

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

File 28-2.

TO: Mr. C. S. Moase,
Manager,
Special Services Section,
Admin. Bldg.

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

DATE: **OCT 12 1965**

OUR FILE REF.

IN REPLY TO

SUBJECT:

FOUNDATION INVESTIGATION REPORT

For

749 Little Simcoe Street Patrol Yard,
Lot 12, Conc. 'C', City of London,
Co. of Middlesex, Dist. #2 (London).
W.J. 65-F(R)-65 -- W.P. (Nil)

Attached, we are forwarding to you, our 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 additional information be required, please feel free to contact our Office.

KYL/MdeF

Attac.

cc: Messrs. C. S. Moase (4)

E. J. Orr
D. W. Farren
H. C. Dernier
J. Roy
A. Watt

KYL
K. v. Lo,
SUPERVISING FOUNDATION ENGR.
For:
A. G. Sterner,
PRINCIPAL FOUNDATION ENGR.

Foundations Office
Gen. Files

FOUNDATION INVESTIGATION REPORT
For
749 LITTLE SIMCOE STREET PATROL YARD,
Lot 12, Conc. 'C', City of London,
Co. of Middlesex, Dist. #2 (London).
W.J. 65-F(R)-65 -- W.P. (Nil)

A request for a foundation investigation at 749 Little Simcoe St., City of London, was received from Special Services Section, in a memo dated April 7, 1965.

A field investigation was subsequently carried out by the Foundation Section to determine the subsoil conditions existing at the site.

The field work consisted of 2 sampled boreholes and 4 dynamic cone penetration tests. The locations and elevations are shown on Dwg. 65-F(R)-65A.

The subsoil was found to be somewhat variable over the site area.

The material in B.H. #1 consisted of compact silt with traces of sand (oil saturated). The 'N' values ranged from 10 to 30 blows per foot.

At the location of borehole #3, from ground level to Elev. 799', the material consisted of very loose (1 blow per foot) to compact sand with traces of fine gravel.

This deposit is underlain by a compact gravelly sand stratum with a thickness of 6 ft., and was found to be saturated with oil. The origin of the oil is unknown.

At or about Elev. 795' a probable bedrock zone was discovered. However, the drilling operation was not carried below the refusal depth.

cont'd. /2 ...

Due to the conditions existing at the location of borehole #3, it is not recommended to place the footings above Elev. 806'. At or below Elev. 806' a safe bearing pressure of 0.5 t.s.f. may be used to design spread footings.

With regard to the future paved and gravelled areas, the following recommendations were received from the Regional Materials Engineer:

"Due to the grades of the existing buildings, excavation to provide for 18" of granular consisting of 6" G.B.C. Class "A" over 12" G.B.C. Class "B" is recommended. Further, it is recommended that all topsoil be removed and backfilled with suitable material up to subgrade elevation. The average depth from ground level to the bottom of the topsoil is 20 inches.

If the Yard is to be paved, we would recommend a 2" H.L.6 (modified) binder course and a 1½" H.L.3 top course."

The field work was carried out during the period of June 10 and 11, 1965, under the supervision of Mr. P. Payer, Project Foundation Engineer, who also prepared this report, under the general supervision of Mr. K. G. Selby, Senior Foundation Engineer. The equipment used was owned and operated by Johnston Drilling Company.

October 1965

APPENDIX I

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

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

ABBREVIATIONS USED IN THIS REPORT

SOIL PROPERTIES

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

GENERAL

π	-3.1416
e	BASE OF NATURAL LOGARITHMS 2.7183
$\log_e \sigma$ OR $\ln \sigma$	NATURAL LOGARITHM OF σ
$\log_{10} \sigma$ OR $\log \sigma$	LOGARITHM OF σ 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
$\bar{\sigma}$	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
SERVICES BRANCH
SPECIAL SERVICES SECTION REQUISITION

REQUISITION NO. 1414

TO BE SHOWN ON ALL BILLINGS

Mr. A. Rutka, Materials and Testing Engineer,
DISTRICT Engineer

TO: DISTRICT ENGINEER

DISTRICT: Downsview.

DATE April 7, 1965

NOTE: THIS FORM MUST BE USED FOR ALL PROJECTS FOR WHICH SPECIAL SERVICES ARE RESPONSIBLE

PLEASE INDICATE WHICH OF THE THREE FOLLOWING CATEGORIES APPLY

CATEGORY 1

AN EMERGENCY PROJECT
ALL PROJECTS OF THIS NATURE MAY
BE UNDERTAKEN AT THE DISCRETION
OF THE DISTRICT IN WHICH CASE THIS
FORM WILL BE USED AS A CONFIRM-
ING DOCUMENT ONLY.

CATEGORY 2

NORMAL MAINTENANCE
ALL PROJECTS OF THIS NATURE MAY
BE UNDERTAKEN AT THE DISCRETION
OF THE DISTRICT BUT EACH ITEM
MUST NOT EXCEED AN ESTIMATED
COST OF \$200.00 IN WHICH CASE THIS
FORM WILL BE USED AS A CONFIRM-
ING DOCUMENT ONLY.

CATEGORY 3

MAJOR PROJECTS (NON-EMERGENCY -
EXCEEDING \$200.00)
ALL PROJECTS OF THIS NATURE MUST
BE APPROVED BY THE REGIONAL
SPECIAL SERVICES INSPECTOR BE-
FORE UNDERTAKEN.

[illegible]

MULTIPLE PROJECTS MAY BE INCLUDED ON ONE FORM PROVIDED THEY ARE CONCENTRATED AT ONE SITE

REQUIRED FOR 740 Little Simcoe Street,
London, Ontario.

REQUESTED BY _____

SIGNED _____
DISTRICT ENGINEER

SIGNED [Signature]
REGIONAL SPECIAL SERVICES INSP

DISTRICT OFFICE SUPERVISOR

Mr. G.A. Wrong,
Principal Soils Engineer,
Materials & Testing,
Downsview

Materials & Testing,
London

July 14, 1965.

Re: Soils Investigation of Little Simcoe St. Site

Attached is a copy of the borehole log for the above site. You will note that there is a variable depth of gravel over 9" to 20" of topsoil over a fine to medium loamy sand. At one location (in the south east corner) the sand was saturated at a depth of 3 feet.

Due to the grades of the existing buildings, excavation to provide for 18" of granular consisting of 6" G.B.C. Class A over 12" G.B.C. Class B is recommended. Further, it is recommended that all topsoil be removed and backfilled with suitable material up to subgrade elevation. The average depth from ground level to the bottom of the topsoil is 20 inches.

If the yard is to be paved we would recommend a 2" H.L.6 (modified) binder course and a 1½" H.L. 3 top course.

DS/jb
cc: K.Y. Lo
D. Suzuki
file


for: D. Suzuki
J.R. Roy
Regional Materials Engineer



#65-F(R)-65

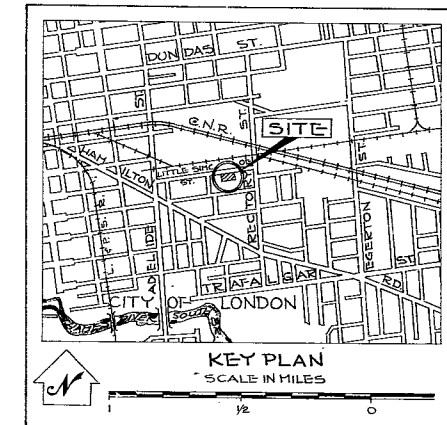
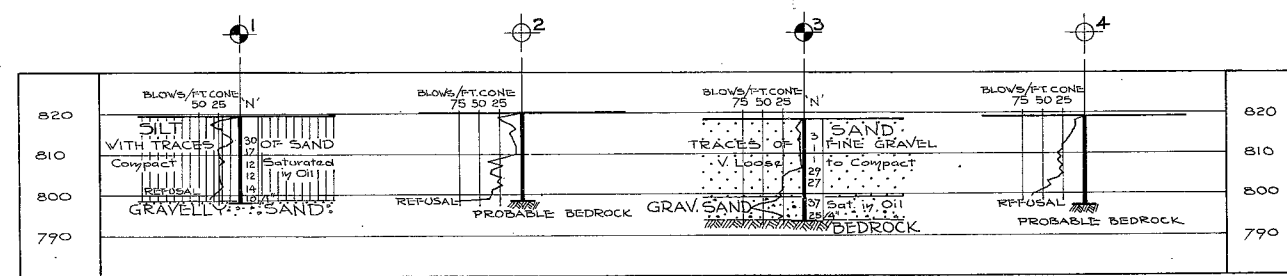
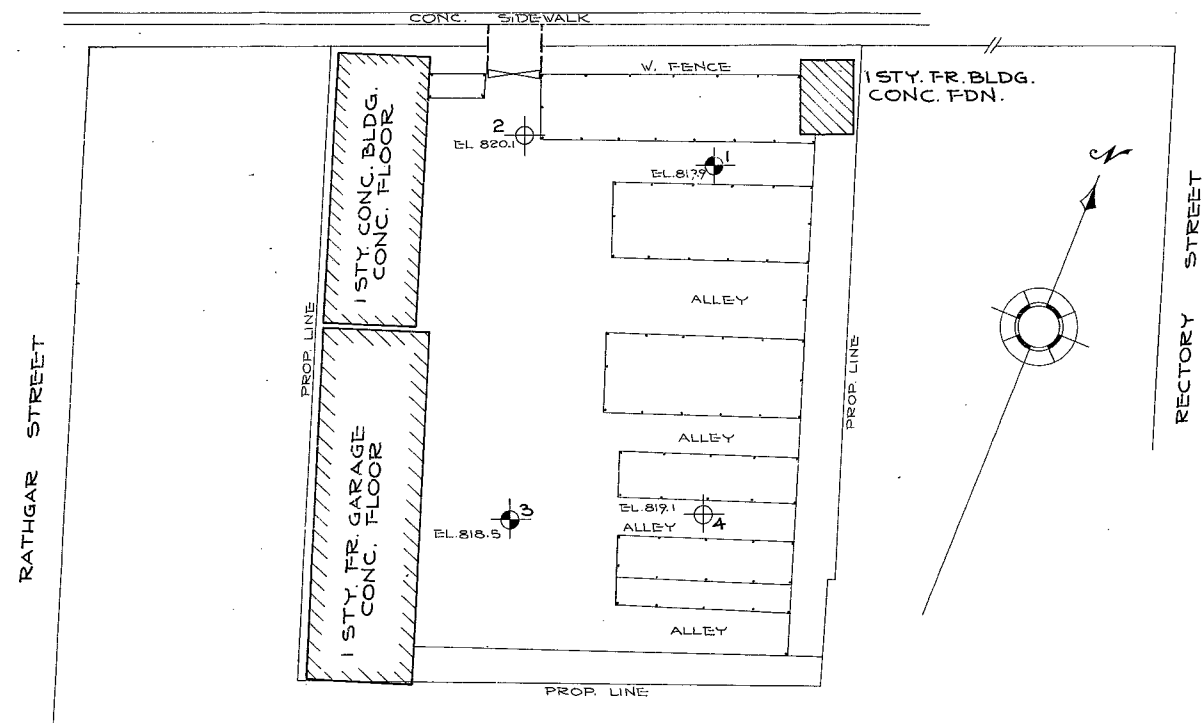
749 LITTLE

SIMCOE ST.

PATROL YARD,

LONDON CITY

CITY OF LONDON
E OF LITTLE SIMCOE STREET



LEGEND

- BORE & CONE PENETRATION HOLE
- CONE PENETRATION HOLE

- 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.

DEPARTMENT OF HIGHWAYS - ONTARIO			
MATERIALS & RESEARCH SECTION			
LITTLE SIMCOE ST PATROL YARD LONDON			
SHOWING POSITIONS & ELEVATIONS OF HOLES			
HWY. _____	DISTRICT 2	COUNTY MIDDLESEX	
TOWNSHIP CITY OF LONDON	LOT _____	CON. _____	
LOCATION LITTLE SIMCOE ST. - LONDON			
DRAWN BY: D.G.H.	CHECKED BY: <i>[Signature]</i>	W.P.	
DATE 5 AUG/65	APPROVED BY: _____	DRAWING NO.	
SCALE AS SHOWN		65-RF-65A	