

#67-F-89  
W.P.# 598-56  
HWY# 33  
MCCAULEY'S  
CREEK



CI GEN. FILES

T.L. 33A-2

DEPARTMENT OF HIGHWAYS ONTARIO

MEMORANDUM

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

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

Attn: Mr. S. McCombie

DATE: September 29, 1967

OUR FILE REF.

IN REPLY TO

OCT 3 1967

SUBJECT:

FOUNDATION INVESTIGATION REPORT

for

The Proposed Crossing of Hwy. #33  
Line 'H' and McCauley's Creek  
Dist. #8 Kingston

W.J. 67-F-89 -- W.P. 598-56

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 additional information be required, please do not hesitate to contact our office.

AGS:mt  
Attach.

*M. Levata*  
for A. G. Stermac

PRINCIPAL FOUNDATION ENGINEER

cc: Messrs. B. R. Davis (2)  
H. A. Tregaskes  
D. W. Farren  
S. J. Markiewicz  
E. A. Cash  
G. Scott  
J. E. Gruspier  
B. A. SINGH

Foundation File  
General File

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FOUNDATION INVESTIGATION REPORT  
for  
The Proposed Crossing of Hwy. #33  
Line 'H' and McCauley's Creek  
Dist. #8 Kingston  
W.J. 67-F-89 -- W.P. 598-56

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1. INTRODUCTION:

The foundation section carried out an investigation to determine the subsoil conditions at the above site. Mr. G. Scott, Regional Bridge Location Engineer, requested this investigation in a memorandum dated September 6, 1967.

2. DESCRIPTION OF SITE:

The site is located about 1.5 miles north of the junction of Hwys. 401 and 33, on Hwy. 33, Line 'H'. The creek will be diverted under the proposed Line 'H' structure. At the time of the investigation the creek was dry, but normally the creek flows in a southerly direction. The surrounding area is relatively flat.

3. SOIL TYPES AND SOIL CONDITIONS:

Two sampled boreholes were carried out during the investigation. The subsoil consists of a five foot layer of loose to dense sand with some stone fragments followed by a sound limestone bedrock proven for about eight feet. The elevation of the bedrock ranged from 294.0 to 294.5. The groundwater level varied from elevation 296.8 to 297.7. The stratigraphical profiles are shown in the Appendix of this report.

4. DISCUSSION AND RECOMMENDATIONS:

It is proposed to construct a 35 ft. span structure at the above site.

It is recommended to support the structure on a spread footing type foundation founded into the sound limestone bedrock at elev. 294.0. Safe pressures up to 20 t.s.f. can be assumed if spread footings are founded into the sound bedrock. No major dewatering problems are anticipated.

5. MISCELLANEOUS:

The field work for this report was carried out during the period Sept. 12-15, 1967, under the supervision of Mr. P. Payer, Project Foundation Engineer. Mr. A. M. Seppala, Project Foundation Engineer, wrote this report. Equipment was owned and operated by Master Soil Investigation Ltd.

Mr. K. G. Selby, Supervising Foundation Engineer, reviewed this report.

September 1967

APPENDIX I

CHECKED BY                     

[illegible]



DEPARTMENT OF HIGHWAYS - ONTARIO

**MATERIALS & TESTING DIVISION**

JOB 67-F-89

LOCATION Sta. 26 + 42 @ Line 'H' and 21' o/s to Rt.

ORIGINATED BY PP

W. P. \_\_\_\_\_ 598-56

BORING DATE September 15, 1967

COMPILED BY AMS

DATUM Geodetic

BOREHOLE TYPE BX Casing & AXT Rock Core

CHECKED BY                     

[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

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

$\gamma$	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 = $\frac{-\Delta e}{(1+e)\Delta\sigma}$
$c_v$	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
$\tau_f$	SHEAR STRENGTH
$c'$	EFFECTIVE COHESION INTERCEPT
$\phi'$	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	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
$\beta$	ANGLE OF SLOPE TO HORIZONTAL

DEPARTMENT OF HIGHWAYS ONTARIO  
MEMORANDUM

67-F-89

To: Mr. A. G. Stermac,  
Principal Foundation Engineer,  
Laboratory Building,  
DOWNSVIEW, Ontario.

FROM: Bridge Division,  
KINGSTON, Ontario.

DATE: September 6, 1967

OUR FILE REF.

IN REPLY TO

SUBJECT:

W.P. 598-56, Site 11-276, McCauley's Creek,  
Highway 33, District 8

We are sending you herewith 2 copies of Bridge Site Plan E-4645-1 for the subject structure, together with Preliminary Structure Site Report. The proposed location for the structure is marked in red on the plan.

We will be pleased if you would expedite this project as we propose to issue for design with a note that Foundation Investigation will be available shortly.

  
J. A. Fisher

For: Gavin Scott, P. Eng.  
REGIONAL BRIDGE LOCATION ENG.

JAF/GS/hl  
Encls.

Originals to:  
Bridge Office Files Section  
c.c.  
Mr. A. G. Stermac

PRELIMINARY STRUCTURE SITE REPORT

HWY. 33 R.V.W.P. 598-56 STATION 26+50 L.W.H. DISTRICT 8

PLAN NO. \_\_\_\_\_ PROFILE NO. \_\_\_\_\_ SITE PLAN NO. E 4645-1

Purpose of Structure: River Crossing ☒ R.R.X  
Grade Separation \_\_\_\_\_ Other \_\_\_\_\_

Is Structure located on D.H.O. right-of-way? \_\_\_\_\_. If not, who owns property and was permission obtained to carry out necessary exploration work? \_\_\_\_\_

Permission should be obtained.

Describe Soil Conditions at Site. This is to be determined chiefly from a visual observation and possibly a limited amount of hand exploration and should include the general geological formation, anticipated soil conditions, bedrock if visible, etc.

W & T. Soil profile indicates possible rock @ shallow depth.

Is Structure Site readily accessible with Core Drill or Power Auger?

Fairly readily accessible.

Would preliminary borings by Power Auger be advantageous?

Is water available at the site? Yes If not, where is closest source?

Should Approach Fills be investigated for stability?

Note considered a problem

REMARKS: It is believed that rock will be found @ shallow depth  
Designer would like confirmation of rock elevation.

DEFECTS IN NEGATIVE DUE TO  
CONDITION OF ORIGINAL DOCUMENT

DATE Sept. 11, 1967

ENGINEER [Signature]

## MEMORANDUM

To: Mr. K. Selby,  
Supervising Foundation Engineer.

FROM: Z. Koniuszy

DATE: September 20, 1967.

OUR FILE REF.

IN REPLY TO

SUBJECT: Foundation Project 67-F-89  
WP 598-56  
Drilling Cores from Glen Miller and Hwy. 33 area

BH#1

- 4.7-5.0 - Rubble of grey, medium grained and shaley limestone.
- 5.0-5.9 - Grey shale with thin seams of grey, fine grained limestone.
- 5.9-6.7 - Light grey, medium grained, medium hard limestones. Sproadic shale seams.
- 6.7-13.1 - Grey fine to medium grained shaley limestone. Shale in layers or irregular patches. Percentage of limestone slightly prevailing over shale.

BH#2

- 4.9-5.1 - Rubble of grey fine grained medium hard (not weathered) limestone.
- 5.1-5.8 - Grey medium grained limestone.
- 5.8-7.2 - Grey shale with seams of grey limestone.
- 7.2-7.9 - Grey medium grained limestone with sporadic patches or thin seams of shale.
- 7.9-14.5 - Grey, medium grained limestones, with shale in seams (up to 1") or irregular patches. Amount of limestone slightly prevailing over shale.

Both bore holes were drilled in Trenton Formation belonging to the Middle Orovician System. Samples show typical grey, fine to medium grained Trenton limestone separated by seams or layers of grey shale. Abundant fossils and numerous small vugs lined with calcite crystals.

Rock is sound, does not show any signs of weathering or underground water erosion.

ZK/ss

*Z. Koniuszy*  
Z. Koniuszy,  
Geologist.

401 & Keele Street  
Downsview, Ontario

October 10, 1967

Master Soil Investigation  
104 Kenhar Drive  
Weston, Ontario

Dear Sirs:

This is to confirm our request of September 11, 1967 for the supply of a Diamond Drill together with all necessary equipment, as specified under the terms of our Contract Agreement, at Glen Miller Rd, Hwy. 401 & 33, Trenton, Ont.

This project bears Job Number 67-F-89.

Yours truly,

*K. C. Salby*

KCS:el

K. C. Salby  
Supervizing Foundation Engineer  
For: A. G. Stermac  
Principal Foundation Engineer

cc: M. Konings  
Foundation Files 110  
General Files

Department of Highways Ontario

Copy for the information of

Mr. A. Stermac

Mr. G. Scott,  
Reg. Bridge Location Engineer,  
Kingston Regional Office,  
Kingston, Ontario

Bridge Division,  
Downsview, Ontario

January 5, 1968

McCauley's Creek Bridge  
2.4 Miles North of Trenton N. Limits  
W.P. 598-96-03, Site No. 11-276  
Highway 33, District No. 8

Attached herewith are prints of the Preliminary Bridge Plan Drawing D-6365-P for the above-mentioned structure.

The estimated cost of the proposed structure is \$30,000. This cost includes tender, materials, engineering and sundry construction.

Any comments or revisions you may have should be submitted within three weeks.

CSG:rd

C.S. Grebski,  
Bridge Design Engineer

Attach.

c.c. S. McCombie  
A. Stermac (2)  
J. Anderson

No comments

TP JAN. 8/68  
H. J. Sullivan





PROGRAM STATUS REPORT

W.P. See below DIST. 8 HWY. 33 TYPE OF WORK C.D.G.B.P. & Strs.  
DESCRIPTION See Below

PRESENT PROGRAM YEAR 19 Ex DATE INITIATED June 9/77

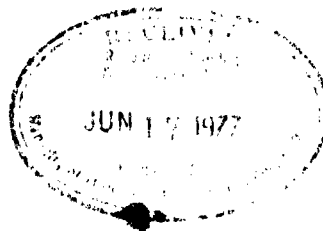
The following projects which were set up years ago, have now been removed from the Program and cancelled:

W.P. No.	Group No.	Type of Work	Description
598-56-020	598-56-02	G.D.G.B.P.	From Hwy 401 N'y (Cl-Cont) 4.5 Mi.
598-56-030	598-56-03	Str.	McCauley's Creek Bridge 2.4 Mi. North of Trenton N. Lts.
598-56-040	598-56-04	Str.	Retaining Wall at Hydro Generating Station, 0.3 Mi. North of Hwy 401
598-56-050	598-56-05	G.D.G.B.P.	From Trenton North Limits Northerly to Hwy 401 - 0.9 Mi. (CL-DL)

JG/AIL/KF

REMARKS:

New projects will be established pending completion of report under WP 134-77-00.



PRE-CONTRACT ENGINEERING SCHEDULE

- |                               |                               |
|-------------------------------|-------------------------------|
| 1. STATUS REPORT              | 21. STRUCT. QUANT'S COMPLETE  |
| 2. ROUTE PLANNING STUDIES     | 22. STR. PLANS & D4 TO S.D.O. |
| 3. TRAFFIC ISSUED             | 23. N.W.P.A. APPL'N SUBM'D.   |
| 4. PRE-DESIGN PHOTOGRAMMETRY  | 24. N.W.P.A. APPROVAL REC'D.  |
| 5. DRAINAGE STUDY ISSUED      | 25. SOILS DESIGN REPORT       |
| 6. DESIGN CRITERIA            | 26. 40' TO 1" PLANS ISSUED    |
| 7. TITLE SEARCH REQUEST       | 27. CO-ORDINATED ALIGNMENT    |
| 8. PRE-DESIGN REPORT          | 28. STRUCTURE SITE GEOMETRICS |
| 9. FINAL ALIGNMENT REQUEST    | 29. INTERSECTION DESIGN COMP. |
| 10. DESIGN X-SECTIONS REQ'T.  | 30. FINAL PROPERTY REQUEST    |
| 11. DESIGN X-SECTIONS ISSUED  | 31. R.T.C. APPL'N. SUBM'D.    |
| 12. PLANS & PROF. TO S.D.O.   | 32. R.T.C. APPROVAL REC'D.    |
| 13. PLANS & PROF. ISSUED      | 33. DESIGN SYNOPSIS REPORT    |
| 14. E & G PLANS ISSUED        | 34. ILLUMINATION DESIGN COMP. |
| 15. ENG. & TITLE RECORDS      | 35. SYSTEMS DESIGN CONSULTS.  |
| 16. FOUNDATION REPORT REQ'D.  | 36. PERCENT COMPLETE S.D.O.   |
| 17. FOUNDATION REPORT ISSUED  | 37. STRUCT. DESIGN CONSULTS.  |
| 18. STRUCT. PLANNING REPORT   | 38. PERCENT COMP. STR. DESIGN |
| 19. PRELIM. STRUCTURE PLANS   | 39. DOCUMENTS IN SCRUTINY     |
| 20. STRUCTURE DESIGN COMPLETE | 40. PROPERTY CLEARANCE        |

PROGRAM MANAGEMENT ENGINEER

PROGRAM CONTROL ENGINEER

REGIONAL DIRECTOR

DATE

DATE

DATE

