

MEMORANDUM

To: Mr. B. R. Davis,
Bridge Engineer,
Bridge Division.

From: Foundation Section,
Materials and Testing Division,
Room 107, Lab. Bldg.

Attention: Mr. S. McCombie

Date: December 1, 1965

Our File Ref.

In Reply To

DEC - 9 1965

SUBJECT:

FOUNDATION INVESTIGATION REPORT

For

Proposed Crossing at Hwy. #401 and
Road All'ce. between Lots 12 & 13,
Con. #3, Township of Southwold,
County of Elgin, London, District #2.
W.J. 65-F-93 -- W.P. 122-64

Attached, we are forwarding to you, our detailed
foundation investigation report on the subsoil conditions
existing at the above structure site.

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

AGS/MdeF

Attach.

cc: Messrs. B. R. Davis (2)

H. A. Tregaskes

D. W. Farren

A. Gater

H. C. Dernier

J. Roy

A. Watt

Foundations Office

Gen. Files

A. G. Sternac
A. G. Sternac
PRINCIPAL FOUNDATION ENGINEER

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FOUNDATION INVESTIGATION REPORT
For
Proposed Crossing at Hwy. #401 and
Road All'ce. between Lots 12 and 13,
Con. #3, Township of Southwold,
County of Elgin, London, District #2.
W.J. 65-F-93 -- W.P. 122-64

1. INTRODUCTION:

A request, dated July 22, 1965, for a foundation investigation at the site for the proposed crossing at Hwy. #401 and road all'ce. between Lots 12 and 13, Con. #3, was received by this Section, from Mr. G. Scott, Regional Bridge Location Engineer.

A field investigation was subsequently carried out by this Section. Presented in this report are the results of this investigation, together with recommendations pertaining to the design of foundations for this structure and its approaches.

2. SITE DESCRIPTION:

The immediate vicinity of this site consists mainly of arable and pasture land with occasional copses. Topographically, it is flat to gently undulating.

Physiographically, this area lies in the Elfrid Clay Plain, which consists mainly of strongly calcareous stratified clays and silts imported from higher up the Thames Valley.

3. FIELD INVESTIGATION AND LABORATORY TESTS:

A total of 5 sampled boreholes and 5 dynamic cone penetration tests were carried out during the course of this field investigation, using a

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

conventional diamond drill adapted for soil sampling purposes.

All the soil on this site was of a cohesive nature, but of such a hard consistency that only one standard 2" I.D. Shelby tube sample could be taken.

Most of the samples were extracted using a standard 2" O.D. split-spoon sampler advanced by blows of a 140-lb. hammer imparting an energy of 350 ft.-lbs./blow.

The locations and elevations of the boreholes were surveyed by the Engineering Field Survey Section of the London District, and are shown on Dwg. #65-F-93A, which accompanies this report.

Samples were visually examined in the field and then in the laboratory; consequently, combinations of the following tests were carried out on selected samples.

Moisture Contents.

Atterberg Limits.

Grain Size Distributions.

Unconfined Triaxial Tests.

The laboratory test results are plotted on the Borelog sheets attached to this report.

4. SUBSOIL CONDITIONS:

4.1) General:

Subsoil at this site consists of about 6 feet of fill material overlying an extensive deposit of silty clay containing some sand and traces of gravel. The boundaries of the deposits are shown on the borelogs contained

cont'd. -/3

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

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

in the Appendix of this report. The estimated stratigraphical profile shown on Drawing 65-F-93A, is based upon this information. From ground level downwards, the material of the different deposits is described as follows:

4.2) Clayey Silt with Sand & traces of Gravel (Fill Material):

This deposit consists of highway fill material and is composed of a mixture of clayey silt and sand and contains traces of gravel. The maximum observed depth was 6.5 feet in B.H. #1. The average 'N' value within the layer is about 7 blows per foot from which the consistency is estimated to be in the firm to stiff range. The shear strength is estimated to range from 800 to 2,000 p.s.f.

4.3) Silty Clay with Sand & traces of Gravel:

This deposit underlies the fill material and is composed of a mixture of silty clay and sand and contains traces of gravel. The maximum observed depth was 121.5' (el. 620.5) in B.H. #4.

The consistency of the overall deposit ranges from very stiff to hard with 'N' values ranging from 18 to 71 blows per foot. The undrained shear strength of the soil is estimated to range from about 3,000 p.s.f. to about 10,000 p.s.f. Physical properties of the material as determined from laboratory tests, are summarized as follows:

Liquid Limit	--	35% - 44%
Plastic Limit	--	17% - 24%
Moisture Content	--	19% - 25%

cont'd. /4 ...

5. GROUND WATER:

Ground water was observed in the boreholes at completion of the investigation (August 31st), at the following elevations:

B.H. #2	--	El. 742.2
B.H. #3	--	El. 742.4
B.H. #4	--	El. 742.3
B.H. #5	--	El. 739.9

6. DISCUSSION AND RECOMMENDATIONS:

It is proposed to construct a new bridge at this site to carry the Road Allowance between Lots 12 & 13 of Con. 3, Southwold Twp., over Hwy. #401. The total length of the new structure will be in the order of 200 feet and the maximum height of the approach embankment will be approximately 27 feet.

The investigation has shown the upper subsoil layers to be of adequate strength to provide support for spread footings, and in view of this, the following recommendations are made:

(1) All piers and abutments for the structure may be supported on spread footings founded in the silty clay layer at or below approximate el. 740.0. A net safe pressure of 2.5 t.s.f. may be assumed for design purposes. It will be necessary also, to ensure at least 6 feet of cover for frost protection.

(2) As an alternative, the structure abutments may be constructed within the approach embankments and supported on 12 $\frac{3}{4}$ -inch O.D. steel tube piles driven to approximate el. 735.0. A safe load of 30 tons per pile may be assumed. In any event, piles should not be driven below el. 735.0.

cont'd. /5 ...

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

(3) No stability problems are anticipated for the approach embankments provided 2:1 slopes are constructed.

(4) No dewatering problems are anticipated.

7. SUMMARY:

A foundation investigation at the site of the proposed crossing of Hwy. #401 and Road Allowance between Lots 12 & 13, Con. 3, Southwold Twp., is reported.

Subsoil consists of about 6 feet of clayey silt fill material overlying at least 121 feet of very stiff to hard silty clay.

It is recommended to support the complete structure on spread footings founded at or below approximate el. 740, with a safe net pressure of 2.5 t.s.f. As an alternative, the structure abutments may be supported on 12 $\frac{3}{4}$ -inch O.D. steel tube piles driven to el. 735.0, assuming a design load of 30 tons per pile.

No stability problems are anticipated.

No dewatering problems are anticipated.

8. MISCELLANEOUS:

The field equipment was owned and operated by Dominion Soil Investigation, Ltd. of London, Ontario.

This project was supervised by Mr. P.M.A. McGlone, Project Foundation Engineer, who also prepared this report.

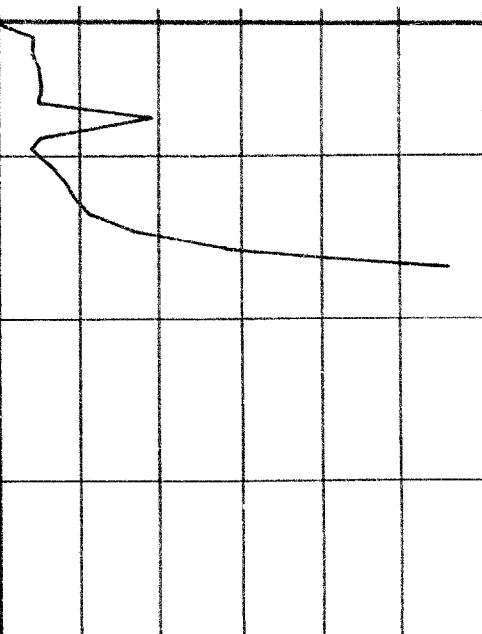
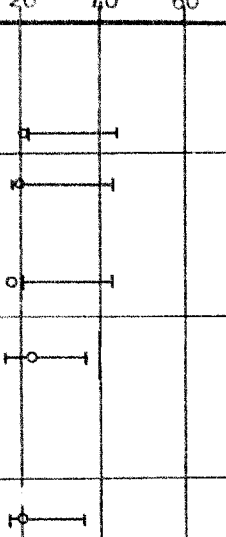
The investigation was carried out under the general supervision of Mr. K. G. Selby, Senior Foundation Engineer, who also reviewed this report.

December 1965

APPENDIX I.

FOUNDATION SECTION

CHECKED BY S. K.G.S.

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 25 50 75 100 125	SHEAR STRENGTH P.S.F.	LIQUID LIMIT ——— WL PLASTIC LIMIT ——— WP WATER CONTENT ——— w wp ——— w ——— WL WATER CONTENT % 20 40 60	BULK DENSITY γ _B P.C.F.	REMARKS															
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE							BLOWS / FOOT														
748.2	0.0	Clayey silt with sand (Fill) Firm to stiff.				740																			
741.7	6.5		1	SS	8						2	SS	14	3	SS	39	4	SS	59	5	SS	42	6	SS	27

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 2

FOUNDATION SECTION

JOB 65-F-93

LOCATION Hwy 401 Sta. 365/85, G

ORIGINATED BY P. McG

W.P. 122-64

BORING DATE Aug. 1965.

COMPILED BY

DATUM G.S.C.

BOREHOLE TYPE Washboring - NX Casing.

CHECKED BY K.G.S. *ML*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT — WL PLASTIC LIMIT — WP WATER CONTENT — W			BULK DENSITY Y P.C.F.	REMARKS					
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		25	50	75	100	125	WP — W — WL									
							SHEAR STRENGTH P.S.F.					WATER CONTENT %									
							o Unconfined														
						500	1000	1500	2000	2500	20	40	60								
745.7	0.0 Clayey silt with some sand & organics (Fill)					740										W.L. Observed in borehole.					
742.4	Firm to stiff.		1	SS	26																
3.3			2	SS	30																
	Silty clay with some sand. Very stiff to hard, brown.		3	SS	34	730															
			4	SS	34																
			5	SS	34																
726.7	Grey		6	SS	27	720															
19.0			7	SS	16																
			8	SS	16																
712.7			9	SS	17	710									127.5	Disturbed Sample					
33.0	End of borehole.														127						

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

JOB 65-F-93

LOCATION Hwy 401 Sta. 365/83, 61' Lt.

ORIGINATED BY P. McG

W.P. 122-64


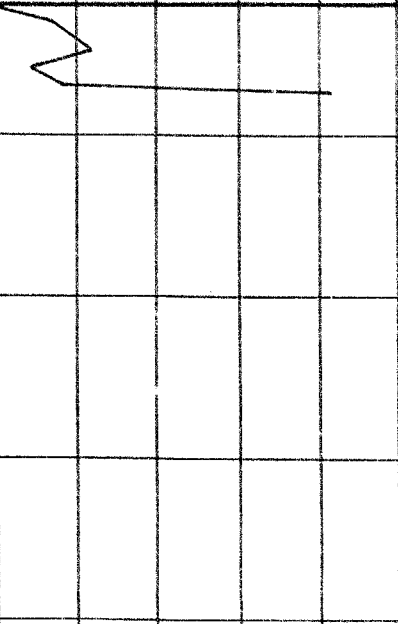

BORING DATE Aug. 1965.

COMPILED BY

DATUM G.S.C.

BOREHOLE TYPE Washboring - NX Casing.

CHECKED BY K.G.S.

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — WL PLASTIC LIMIT — WP WATER CONTENT — W			BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT 25 50 75 100 125					SHEAR STRENGTH P.S.F.				
747.9	0.0		1	SS	6							10			 WL observed in borehole	
741.6	6.3		2	SS	19		740						10			
			3	SS	35											
			4	SS	59								10			
			5	SS	36		730									
			6	SS	39								10			
			7	SS	25		720						10			
716.4			8	SS	18											
31.5	End of borehole.					710										

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING DIVISION
JOB 65-F-93
W.P. 122-64
DATUM G.S.C.

RECORD OF BOREHOLE NO. 4

FOUNDATION SECTION

LOCATION Hwy 401 Sta. 365+82, 95' Lt. ORIGINATED BY P. McG
BORING DATE Aug. 1965. COMPILED BY _____
BOREHOLE TYPE Washboring - NX Casing. CHECKED BY J.K.G.S.

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE				LIQUID LIMIT — WL PLASTIC LIMIT — WP WATER CONTENT — W			BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT				WATER CONTENT %				
							25	50	75	100	125	WP	W		
SHEAR STRENGTH P.S.F.															
742.3						740									WL observed in borehole.
0.0			1	SS	44										
			2	SS	48										
			3	SS	29										
			4	SS	31										
			5	SS	18										
			6	SS	18										
			7	SS	17										
			8	SS	20										
			9	SS	22										
			10	SS	20										
			11	SS	24										
			12	SS	22										
			13	SS	24										
			14	SS	33										
			15	SS	31										
			16	SS	38										
			17	SS	54										
			18	SS	50										
			19	SS	50										
620.8			20	SS	52										
121.5	End of borehole.					620									

Silty clay with some sand & traces of gravel.

Very stiff to hard.

Grey.

FOUNDATION SECTION

JOB 65-F-93

LOCATION Hwy 401 Sta. 365/84. 95' Rt.

ORIGINATED BY P. McG

W.P. 122-64

BORING DATE Aug. 1965.

COMPILED BY

DATUM G.S.C.

BOREHOLE TYPE Washboring - NX Casing.

CHECKED BY K K.G.S.

SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT		LIQUID LIMIT — WL PLASTIC LIMIT — WP WATER CONTENT — W		BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	ELEV. SCALE	SHEAR STRENGTH P.S.F.	WATER CONTENT % 20 40 60		
742.7 0.0	Silty clay with sand & organics.		1	SS	9	740				
			2	SS	31					
			3	SS	31					
			4	SS	22	730				
			5	SS	25					
			6	SS	28					
			7	SS	31	720				
	Silty clay with some sand and traces of gravel.		8	SS	20					
	Very stiff to hard, grey.		9	SS	15	710				
			10	SS	17	700				
	V. stiff to hard.		11	SS	16					
			12	SS	27	690				
			13	SS	20					
			14	SS	35	680				
			15	SS	37					
			16	SS	27	670				
			17	SS	35					
			18	SS	26	660				
			19	SS	21					
626.2						650				
116.5	End of borehole.					640				
						630				
						620				

ABBREVIATIONS USED IN THIS REPORT

PENETRATION RESISTANCE

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

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

DESCRIPTION OF SOIL

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

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

TYPE OF SAMPLE

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

SOIL TESTS

Q _u	UNCONFINED COMPRESSION	L.V	LABORATORY VANE
Q	UNDRAINED TRIAXIAL	F.V	FIELD VANE
Q _{cu}	CONSOLIDATED UNDRAINED TRIAXIAL	C	CONSOLIDATION
Q _d	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
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_i	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

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

To: Mr. A. Stermac,
Principal Foundation Engineer,
Room 107, Lab. Bldg.

FROM: Bridge Division,
Downsview, Ontario.

DATE: July 22, 1965.

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 122-64, Site 5-186,
Township Rd. to Lawrence,
Station Underpass,
Hwy. 401, District No. 2.

We are sending you herewith two prints of Bridge Site Plan E 4352-1 on which we have marked in red the proposed location of the above structure.

The bridge site is readily accessible. It is 10.2 miles west of Hwy. 4.

Please make the necessary arrangements for foundation soils investigation. We will be pleased to have your report in due course.



NZ/ag
c.c. S. McCombie
G. Scott
R. Fitzgibbon

N. Zoltay,
for G. Scott,
Regional Bridge Location Engineer.

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

To: Mr. A. Stermac,
Principal Foundation Engineer,
Room 107, Lab. Bldg.

From: Bridge Division,
Downsview, Ontario.

Date: February 1, 1966.

Our File Ref.

In Reply To

Subject: W.P. 122-64, Site 5-186,
Twp. Road to Lawrence Sta. U'Pass,
Hwy. 401 - Dist. 2.

We are sending to you herewith one print of Preliminary Plan D 5872-P1 of the above structure.

Would you please let us have your written comments.



NZ/sp
Encl. S. McCombie
cc. G. Scott
A. Watt

N. Zoltay,
for G. Scott,
Regional Bridge Location Engineer.

Mr. B. B. Davis,
Bridge Engineer,
Bridge Division.

Foundation Section,
Materials & Testing Div.,
Room 107, Lab. Bldg.

Attention: Mr. N. Zoltay,
Bridge Location Engr.

February 25, 1966

W.P. 122-64, W.J. 65-P-93,
Twp. Road to Lawrence Station U'pass.,
Hwy. 401, District #2 (London).

We have reviewed your Preliminary Plan D-5872-P1
of the above structure.

We noticed that the type of piles to support the
bridge abutments is not specified. It is suggested that
12 $\frac{1}{2}$ -inch O.D. steel tube piles be used, and they should
be driven below El. 735.0'.

KGS/mief

K. G. Selby
K. G. Selby,
SENIOR FOUNDATION ENGR.
For:
A. G. Stermac,
PRINCIPAL FOUNDATION ENGR.

cc: Foundations Office ✓
Gen. Files

Mr. H. C. Dernier,
District Engineer,
London, Ontario.

Materials & Testing Division.

Attn: Mr. E. Greenly.

April 5, 1966.

Installation of Settlement Plates at the
Approach Fill Locations on Hwy. 401, Dist. #2.

Further to our telephone conversation as requested by you, we are enclosing the list of various structures which are to be built in your area. We may wish to instrument some of these projects and request you to advise us at least two weeks prior to the commencement of approach fill construction of each project.

- WP 61-59 City Rd. to Iona Interchange 12 Miles West of Hwy. 4.
- WP21-55 Concession Rd. Underpass 3.1 Miles West of Hwy. 76.
- WP22-59-1 Dingman Cr. Rd. Underpass 0.9 Miles West of Wellington Rd. Underpass.
- WP22-59-2 Dingman Cr. Rd. Crossing of Tributary to Dingman Cr., 0.9 Miles West of Wellington Rd. Underpass.
- WP52-59 City Rd. to Shelden Interchange 7.7 Miles West of Hwy. 4.
- WP98-57 Bostwick Rd. Underpass 1.7 Miles East of Hwy. 4.
- WP122-64 Twp. Rd. to Lawrence Station Underpass 10.3 Miles West of Hwy. 4. 65-1.89
93

MO/tt
cc: Foundations Office
Gen. Files

M. Davata
SENIOR FOUNDATION ENGINEER
For: A. G. Sternac
PRINCIPAL FOUNDATION ENGINEER

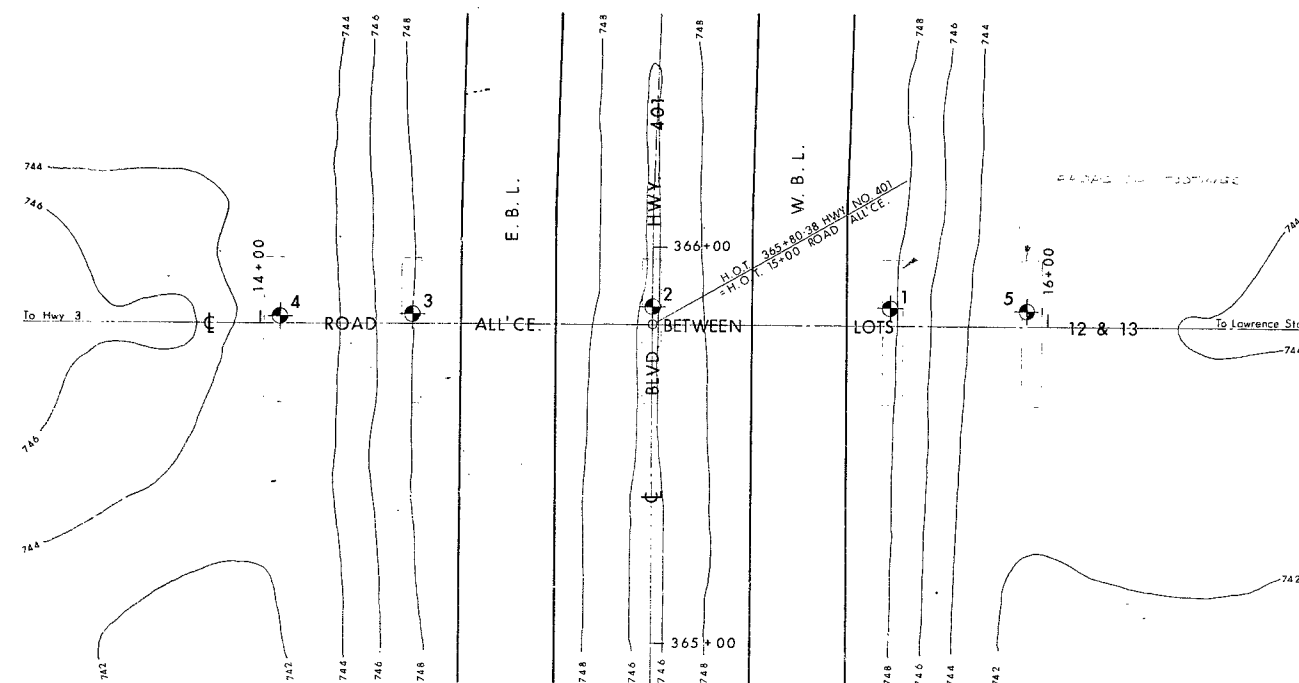
#65-F-93

W.P. #122-64

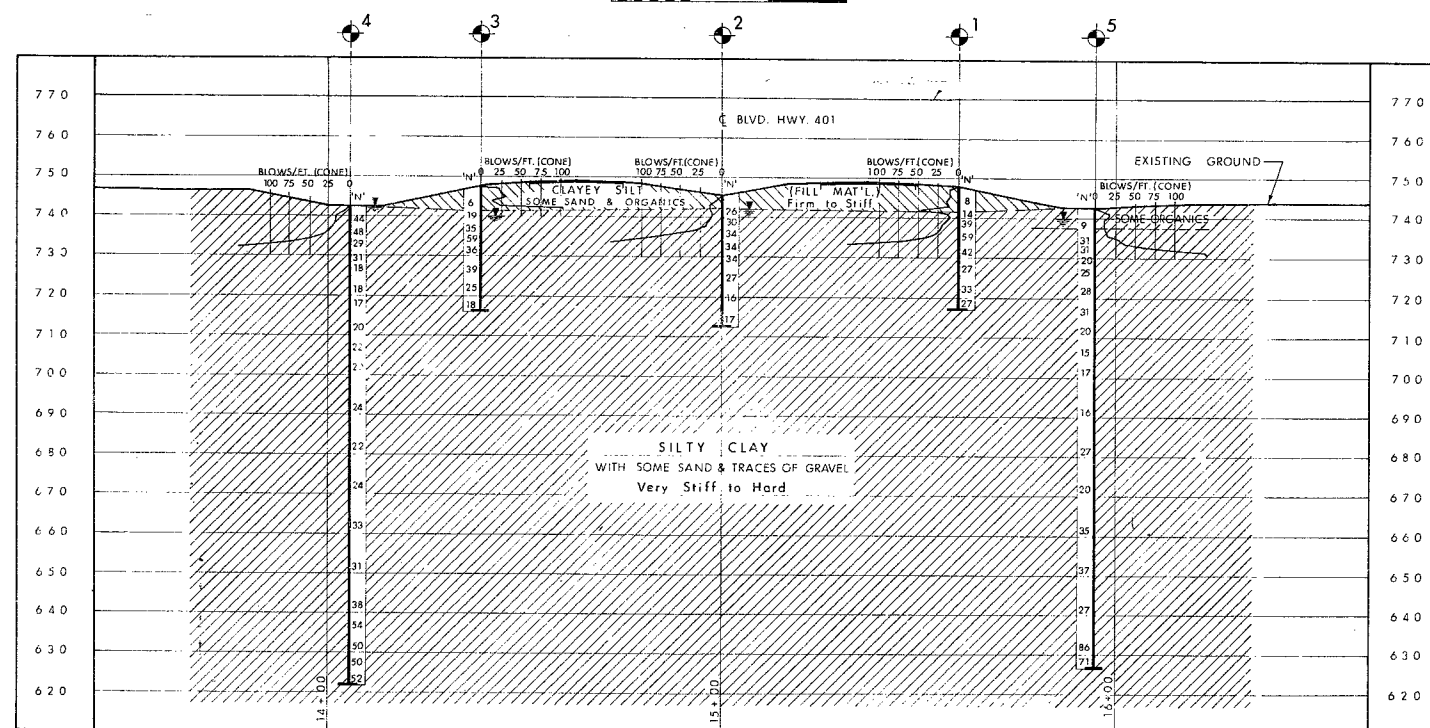
HWY #401

SOUTHWOLD

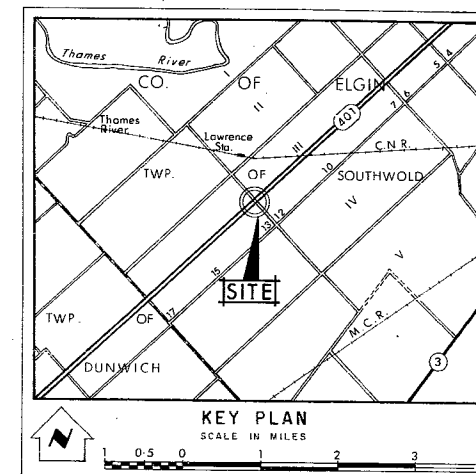
TWP. ROAD



PLAN
SCALE 20 10 0 20 40 FT.



PROFILE
SCALE 20 10 0 20 40 FT.



LEGEND			
	Bore Hole		
	Cone Penetration Hole		
	Bore & Cone Penetration Hole		
	Water Levels established at time of field investigation. AUG. 1965		

NO.	ELEVATION	STATION	OFFSET
1	748.1	365+85	60' RT.
2	745.6	365+85	4'
3	747.9	365+83	61' LT.
4	742.3	365+82	95' LT.
5	742.7	365+84	95' RT.

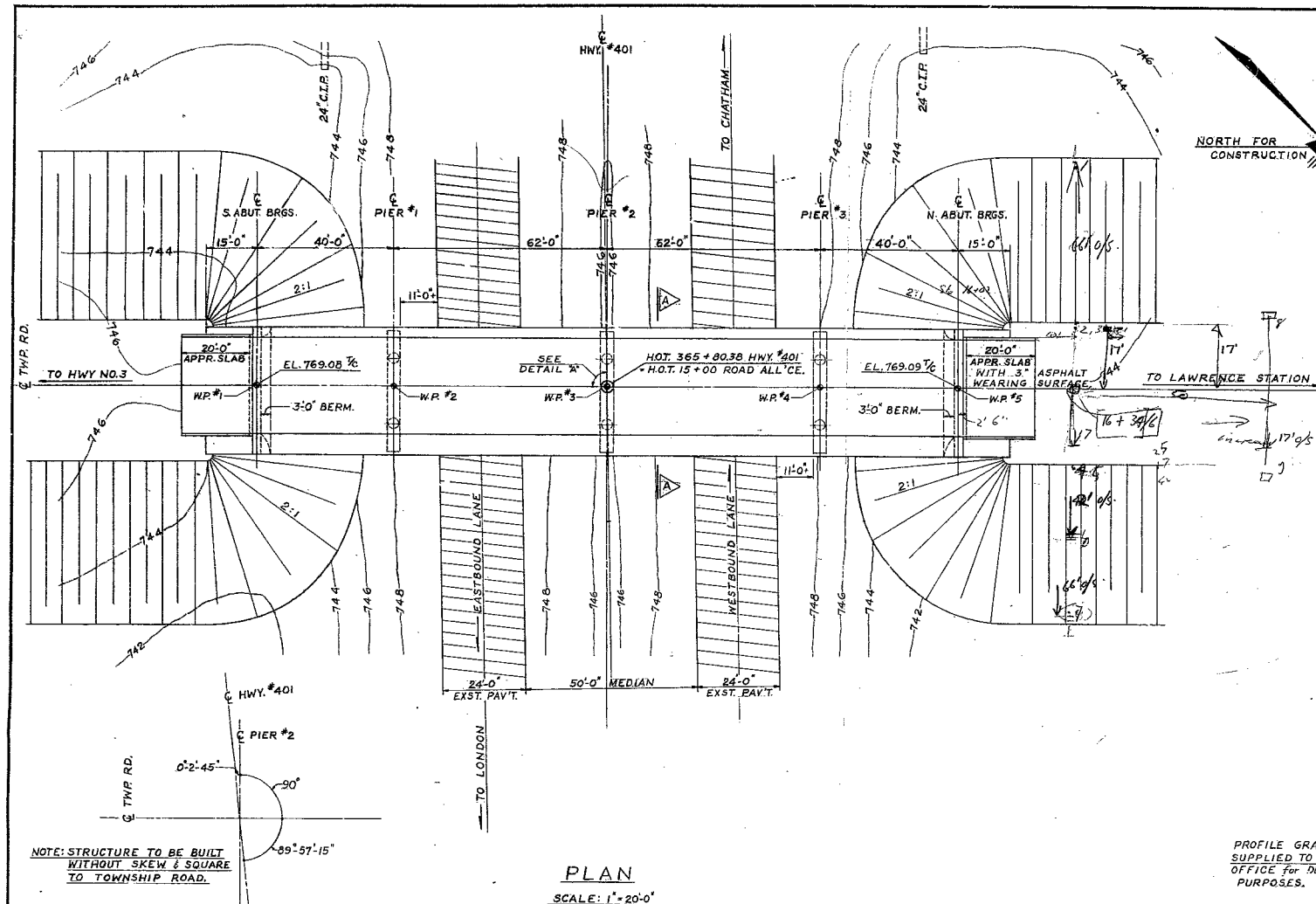
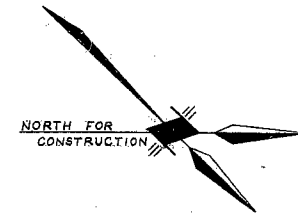
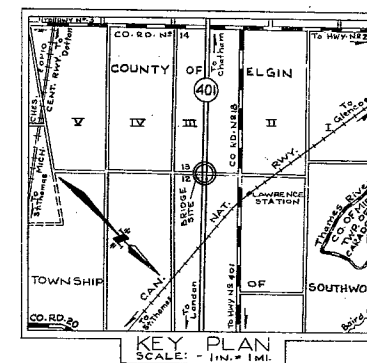
NOTE
The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence and may be subject to considerable error.

REVISIONS	DATE	BY	DESCRIPTION

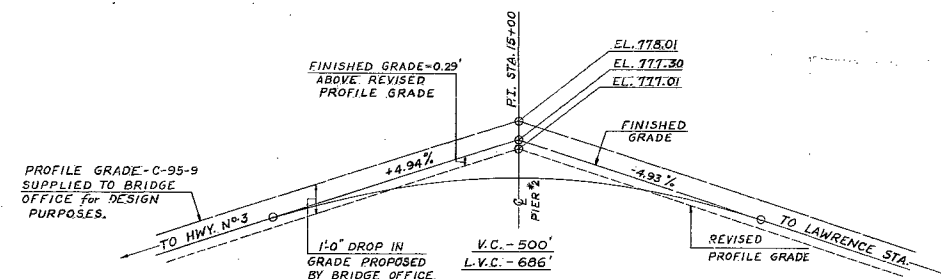
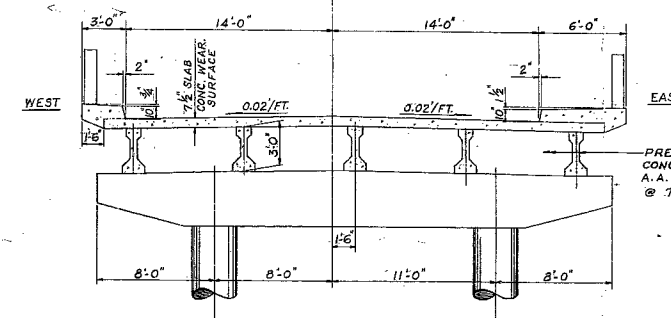
DEPARTMENT OF HIGHWAYS - ONTARIO			
MATERIALS & TESTING DIVISION - FOUNDATION SECTION			
SOUTHWOLD TWP. ROAD			
LOT 13			
KING'S HIGHWAY NO.	401	DIST. NO.	2
CO.	ELGIN	TWP.	SOUTHWOLD
LOT 12 & 13	CON.	III	
BORE HOLE LOCATIONS & SOIL STRATA			
SUBM.D. P.M.C.	CHECKED	W.P. NO.	122-64
DRAWN	S.O.	CHECKED	JOB NO. 65-F-93
DATE	30 NOV 1965	SITE NO.	
APPROVED	<i>Adrian</i>	CONT. NO.	
		N.B.T. DRAWING NO. 65-F-93A	
		BRIDGE DRAWING NO.	

REF. NO. E-4352-1

466300 E
7732900 N
40.111 W



DETAIL A
N.T.S.



REFERENCE BENCH MARK
B.M. ELEV. - 747.85
GEODETIC DATUM - ... 1/4 W. IN E. ROOT OF 2'-0"
ELM. 200'-0" RT. OF STA. 360+50 (HWY. 401).

REVISIONS	DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO
BRIDGE DIVISION

TWP. RD. TO LAWRENCE STA. U'PASS.
(10.2 MILES WEST OF HIGHWAY #4)

KING'S HIGHWAY No. 401 DIST. No. 2
CO. ELGIN
TWP. SOUTHWOLD LOT 12 & 13 CON. III

- PRELIMINARY -

APPROVED: _____ SITE No. 5-186 W.P. No. 122-64
DESIGN S.K. CHECK _____ CONTRACT No. _____
DRAWING R.T. CHECK J.K. DRAWING No. D-5872-P1
DATE JAN/66 LOADS H20-S16

PRINT RECORD	No.	FOR	DATE

