

## MEMORANDUM

BA 1833

To: Mr. A. M. Toye,  
Bridge Engineer,  
Bridge Division.

FROM: Foundation Section,  
Materials & Research Div.,  
Room 107, Lab. Bldg.

Attention: Mr. S. McCombie

DATE: April 30, 1964

OUR FILE REF.

IN REPLY TO

## SUBJECT:

## FOUNDATION INVESTIGATION REPORT

For

Tr. y. #126 and Second Concession  
Road Line 'D' Underpass, County of  
Middlesex, City of London, Lot 16  
District #2

W.J. 64-F-20 -- W.P. 222-62

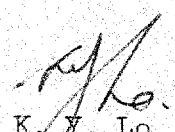
Attached, we are forwarding to you, our detailed foundation investigation report on the subsoil conditions existing at the above structure site.

We believe that you will find the factual data and recommendations contained therein, adequate for your future design work. Should further information be required, please feel free to contact our Office.

KYL/MdeF  
Attach.

cc: Messrs. A. M. Toye (2)  
H. A. Tregaskes  
H. D. McMillan  
A. Gater  
H. C. Dernier  
J. Roy  
A. Watt

Foundations Office  
Gen. Files

  
K. Y. Lo,  
SUPERVISING FOUNDATION ENGR.  
For:  
A. C. Stermac,  
PRINCIPAL FOUNDATION ENGR.

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-

# FOUNDATION INVESTIGATION REPORT

For

Hwy. #126 and Second Concession  
Road Line 'D' Underpass, County of  
Middlesex, City of London, Lot 16  
District #2

W.J. 64-F-20      --      W.P. 222-62

## 1. INTRODUCTION:

A request to carry out a foundation investigation at realigned Second Concession Road Line 'D' and Hwy. #126, was received from the Bridge Location Engineer, Mr. G. Scott, March 17, 1964.

It is proposed to erect a new bridge to carry Second Concession Road Line 'D' over Hwy. #126. The site of the proposed bridge is located approx. 2.5 miles south of the City of London, County of Middlesex, Twp. of Westminster. At this location, the chainage of the realigned Secondary Concession Road Line 'D' is from 123+55 to 125+90, and that of Hwy. #126 is 34+61.

In order to determine the soil properties and decide on the type of foundation, an investigation was carried out by this Section. Results and the discussion of the field and Laboratory investigations, as well as conclusions and recommendations for the future design work, are contained in the following paragraphs of this report.

## 2. DESCRIPTION OF SITE:

The site of the proposed underpass is located approximately 2.5 miles south of the City of London. The surrounding area is generally flat terrain.

cont'd. /2 ...

2. DESCRIPTION OF SITE: (cont'd.) ...

Physiographically, the site is located on the so-called "Mount Elgin Ridges".

3. FIELD AND LABORATORY WORK:

In order to obtain sufficient information on the type and properties of the subsoil, five sampled boreholes, and eight dynamic cone penetration tests, were carried out at this site.

Split-spoon samples were taken at various depth intervals. Samples recovered in the split-spoon sampler were used to determine the following physical properties:

1. Natural Moisture Content.
2. Atterberg Limits.
3. Grain Size Distribution.

Results of these laboratory tests are summarized in Appendix I of this report.

4. SUBSOIL CONDITIONS:

4.1) General:

The stratigraphy of the soil at the site was found to be generally uniform. A detailed description of various soil types encountered during the investigation, is shown in Appendix I of this report, and is also given in subsequent paragraphs. The estimated stratigraphical profile, shown on Dwg. No. 64-F-20A, is based upon this information.

cont'd. /3 ...

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

4.2) Clayey Sandy Silt - Very Stiff to Hard - (Glacial Till):

Immediately below the topsoil, or highway fill, is a stratum of clayey sandy silt (glacial till).

The upper part of this layer has been subjected to some oxidation and exhibits a predominantly reddish-brown colour.

Grain size distribution curves indicated that this stratum is composed of 22% sand and 78% clay and silt. Liquid limits for this stratum vary from 18.6% to 35.8%, while plastic limits range from 11.5% to 18.7%. The average moisture content in this stratum was found to be 14.1%, ranging from 4.7% to 21%. The overall stratum is in a very stiff to hard condition, with an average 'N' value of 68 blows/foot. Plasticity charts for all boreholes are given in Appendix I of this report.

5. GROUND WATER CONDITIONS:

The ground water level, at the time of the investigation, was found at the following elevations:

In B.H. #1	at	El. 892.4
B.H. #4	at	El. 893.2
B.H. #5	at	El. 893.6
B.H. #7	at	El. 893.7
B.H. #8	at	El. 892.4

It may be assumed that the water level will vary with the seasons of the year.

No artesian water conditions were encountered.

cont'd. /4 ...

6. DISCUSSION AND RECOMMENDATIONS:

The investigation has revealed that the subsoil conditions at the site are such that adequate support for spread footing type foundations can be obtained at relatively shallow depths. It is therefore recommended that the pier and abutment footings be founded about six feet below existing original ground levels, at elevations ranging from 889.0 to 892.0. A net allowable pressure of 3 tons /sq.ft. may be assumed for design purposes. If perched abutments would be considered, they may be supported on 12 $\frac{3}{4}$ " O.D. x 0.25" wall steel tube piles driven down to El. 880.0. In this case, a safe load of 40 tons per pile may be assumed for design purposes.

Since the subsoil consists of relatively impermeable material, dewatering of the proposed excavations should present no major problems.

No stability problems for the approach fills are anticipated.

7. SUMMARY:

A foundation investigation at the site of the proposed Second Concession Road and Hwy. #126, is reported.

Subsoil was found to consist generally of very stiff to hard sandy clayey silt (glacial till) deposits down to a depth of at least 30 feet below the existing Hwy. #126.

Spread footings with an allowable net pressure of 3 tons/sq.ft. are recommended for footings placed at a depth of approx. 6 feet below existing original ground elevations.

If perched abutments would be considered, they could be

cont'd. /5 ...



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

constructed on  $12\frac{3}{4}$ " O.D. steel tube piles driven down to El. 880.0. A design load of 40 tons/pile may be applied in this case.

No dewatering problems are anticipated.

No stability problems for the approach fills are anticipated.

8. MISCELLANEOUS:

The field work, performed during the period from April 6 to April 13, 1964, together with the preparation of this report, was undertaken by Mr. W. W. Kulmatickas, Project Foundation Engineer. The investigation was carried out under the general supervision of Mr. K. G. Selby, Senior Foundation Engineer, who reviewed this report.

April 1964

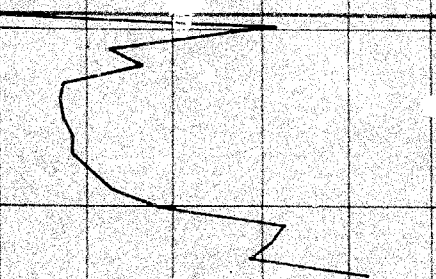
APPENDIX I.







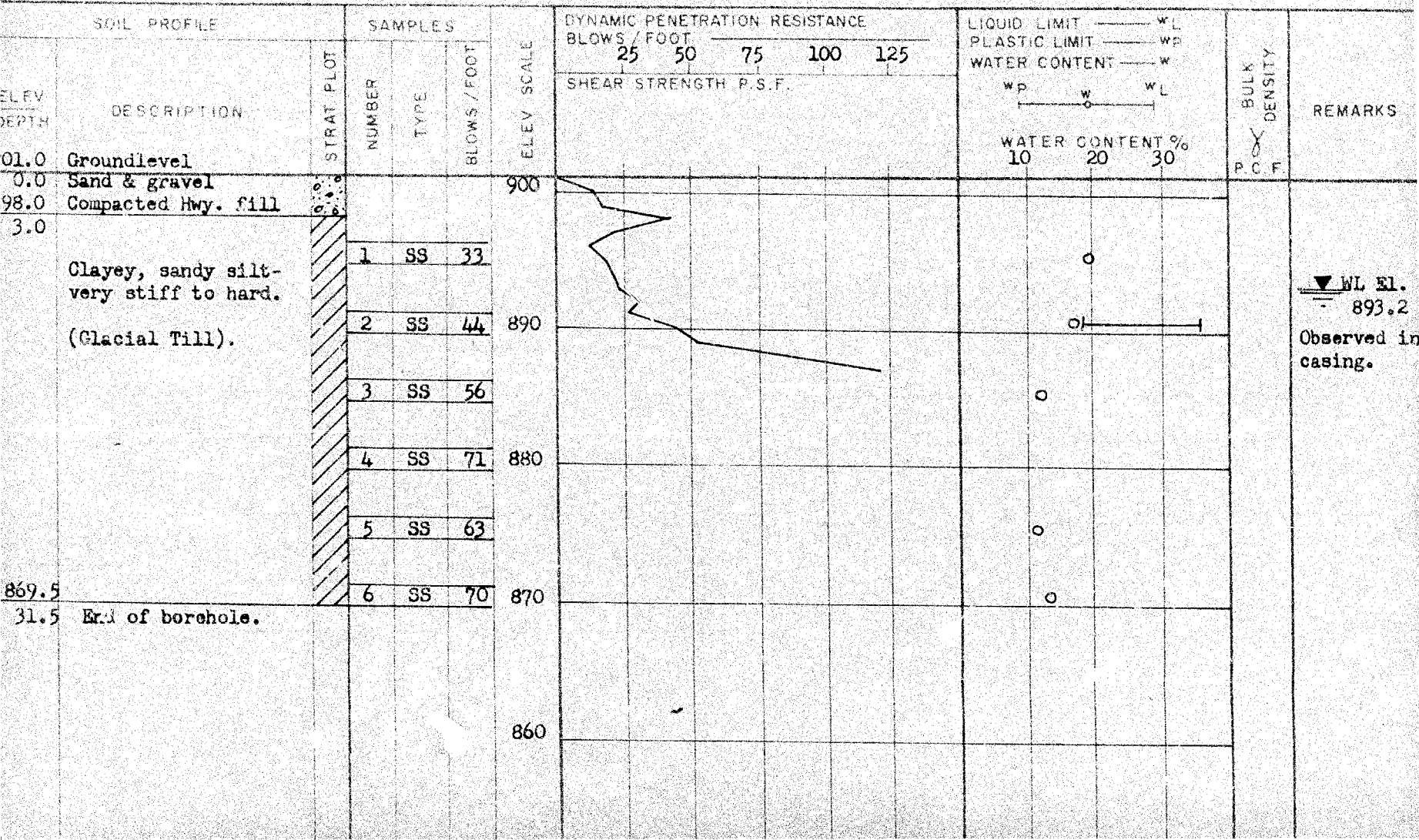
JOB <u>64-F-20</u>	LOCATION <u>Hwy. 126 &amp; Conc. Rd #2 Line "D" Ch. 125+50 21'-0" Lt.</u>	ORIGINATED BY <u>W.W.K.</u>
N.P. <u>222-62</u>	BORING DATE <u>March 27, 1964.</u>	COMPILED BY <u>W.W.K.</u>
DATUM <u>901.1</u>	BOREHOLE TYPE <u>Penetration Only.</u>	CHECKED BY <u>K.G.S.</u>

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT ——— WL			BULK DENSITY  P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT	BLOWS / FOOT					PLASTIC LIMIT ——— WP					
						25	50	75	100	125	WATER CONTENT ——— W					
						SHEAR STRENGTH P.S.F.					W P      W      W L ————— 10      20      30			WATER CONTENT % 10      20      30		
01.1 0.0	Groundlevel															
16.1 5.0	End of Penetration.															

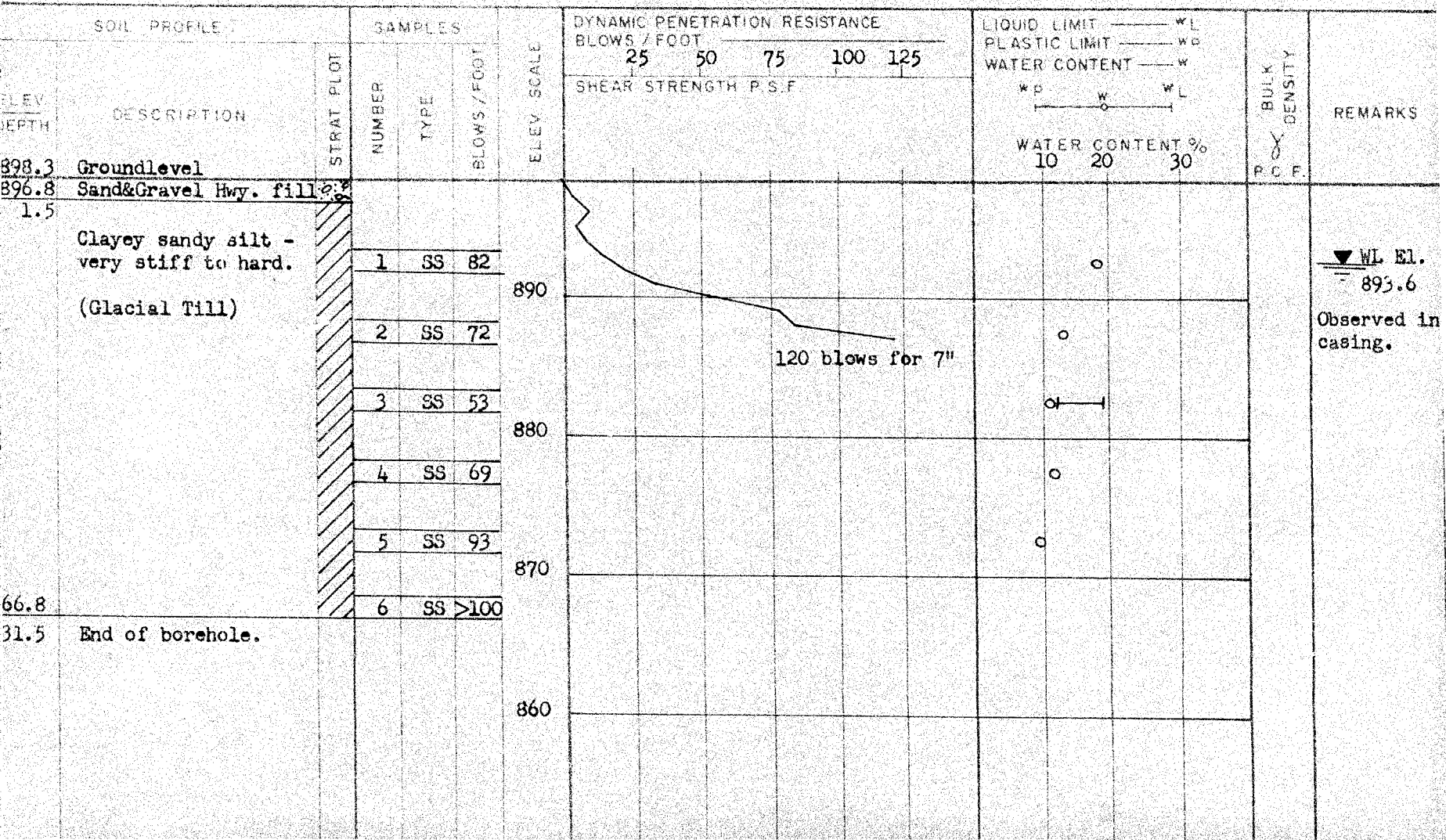
# RECORD OF BOREHOLE NO. 4

FOUNDATION SECTION

JOB 64-F-20 LOCATION Hwy. 126 & Conc. Rd. #2 Line "D" Ch. 125+30 21'-0" Rt. ORIGINATED BY W.W.K.  
 W.P. 222-62 BORING DATE March 25, 26 1964. COMPILED BY W.W.K.  
 DATUM 901.0 BOREHOLE TYPE Washboring - BX Casing. CHECKED BY K.G.S.



JOB 64-F-20 LOCATION Hwy. 126 & Conc. Rd #2 Line "D" Ch. 124/85 21'-0" Lt. ORIGINATED BY W.W.K.  
W.P. 222-62 BORING DATE March 28 & 29, 1964. COMPILED BY W.W.K.  
DATUM 898.3 BOREHOLE TYPE Washboring - BX Casing. CHECKED BY K.G.S.





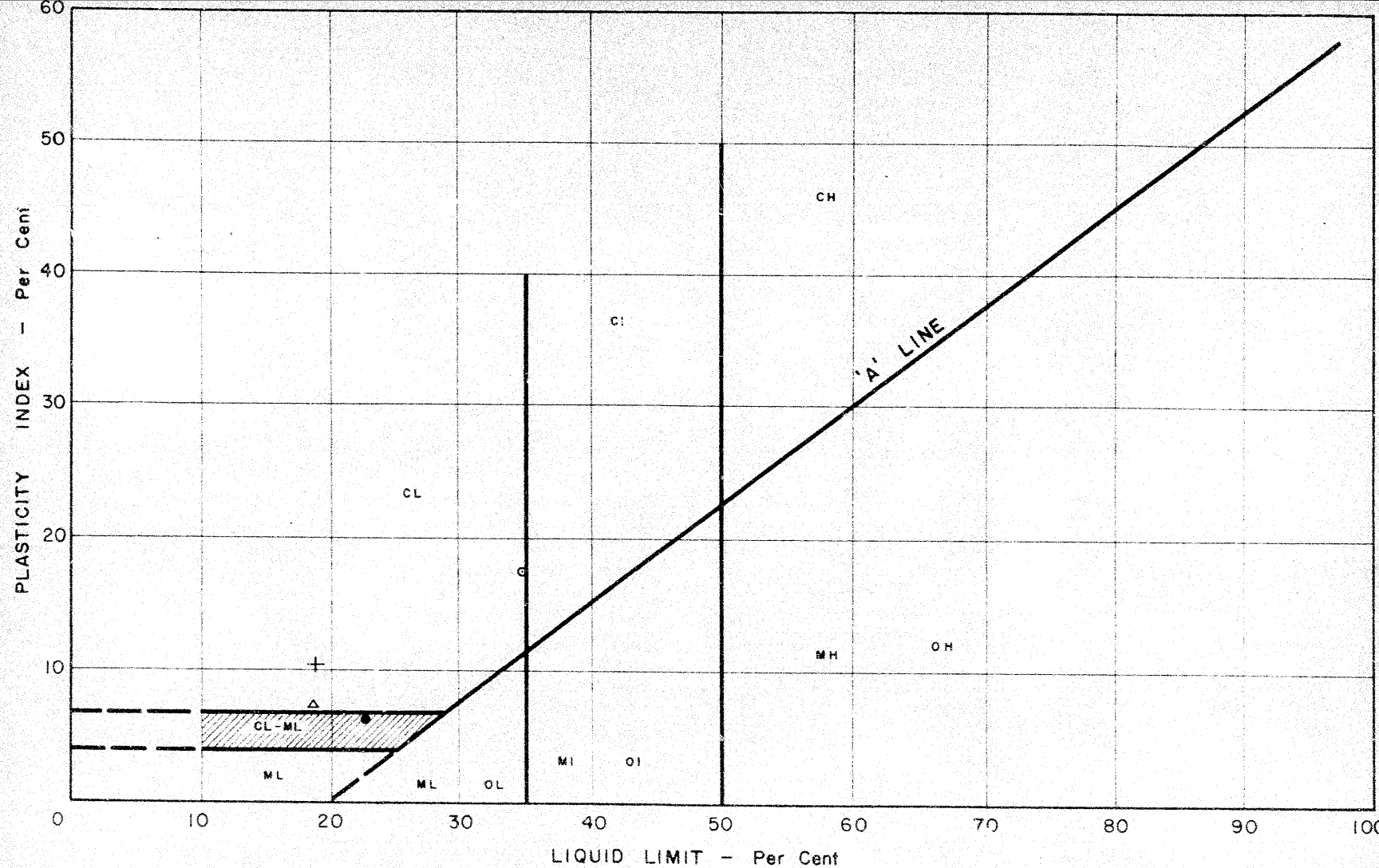
SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	LIQUID LIMIT ——— w <sub>L</sub> PLASTIC LIMIT ——— w <sub>p</sub>	BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	SHEAR STRENGTH P.S.F.	w <sub>p</sub> w <sub>s</sub> w <sub>L</sub> WATER CONTENT %	P.C.F.	
98.1 0.0	Groundlevel							
89.1 9.0	End of Penetration.							





CHECKED BY K.G.S.

WL El.  
892.4  
Observed in  
casing.



NOTES

- BORE HOLE - 1
- BORE HOLE - 4
- △ BORE HOLE - 5
- + BORE HOLE - 7

DEPARTMENT OF HIGHWAYS - ONTARIO  
MATERIALS & RESEARCH DIVISION  
PLASTICITY CHART

Job No. 64-F-20 W.P. No. 222-62  
Location HWY. NO. 126 & 2ND. CONCESSION ROAD

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 <sub>u</sub>	UNCONFINED COMPRESSION	L.V.	LABORATORY VANE
Q	UNDRAINED TRIAXIAL	F.V.	FIELD VANE
Q <sub>cu</sub>	CONSOLIDATED UNDRAINED TRIAXIAL	C	CONSOLIDATION
Q <sub>d</sub>	DRAINED TRIAXIAL	S	SENSITIVITY

# ABBREVIATIONS USED IN THIS REPORT

## SOIL PROPERTIES

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

## GENERAL

$\pi$	$= 3.1416$
e	BASE OF NATURAL LOGARITHMS 2.7183
$\log_e a$ 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
$\sigma$	NORMAL STRESS
$\sigma'$	NORMAL EFFECTIVE STRESS ( $\bar{\sigma}$ IS ALSO USED)
$\tau$	SHEAR STRESS
$\epsilon$	LINEAR STRAIN
$\gamma$	SHEAR STRAIN
$\nu$	POISSON'S RATIO ( $\mu$ IS ALSO USED)
E	MODULUS OF LINEAR DEFORMATION (YOUNG'S MODULUS)
G	MODULUS OF SHEAR DEFORMATION
K	MODULUS OF COMPRESSIBILITY
$\eta$	COEFFICIENT OF VISCOSITY

## EARTH PRESSURE

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

## FOUNDATIONS

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

## SLOPES

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

To: Mr. B. Davis,  
Bridge Design Engineer.

FROM: Bridge Division,  
Downsview, Ontario.

DATE: May 20, 1964.

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 222-62 - Br. Site 20-452  
Second Concession Rd. Underpass  
0.65 Mi. N. of Hwy. 401  
Hwy. 126 - District 2

Attached please find survey plans for the above structure.

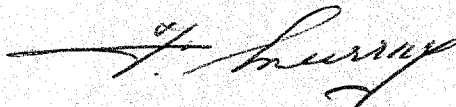
Bridge Site Plan	E 4316-1
Location Plan	B 94-18
Location Profile	C 94-29
Foundation Soils Plan	D 5506-2

The Cross-section with the following reports are enclosed.

Soils	BA 1833
Bridge Planning	by N. Zoltay

Preliminary plans for the above structure should be ready as soon as possible and the completed tracings by October 21, 1964.

The drawing number for this bridge is D-5506.



FM/im  
cc. A. Gater  
N. Zoltay  
R. Fitzgibbon

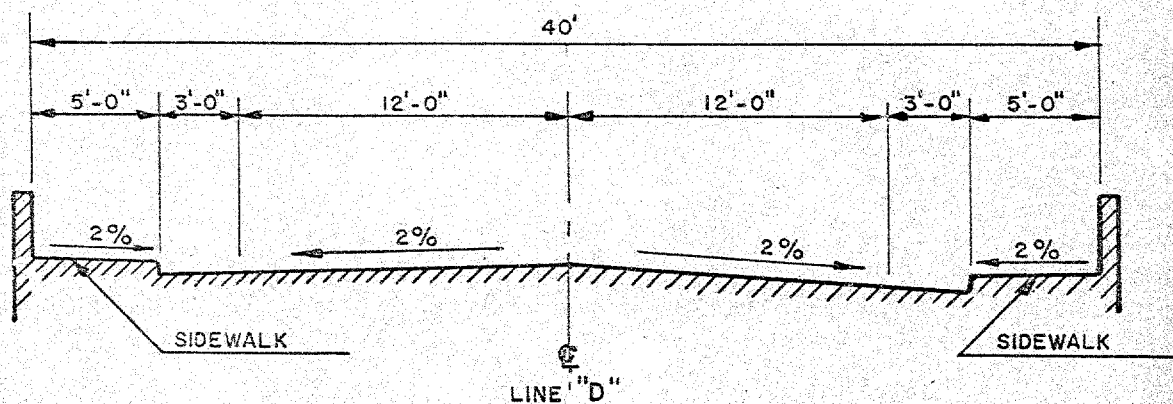
F. Murray,  
for S. McCombie,  
Bridge Planning Engineer.

W. P. #222-62

BR. SITE #20-452

MAY 19, 1964

SECOND CONCESSION RD. UNDERPASS  
0.65 MI. NORTH OF HWY #401  
HWY. #126 - DIST. # 2.



CROSS SECTION — SECOND CONCESSION RD. OVER HWY. #126

PROFILE GRADE — 0.37' BELOW FINISHED GRADE AT CROWN  
HANDRAIL — D. H. O. STD. STEEL

ASPHALT DEPTH = 3" ?

# BRIDGE PLANNING REPORT

## DEPARTMENT OF HIGHWAYS ONTARIO

BRIDGE DIVISION

SECOND CONCESSION RD. UNDERPASS

0.65 MI. NORTH OF HWY. #401

KING'S HIGHWAY NO. 126

DIST. NO. 2

CO. Middlesex

TWP. Westminister

LOT 16

CON. 1 & 11

SITE NO.

20-452

W. P. NO.

222-62

N. Zoltay

BRIDGE LOCATION ENG. for G. Scott

DATE May 13, 1964



Copy for the information of

Mr. G. Scott,  
Regional Bridge Location Engineer,  
Administration Bldg.

Mr. B. R. Davis,  
Bridge Design Engineer,  
Administration Bldg.

Bridge Division,  
Downsview, Ontario.

May 7, 1964.

Bridge Site #20-452  
W.P. 222-62  
Second Concession Rd. Underpass  
0.65 Mi. North of Hwy. #401  
Hwy. #126 District #2

1. Location

On existing Hwy. #126, approximately 2/3 mile north of  
Hwy. #401.

County:	Middlesex
Township:	Westminster
Concession:	I & II
Lot:	16

2. Survey Plans

Plan	B 94-18 Signed W. R. Kinnear, Mar. 26, 1964
Profile	C 94-29 " " " " " " "
Br. Site Plan	E 4316-1 " " " " " " "

3. Design Criteria

Refer to sheet W.P. 222-62 dated March 4th, 1964. The <sup>the</sup> following notes abstracted from that sheet are applicable to <sup>a</sup>second Concession Road at this Bridge Site.

	Design Standards
A.A.D.T.	14,000 (1980) (b)
Highway Class No.	M J. ART.
Minimum Stopping Sight Distance	50 m.p.h.
Equivalent Vertical Curve	600'
Grades Maximum	5%
Curvature Maximum	7°
Pavement Width	24' (c)
Pavement Depth Base	3"
Pavement Depth Top	1 1/2"
Shoulder Width	8'
Shoulder Rounding	2'
R.O.W. Width	150' Min.

Copy for the information of

RE: Bridge Site #30-452

W.P. 222-62

Second Concession Rd. Underpass

0.65 Mi. North of Hwy. #401

Hwy. #126 District #2Notes:

2

- a) D.H.O. took responsibility to construct Second Concession Road Diversion from about 1,700 feet east of Hwy. #126, westerly <sup>2</sup> to Pond Mills Road, about 800 feet south-east of Ponds.
- b) Anticipated traffic volumes <sup>are</sup> based upon full development of the area surrounding this proposal.
- c) Cross-section for structure over Hwy. #126 to be 5-3-24-3-5 (sidewalk) as Stage #1.
- Am Additional <sup>are will</sup> two lanes ~~to~~ be added as stage #2 to the north of stage #1 and separated by a raised median, when required by traffic volumes.

REMARKS:

1. This project ( stage #1) includes construction of a road connecting <sup>old</sup> old and new Second Concession Road. To be located immediately east of the Ponds and to have a 5-20-6 cross-section within a 66 foot R.O.W.
  2. After completion of Stage #1 the appropriate road sections <sup>are</sup> to be taken over by the City of London and Township of Westminster, Stage #2 to be built by <sup>Municipalities</sup> Municipalities.
4. Proposed Cross-Section for the Structure

Hwy. #126 under Second Concession Road Bridge

10' shoulder + 2 at 12' traffic lanes + 25' to center line of median + 25 + 2 at 12' traffic lanes + 10' shoulder.

Note: A pier can be placed in the centre of the median. In placing the pier, space should be retained in the median for future widening to 6 traffic lanes and minimum clearance of 10 feet on each side of the pier.

Second Concession Road over Hwy. #126

Handrail + 5' + 3' + 12' + 12' + 5' + 3' + Handrail

5. Existing and Proposed Lines

Hwy. #126 is straight for a reasonable distance at the crossing.

The line "D" for Second Concession Road has been diverted from the existing alignment from approximately 1/3 mile east of

Copy for the information of

RE: Bridge Site #20-452

W.P. 222-62

Second Concession Rd. Underpass

0.65 Mi. North of Hwy. #401

Hwy. #126 District #25. Existing and Proposed Lines-Cont'd

Hwy. #126 to Pond Mills Road to the West. It crosses the existing Hwy. #126 with an intersection angle of  $63^{\circ} 16' 45''$  in the south-west quadrant.

↑ The intersection chainages are  $34 + 61.18$  on Hwy. #126 and  $125 + 72.41$  on Second Concession Rd.

6. Existing and Proposed Grade

The profile grade of existing Hwy. #126 dips 0.47% south towards Hwy. #401 and crosses the intersection at profile grade elevation 900.84' (sta.  $34 + 61.18$ ). *west*

The proposed grade for Second Concession Road is on a 600' V.C. over the bridge using a 5% (south) and 4% (north) approach grade. These intersect at station:  $124 + 50$  at an elevation (top of pavement) 932.45. *EoJ*

7. Existing Bridge

None

8. Services

Two sets of H.E.P.C. 110,000 volt electric power lines on steel towers parallel Hwy. #126 a short distance beyond the west property line. The east line crosses the proposed Second Concession Rd. at approximately 235 feet from centre line of Hwy. #126 and the west line approximately 330 feet.

A 27,500 volt electric power line on wooden poles parallels Hwy. #126 immediately west of the steel towers.

A telephone service line on wooden poles is between the H.E.P.C. lines.

*the*  
The proposed profile of <sup>the</sup> second Concession Road will necessitate ~~a obtaining~~ greater clearance at the H.E.P.C. lines and the Bell Telephone line.

There are no service lines in the vicinity of the proposed bridge site.

9. Foundation Soils

Refer to report BA 1833 issued by the Materials and Research Section April 30th, 1964.

2

The following is a copy of the summary to that report:

RE: Bridge Site #20-452  
W.P. 222-62  
Second Concession Rd. Underpass  
0.65 Miles North of Hwy. #401  
Hwy. #126 District #2

9. Foundation Soils-Cont'd

"A foundation investigation at the site of the proposed Second Concession Road and Hwy. #126, is reported.

Subsoil was found to consist generally of very stiff to hard sandy clayey silt (glacial till) deposits down to a depth of at least 30 feet below the existing Hwy. #126.

Spread footings with an allowable net pressure of 3 tons/sq.ft. are recommended for footings placed at a depth of approximately 6 feet below existing original ground elevations (ranging from El. 889.0 to El. 892.0).

If perched abutments would be considered, they could be constructed on 12 3/4" o.d. steel Tube Piles driven down to El. 880.0. A design load of 40 tons/pile may be applied in this case.

No dewatering problems are anticipated.

No stability problems for the approach fills are anticipated."

10. Additional Factors Likely to Affect Design or Construction

As <sup>the</sup> Second Concession Road is not yet constructed no problem regarding traffic is anticipated.

Hwy. #126 can be detoured by temporarily modification on one of the existing lines.

11. Photographs on file

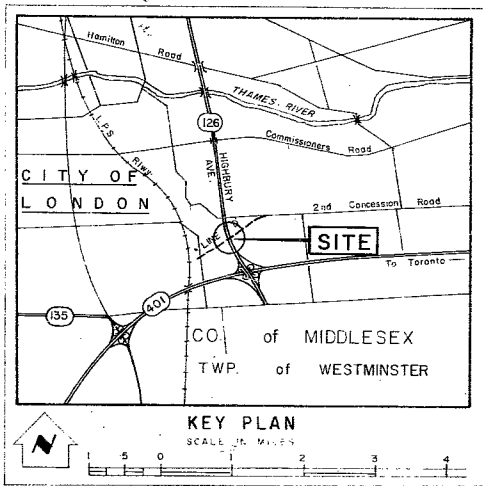
1. General alignment to North.
2. General alignment to East.
3. General alignment to South.
4. General alignment to West.





NZ/sp  
cc. S. McCombie  
A. Gater  
Designer ✓  
G. Scott  
N. Zoltay

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

#64-F-20  
W.P. #222-62  
HWY. #126 &  
#2ND CONC. RD.  
LINE "D"  
UNDERPASS.

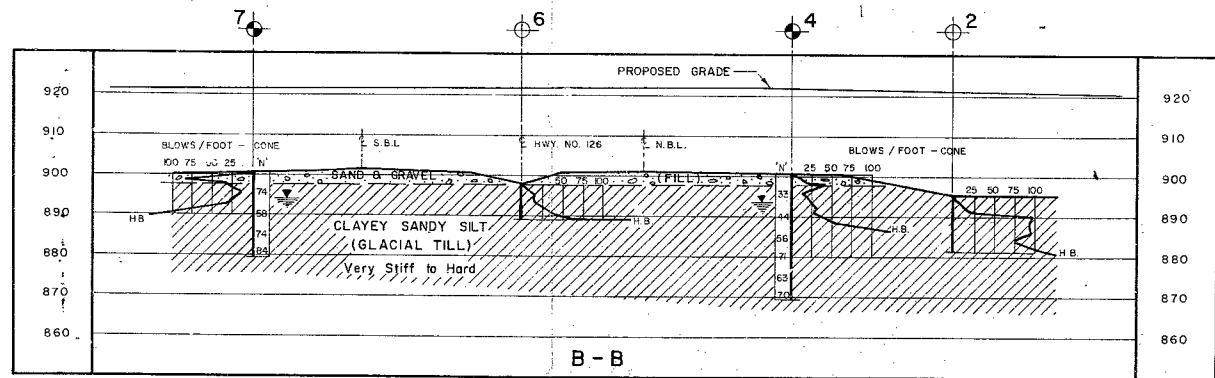
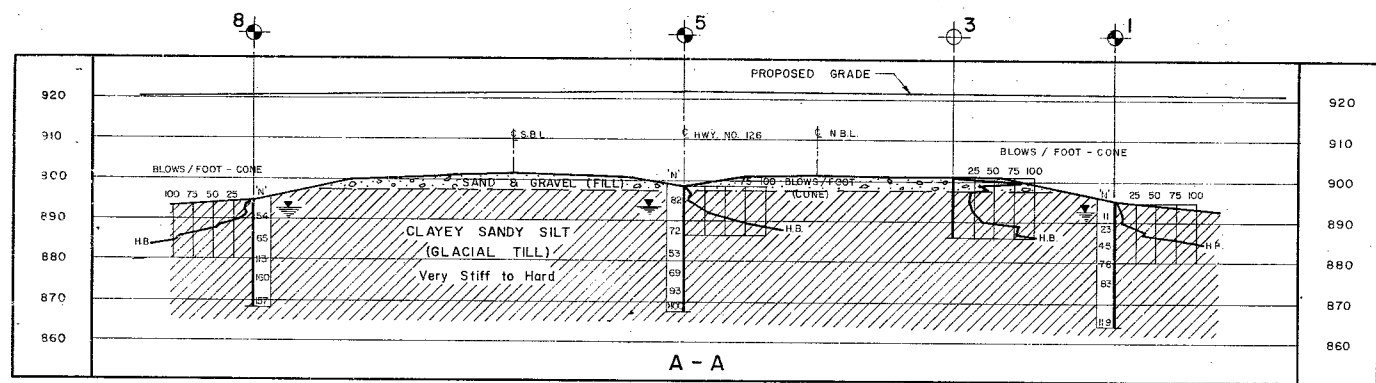
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LEGEND			
	Bore Hole		
	Cone Penetration Hole		
	Bore & Cone Penetration Hole		
	Water Levels established at time of field investigation. March, 1964.		
H.B.	Hammer Bouncing		
NO.	ELEVATION	STATION	OFFSET
1	895.5	125 + 50	21' LT.
2	895.5	125 + 70	21' RT.
3	901.1	125 + 50	21' LT.
4	901.0	125 + 30	21' RT.
5	898.3	124 + 85	21' LT.
6	898.1	124 + 60	21' RT.
7	900.4	123 + 95	21' RT.
8	894.6	123 + 55	21' 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.

[illegible]

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS & RESEARCH DIVISION - TORONTO REGIONAL OFFICE			
SECOND CONCESSION ROAD DIVERSION LINE 'D'			
KING'S HIGHWAY NO. 126 (HIGHBURY AVE.)		DIST. NO. 2	
CO. MIDDLESEX			
TWP. CITY OF LONDON		LOT 16	CON. II
BORE HOLE LOCATIONS & SOIL STRATA			
SUBMIT. W.K.	CHECKED <i>MS</i>	W.P. NO. 222-62	MSB 1964-65 64-F-20A
DATE F.C.	CHECKED <i>MR</i>	JOB NO. 64-F-20	
DRAW APRIL 24, 1964		SITE NO.	BRIDGE OPENING NO.
APPROVED <i>A. G. Thomas</i> PRINCIPAL GEOLOGICAL ENGINEER		CONT. NO.	

[illegible]