

# 68-F-213 M

CULVERT C-180

CTY. RD. # 21

Mc GILLIVRAY TWP.

BA. 2795  
Site 19-C



**DOMINION SOIL INVESTIGATION LIMITED**  
CONSULTING SOIL & FOUNDATION ENGINEERS

HEAD OFFICE  
104 CROCKFORD BLVD.  
SCARBOROUGH, ONT.  
CANADA  
TELEPHONE: 751-6565

BRANCH OFFICE  
369 QUEENS AVE.  
LONDON, ONT.  
TELEPHONE: 433-3851

London  
March 6th, 1968.

ASSOCIATED COMPANY  
SOIL TESTING AND ENGINEERING LTD.  
39 BRENTFORD ROAD  
KINGSTON 5, JAMAICA  
WEST INDIES

Report  
8-1-L12.

Mr. F.B.D. Arnold P.Eng.,  
Middlesex County Engineer,  
County Buildings,  
London, Ontario.

68-F-213 M

Attention: D.M. Husson P.Eng.,  
Assistant County Engineer,

Dear Sir,

Soil Investigation for Culvert C-180.  
County Road No.21, Township of McGillivray.

We have completed this project in accordance with your letter of authorization dated January 23, 1968. This report contains a record of our findings and presents our recommendations for the design and construction of foundations.

FIELD WORK.

The field work, consisting of one borehole and one dynamic cone penetration test, was carried out on February 19, 1968, at the location shown on Enclosure 1.

The borehole was advanced to the sampling depths by washboring methods and was lined with 8x size casing. Standard penetration tests were performed at frequent intervals of depth, to obtain an indication of the consistency of the clay subsoil and to recover representative samples for classification purposes.



The dynamic cone penetration test was performed to obtain an indication of soil density and strata changes with depth.

The results of the field tests are recorded on the borehole log sheet, comprising Enclosure 2. Elevations were referred to the top of the concrete curb of the existing culvert at the location indicated on Enclosure 1. The benchmark was given the assumed value E1.100 feet.

#### SUBSURFACE CONDITIONS.

Detailed descriptions of the strata encountered are given on the borehole log sheet. The following notes are intended only to amplify this data.

The soil profile revealed by the borehole consists of silty clay fill, which extends to a depth of 5.5 feet, overlying silty clay till. The consistency of the silty clay till is described as 'very stiff' to 'hard' as indicated by 'N' values ranging from 24 to 61 blows per foot.

From a visual and tactile examination of the soil samples it is estimated that the clay till has a low plasticity and compressibility and that the natural moisture content is close to the Plastic Limit of the soil.

#### GROUNDWATER CONDITIONS.

Due to the impervious nature of the clay subsoil the borehole remained dry throughout the boring operation. The ice level in



the creek was observed at El.91.8.

DISCUSSION.

It is understood that the proposed culvert is a concrete cast in place structure with conventional spread footings.

The creek bed extends down to El.90.6, therefore allowing 4 feet of cover for frost protection, consideration should be given to a footing grade at or below El.86.5. This level lies within the stratum of hard silty clay till and on the basis of the borehole results a maximum net soil pressure of 3000 p.s.f. is appropriate for the design of footings.

Total settlement of a 4 foot wide footing mobilizing the above soil pressure is estimated to be about 0.5 inch.

Construction.

It is anticipated that seepage into excavations will be controlled by pumping from sumps dug below the footing grade. Excavations in the clay till can be made with vertical sides which will require a minimum of bracing.



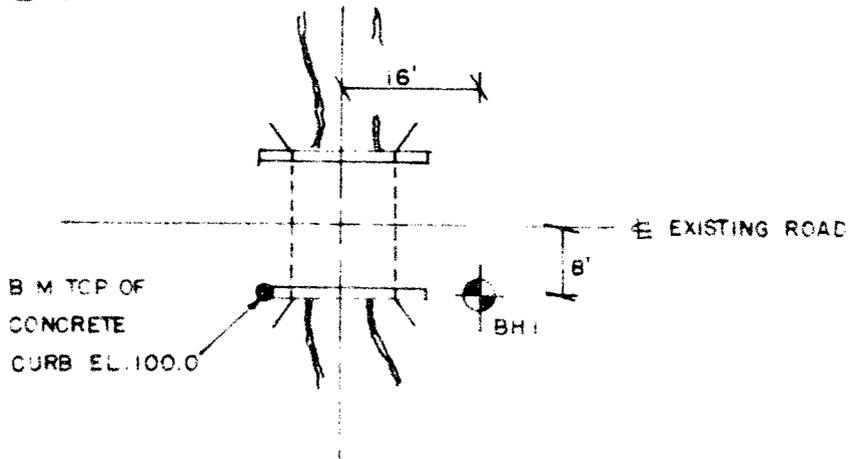
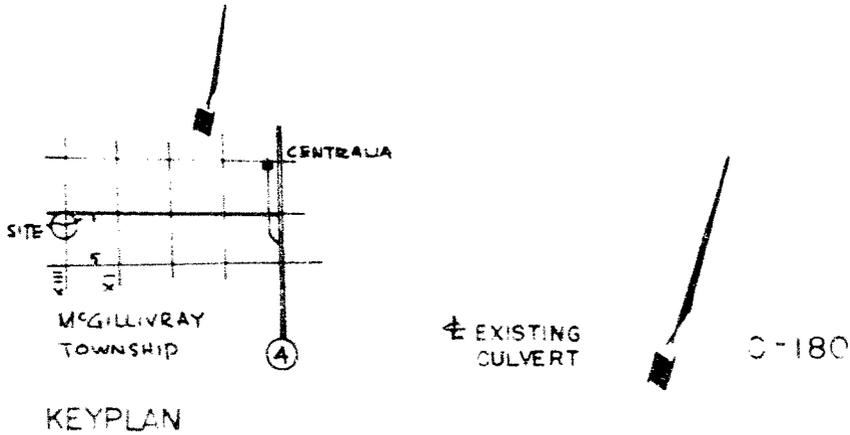
Yours very truly,

DOMINION SOIL INVESTIGATION LIMITED.

*C. J. W. Atkinson*  
C. J. W. Atkinson, M.Sc., P.Eng.,  
Branch Manager.,

CJWA/jb.

Prep. By



LOCATION OF BOREHOLES

SCALE 1" = 20'

# LOG OF BOREHOLE 1

Our Reference No 8-1-L12.

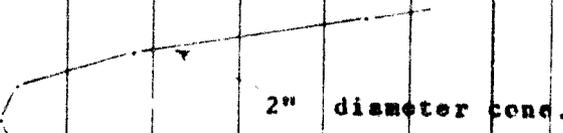
Enclosure No 2.

CLIENT: County of Middlesex.  
 PROJECT: Culvert C-130  
 LOCATION: County Road No. 21.  
 DATUM ELEVATION: 100 feet (see Enclosure 1).

**DRILLING DATA**

Method: Washboring.  
 Diameter: 3-inch  
 Date: February 19, 1968

SUBSURFACE PROFILE				SAMPLES			PENETRATION RESISTANCE					WATER CONTENT %			REMARKS	
ELEVATION Ft.	DEPTH Ft.	DESCRIPTION	SYMBOL	GROUND WATER	NUMBER	TYPE	N' Blows / Foot	Blows / Foot					PLASTIC LIMIT W <sub>p</sub>	NATURAL W		LIQUID LIMIT W <sub>L</sub>
								20	40	60	80	100				
								UNDRAINED SHEAR STRENGTH + FIELD VANE TEST      • COMPRESSION TEST					lbs/sq ft.			
99.8	0.0	Ground Surface.														
	1.0	Road Ballast.		DRY												
	5.5	Brown silty clay (Fill)			1	SS	24									
		Very stiff to hard silty clay, trace of gravel			2	SS	35									
		(Glacial Till)			3	SS	39									
					4	SS	40									
					5	SS	56									
					6	SS	61									
	26.5	End of Borehole														



CREEK BED EL. 90.6

VERTICAL SCALE 1 inch to 5 feet