

MEMORANDUM

GEN. FILES

23-68-22

TO: Mr. S. J. Markiewicz,
Regional Road Design Engineer,
Eastern Regional Office,
Kingston, Ontario.

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

DATE: November 3, 1967

OUR FILE REF.

IN REPLY TO

NOV '9 1967

SUBJECT:

FOUNDATION INVESTIGATION REPORT FOR
Existing Sewer and Water Main at the
Crossing of New Moodie Drive and
Existing Corlston Road and the
Existing Sewer at Station 126+97 of
Hwy. 417 (Queensway) Twp. of Nepean
Lots 1088, Con. II & I, Dist. 9 (Ottawa)
W.J. 67-F-98 -- W.P. 429-64

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

We believe that the factual data and recommendations
contained therein, will prove adequate for your design
requirements. Should you require additional information, or
should there be any queries in connection with this report,
please do not hesitate to contact our Office.

AGS/MaeF
Attach.

A. G. Sternac
PRINCIPAL FOUNDATION ENGINEER

cc: Messrs. S. J. Markiewicz (2)
H. A. Tregaskes
D. W. Farren
S. McCombie
C. R. Robertson
G. Scott
J. E. Gruspier
De Leuw, Cather & Co. of Canada Ltd. (Ottawa)
B. A. Singh

Foundations Files
Gen. Files

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FOUNDATION INVESTIGATION REPORT FOR
Existing Sewer and Water Main at the
Crossing of New Moodie Drive and
Existing Corkstown Road and the
Existing Sewer at Station 126+97 of
Hwy. 417 (Queensway) Twp. of Nepean
Lots 10&8, Con.II & I, Dist.9 (Ottawa)
W.J. 67-F-98 -- W.P. 429-64

1. INTRODUCTION:

A request to carry out an investigation to determine the soil conditions at the site of the existing sewer and water main at the crossing of new Moodie Drive and the existing Corkstown Road - Site 'A' - and the existing sewer at Station 126+97 of Hwy. 417 - Site 'B' - was received from Mr. S. J. Markiewicz, Regional Road Design Engineer, in a memo dated September 25, 1967.

An investigation was subsequently carried out by this Section.

This report contains the results of our field and laboratory investigation, together with our recommendations for relieving the loads on the conduits when the new embankment is constructed.

2. DESCRIPTION OF SITE:

At Moodie Drive there is an 18" dia. sewer on the south side of the existing Corkstown Road, and a 16" dia. water main on the north side of it. A 36" dia. sewer crosses the proposed Hwy. 417 (Queensway) at Station 126+97.

The surrounding area at both sites is under cultivation and is relatively flat.

Physiographically, the sites lie in the area of the Lowlands of the St. Lawrence and more particularly, the Ottawa Valley Clay Plain.

3. FIELD AND LABORATORY WORK:

The field work at Site 'A' consisted of six sampled boreholes and four dynamic cone penetration tests; and of two sampled boreholes and two dynamic cone penetration tests at Site 'B'.

Disturbed samples were obtained using a 2-inch O.D. split-spoon sampler driven according to the specifications for the Standard Penetration Test. Undisturbed samples were obtained by means of 2-inch I.D. Shelby tubes which were pushed into the soil manually.

In-situ vane tests were carried out wherever possible, at elevations 12 inches below various sample depths.

Samples were visually examined in the field and subsequently in the laboratory. The following tests were carried out on selected samples:

- 1) Grain-size Analysis
- 2) Atterberg Limits
- 3) Unconfined Compression Test
- 4) Consolidation Test
- 5) Natural Moisture Content
- 6) Bulk Density

The results of field and laboratory tests are summarized in the Record of Borehole sheets, which are contained in the appendix to the report.

The locations and the elevations of boreholes are given on Drawing No. 67-F-98A and 67-F-98B, which are also contained in the appendix to this report.

The borehole elevations were provided by the Ottawa District Office of the D.H.O.

cont'd. /3 ...

4. SUBSOIL CONDITIONS:

The boundaries between the different deposits are shown on the attached Record of Borehole sheets. The estimated stratigraphical profiles shown on Drawing No's. 67-F-98A and 67-F-98B, are based upon this information.

4.1) Site 'A' -

The subsoil consists of a deposit of firm to stiff clay to clayey silt, 15.0 to 23.5 ft. in thickness, underlain by a deposit of loose to very dense sandy silt to silty sand, having traces of clay and gravel. All the holes were terminated in the latter deposit.

The backfill material in the sewer trench seems to be the same as the original material, except for a sand cover around the sewer pipe.

4.2) Site 'B' -

The subsoil at this site consists of a deposit of compact to very dense sandy silt having traces of clay and gravel. In borehole 8, this is overlain by a 7.0 ft. thick layer of very stiff clayey silt.

5. GROUNDWATER:

The natural groundwater level at Site 'A' was found to be at elevations 213.0 - 215.4; while at Site 'B' the elevation of groundwater after two days of rain, was 244.9.

6. DISCUSSION AND RECOMMENDATIONS:

It is proposed to construct an underpass at Site 'A'. The invert levels of the sewer and the water main are about 13.0 ft. and 8.0 ft., respectively, below the ground level. An additional fill up to a maximum of 14.0 ft. in height is proposed to be placed at this site.

cont'd. /4 ...

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

At Site 'B', the invert level of the sewer is 18.0 - 20.0 ft. below the ground level and an additional 16.0 ft. of fill will be placed over it.

According to the consultant, De Leuw, Cather Co. Ltd., the structural strength of the sewer pipes is such that they cannot withstand the load of the additional fill to be placed. Therefore, some measures have to be taken to relieve the load on the pipes. This can be achieved by providing an imperfect trench over the sewer pipes, as proposed by Spangler (Ref. No. 2) in the following manner:

(1) Excavate a neat width trench exactly over the pipe and brace the sides.

(2) Backfill the trench with material which should be more compressible than the present backfill material.

(3) New fill should be placed in successive lifts to within 10.0 ft. of final grade. At each lift, the trench should be excavated exactly over the pipe and refilled with looser, more compressible material. The top 10.0 ft. of the fill should all be compacted thoroughly to guard against a depression in the future pavement.

It is very important that the width of the trench should be as narrow as possible and that it should be located exactly over the pipe. It is suspected that the sewer at Moodie Drive is not in a straight line.

Two case histories have been found in the engineering literature dealing with conduits in trenches. The references are as follows:

cont'd. /5 ...

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

- (1) SCHLICK, W. J., "Loads on Negative-Projecting Conduits." H.R.B. Proceedings, 1952, pp 308 - 319.
- (2) SPANGLER, M. G., "A Practical Application of the Imperfect Ditch Method of Construction." H.R.B. Proceedings, 1958, pp 271 - 277.

At Site 'A' a differential settlement of 2.0 inches under the 18" dia. sewer and the 10" dia. water main in a length of about 50.0 ft. is anticipated. The maximum settlement of the ground would be in the order of 4.0 inches.

At Site 'B' no significant settlements of the subsoil are anticipated.

7. SUMMARY:

An investigation to establish the subsoil conditions at the site of the 18" dia. sewer and the 10" dia. water main at the proposed crossing of Moodie Drive and the existing Corkstown Road - Site 'A' - and the 36" dia. sewer at Station 126+97 of Hwy. 417 (Queensway) - Site 'B' - is reported. At these locations it is proposed to construct new fills approximately 14.0 ft. and 16.0 ft. high, respectively.

Subsoil at Site 'A' consists of a deposit of clay to clayey silt overlying a layer of sandy silt to silty sand, having traces of clay and gravel.

Subsoil at Site 'B' essentially consists of a deposit of sandy silt, having traces of clay and gravel.

A method of achieving the 'imperfect trench' condition with the objective of relieving the loads on the sewer pipes, is outlined in the main body of the report.

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

At Site 'A' some subsoil settlements are anticipated, while no significant subsoil settlements are anticipated at Site 'B'.

8. MISCELLANEOUS:

The field work for this project was carried out during the period October 6 to October 18, 1967, under the supervision of Mr. A. Prakash, Project Foundation Engineer, who also prepared this report.

The equipment used was owned and operated by F. E. Johnston Drilling Co. Ltd.

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

November 1967

APPENDIX I

DEPARTMENT OF HIGHWAYS - ONTARIO

RECORD OF BOREHOLE NO. 1

FOUNDATION SECTION

MATERIALS & TESTING DIVISION

JOB 67-F-98 LOCATION Sta. 433 + 05 142' Lt. Moodie Dr. Line 'A' ORIGINATED BY AP
W.P. 429-64 BORING DATE Oct. 6 - 10, 1967 COMPILED BY AP
DATUM Geodetic BOREHOLE TYPE Washboring, NX Casing and Cone Test CHECKED BY [Signature]

SOIL PROFILE		STRAT. PLOT	SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT ——— WL PLASTIC LIMIT ——— WP WATER CONTENT ——— W			BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION		NUMBER	TYPE	BLOWS / FOOT		20	40	60	80	100	WP	W	WL		
222.3	Ground Level															
0.0	Clay to silty clay		1	TW	PM	220										
			2	TW	PM											
			3	TW	PM											
	Firm to stiff		4	TW	PM	210										
			5	TW	PM											
			6	TW	PM											
198.8			7	SS	12	200										
23.5	Sandy silt/silty sand, traces of clay & gravel		8	SS	106											
193.8	Compact to very dense.															
28.5	End of Borehole					190										

213.8
Oc.t.12/67
109
11 32 43 11
10 45 37 8

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 3

FOUNDATION SECTION

JOB 67-F-98

LOCATION Sta. 433 + 86 66' Ft. Moodie Dr. Line 'A'

ORIGINATED BY AP

W.P. 429-64

BORING DATE Oct. 11-12, 1967

COMPILED BY AP

DATUM Geodetic

BOREHOLE TYPE Washboring, NX Casing and Cone

CHECKED BY *AP*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 SHEAR STRENGTH P.S.F. ○ Unconfined + Field Vane ⊕ Remoulded	LIQUID LIMIT — WL PLASTIC LIMIT — WP WATER CONTENT — W wp — w — WL WATER CONTENT % 25 50 75	BULK DENSITY P.C.F.	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT						
223.3	Ground Level									Gr.Sa.Si.Cl	
0.0	Clay to silty clay		1	TW	PM	220				0 5 61 34	
	Firm to stiff		2	TW	PM						215.3
			3	TW	PM						Oct. 13, 1967
			4	TW	PM	210				109	0 41 53 6
			5	TW	PM						0 12 55 33
204.3											
19.0	Sandy silt/silty sand traces of clay and gravel.		6	SS	22	200				16 45 29 10	
			7	SS	80						
193.3	Compact to very dense		8	SS	84						
30.0	End of Borehole					190					

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 4



FOUNDATION SECTION

JOB 67-F-98LOCATION Sta. 433 + 10 140' Lt. Moodie Dr. Line 'A'ORIGINATED BY APW. P. 129-64BORING DATE Oct. 12, 1967COMPILED BY APDATUM GeodeticBOREHOLE TYPE Washboring, NX CasingCHECKED BY ML

SOIL PROFILE			SAMPLES			ELEV. SCALE	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		SHEAR STRENGTH P.S.F.					w_p w w_L				
							+ Field Vane \oplus Remoulded 400 800 1200 1600 2000					WATER CONTENT % 25 50 75				
223.5	Ground Level														Gr. Sa. Si. Cl.	
0.0	Silty clay to clayey silt. Firm to stiff 18" \varnothing sewer					220									213.0 Oct. 13/67 13 11 51 25	
			1	TW	PM		\oplus		+							
			2	TW	PM											
			3	TW	PM	210	\oplus			+						
207.0			4	TW	PM											
16.5	End of Borehole					200										

213.0
Oct. 13/67
13 11 51 25

CHECKED BY

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		SHEAR STRENGTH P.S.F. o Unconfined + Field Vane ⊕ Remoulded 400 800 1200 1600 2000					WATER CONTENT % 25 50 75				
223.6	Ground Level															
0.0	Silty clay Stiff					220								113	▽ 217.8 Oct. 18, 1967	
			1	TW	PM											
			2	TW	PM											
208.6						210	⊕	o		+						
15.0	Sandy silt/silty sand traces of clay and gravel.		3	TW	PM								OH			
			4	SS	8											
200.6	Loose to compact		5	SS	11								OH			
23.0	End of Borehole					200										

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING DIVISION

RECORD OF BOREHOLE NO. 7

FOUNDATION SECTION

JOB 67-F-98

LOCATION Sta. 128 + 00 120' Rt. Hwy. 417 Line 'D'

ORIGINATED BY AP

W.P. 429-64

BORING DATE Oct. 16, 1967

COMPILED BY AP

DATUM Geodetic

BOREHOLE TYPE Washboring, BX Casing and Cone

CHECKED BY [Signature]

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT ——— WL PLASTIC LIMIT ——— WP WATER CONTENT ——— W WP ——— W ——— WL WATER CONTENT % 25 50 75	BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT	20	40	60	80	100		
253.9	Ground Level													
0.0	Sandy silt, traces of clay and gravel.													
			1	SS	71									
			2	SS	50/2"									
	Very dense.													
			3	SS	100/2"									
			4	SS	100/3"									
228.7			5	SS	100/8"									
25.2	End of Borehole													

11 37 44 8
244.9
Oct. 18/67

5 34 53 8

RECORD OF BOREHOLE NO. 8

FOUNDATION SECTION

JOB 67-F-98

LOCATION Sta. 125 + 88 125' Lt. Hwy. 417 Line 'D'

ORIGINATED BY AP

W. P. 429-64

BORING DATE Oct. 18, 1967

COMPILED BY AP

DATUM Geodetic

BOREHOLE TYPE Washboring, BX Casing & Cone

CHECKED BY AK

[illegible]

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_t	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

Von Mierbach. De Leuw Cather Ottawa

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

TO: Mr. A.G. Stermac,
Principal Foundation Engineer,
Materials & Testing Division,
DOWNSVIEW, Ont-10.

FROM: Road Design Division
Kingston.

DATE: September 25, 1967.

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 429-64, Hwy. 417, Richmond Road Westerly to
County Road 9, District 9, Ottawa

67-F-98

Attached is a copy of a letter received from Mr. M.N. Gault
of De Leuw, Cather and Company of Canada Limited.

As requested, please arrange to obtain the additional borings.
We would appreciate this information as soon as feasibly
possible.

S. J. Markiewicz

S. J. Markiewicz,
REGIONAL ROAD DESIGN ENGINEER
SJM/mjh
Att.
c.c. J.E. Gruspier

CONSULTING ENGINEERS

Our Ref. 4151
September 20, 1967

Mr. S. J. Markiewicz
Regional Road Design Engineer
Department of Highways of Ontario
Postal Bag 4,000
KINGSTON, Ontario

Dear Mr. Markiewicz:

Re: W.P. #29-64 Highway 17
Richmond Road to Co. Sub. Rd. 9

You will recall that during the design of the above project we were concerned about the strength of the existing 36" sanitary sewer crossing the highway at about station 127+00.

This sewer is located in an area of sensitive clay subsoils with approximately 17 feet of cover to existing ground. The highway embankment will place an additional 16 feet of rock fill over the sewer. A similar, less severe case prevails where new Moodie Drive crosses over the existing Corkstown Road sewer.

Our design to relieve the load on the sewer employed the "imperfect trench" method as shown on the contract drawings submitted to you previously. However, this design was based on certain assumptions of the soils properties which could not be verified in the time then available.

Recently we discussed this matter at some length with Mr. Gruspier and subsequently, at his suggestion, with Messrs. Stermac and Selby of your head office Materials and Testing Division.

There are two questions regarding these sewers which should be investigated:

- a) Will the settlement of the existing ground at the level of the sewer due to the highway embankment load be limited to an amount which the sewer can take without hydraulic or structural failure.

CHECKED BY	NAME	DATE
Regional Rd. Design Eng.		
Sr. Proj. Design Eng.		
Proj. Design Eng.		
Office Proj. Design Eng.		
Sr. Pre-Engineering Est.		
Property & Util. Tech.		
Office Clerk		

.... 2
RECEIVED**SEP 21 1967****ROAD DESIGN
D.H.O. KINGSTON**

De Leuw, Cather

September 20, 1967
Mr. S. J. Turkiewicz

- b) What protection or strengthening does the pipe require to withstand the load from the additional height of fill to be placed over it.

As the soils data presently available relates to borings located some distance from the sewer locations, Mr. Stermac would like to obtain a series of borings along the line of the sewers before making any recommendation.

If you concur with this, would you please write to Mr. Stermac authorizing the extra work which should preferably be carried out next week or soon thereafter.

Yours very truly,

DE LEUW, CATHER & COMPANY OF CANADA LIMITED

M. N. Gault,
Project Manager

MNG/bva

H R B

REC. VOL 37
1958 Page 271.

401 & Keele Street
Downsview, Ontario

October 31, 1967

Johnston Drilling Co.Ltd.
377 Munster Ave.
Toronto, Ontario

Dear Sirs:

This is to confirm our request of October 4, 1967 for the supply of a Diamond Drill together with all necessary equipment as specified under the terms of our Contract Agreement at Corkstown Rd., Hwy. 417, Bells Corners, Ottawa, Ontario, on October 6, 1967.

This project bears Job Number 67-P-98.

Yours truly,

A. G. Selby

KGS:mt

A. G. Selby
Supervising Foundation Engineer
for: A. G. Stermac
Principal Foundation Engineer

cc: H. Konings
Foundation Files //C
General Files

MEMORANDUM

To: J. Graspier
Regional Materials Engineer
Eastern Regional Office
Kingston, Ontario

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

DATE: November 17, 1967

Our File Ref.

IN REPLY TO

SUBJECT: 18" Sewer at New Moodie Drive and Corkstown Rd.
and 36" Sewer at Sta. 126 + 97, Hwy. 417, Ottawa
W.J. 67-F-98 W.P. 429-64

Following our discussion by telephone on November 16, 1967, this memo confirms recommendations given verbally to you in connection with the above-mentioned project.

1. Referring to 6(3) on Page 4 of the Foundation Report 67-F-98, if the new fill consists entirely of rock material, it may be placed in the conventional manner without excavating and refilling.
2. The depth of the re-excavations below the present ground level in the old sewer trenches should be at least 10 feet. This trench may be back-filled with the same excavated material provided it is replaced in a much looser or compressible condition.

K. G. Selby

KGS:mt

K. G. Selby
Supervising Foundation Engineer
for: A. G. Stermac
Principal Foundation Engineer

cc: S. J. Markiewicz (2)
E. A. Tregaskes
D. W. Farren
S. MacCormie
C. R. Robertson
G. Scott
De Leuw, Cather & Co. of Canada Ltd. (Ottawa)

Foundation Files
General Files

MEMORANDUM

To: Mr. S. J. Markiewicz,
Regional Road Design Engineer,
R.D.O., Kingston.

FROM: Materials & Testing Division,
Kingston,

DATE: January 26th, 1968.

OUR FILE REF.

IN REPLY TO

SUBJECT:

Re: W.P. 429-64-02, Ottawa Queensway
South Service Road, County Road 9
to Moodie Drive,
District 9, Ottawa.

67-F-98

A foundation investigation and stability analysis has been carried out for the embankment across St. Lawrence Creek. (sta. 17+25).

The embankment can consist of acceptable earth or rockfill with a minimum of 2:1 side slopes.

This is further to our memo of December 7th, 1967.

H. A. Meyer
H. A. Meyer

for J. E. Gruspier,
Regional Materials Engineer.

HAM/jk

c.c. A. G. Stermac.

MEMORANDUM

TO:

Mr. A. Stermac,
Principal Foundation Engineer,
Room 107,
Lab. Building.

FROM:

Bridge Division,
Downsview, Ontario

DATE:

February 18, 1966

OUR FILE REF.

IN REPLY TO

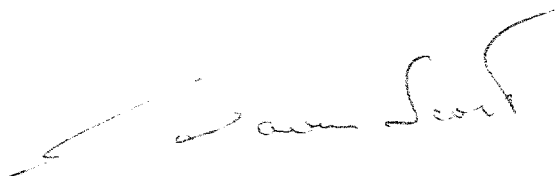
SUBJECT:

W.P. 429-64,
Ottawa Queensway Extension,
District 9, Ottawa

The following structures are included in the above project and are pertinent to the question¹ of Mr. Forster's letter dated February 11, 1966, a copy of which is attached.

W.P. 108-65 C.N.R. O'head 2.7 miles west of Hwy. 7 Inter-
change.
W.P. 423-64 O'Pass at Blair Road
W.P. 430-64 Moody Drive Interchange
W.P. 431-64 County Road No. 40 Interchange
W.P. 909-64 Highway 7 (Richmond Road) Interchange.

We would be pleased if you will take note of the queries 1 and 2 in Mr. Forster's letter, meanwhile we will provide him with appropriate answers to items (a), (b) and (c).



GS/pr
Attach.

G. Scott,
Regional Bridge Location Engineer

*File
Copy
Foundation Section*

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

To: Mr. G. Scott,
Regional Bridge Location Engineer,
Bridge Office,
Downsview.

FROM: Functional Planning Section,
Kingston.

DATE: February 11, 1966

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 429-64, Ottawa Queensway Extension,
District 9 - Ottawa

Further to our discussion on February 6, 1966, we would appreciate the following comments from the Foundation Section with regard to the above project.

1. Is it practical to build 2 lane structures and approaches over the Queensway and then widen to 4 lanes at some future date in view of the existing soil conditions?
2. The gully which carried a stream draining from the southwest quadrant of the Cty. Rd. 40 intersection to the northeast quadrant of the intersection is crossed many times by proposed ramps. Will it be possible to build embankments across this gully or should it be avoided at all costs? The stream will likely be diverted.

In addition, to the above we would appreciate estimates of the cost of proposed structures as follows:

- (a) Cost of an overhead structure with the railway remaining in its present location.
- (b) Cost of a subway with the railway remaining in its present location.
- (c) Cost of a subway with the railway located approximately 400' east of its present location.

J. L. Forster,
Regional Functional Planning Engineer

#67-F-98

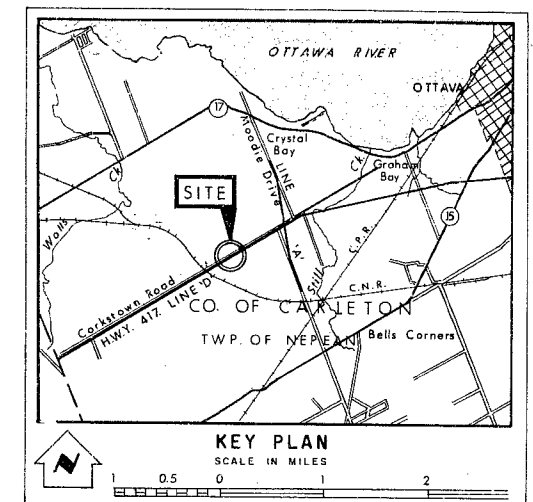
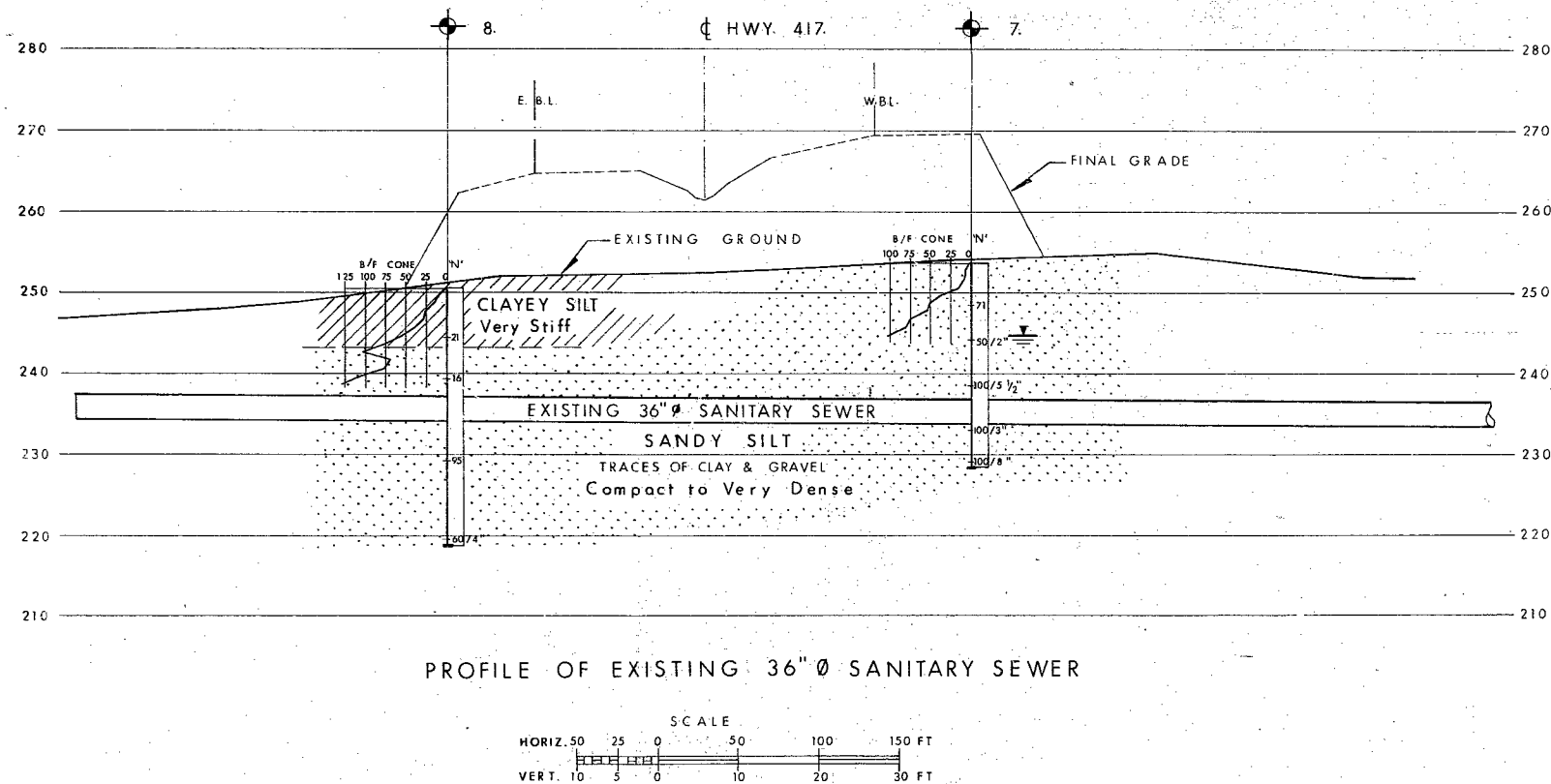
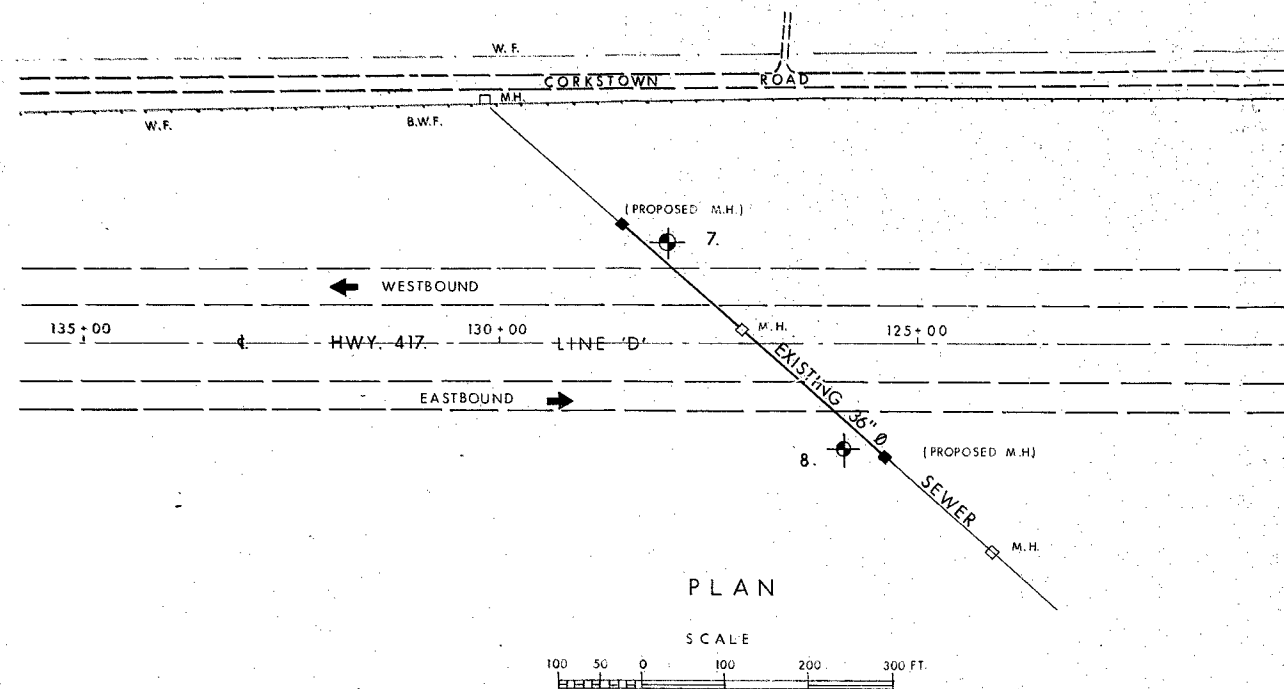
W.P. #429-64





HWY #417 &

MOODIE DRIVE

SEWER &

WATERMAIN



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

NO.	ELEVATION	STATION	OFFSET
7.	253.9	128 + 00	120' RT.
8.	250.5	125 + 88	125' 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 & TESTING DIVISION - FOUNDATION SECTION			
EXISTING 36" Ø SEWER STA. 126 + 97			
KING'S HIGHWAY NO. 417		LINE 'D'	
CO. CARLETON		DIST. NO. 9	
TWP. NEPEAN		LOT 8	CON. I & II OF