



ONTARIO  
DEPARTMENT OF HIGHWAYS

Highways Laboratory,  
c/o Room 1402,  
Parliament Buildings,  
Toronto, Ontario.

January 27, 1954.

Mr. A. Boyd,  
Bridge Engineer.

Dear Sir:  
Re: Foundation investigation, South Road and  
Highway 101, near S.S. 101, Lot 1-11-11.

We are forwarding herewith two copies of the report on the above.  
The first copy of the report will be made available for at future  
inspections and for reference only.

Yours truly,

F. G. Thompson,  
Materials & Research Engineer.

Very

*Merritt M. Harris*  
M. M. Harris

cc: to

Copies to:

Mr. A. Boyd, Bridge Engineer (2)  
Mr. E. Thompson, Chief Engineer (1)  
Mr. J. Baker, Chief Engineer (1)  
Mr. E. B. Richardson, Chief Engineer (1)  
Mr. E. Thompson (1) ✓  
File (1)

REPORT  
ON THE  
FOUNDATION INVESTIGATION  
AT  
BEACH ROAD NEAR BURLINGTON BEACH  
ON QSW AT  
STATION 23-17

Copies to:

Mr. A. Toye, Bridge Engineer (2)  
Mr. H. Fregaskes, Const. Engineer (1)  
Mr. J. Walter, Design Engineer (1)  
Mr. R. E. Richardson, Dist. Engineer (1)  
Mr. C. Parantatos (1)  
File (1)

### INTRODUCTION:

A subsurface exploration was carried out by core drill on the location of the proposed structure at the intersection of Beach Road, and the QEW near Burlington Beach (HW 48-56) 1955 Preparation List.

The ancillary works were drilled by power auger.

The proposal calls for a skew bridge of some 125' span over the two lanes of the QEW Highway to Niagara Falls.

### SITE CONDITIONS:

The site is located on an area of low relief, intersected by the shallow fill upon which the QEW is constructed. The Redhill Creek flows on the northern side of the structure through an area which may be subject to flood but is certainly of swamp character.

### PROCEDURE:

The site work was carried out during the period 23rd Nov. 1955 - 7th Dec. 1955 and comprised of two short penetration holes and four borings.

High resistance was experienced to the cone penetrometer at approximately 10 ft. to 14 ft. subsequent borings proved that this resistance is mainly a result of high skin friction.

Both 3" and 2" thin walled augers were used in the clay, and cone barrel and split sampler in the material at greater depths.

### SOIL STRATIGRAPHY:

A shallow layer of top soil is underlain by a stiff grey-brown glacial clay to an average depth of 10 ft. The major soil layer, however, is a similar clay but grey in colour which exists to a further 15' - 25'. Locally alternate layers of clay-shale, or in one case sand and shale, overlies shale bedrock which is found at an elevation of 207.0.

The overall thickness of the clay layer varies under the two abutments being 27'-30' in depth under northern abutment and 31-35 ft. under the southern abutment.

#### WATER CONDITIONS:

In borehole #5 the drill cut into a saturated layer at about 40' with the water under a temporary static head. The water rose to 35" above ground level. When the hole progressed a further 18" or 24" into an underlying layer of sand the flow ceased.

In the case of the other holes the water level was 48" below ground level but it appeared to be supplied by seepage from the saturated road base or fill.

#### ANALYSIS AND DISCUSSION OF RESULTS:

The shear properties of the soil mass are excellent showing unconfined strength values on the average of 3,500 lb./sq. ft. to 6000 lb./sq. ft. Results are generally consistent with two very high values - beyond the limits of the testing machine - and the lowest value recorded of 3000 lb./sq. ft. at a depth of 20'0".

With such high values of unconfined strength it is considered highly improbable that there is any possibility of base failure under the fill.

The moisture content of the soil throughout the layer is fairly constant and of the order of 19%.

#### RECOMMENDATIONS:

The soil of this stiff glaciated clay type provides a suitable foundation for a structure of the rigid frame type provided a stress of 5000 lb./sq. ft. is not exceeded.

A flexible designed structure could be equally well constructed in which case the allowable stress could be increased.

Fill construction may be considered normal from a foundation point of view except in the case of the approach which crosses the Rockhill Creek.

The fill should be constructed so that adequate density is obtained to prevent sliding within the fill material. The possibility base failure is discounted for normal fill construction.

G. M. Parantatos,  
Foundation Engineer.

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# OFFICE REPORT ON SOIL EXPLORATION

DRILL NO. 44  
CASING (STANDARD SAMPLERS TO FIT UNLESS NOTED)  
SAMPLER HAMMER WT. # DROPS INCHES  
JOB # 100-46  
DATE REPORT 25/4/61  
DATE BORING 25/4/61  
BORING NO. 1  
DATE REPORT 25/4/61  
DATE BORING 25/4/61  
BORING DATE 25/4/61

## SAMPLE CONDITION

☒ DISTURBED  
☐ GOOD  
☐ LOST

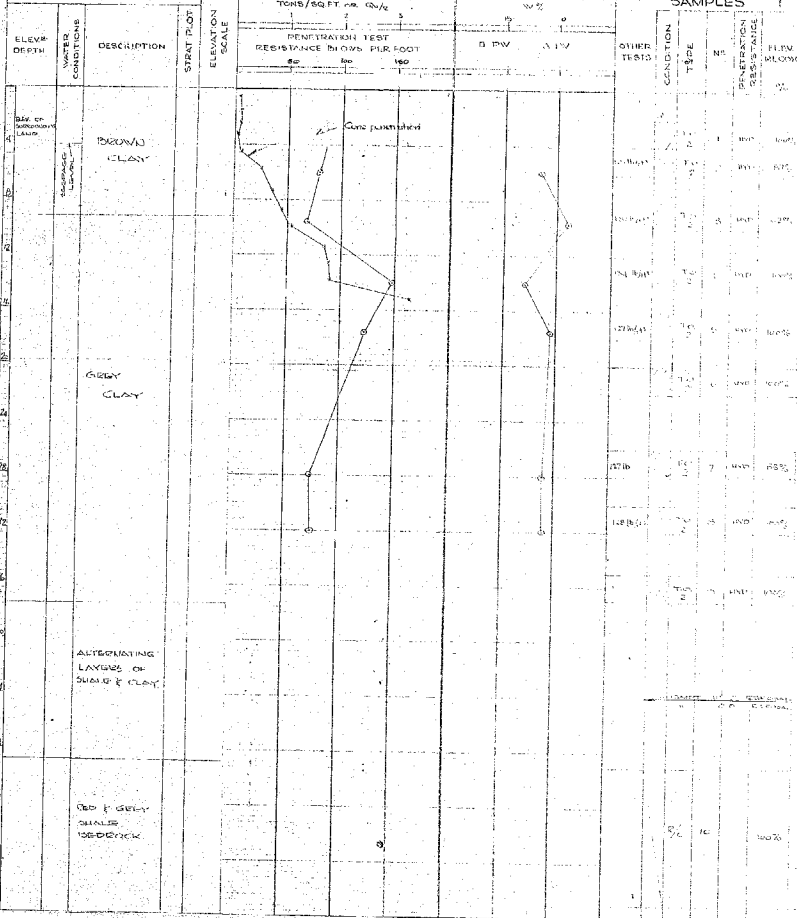
## SAMPLE TYPES

C-1 CHUCK  
 D-1 DRIVE OPEN  
 D-2 DRIVE FOOT VALVE  
 TO - THIN WALLED OPEN  
 WS - WASHED SAMPLE  
 RC - ROCK CORE

## ABBREVIATIONS

V - VIBRO VANE SHEAR TEST  
 M - MECHANICAL ANALYSIS  
 U - UNCONFINED COMPRESSION  
 Q - TRIAXIAL CONSOLIDATED QUICK  
 Q - TRIAXIAL QUICK  
 S - TRIAXIAL SLOW  
 W - WATER LEVEL IN CASING  
 WT - WATER TABLE IN SOIL

## SOIL PROFILE



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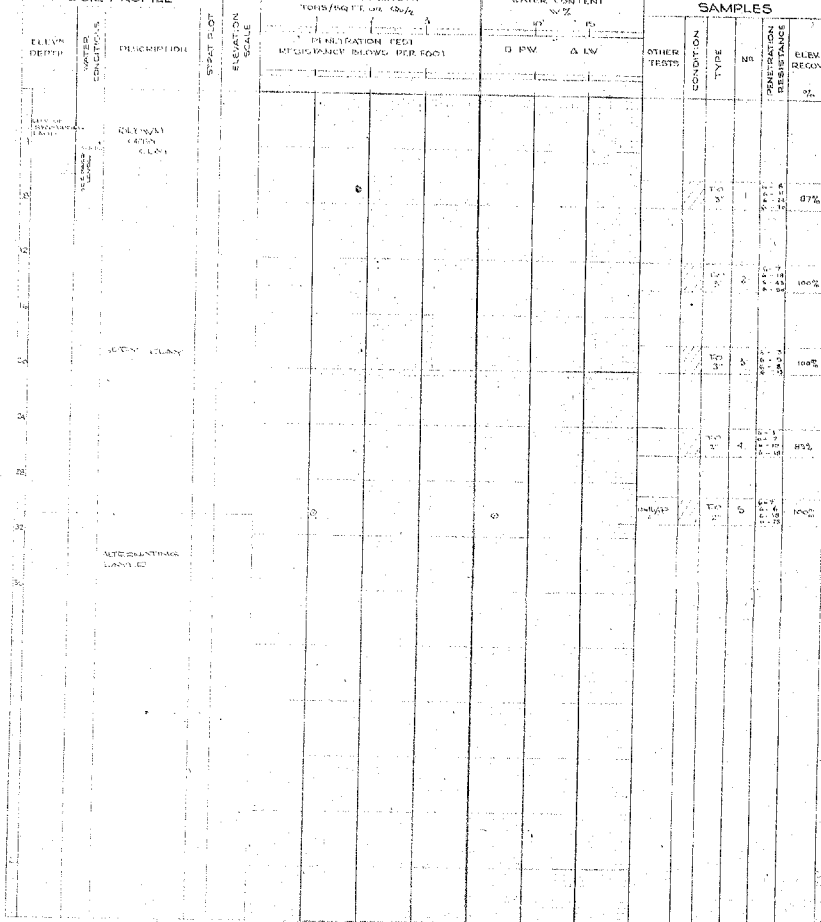
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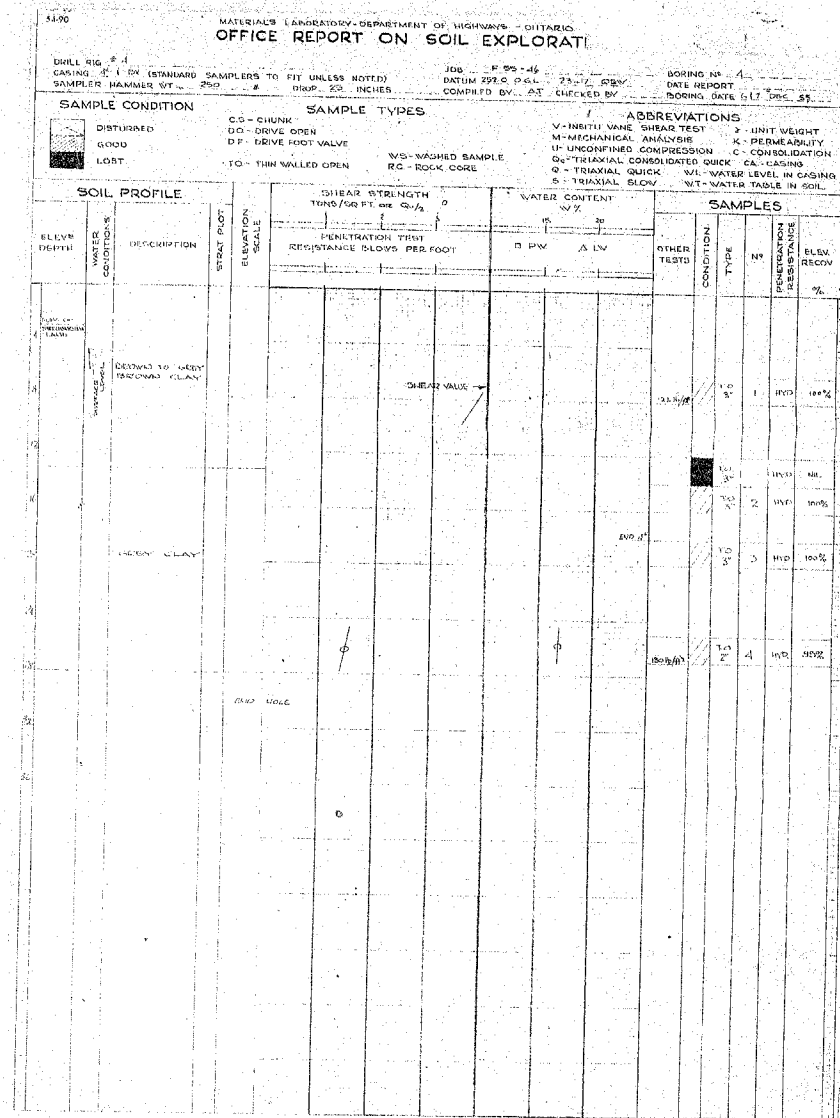
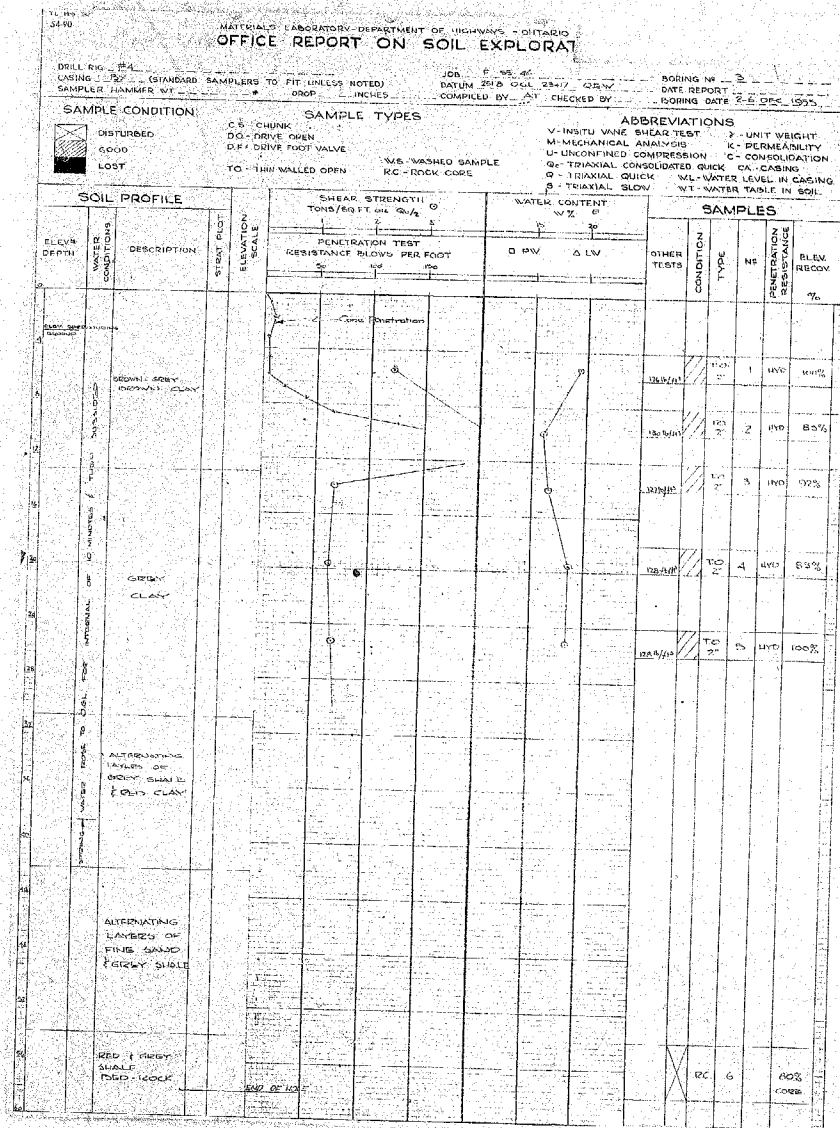
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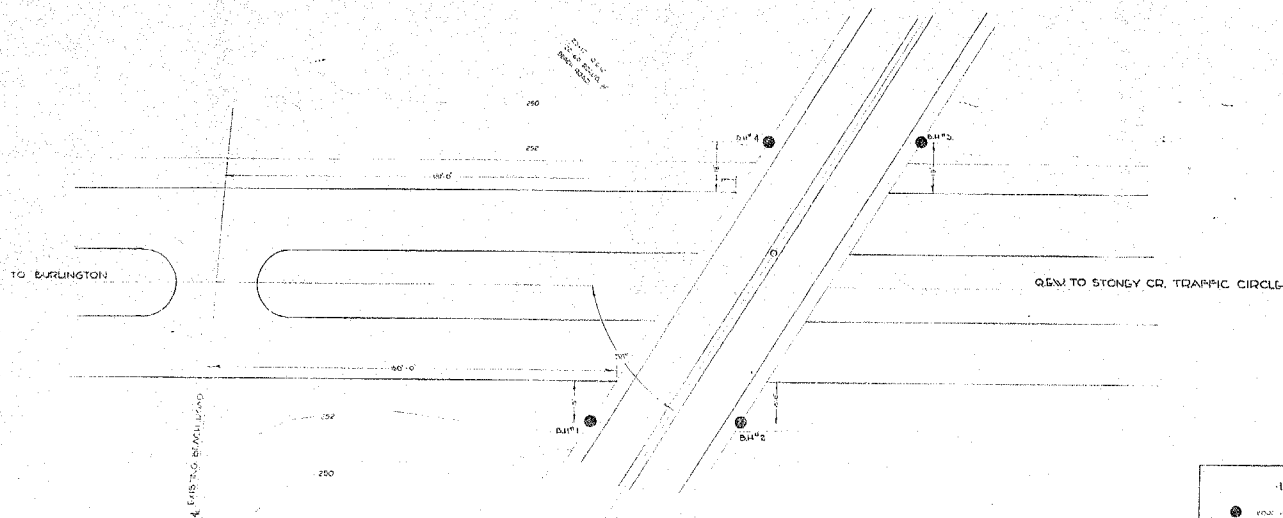
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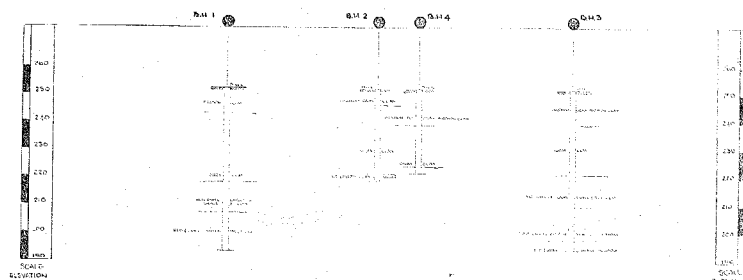
PLAN

**LEGEND**

● POINT MARK

**SCALE**

HORIZONTAL 1 inch = 100 feet  
VERTICAL 1 inch = 20 feet



SECTIONAL ELEVATION

PRINT RECORD		
NO.	DATE	FILE

DEPARTMENT OF HIGHWAYS-ONTARIO			
MATERIALS LABORATORY-TORONTO			
<b>INTERSECTION OF Q.E.W. AND BEACH ROAD</b>			
THE KING'S HIGHWAY NO. Q.E.W.		DIV. NO. 4	
CO. WEST WORTH			
TWP. SALTPLGHT		CON. I	
F-55-46			
APPROVED			
DESIGNED		CHECKED	
DRAWN		CORRECTED	
DATE		DATE	