#58-F-214-C

W.P. 99-57

WESTMINSTER

TWP. BRIDGE

BA 691

58-F-214c.

UNIVERSAL
GEOTECHNIQUE
LIMITED

REPORT

on

SUBSURFACE EXPLORATION

for proposed

WESTMINSTER TOWNSHIP BRIDGE N° 13

COUNTY OF MIDDLESEX

ONTARIO

2924 Bloor Street West,
Toronto 18, Ontario.

REPORT

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INTRODUCTION

The Highways Department of the Province of Ontario are planning a proposed crossing at the White Oak sideroad, leg "A" and Highway 401 approximately six miles Southwest of London.

In order to determine the subsurface conditions for purposes of engineering design in connection with the proposed bridge, the D.H.O. authorized GEOTECHNIQUE to carry out a subsurface exploration of the proposed site and accordingly exploratory boreholes were put down in conformity with the requirements of the Department as shown on drawing N° E-3287-1 which has been reproduced in part as drawing N° 1 of this Report.

THE SITE

The site of the proposed bridge is situated approximately six miles Southwest of London on lot 20, concession 5, in the Township of Westminster, County of Middlesex.

SUBSURFACE EXPLORATION

Subsurface exploration was carried out during the period of 14th to the 20th of December, 1957, and comprised a total of four exploratory boreholes located in positions as shown on the plan accompanying this Report. The proposed locations of the boreholes were staked and the ground surface elevations obtained by a D.H.O. Survey Crew.

Soil samples were obtained generally at intervals of about 2-1/2 feet down to a depth of 15 feet and thereafter the spacing was increased to about 5 feet. Where noticeable changes of strata occurred the depths of such changes were registered.

The state of compaction of essentially cohesionless soil and the consistency of cohesive soil were determined by the standard penetration test taken during the operation of soil sampling. (The standard penetration test, as referred to in this Report, involves the recording of the number of blows (N) of a 140 lb. hammer falling 30 inches that are required to drive a 2 inch diameter split barrel sampler 1 foot into the soil at the bottom of the borehole).

Visual examination and classification of all samples was carried out in the field and in the laboratory and the descriptions of the strata thereby obtained together with the results of the standard penetration tests are given on the borehole logs and these, together with borehole sections A-A' and B-B' and a location plan, form part of this Report.

Subsurface conditions given in this Report are those indicated by material encountered in the boreholes. The accuracy of extrapolation to obtain the soil profile should be associated directly with the geological conditions and inversely with the spacing of the boreholes.

GEOLOGICAL FEATURES

The site is situated approximately six miles Southwest of London in the drumlinized or fluted till plain and from the information derived from the boreholes it may be concluded that the strata down to the explored depth can be divided into the following categories:

(a) FILL

A very limited amount of fill was encountered in all the boreholes extending from the ground surface to depths varying up to 2-1/2 feet.

(b) GREYISH BROWN CLAY TILL

Greyish brown clay till was encountered in all the boreholes. The till generally consists of very sandy clay with fine to medium subangular gravel and is in part characterized by iron-stained fissures.

(c) GLACIAL SANDS & GRAVELS

This material was also encountered in all the boreholes and exists in a generally dense state of compaction.

(d) GLACIAL SANDY SILT

Glacial sandy silt was encountered near the bottom of borehole BH.4 and existed in a dense state.

DISCUSSION

The intended level to the underside of the foundations of the proposed bridge is not at present determined but assuming that normal spread footings should be founded at an elevation of say 850 an allowable bearing capacity of 3 tons/sq.ft. is suggested for design purposes.

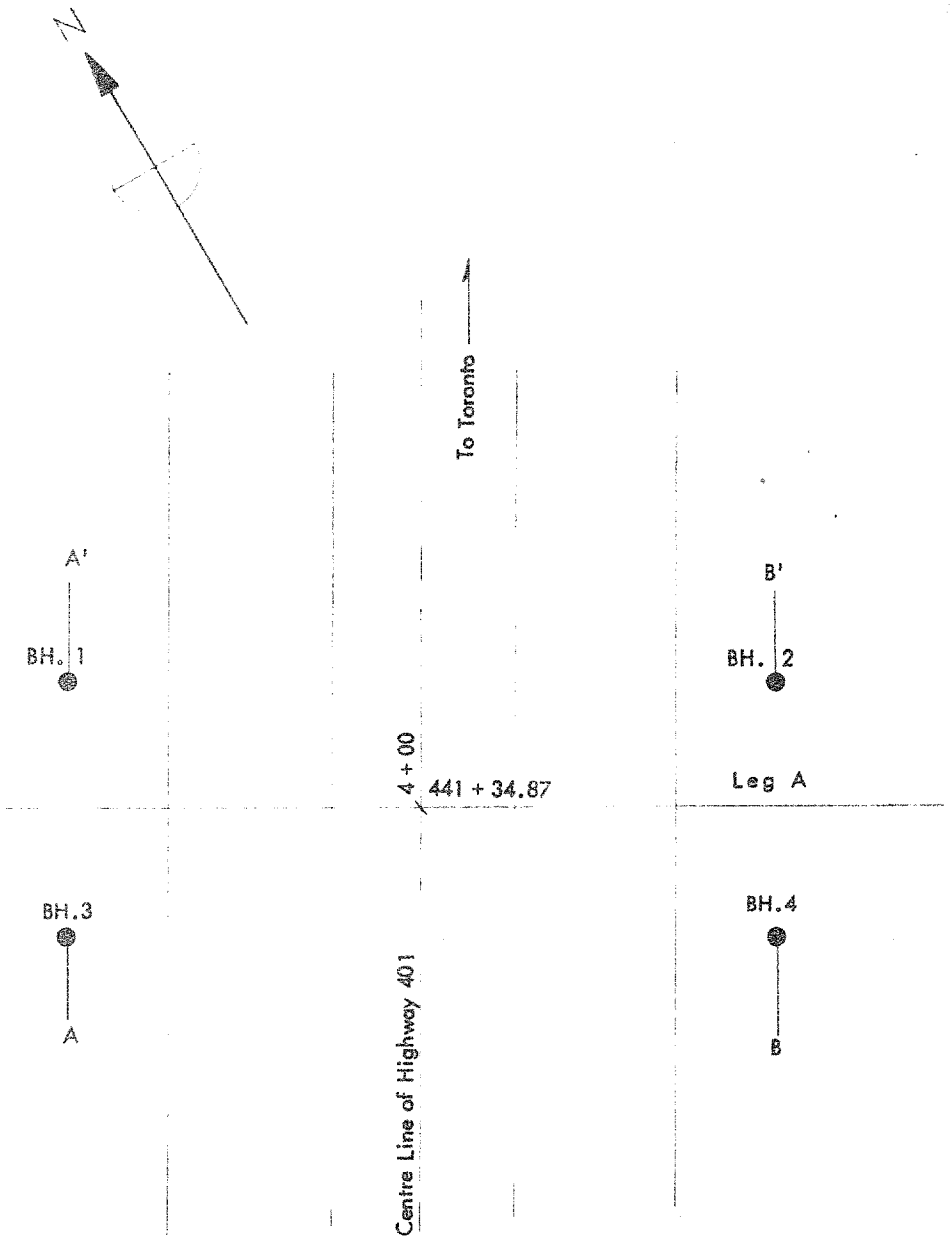
It will be observed that at an elevation of 850 in borehole BH.3 somewhat looser conditions obtain but this would appear to be purely local as generally the boreholes have indicated compact strata. Whilst we have divided the glacial sands and gravels from the greyish brown clay till it may be concluded that essentially they constitute part of the same formation comprising the fluted till plain that exists in the region and, consequently, local variations are not unexpected. Generally, however, it would be expected that the strata at the proposed site will exist in a compact state.

If the assumed foundation level of 850 is approximately the correct elevation then no difficulties should be encountered with ground water conditions as the level of free water encountered during the period of exploration was much lower.

Universal GEOTECHNIQUE Limited,

L. Baskin, P.Eng.
Engineering Geologist.

Report N° T.272/57 January, 1958.



SCALE 1" = 20'-0"

This sketch is a copy of section of plan N° E-3287-1, W.P. 99-57, supplied by D.H.O.

PROJECT Westminster Township, Bridge N° 13, County of Middlesex, Ont.

TITLE Borehole Location Plan

DRG NO 1 ORDER NO. T.272/57

UNIVERSAL GEOTECHNIQUE LIMITED

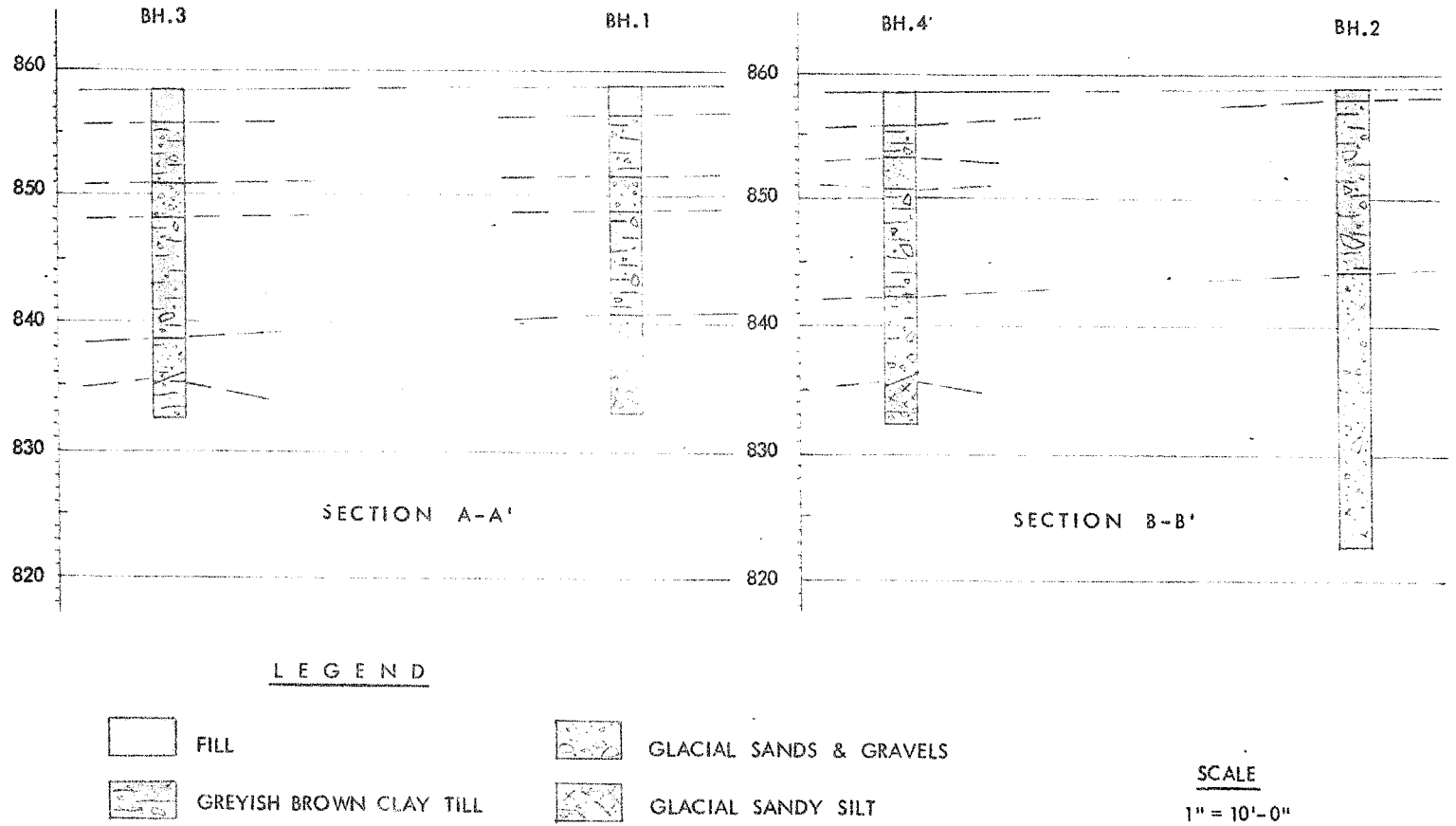
FORM G-3 500
LIMITED STATIONERY CO. Ltd

PROJECT Westminster Township, Bridge N° 13, County of Middlesex, Ont.

TITLE Borehole Sections

DRG. NO. 2 ORDER NO. T.272/57

UNIVERSAL GEOTECHNIQUE LIMITED



UNIVERSAL **GEOTECHNIQUE** LIMITED

SOIL MECHANICS LABORATORY

BOREHOLE LOG

PROJECT Westminster Township, Bridge N° 13, County of Middlesex, Ontario. ORDER NO. T.272/57

CLIENT Department of Highways, Ontario.

BOREHOLE NO. BH.1 DIAMETER 2-1/2" CASING 2-1/2"

BOREHOLE LOCATION See Plan INCLINATION Vertical BEARING ——

DESCRIPTION OF STRATA	ELEVATION	LEGEND	SAMPLE	DEPTH	THICKNESS	N	REMARKS
Dark brown sandy loam with traces of organic matter. FILL.	858.67			Zero			
Clay, sand and gravel. Probably FILL.				1'-0"			
Very stiff light brown sandy CLAY with generally fine subangular gravel.			1	2'-6"		17	Damp. High dry strength.
do			2			18	do
Dense brown fine to coarse SAND with fine gravel, generally subangular.			3	7'-3"		33	Wet No dry strength.
Very stiff brownish grey very sandy CLAY with fine to medium subangular gravel.			4	10'-0"		29	Moist. High dry strength.
Hard do			5			35	Damp High dry strength.
Very stiff do			6	Free Water		27	Moist High dry strength.
				18'-0"			
Dense brown fine to coarse SAND.			7			55	Wet No dry strength.
				22'-6"			
Dense brown fine to coarse SAND and fine to medium GRAVEL, subangular to subrounded.			8	25'-9"		47 (9")	do
				End of Borehole			

SCALE : 1" = 5'-0" • DISTURBED SAMPLE ■ UNDISTURBED SAMPLE

UNIVERSAL **GEOTECHNIQUE** LIMITED

SOIL MECHANICS LABORATORY

BOREHOLE LOG

PROJECT Westminster Township, Bridge N° 13, County of Middlesex, Ontario. ORDER NO. T.272/57

CLIENT Department of Highways, Ontario.

BOREHOLE NO. BH.2 DIAMETER 2-1/2" CASING 2-1/2"

BOREHOLE LOCATION See Plan INCLINATION Vertical BEARING ———

DESCRIPTION OF STRATA	ELEVATION	LEGEND	SAMPLE	DEPTH	THICKNESS	N	REMARKS
Brown sand and gravel. FILL.	858.74			Zero 0'-8"			
Hard brown somewhat dessicated sandy CLAY with fine to medium subangular gravel.			1			35	Damp High dry strength.
do			2	5'-6"		34 (9")	Wet
With pockets of sand and gravel. Hard brownish grey very sandy CLAY with fine to large gravel.			3	6'-9"		48 (6")	Moist. High dry strength High N due to large gravel.
Hard brownish grey sandy CLAY with fine to medium subangular gravel, some iron stained fissures.			4			40	Damp. High dry strength.
do			5			42	do
Dense brown fine to coarse SAND with pockets of grey iron stained very sandy clay containing fine gravel.			6	14'-6" Free Water		35	Damp Low dry strength.
Dense greyish brown fine silty SAND.			7	18'-9" 21'-6"		32	Wet. Low to medium dry strength.
Dense brown fine to coarse SAND with fine gravel, generally subangular.			8			38	Wet No dry strength.
do Gravel fine to medium.			9	32'-0"		30	do
Firm to dense greyish brown fine silty SAND.			10	36'-0" End of Borehole		29	Wet. Low dry strength.

SCALE : 1" = 5'-0" • DISTURBED SAMPLE ■ UNDISTURBED SAMPLE

UNIVERSAL **GEOTECHNIQUE** LIMITED

SOIL MECHANICS LABORATORY

BOREHOLE LOG

PROJECT Westminster Township, Bridge N° 13, County of Middlesex, Ontario. ORDER NO. T.272/57

CLIENT Department of Highways, Ontario.

BOREHOLE NO. BH.3 DIAMETER 2-1/2" CASING 2-1/2"

BOREHOLE LOCATION See Plan INCLINATION Vertical BEARING ——

DESCRIPTION OF STRATA	ELEVATION	LEGEND	SAMPLE	DEPTH	THICKNESS	N	REMARKS
	858.44			Zero			
Sand and gravel. FILL. Brown very sandy clay with gravel. Probably FILL.				0'-8"			
Very stiff brown sandy slightly dessicated CLAY with fine to medium gravel.			● 1	2'-6"		20	Damp. High dry strength.
Very stiff brown sandy silty CLAY with fine to medium gravel, iron stained fissures.			● 2	4'-9"		22	do
Loose brown fine to coarse SAND and fine GRAVEL, little clay.			● 3	7'-3"		13	Wet Medium dry strength.
				10'-0"			do
Dense SAND and fine GRAVEL. Very stiff brown sandy CLAY with fine to medium subangular gravel.			● 4	11'-0"		35	Damp High dry strength.
Hard brownish grey do			● 5			40	Damp High dry strength.
do			● 6			42	do
				Free Water			
				19'-6"			
Hard brown clayey SAND with pockets of fine to medium sand and silty clay.			● 7			40 (9")	Moist Medium dry strength.
Hard grey very sandy CLAY with occasional gravel.			● 8	25'-9"		41 (9")	Damp. Medium to high dry strength.
				End of Borehole			

SCALE : 1" = 5'-0" ● DISTURBED SAMPLE ■ UNDISTURBED SAMPLE

UNIVERSAL **GEOTECHNIQUE** LIMITED

SOIL MECHANICS LABORATORY

BOREHOLE LOG

PROJECT Westminster Township, Bridge N° 13, County of Middlesex, Ontario. ORDER NO. T.272/57

CLIENT Department of Highways, Ontario.

BOREHOLE NO. BH.4 DIAMETER 2-1/2" CASING 2-1/2"

BOREHOLE LOCATION See Plan INCLINATION Vertical BEARING ———

DESCRIPTION OF STRATA	ELEVATION	LEGEND	SAMPLE	DEPTH	THICKNESS	N	REMARKS
Clay, sand and gravel. FILL.	858.54			Zero			
Brown sandy clay with gravel. Probably FILL.				0'-10"			
Hard brown sandy CLAY with fine to medium subangular gravel.			● 1	2'-6"		34	Damp High dry strength.
Dense fine to coarse SAND.			● 2	5'-0"		33	(9") Damp No dry strength.
				7'-6"			
Hard greyish brown sandy CLAY with fine to medium subangular gravel.			● 3			36	Damp High dry strength.
do			● 4			32	do
do			● 5			29	do
do			● 6	16'-0"		27	do Damp. Medium to high dry strength.
Firm to dense grey fine silty somewhat clayey SAND with occasional fine to medium gravel.					Free Water ▽		
				19'-0"			
Dense brown fine to coarse SAND and fine to medium GRAVEL, generally subangular.			● 7			40	Moist No dry strength.
Dense grey sandy SILT with layers of grey sandy gravelly clay. Gravel generally fine.			● 8	26'-0"		48	Moist. Low dry strength.
				End of Borehole			

FORM G-1 A 500 (UNITED STATIONERY LTD.)

SCALE : 1" = 5'-0" ● DISTURBED SAMPLE ■ UNDISTURBED SAMPLE