

DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 40I13-42

DIST 2 REGION Southwestern

W.P. No. 40-66-16

CONT. No. 79-51

W. O. No. _____

STR. SITE No. 19-525

HWY. No. 402

LOCATION Concession Road 10

Underpass, Township of Caradoc

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 4

REMARKS: documents to be unfolded
before microfilming

FOUNDATION INVESTIGATION REPORT

for

Concession Road 10 Underpass, Hwy. 402
Township of Caradoc, District 2, London
W.P. 40-66-16 Site 19-525

1. INTRODUCTION

This report is to provide information for the design and construction of the proposed structure and its approaches at the above mentioned site. Subsoil information is based on 3 sampled boreholes and 3 dynamic cone penetration tests.

2. SITE DESCRIPTION

The proposed site is located in the Township of Caradoc, some 3 miles northeast of the Town of Strathroy. It is located one-half mile west of the junction of Concession Road 10 and the 20th Sideroad.

The general area is a flat sand plain with occasional low ridges and is engaged in mixed agricultural production. Physiographically, this site is located in an area referred to as the Caradoc Sand Plain.

3. SUBSOIL

Subsoil consists of a deep deposit of 60 feet of uniform fine sand which was laid down as a delta at an early outlet of the Thames River. Beneath this is a deposit of very dense silt some clay and a trace of sand.

The fine sand (typical grain size distribution shown as an envelope in Figure 1) may be divided into 2 portions. The upper portion, about 7 feet in thickness, is very loose to compact with standard penetration 'N' values ranging from 1 to 13 blows per foot. The silt content is relatively high in this zone ranging up to 30%.

The lower portion of the deposit has a lower silt content, generally being less than 10%. The relative density is much higher, ranging from compact to very dense, with Standard Penetration 'N' values ranging from 25 to in excess of 100 blows per foot. Laboratory tests indicate moisture

contents of approximately 20%.

4. GROUNDWATER

Groundwater was encountered in the fine sand at approximate elevation 760. It should be noted that this water level was recorded in August and probably represents its lowest level during the year.

5. DISCUSSION AND RECOMMENDATIONS

(5.1) General

The underpass as proposed will consist of a 2 span structure with each span being 102 feet in length. The approach embankment will be approximately 30 feet in height.

(5.2) Franki Piles

Any or all of the footings may be supported on Franki type displacement caissons. To form these piles the drive tubes should be advanced to elevation 760 with the bulb of the pile formed below this elevation. Piles with the following shaft diameters (inside diameter of drive tube) will develop the following design bearing capacities.

14 in.	-	70 Tons
18 in.	-	125 Tons
22 in.	-	150 Tons

The cost of installing these piles complete with all materials other than reinforcing steel, may be estimated assuming \$25.00, \$28.00 and \$32.00 per lineal foot for the 14 inch, 18 inch and 27 inch types, respectively.

(5.3) Steel Tube Piles

The footings for the entire structure may be supported on steel tube piles (12-3/4" x 1/4") driven to elevation 755. A safe design load of 35 tons per pile should be assumed for design purposes. Any horizontal loading should be resisted by battered piles.

(5.4) Spread Footings

The centre pier may be supported on a spread footing at elevation 757. A net safe bearing pressure of $3\frac{1}{2}$ tons per square foot may be used for design purposes. For calculation of sliding resistance, a friction coefficient of 0.4 may be assumed to apply between the base of the footing and the underlying undisturbed subsoil. Total settlement which will occur as the load is applied, will be approximately 1 inch for the recommended loading.

(5.5) Dewatering

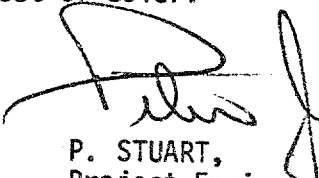
If the centre pier is supported by a spread footing, a dewatering scheme will be required to prevent the excavation bottom from boiling. A possible scheme would be to carry out the excavation within interlocking sheet piling driven to a depth below the bottom of the excavation, equal to or greater than the distance to the water level above it.

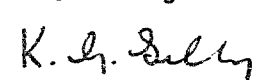
(5.6) Approach Embankments

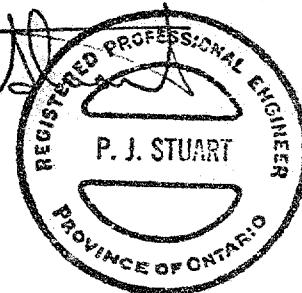
No stability problems are anticipated with embankment fills (30 feet) if 2:1 slopes are employed. Cobbles exceeding 3 inch diameter should be removed from fill placed at locations through which piles have to be driven.

(5.7) Frost Protection

All pile caps or spread footings should be protected against frost action by a minimum 4 feet of cover.


P. STUART,
Project Engineer.


K. SELBY,
Supervising Engineer.



November 1975

RECORD OF BOREHOLE NO 1

WP 40-66-16 LOCATION Co-ords. 15,616,387 N; 1,248,881 E. ORIGINATED BY RD
 DIST 2 HWY 402 BORING DATE August 26, 1975 COMPILED BY RD
 DATUM Geodetic BOREHOLE TYPE Hollow Stem Augers CHECKED BY *[Signature]*

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	REMARKS % GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	W_p	W	W_L		
767.4	Ground Level															
	Fine Sand, Some Silt		1	SS	12											0 87 (13)
	Compact to Loose		2	SS	4											
			3	SS	54											
	Fine sand, trace of		4	SS	111											0 92 (8)
	silt.		5	SS	110											
			6	SS	68											
	Dense to Very Dense		7	SS	66											
			8	SS	45											
			9	SS	100											
725.9			10	SS	100											0 92 (8)
41.5	End of Borehole															

RECORD OF BOREHOLE NO 2

WP 40-66-16

LOCATION Co-ords. 15,616,477 N; 1,248,960 E.

ORIGINATED BY RD

DIST 2 HWY 402

BORING DATE August 25 - 26, 1975

COMPILED BY RD

DATUM Geodetic

BOREHOLE TYPE Hollow Stem Augers

CHECKED BY *CP*

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	REMARKS
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	W_P	W	W_L	
766.8	Ground Level														
0.0	Fine sand with silt Loose to Very Loose		1	SS	11										
			2	SS	1	760									0 69 (31)
			3	SS	35										
			4	SS	105										
	Fine sand, trace of silt.		5	SS	94										
			6	SS	109	750									
			7	SS	45										
	Dense to Very Dense		8	SS	39	740									0 96 (4)
			9	SS	93										
			10	SS	149	730									
			11	SS	34	720									
			12	SS	82	710									
705.8															
61.0	Silt, some clay, trace of sand.														
700.3	Very Dense		13	SS	62										0 5 84 11
66.5	End of Borehole														

RECORD OF BOREHOLE NO 3

WP 40-66-16

LOCATION Co-ords. 15,616,564 N; 1,249,056 E.

ORIGINATED BY RD

DIST 2 HWY 402

BORING DATE August 27, 1975

COMPILED BY RD

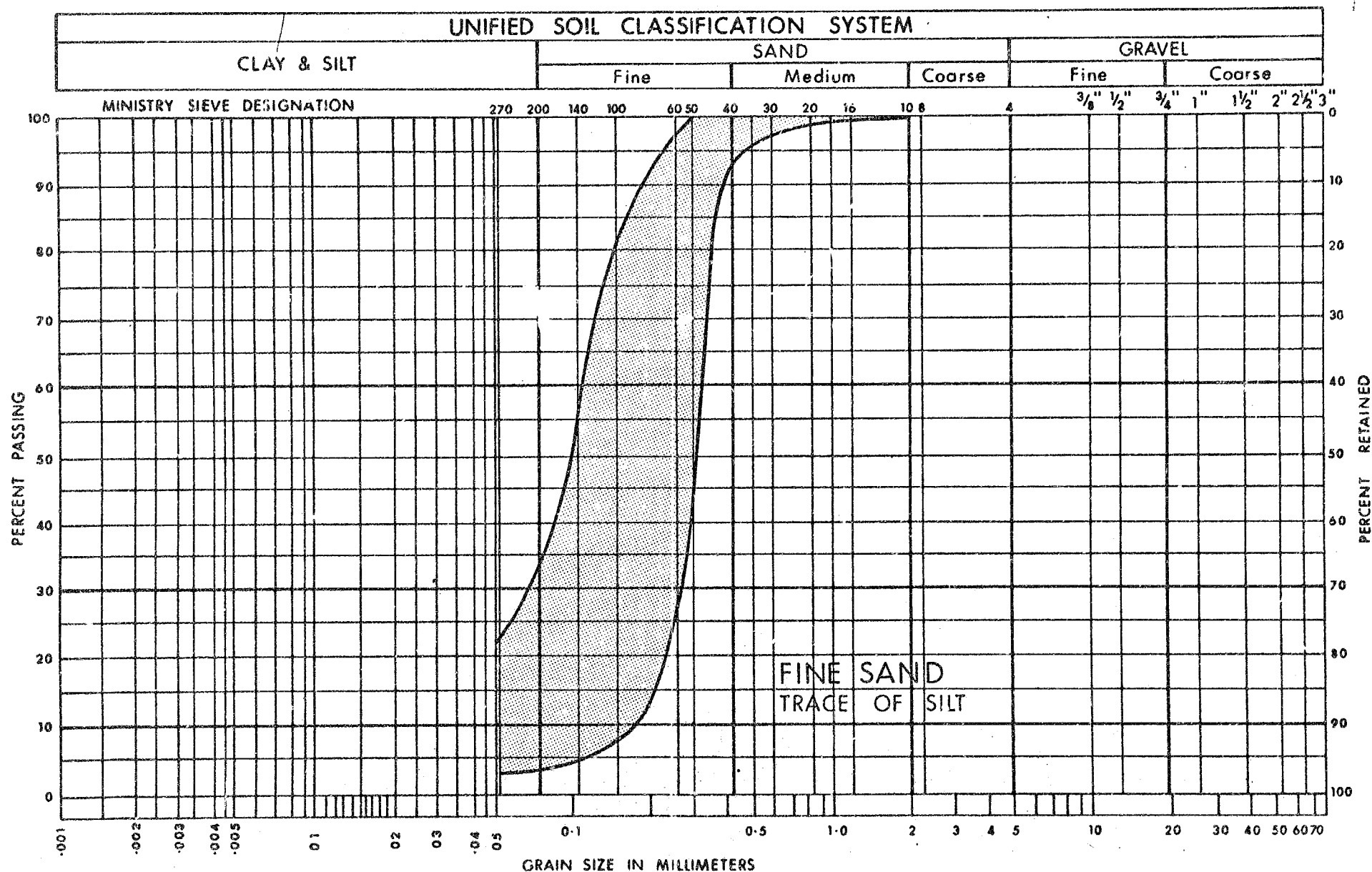
DATUM Geodetic

BOREHOLE TYPE Hollow Stem Augers

CHECKED BY *CP*

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	REMARKS % GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	w_p	w	w_L		
768.3	Ground Level															
0.0			1	SS	13											
	Fine sand,		2	SS	13											
	trace of silt.		3	SS	87											
			4	SS	98											
			5	SS	117											
	Compact to Very Dense		6	SS	86/6"											
			7	SS	29											
			8	SS	25											
			9	SS	38											
727.3			10	SS	100	5"										
41.0	End of Borehole															

GRAIN SIZE DISTRIBUTION



GRAIN SIZE DISTRIBUTION

UNIFIED SOIL CLASSIFICATION SYSTEM

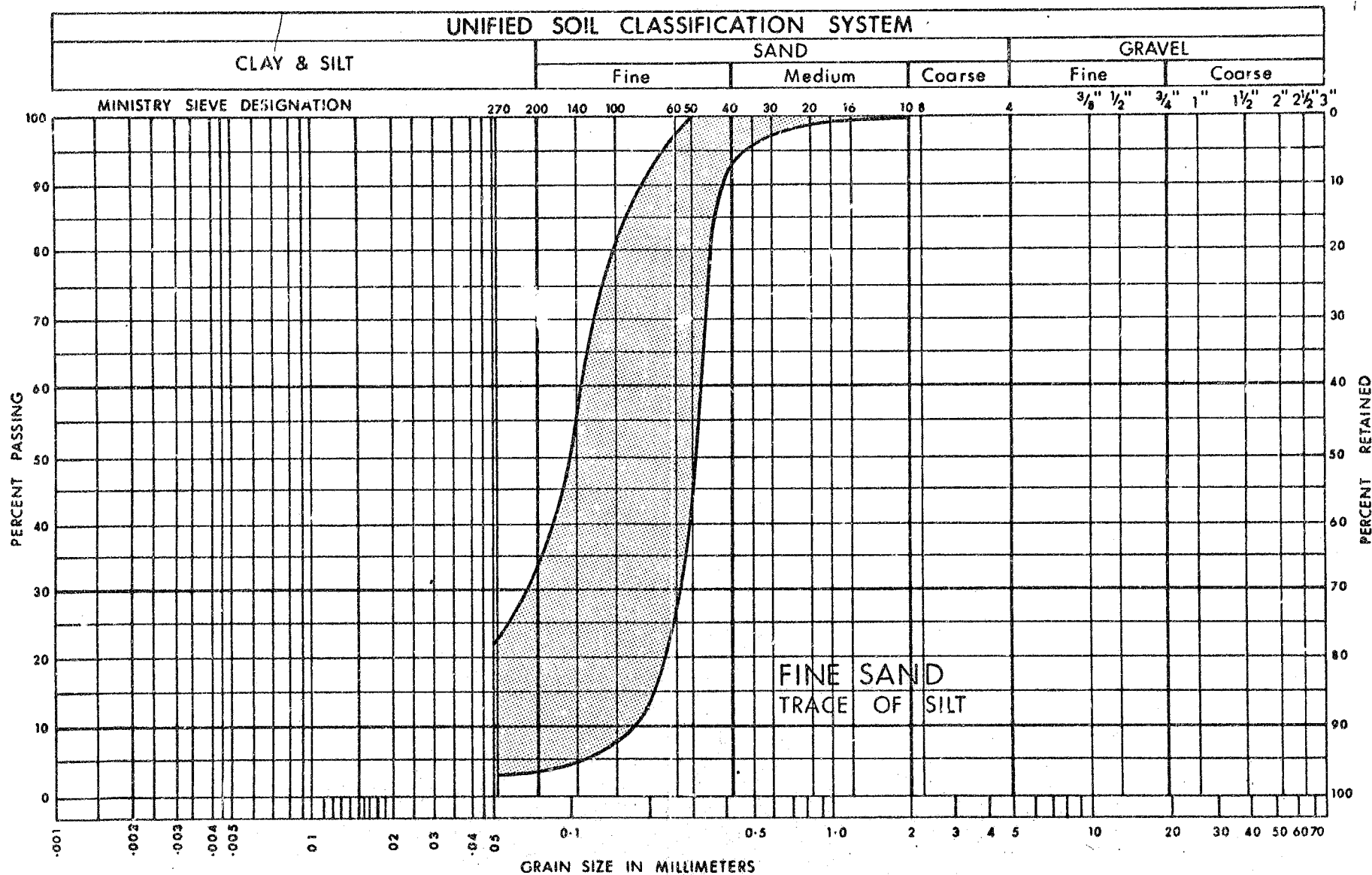
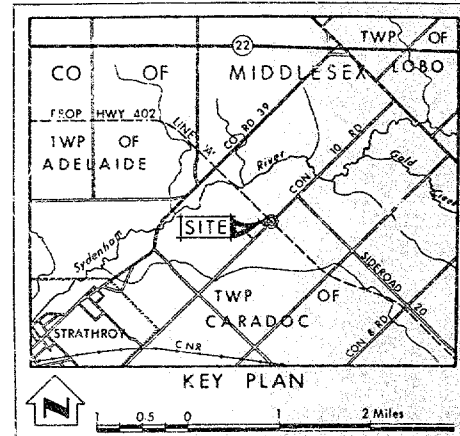
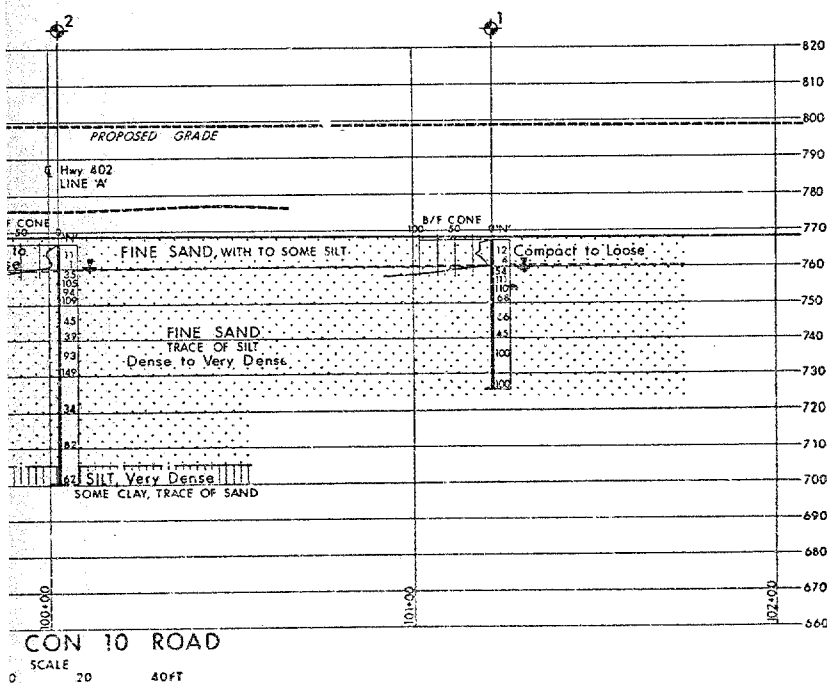
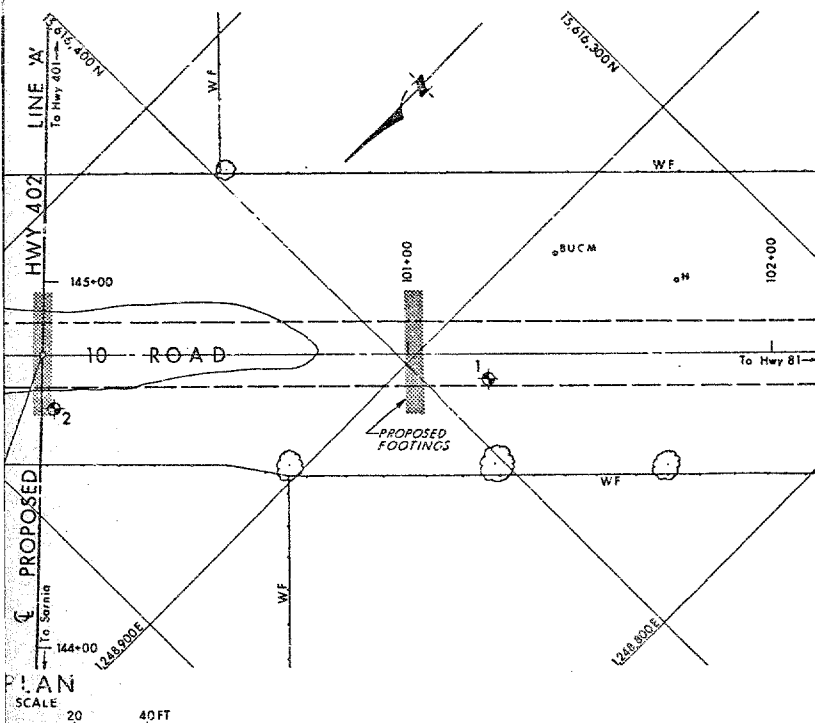


FIG. 1



LEGEND			
	Bore Hole		
	Dynamic Core Penetration Resistance Test		
	Bore Hole & Cone Test		
	Water Levels established at time of field investigation, Aug 1975		

NO.	ELEVATION	CO-ORDINATES NORTH	EAST
1	767.4	15,616,387	1,248,881
2	766.8	15,616,477	1,248,960
3	768.3	15,616,564	1,249,056

NOTE: FOR CONTRACT DOCUMENT

The complete foundation investigation report for this structure may be examined at the Structural Office and Foundations Office, Downsview, and at the LONDON District Office.

NOTE

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

REVISIONS	DATE	BY	DESCRIPTION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS—ONTARIO
ENGINEERING SERVICES BRANCH—GEOTECHNICAL OFFICE—SOIL MECHANICS SECTION

CON 10 ROAD

HIGHWAY NO. Prop. 402 LINE W DIST. NO. 2
CO. MIDDLESEX
TWP. CARADOC LOT 19 & 20 CON. IX & X

BORE HOLE LOCATIONS & SOIL STRATA

SUSMD P.15	CHECKED	W.P. NO. 40-66-16	DRAWING NO.
DRAWN	CHECKED	W.D. NO.	406616-4
DATE	Nov 4, 1975	SITE NO. 19-S25	BRODGE DRAWING NO.
APPROVED		CONT. NO.	

December 29, 1977

Meeting of
Structural Review Committee

Time: 9:00 a.m., December 21, 1977

Place: Boardroom "B", West Building

Attending: Messrs. A. L. McKim - Structural Office
M. Stoyanoff - Structural Office
J. Keen - Structural Office
F. Gormek - Structural Office
N. Zoltay - Structural Office
P. Payer - Soil Mechanics Section

Project Reviewed:

Part of Group W.P. 40-66-21
W.P. 40-66-12, Site 19-528,
Concession #6 Road Underpass.
W.P. 40-66-15, Site 19-526,
Concession #8 Road Underpass.
W.P. 40-66-6, Site 19-525,
Concession #10 Road Underpass.
Highway 402, District #2.

Concession #6 Road Underpass (W.P. 40-66-12)

Foundations

The concrete caisson piling requirements were reviewed and the Committee recommended that the compacted fill (maximum grain size 2") to be placed to top of footing elevation before driving piles.

Structure

Drawing #1

- (a) Note referring to organic top soil is to be changed to read "Excavate (up to 4'-6' thick) organic material".
- (b) Note for "Formwork". Same note as for W.P. 40-66-16 is to be added to the drawing.
- (c) All references for clear cover on reinforcing steel for barrier walls is to be deleted.

Drawing #6

The Committee recommended that the bearing seat should be flat and if time and manpower permit the abutment should be redesigned. If the redesign is not feasible then show a 6" gap between abutment and deck.

Drawing #10

Sequence of Deck Construction. Note is to be changed in effect that all cables (longitudinal and transverse) are grouted in one time.

Drawing #11. Barrier Walls

Drawing is to be updated.

Drawing #15

Standard SS-16-1 is to be updated.

Deck is to be machine finished.

Concession #8 Road Underpass (W.P. 40-66-15)

Foundations

The design complies with the recommendations of the foundation report.

Structure

Drawing #7.

Same comment as for W.P. 40-66-12, Drawing #6.

Drawing #9

Same comments as for W.P. 40-66-12, Drawing #10.

Drawing #11. Barrier Walls

Drawing is to be updated.

Deck is to be machine finished.

Special Provisions and D4

The Designer is to update special provisions and D4.

Concession #10 Road Underpass (W.P. 40-66-16)

Foundations

Same comments as for W.P. 40-66-12.

Structure

Drawing #4

Same comments as for W.P. 40-66-12, Drawing #6.

Drawing #8

Same comments as for W.P. 40-66-12, Drawing #10.

Drawing #10 Barrier Walls

Drawing is to be updated.

Drawing #14

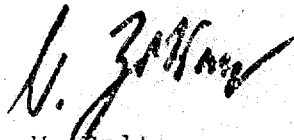
The Designer is to review standard SS-5-1 and change it if necessary.

The deck is to be machine finished.

Special Provisions and D4

The Designer is to update special provisions and D4.

No other points were brought up and the meeting adjourned at 11:05 a.m.

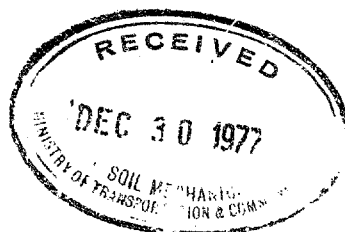


N. Zoltay,
Structural Contract
Specifications Engineer.

NZ/im

c.c. All present

J. B. Wilkes
R. A. Dorton
A. E. McKim
C. S. Grebski
E. Van Beilen
K. Bassi
J. H. Blevins
A. Wittenberg
J. Keen



DOCUMENT V. IDENTIFICATION

GEOCRES No. 4013-42

DIST. 2 REGION Southwestern

W.P. No. 40-66-16

CONT. No. 79-51

W. O. No. _____

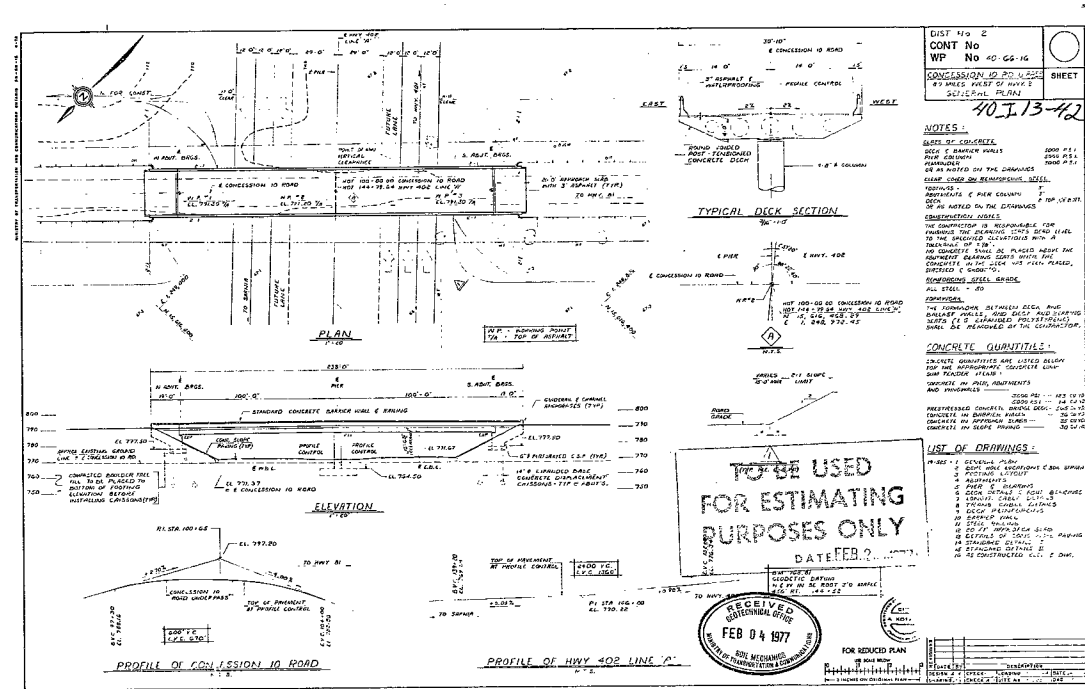
STR. SITE No. 19-535

HWY. No. 402

LOCATION Concession Rd 10 Underpass,
Township of Carleton Place

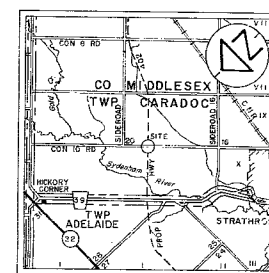
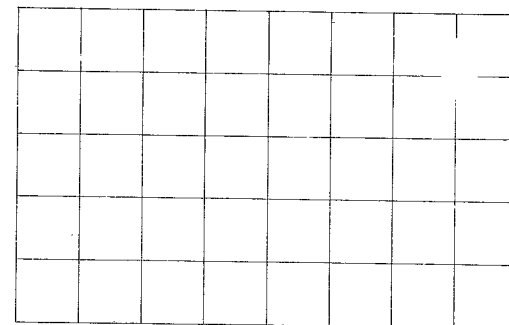
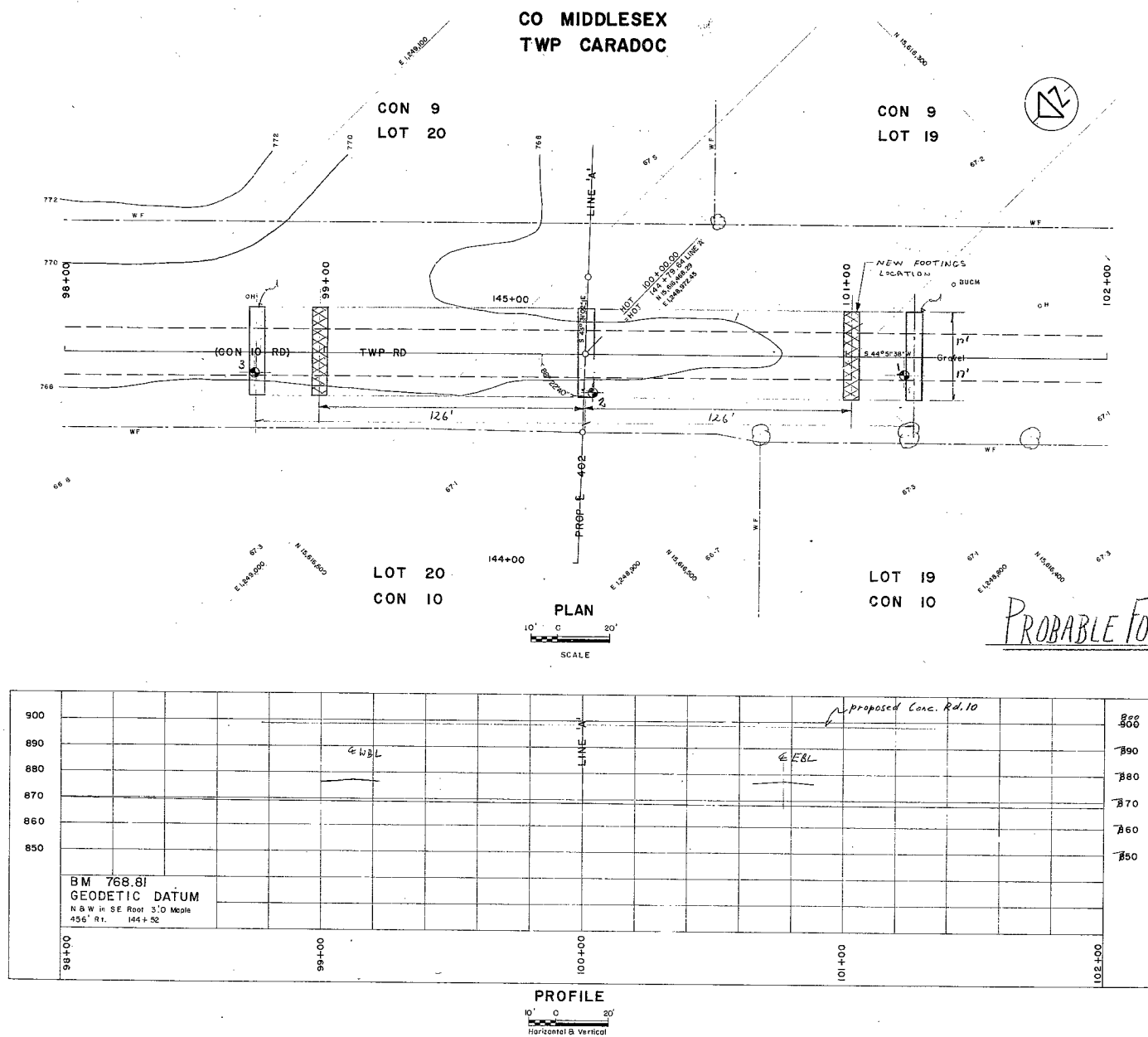
OVERLAY DRAWING: YES () NO () 4

REMARKS: _____



54-5385-00

E-5385-1



KEY PLAN

0.5 mi 1.0 mi
SCALE

STR W.P. 40-66-16

DATE	REVISION & ADDITIONS	BY	CH'KD

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO
DESIGN DIVISION DESIGN SERVICES BRANCH
ENGINEERING SURVEYS OFFICE
SOUTHWESTERN REGION

BRIDGE SITE

PROPOSED CROSSING

AT
TWP RD (CON 10 RD)

AND
PROP. KING'S HWY 402 LINE 'A'

LOTS 19&20 TWP CARADOC		CON 9 & 10 CO MIDDLESEX	
SCALE AS SHOWN		DISTRICT 2 LONDON	
		REGION SOUTHWESTERN	
W. P.	40-66-21	Date of Survey April 1975 Plan July 1975	SITE 19-525
SURVEY BY Chief of Party W FISCHER Supervisor R AGNEW		DRAWN BY Draftsman J BAXTER & M RYAN Supervisor O SCHUR	
CHECKED BY Draftsman J BAXTER Supervisor O SCHUR		PLAN E-5385-1	



E-5385-1

E-5385-1



4013-42

