REMARKS



NOTES
 • 1/2" DENOTES ELEVATIONS ARE
 TO 1/2" OF 1/2" AS SHOWN
 • W.P. DENOTES WORKING POINT



- LIST OF DRAWINGS**
- D-7064-1 - GENERAL LAYOUT
 - D-7064-2 - BOREHOLE LOCATIONS AND SOIL STRATA
 - D-7064-3 - FOUNDATION LAYOUT
 - D-7064-4 - ABUTMENTS
 - D-7064-5 - PIER
 - D-7064-6 - STRUCTURAL STEEL I
 - D-7064-7 - STRUCTURAL STEEL II & BEARING DETAILS
 - D-7064-8 - DECK
 - D-7064-9 - PARAPET WALL DETAILS
 - D-7064-10 - STANDARD STEEL PARAPET RAIL
 - D-7064-11 - 20 FOOT APPROACH SLAB
 - D-7064-12 - STANDARD DETAILS I
 - D-7064-13 - STANDARD DETAILS II
 - D-7064-14 - AS CONSTRUCTED ELEV. FROM



NOTES
CLASS OF CONCRETE
 DECK, CURBS AND PARAPET WALLS 4000 P.S.I.
 HIGH COLUMNS 4000 P.S.I.
 REMAINDER 3000 P.S.I.
 AND/OR AS NOTED ON DRAWINGS
CLEAR COVER ON REIN. STEEL
 FOOTINGS, ABUTMENTS, PIER COLUMNS, DECK: TOP, BOT. 3"
 CURBS, PARAPET WALLS, APPROACH SLABS 2" 1"
 AND/OR AS NOTED ON DRAWINGS
CONSTRUCTION NOTES
 THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE
 BEARING SEATS DEAD LEVEL TO THE SPECIFIED ELEVATIONS
 WITH A TOLERANCE OF ± 1/8" INCH
 NO CONCRETE SHALL BE PLACED ABOVE THE ABUTMENT
 BEARING SEATS UNTIL THE CONCRETE IN THE DECK HAS
 BEEN PLACED
CONCRETE QUANTITIES
 CONCRETE QUANTITIES ARE LISTED BELOW FOR THE
 APPROPRIATE CONCRETE LUMP SUM TENDER ITEMS:
 1. CONCRETE IN PIER, ABUTMENTS
 AND WINGWALLS 31 cu yd. 4000 P.S.I.
 2. CONCRETE IN DECK 226 cu yd.
 3. CONCRETE IN PARAPET WALLS 36 cu yd.
 4. CONCRETE IN APPROACH SLABS 35 cu yd.
STRUCTURAL STEEL QUANTITIES
 TOTAL 139 TONS

B.M. 809.79
 GEODETIC DATUM
 N.W. IN S. ROOT OF 1.5' ASH
 203' LT. 557-52 LINE 'C'.

REVISIONS	DATE	BY	DESCRIPTION

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS
 ONTARIO

TOWNSHIP ROAD UNDERPASS
 2.3 MILES EAST OF HWY. 79

KING'S HIGHWAY No. 402 LINE 'C' DIST. No. 1
 CO. LAMBTON
 TWP. WARWICK

LOTS 24 & 25 CONS. 1 & 2

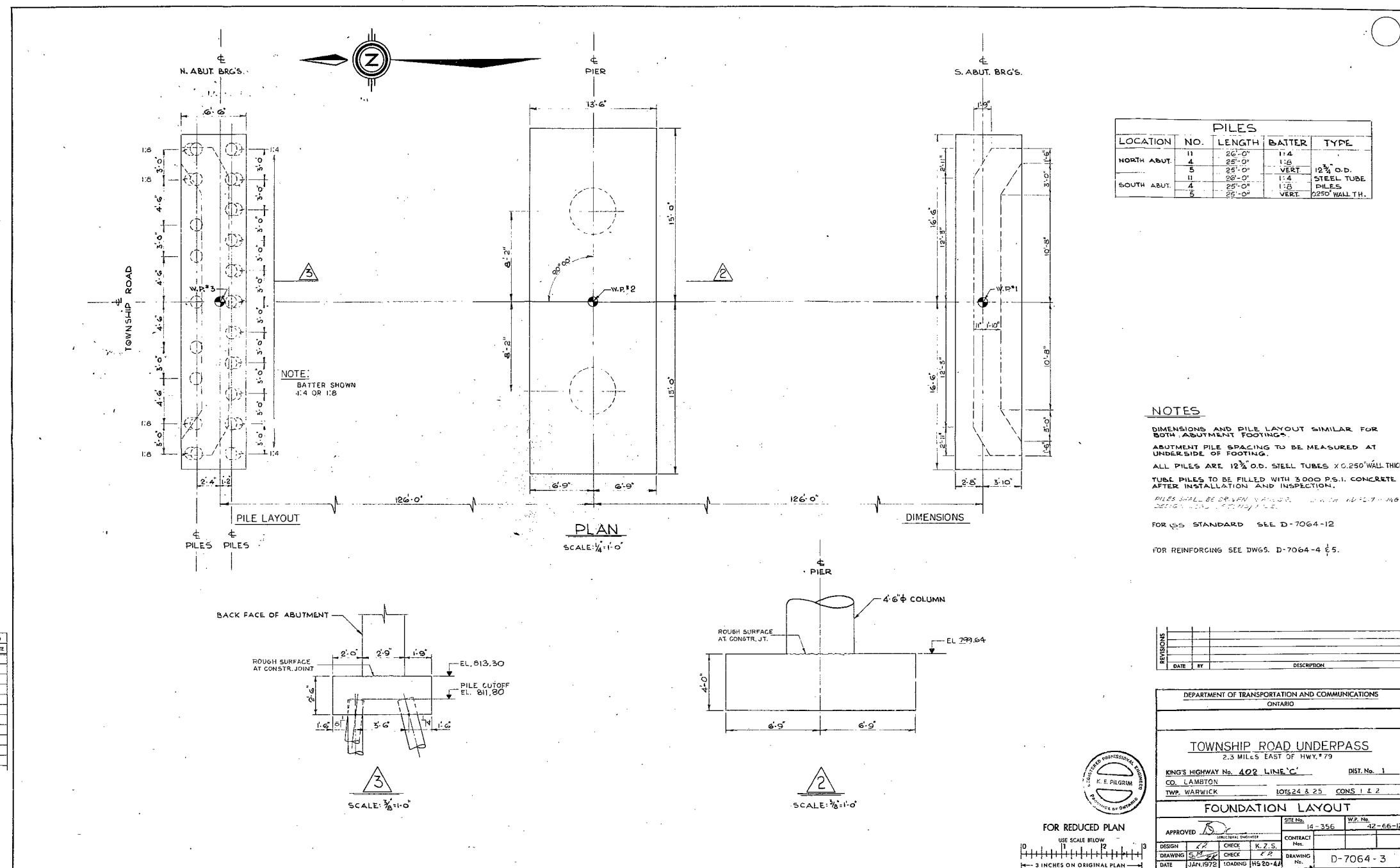
GENERAL LAYOUT

APPROVED	DESIGNED	CHECKED	DATE

14-356 42-66-12
 D-7064-1

FOR REDUCED PLAN
 USE SCALE BELOW
 10 20 30 40 50 60 70 80 90 100
 3 INCHES ON ORIGINAL PLAN

401/3-32



PILES				
LOCATION	NO.	LENGTH	BATTER	TYPE
NORTH ABUT.	11	26'-0"	1:4	12 3/4" O.D. STEEL TUB. PILES
	4	25'-0"	1:6	
	5	25'-0"	VERT.	
SOUTH ABUT.	11	26'-0"	1:4	0.250' WALL TH.
	4	25'-0"	1:6	
	5	25'-0"	VERT.	

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. STEEL TUBES X 0.250" WALL THICK

TUBE PILES TO BE FILLED WITH 3000 P.S.I. CONCRETE
AFTER INSTALLATION AND INSPECTION.

PILES SHALL BE DRIVEN VERTICALLY TO A MINIMUM OF 27" INTO

FOR: 66 STANDARD 655 D-7064-12

FOR Q5 STANDARD SEE D-1004-12

FOR REINFORCING SEE DWGS. D-7064-4 & 5.

[illegible]DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO

TOWNSHIP ROAD UNDERPASS


2.3 MILES EAST OF HWY. # 79

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

CO. LAMBTON

TWP. WARWICK LOTS 24 & 25 CONS 1 & 2

FOUNDATION LAYOUT

APPROVED 		SITE No.	W.P. No.
STRUCTURAL ENGINEER		14-356	42-66-12
		CONTRACT	
		No.	
DESIGN	KP	CHECK	K. Z. S.
DRAWING	S. M. SK	CHECK	KP
DATE	JAN. 1972	LOADING	H5 20-4A
		DRAWING	D-7064-3
		No.	

40113-32