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FOUNDATION DESIGN SECTION

**foundation
investigation and
design report**

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**ENGINEERING MATERIALS OFFICE
FOUNDATION DESIGN SECTION**

WP 5-93-01 DIST 2
HWY 25 STR SITE 35-303

Eramosa River
Proposed Culvert Extensions

*- This Report was Prepared
for the Contract Documents only
- No Distribution*

GEOCRE 40P9-37

DATE AUG 11 1994

FOUNDATION INVESTIGATION REPORT

For

Eramosa River

Proposed Culvert Extensions

W.P. 5-93-01, Site 35-303

Highway 25, District 2, London/Stratford

INTRODUCTION

The proposed widening of Hwy 25 at the Eramosa River necessitates the extension of the existing twin steel pipe arch culverts at the site. This report summarizes the factual information derived from a foundation investigation conducted at the site in 1967.

SITE DESCRIPTION AND GEOLOGY

The site is located 1.6 km south of Osprige, 7.2 km north of Acton on Highway 25 and is situated in Lot 11, Concession 2 & 3 in the Township of Erin, County of Wellington.

The surrounding area has a moderately hilly relief and the particular area of the site is in a flat valley some 457 metres wide. Physiographically, the site lies in the area known as the Horseshoe Moraine. The deposits in the area are predominantly of glacial origin with valleys containing post-glacial and recent sediments. These deposits are underlain by bedrock of the Palaeozoic Era.

FIELD AND LABORATORY INVESTIGATION

Using conventional diamond drilling equipment adapted for soil sampling purposes, 7

sampled boreholes were carried out at the site.

In cohesive material, 50 mm I.D. Shelby tube samples were obtained by manually pushing the tubes into the soil, if possible. Otherwise, samples of cohesive and non-cohesive materials were obtained using a 50 mm O.D. split-spoon sampler driven according to the specifications of the Standard Penetration Test. In-situ shear strength was established, where possible, with a field vane test.

AXT-size rock core samples were obtained from all boreholes to prove bedrock.

Samples were visually examined and identified in the field and subsequently in the laboratory. Laboratory tests were conducted on selected representative samples to determine, where applicable, Atterberg limits, bulk density, grain-size distribution, natural moisture content, organic content, and shear strength. The shear strength was determined by means of laboratory vane, quick triaxial, and unconfined compression tests.

Results of the laboratory and field tests, together with the locations and elevations of the boreholes, are presented in the appendix of this report.

SUBSURFACE CONDITIONS

General

The subsoil at the site consists generally of a deposit of organic material, underlain by a variable deposit of clayey silt to silt with some sandy silt, which extends to bedrock except at the outer extremes of the investigation where a thin till-like deposit overlies the bedrock.

Organic Material

This material was encountered in all boreholes to a depth of 0.9 to 2.9 m. Organic analyses indicated organic contents as high as 63% by weight with corresponding high natural moisture contents up to 292.5%. Some clayey silt, silt and sand were contained in variable quantities throughout the deposit.

Clayey Silt to Silt

Underlying the organic material and extending for a thickness of 2.9 to 4.7 m, was a deposit of clayey silt to silt with some sandy silt. The deposit is layered and is predominantly silt or clayey silt of very low plasticity (CL-ML designation). The upper 0.5 m to .6 m of the deposit contains traces of organics.

The deposit could be described as having a soft to stiff consistency with shear strength generally between 15 kPa and 50 kPa. The silt and sandy silt layers are generally loose. Because of the predominantly silty nature of the soil, the low shear strengths are considered to represent at least a partially disturbed value.

Liquid limits vary between 19% and 32%, plastic limits from 13.5% to 20.9% and moisture contents from 16% to 48% (in general, about 25%). A typical gradation of the more silty materials is: 5% sand, 90% silt, and 5% clay sizes.

Figures 1 and 2 illustrate the results of grain size distribution and Atterberg Limit testing respectively.

Heterogeneous Mixture of Clayey Silt, Sand & Gravel (Glacial Till)

A deposit consisting of a heterogeneous mixture of clayey silt, sand and gravel of glacial till origin was encountered at BH 3. The thickness of this deposit is 0.6 m.

Bedrock

Bedrock was proven in all boreholes by drilling with AXT-sized core. The profile of the bedrock varies between elevations 368.9 m to 370.2 m (i.e., at a depth of 6.1 to 5 m respectively).

The rock is buff granular dolomite, generally sound, but containing some vuggy zones. The formation of rock is a part of the Guelph formation of the Silurian period (Palaeozoic Era).

Groundwater Conditions

The water table was observed in the boreholes and was generally 0.3 to 0.6 feet below the existing ground surface during the time of the investigation.

Groundwater levels in general, are subject to seasonal fluctuations and hence can vary from the values given in this report.

MISCELLANEOUS

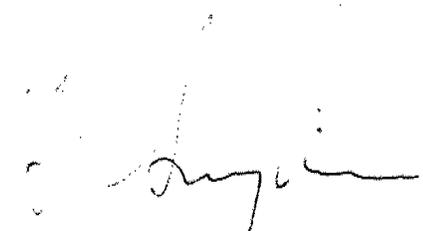
The fieldwork was carried out in the period from February 14 to March 2, 1967, using equipment owned and operated by Dominion Soil Investigation Ltd., under the supervision

of Mr. V. Korlu, Project Foundation Engineer.

The report was prepared by Mr. Korlu and Mr. L. Palmer, Project Foundation Engineer, and was reviewed by Mr. M. Devata, under whose general supervision the entire project was carried.

The factual component of the report was prepared for the contract documents by T. Sangiuliano, Foundation Engineer and approved by D. Dundas, Chief Foundation Engineer (Acting)




T. Sangiuliano, P. Eng.
Foundation Engineer

D. Dundas, P. Eng.
Chief Foundation Engineer
(Acting)

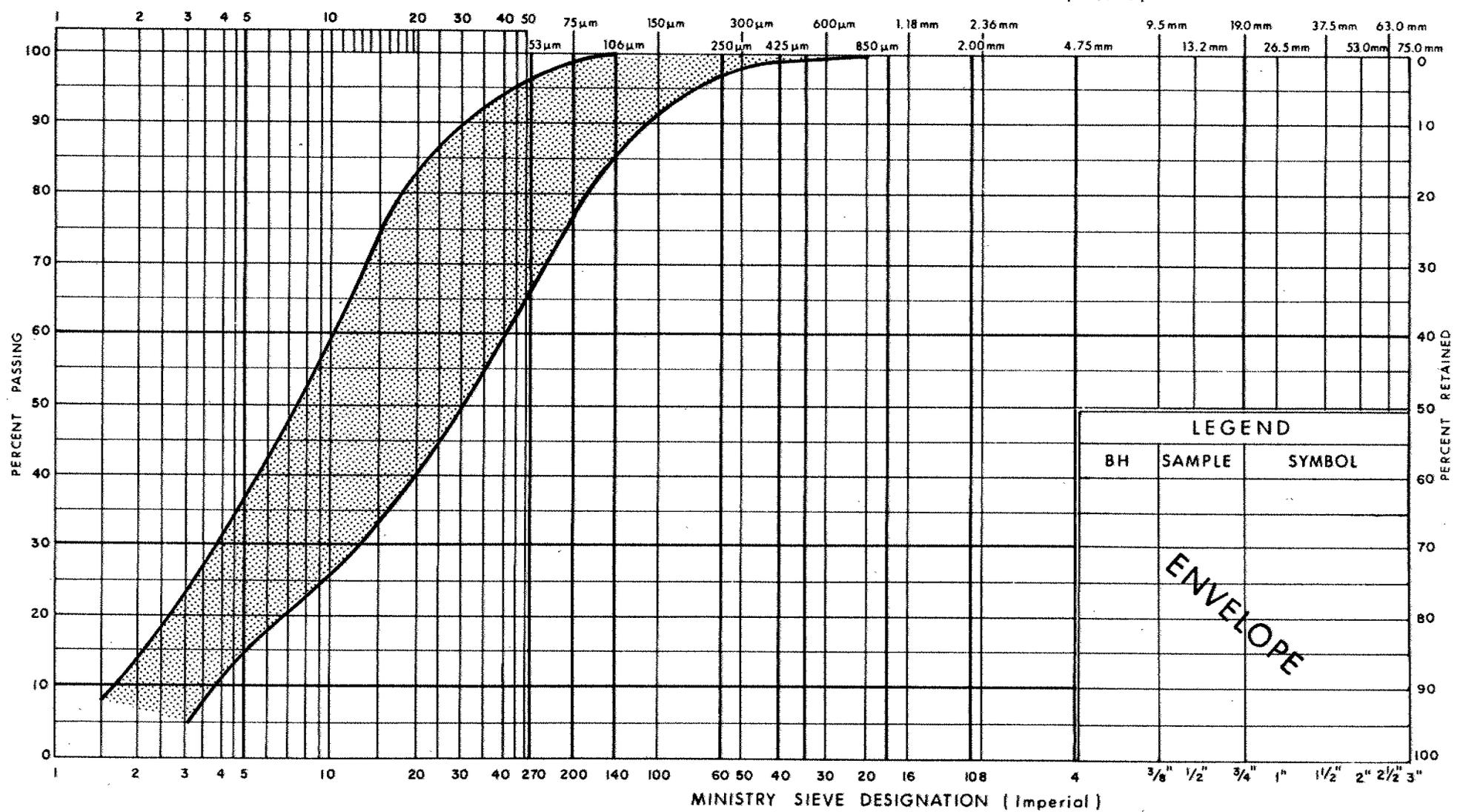
APPENDIX

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY & SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse

GRAIN SIZE IN MICROMETERS

MINISTRY SIEVE DESIGNATION (Metric)

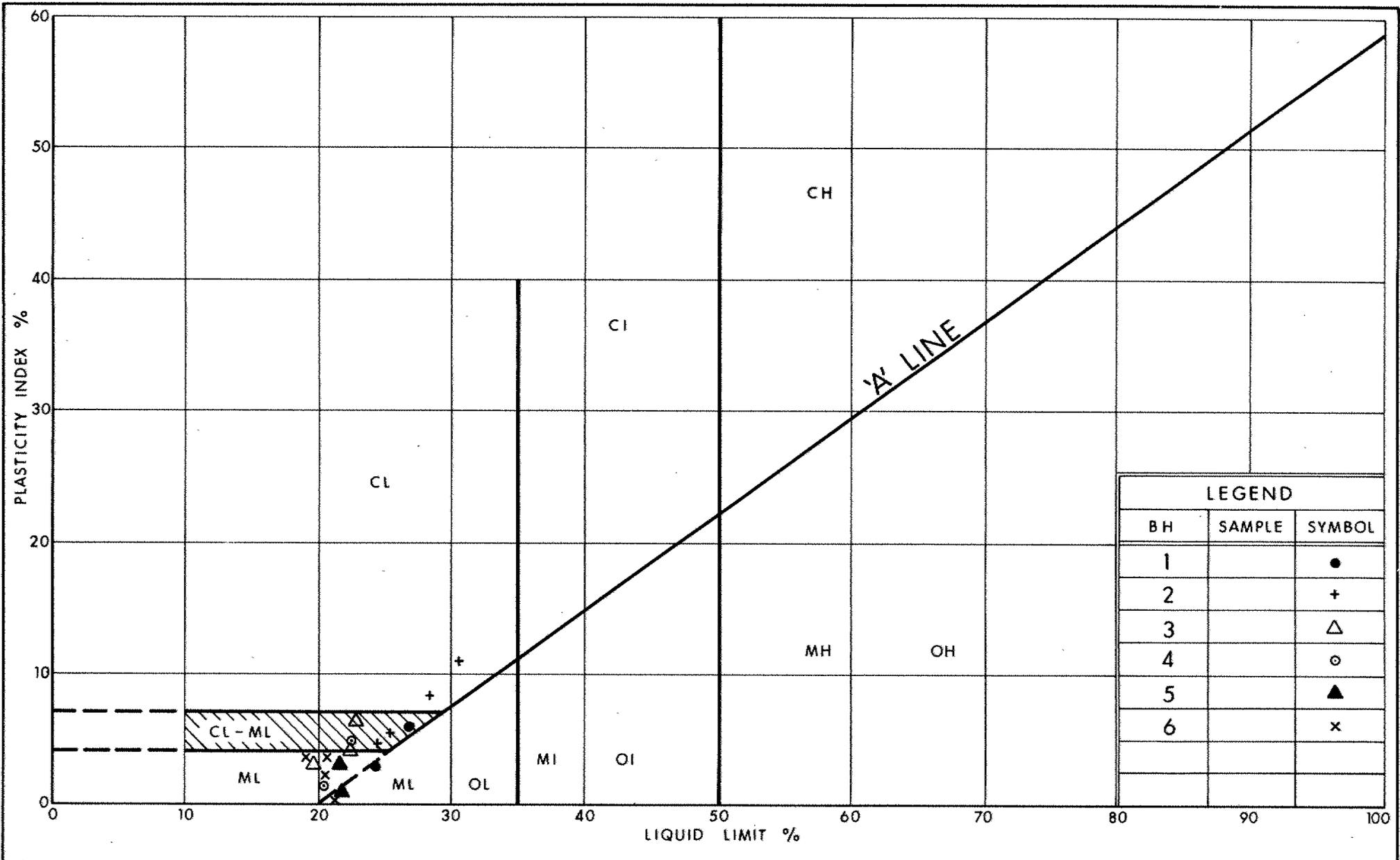


LEGEND		
BH	SAMPLE	SYMBOL
ENVELOPE		

Ministry of Transportation
Ontario

GRAIN SIZE DISTRIBUTION CLAYEY SILT TO SILT

FIG No 1
WP 5-93-01



RECORD OF BOREHOLE No 1

1 OF 1

METRIC

W.P. 5-93-01 LOCATION Sta. 16+201 e/s 4.9m Rt. 9 Hwy 25 ORIGINATED BY VK
 DIST 2 HWY 25 BOREHOLE TYPE Drive Casing and Wash COMPILED BY VK
 DATUM Geodetic DATE 87 02 14 CHECKED BY HR

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			'N' VALUES	20	40	60	80					
375.2	Ground Surface															
0.0	Organics, Some Clayey Silt to Sand		1	SS	6											
373.1			2	SS	7											
2.1	Traces of Organics		3	TW	PM											
	Clayey Silt to Silt Firm to Stiff/Loose		4	TW	PM											
			5	SS	22											
369.8																
5.6	Dolomite Bedrock, Sound Some Vuggy Zones		6	RC	REC 70%											
			7	RC	REC 52%											
368.1			8	RC	REC 100%											
9.1	End of Borehole															
	Formerly BH 1 WP 129-65															

RECORD OF BOREHOLE No 2

1 OF 1

METRIC

W.P. 5-93-01 LOCATION Sta. 16+200 o/s 6.7m Lt. C Hwy 25 ORIGINATED BY VK
 DIST 2 HWY 25 BOREHOLE TYPE Drive Casing and Wash COMPILED BY VK
 DATUM Geodetic DATE 87 02 16 CHECKED BY HR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100						20
375.0	Ground Surface																	
0.0	Organics																	
373.2	Some Clayey Silt to Sand		1	SS	3		2											
1.8	Clayey Silt to Silt Soft/Loose		2	TW	PM		2								19.2	0 2 (98)		
			3	TW	PM		5									19.2		
			4	TW	PM		3.5											
			5	TW	PM		4.5											0 2 (98)
368.9	Dolomite Bedrock Sound		6	RC	REC 100%													
367.4																		
7.6	End of Borehole Formerly BH 2 WP 128-65																	

RECORD OF BOREHOLE No 3

1 OF 1

METRIC

W.P. 5-93-01 LOCATION Sta. 16+182 o/s 6.7m Rt. 6 Hwy 25 ORIGINATED BY VK
 DIST 2 HWY 25 BOREHOLE TYPE Drive Casing and Wash COMPILED BY VK
 DATUM Geodetic DATE 67 02 20 CHECKED BY HR

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			'N' VALUES	20	40	60	80	100	W _p	W			W _L
375.1	Ground Surface																
0.0	Organics, some Clayey Silt to Sand		1	SS	6												
373.3			2	TW	PM												
1.8	Traces of Organics Clayey Silt to Silt, Layered, some Layers of Sandy Silt. Firm/Loose		3	TW	PM												
			4	TW	PM												
370.4			5	TW	PM												
369.8	**		6	SS	100												
5.3	Dolomite Bedrock, Vuggy Zones, Sound		7	RC	REC 75%												
			8	RC	REC 66%												
366.7			9	RC	REC 100%												
8.4	End of Borehole ** Heterogeneous Mixture of Clayey Silt, Sand and Gravel (Glacial Till) Formerly BH 3 WP 129-85																

+3, x5: Numbers refer to Sensitivity 20 15-0.5 (%) STRAIN AT FAILURE 10

RECORD OF BOREHOLE No 4

1 OF 1

METRIC

W.P. 5-93-01 LOCATION Sta. 16+179 o/s 8.5m Lt. E Hwy 25 ORIGINATED BY VK
 DIST 2 HWY 25 BOREHOLE TYPE Drive NX Casing and Wash COMPILED BY VK
 DATUM Geodetic DATE 67 02 22 CHECKED BY HR

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			'N' VALUES	20	40	60	80						100	WATER CONTENT (%)
375.1	Ground Surface																	
0.0	Organics, Some Clayey Silt to Silt		1	TW	PM													Org. 36%
			2	TW	PM													Org. 10.3%
372.2																		
2.9	Traces of Organics		3	TW	PM													
	Clayey Silt to Silt, Soft to Firm/Loose		4	TW	PM													
			5	TW	PM													
369.6			6	TW	PM													
5.5	Dolomite Bedrock, Sound		7	RC	REC 100%													
368.4			8	RC	REC 100%													
6.7	End of Borehole																	
	Formerly BH 4 WP 129-85																	

RECORD OF BOREHOLE No 4a

1 OF 1

METRIC

W.P. 5-93-01 LOCATION Sta. 16+183 o/s 28.0m Rt. C Hwy 25 ORIGINATED BY VK
 DIST 2 HWY 25 BOREHOLE TYPE Drive NX Casina and Wash COMPILED BY VK
 DATUM Geodetic DATE 87 03 02 CHECKED BY HR

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			'N' VALUES	SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE								
375.2	Ground Surface															
0.0	Organics, Some Clayey Silt to Sand															
374.3																
0.9	Clayey Silt to Silt Soft/Loose Traces Organics		1	TW	PM										19.5	0 3 (97)
			2	TW	PM											Org. 18%
			3	TW	PM											Org. 24%
			4	TW	PM											0 79 (21)
			5	TW	PM											0 16 (84)
369.6																0 4 87 9
5.8	Dolomite Bedrock Sound		6	RC	REC											
368.0																
7.2	End of Borehole Formerly BH 15 WP 128-85															

+3, x5: Numbers refer to 20
Sensitivity 15-25 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 5

1 OF 1

METRIC

W.P. 5-93-01 LOCATION Sta. 16+167 o/s 6.7m Rt. C Hwy 25 ORIGINATED BY VK
 DIST 2 HWY 25 BOREHOLE TYPE Drive NX Casings and Wash COMPILED BY VK
 DATUM Geodetic DATE 67 02 22 CHECKED BY HR

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT NUMBER	TYPE	'N' VALUES			SHEAR STRENGTH kPa									
						20	40	60	80	100	20	40	60	KN/m ³	GR SA SI CL	
375.2	Ground Surface															
0.0	Organics, Some Clayey Silt to Silt															
373.5		1	TW	PM												Org. 37%
1.7	Traces of Organics	2	TW	PM		x 3.5										Org. 1%
	Silt, With Layers of Clayey Silt Loose/Firm	3	TW	PM												
		4	TW	PM												
370.2		5	TW	PM												
5.0	Dolomite Bedrock, Some Vugs, Sound	6	RC	REC 100%												
368.5		7	RC	REC 100%												
6.7	End of Borehole															
	Formerly BH 5 WP 129-85															

+3, x5: Numbers refer to 20
Sensitivity 15-0-5 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 6

1 OF 1 METRIC

W.P. 5-93-01 LOCATION Sta. 16+165 o/s 9.1m Lt. E Hwy 25 ORIGINATED BY VK
 DIST 2 HWY 25 BOREHOLE TYPE Drive BX Casing and Wash COMPILED BY VK
 DATUM Geodetic DATE 67 02 23 CHECKED BY HR

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			'N' VALUES	20	40	60	80					
375.1	Ground Surface															
0.0	Organics, Some Clayey Silt to Sand		1	TW	PM											
373.4																
1.7	Traces of Organics		2	TW	PM											
	Clayey Silt to Silt, With Sand seams, Firm to Stiff/Loose		3	TW	PM											
		4	TW	PM												
		5	TW	PM												
369.3																
5.8	Dolomite Bedrock, Sound		6	RC	REC 100%											
368.1			7	RC	REC 100%											
7.0	End of Borehole															
	Formerly BH 6 WP 129-65															

+3, x5; Numbers refer to 20 Sensitivity 15-5 (%) STRAIN AT FAILURE

EXPLANATION OF TERMS USED IN REPORT

N VALUE: THE STANDARD PENETRATION TEST (SPT) N VALUE IS THE NUMBER OF BLOWS REQUIRED TO CAUSE A STANDARD 51mm O D SPLIT BARREL SAMPLER TO PENETRATE 0.3m INTO UNDISTURBED GROUND IN A BOREHOLE WHEN DRIVEN BY A HAMMER WITH A MASS OF 63.5kg, FALLING FREELY A DISTANCE OF 0.76m. FOR PENETRATIONS OF LESS THAN 0.3m N VALUES ARE INDICATED AS THE NUMBER OF BLOWS FOR THE PENETRATION ACHIEVED. AVERAGE N VALUE IS DENOTED THUS \bar{N} .

DYNAMIC CONE PENETRATION TEST: CONTINUOUS PENETRATION OF A CONICAL STEEL POINT (51mm O.D. 60° CONE ANGLE) DRIVEN BY 475 J IMPACT ENERGY ON 'A' SIZE DRILL RODS. THE RESISTANCE TO CONE PENETRATION IS MEASURED AS THE NUMBER OF BLOWS FOR EACH 0.3m ADVANCE OF THE CONICAL POINT INTO THE UNDISTURBED GROUND.

SOILS ARE DESCRIBED BY THEIR COMPOSITION AND CONSISTENCY OR DENSENESS.

CONSISTENCY: COHESIVE SOILS ARE DESCRIBED ON THE BASIS OF THEIR UNDRAINED SHEAR STRENGTH (c_u) AS FOLLOWS:

c_u (kPa)	0 - 12	12 - 25	25 - 50	50 - 100	100 - 200	> 200
	VERY SOFT	SOFT	FIRM	STIFF	VERY STIFF	HARD

DENSENESS: COHESIONLESS SOILS ARE DESCRIBED ON THE BASIS OF DENSENESS AS INDICATED BY SPT N VALUES AS FOLLOWS:

N (BLOWS/0.3m)	0 - 5	5 - 10	10 - 30	30 - 50	> 50
	VERY LOOSE	LOOSE	COMPACT	DENSE	VERY DENSE

ROCKS ARE DESCRIBED BY THEIR COMPOSITION AND STRUCTURAL FEATURES AND / OR STRENGTH.

RECOVERY: SUM OF ALL RECOVERED ROCK CORE PIECES FROM A CORING RUN EXPRESSED AS A PERCENT OF THE TOTAL LENGTH OF THE CORING RUN.

MODIFIED RECOVERY: SUM OF THOSE INTACT CORE PIECES, 100mm* IN LENGTH EXPRESSED AS A PERCENT OF THE LENGTH OF THE CORING RUN. THE ROCK QUALITY DESIGNATION (RQD), FOR MODIFIED RECOVERY, IS:

RQD (%)	0 - 25	25 - 50	50 - 75	75 - 90	90 - 100
	VERY POOR	POOR	FAIR	GOOD	EXCELLENT

JOINTING AND BEDDING:

SPACING	50mm	50 - 300mm	0.3m - 1m	1m - 3m	> 3m
JOINTING	VERY CLOSE	CLOSE	MOD. CLOSE	WIDE	VERY WIDE
BEDDING	VERY THIN	THIN	MEDIUM	THICK	VERY THICK

ABBREVIATIONS AND SYMBOLS

FIELD SAMPLING

S S	SPLIT SPOON	T P	THINWALL PISTON
W S	WASH SAMPLE	O S	OSTERBERG SAMPLE
S T	SLOTTED TUBE SAMPLE	R C	ROCK CORE
B S	BLOCK SAMPLE	P H	T W ADVANCED HYDRAULICALLY
C S	CHUNK SAMPLE	P M	T W ADVANCED MANUALLY
T W	THINWALL OPEN	F S	FOIL SAMPLE

STRESS AND STRAIN

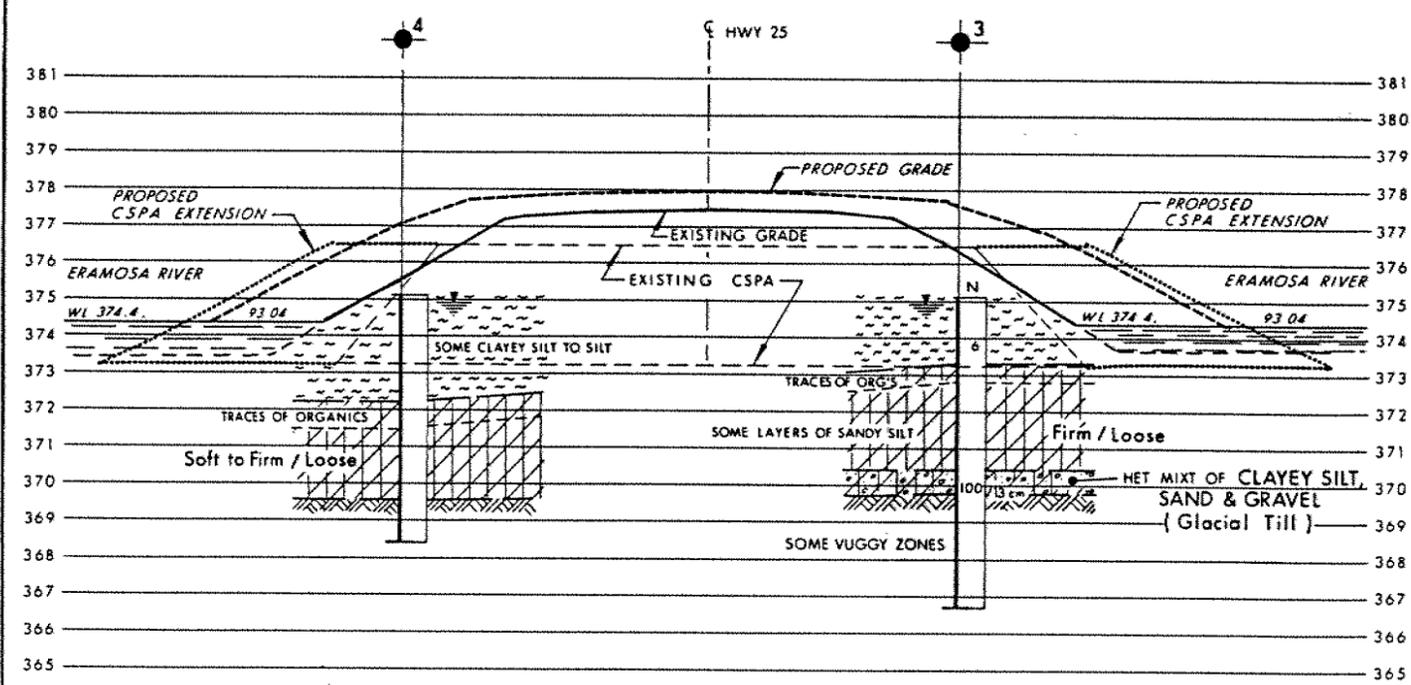
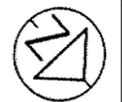
u_w	kPa	PORE WATER PRESSURE
T_u	1	PORE PRESSURE RATIO
σ	kPa	TOTAL NORMAL STRESS
σ'	kPa	EFFECTIVE NORMAL STRESS
τ	kPa	SHEAR STRESS
$\sigma_1, \sigma_2, \sigma_3$	kPa	PRINCIPAL STRESSES
ϵ	%	LINEAR STRAIN
$\epsilon_1, \epsilon_2, \epsilon_3$	%	PRINCIPAL STRAINS
E	kPa	MODULUS OF LINEAR DEFORMATION
G	kPa	MODULUS OF SHEAR DEFORMATION
μ	1	COEFFICIENT OF FRICTION

MECHANICAL PROPERTIES OF SOIL

m_v	kPa^{-1}	COEFFICIENT OF VOLUME CHANGE
C_c	1	COMPRESSION INDEX
C_s	1	SWELLING INDEX
C_α	1	RATE OF SECONDARY CONSOLIDATION
c_v	m^2/s	COEFFICIENT OF CONSOLIDATION
H	m	DRAINAGE PATH
T_v	1	TIME FACTOR
U	%	DEGREE OF CONSOLIDATION
σ'_{vo}	kPa	EFFECTIVE OVERBURDEN PRESSURE
σ'_p	kPa	PRECONSOLIDATION PRESSURE
τ_f	kPa	SHEAR STRENGTH
c'	kPa	EFFECTIVE COHESION INTERCEPT
ϕ'	-°	EFFECTIVE ANGLE OF INTERNAL FRICTION
c_u	kPa	APPARENT COHESION INTERCEPT
ϕ_u	-°	APPARENT ANGLE OF INTERNAL FRICTION
τ_r	kPa	RESIDUAL SHEAR STRENGTH
τ_r	kPa	REMOULDED SHEAR STRENGTH
S_t	1	SENSITIVITY = $\frac{c_u}{\tau_r}$

PHYSICAL PROPERTIES OF SOIL

P_s	kg/m^3	DENSITY OF SOLID PARTICLES	e	1, %	VOID RATIO	e_{min}	1, %	VOID RATIO IN DENSEST STATE
γ_s	kn/m^3	UNIT WEIGHT OF SOLID PARTICLES	n	1, %	POROSITY	I_D	1	DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$
P_w	kg/m^3	DENSITY OF WATER	w	1, %	WATER CONTENT	D	mm	GRAIN DIAMETER
γ_w	kn/m^3	UNIT WEIGHT OF WATER	s_r	%	DEGREE OF SATURATION	D_n	mm	n PERCENT - DIAMETER
ρ	kg/m^3	DENSITY OF SOIL	w_L	%	LIQUID LIMIT	C_u	1	UNIFORMITY COEFFICIENT
γ	kn/m^3	UNIT WEIGHT OF SOIL	w_p	%	PLASTIC LIMIT	h	m	HYDRAULIC HEAD OR POTENTIAL
ρ_d	kg/m^3	DENSITY OF DRY SOIL	w_s	%	SHRINKAGE LIMIT	q	m^3/s	RATE OF DISCHARGE
γ_d	kn/m^3	UNIT WEIGHT OF DRY SOIL	I_p	%	PLASTICITY INDEX = $\frac{w_L - w_p}{I_p}$	v	m/s	DISCHARGE VELOCITY
ρ_{sat}	kg/m^3	DENSITY OF SATURATED SOIL	I_L	1	LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$	i	1	HYDRAULIC GRADIENT
γ_{sat}	kn/m^3	UNIT WEIGHT OF SATURATED SOIL	I_C	1	CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$	k	m/s	HYDRAULIC CONDUCTIVITY
ρ'	kg/m^3	DENSITY OF SUBMERGED SOIL	e_{max}	1, %	VOID RATIO IN LOOSEST STATE	j	kn/m^3	SEEPAGE FORCE
γ'	kn/m^3	UNIT WEIGHT OF SUBMERGED SOIL						



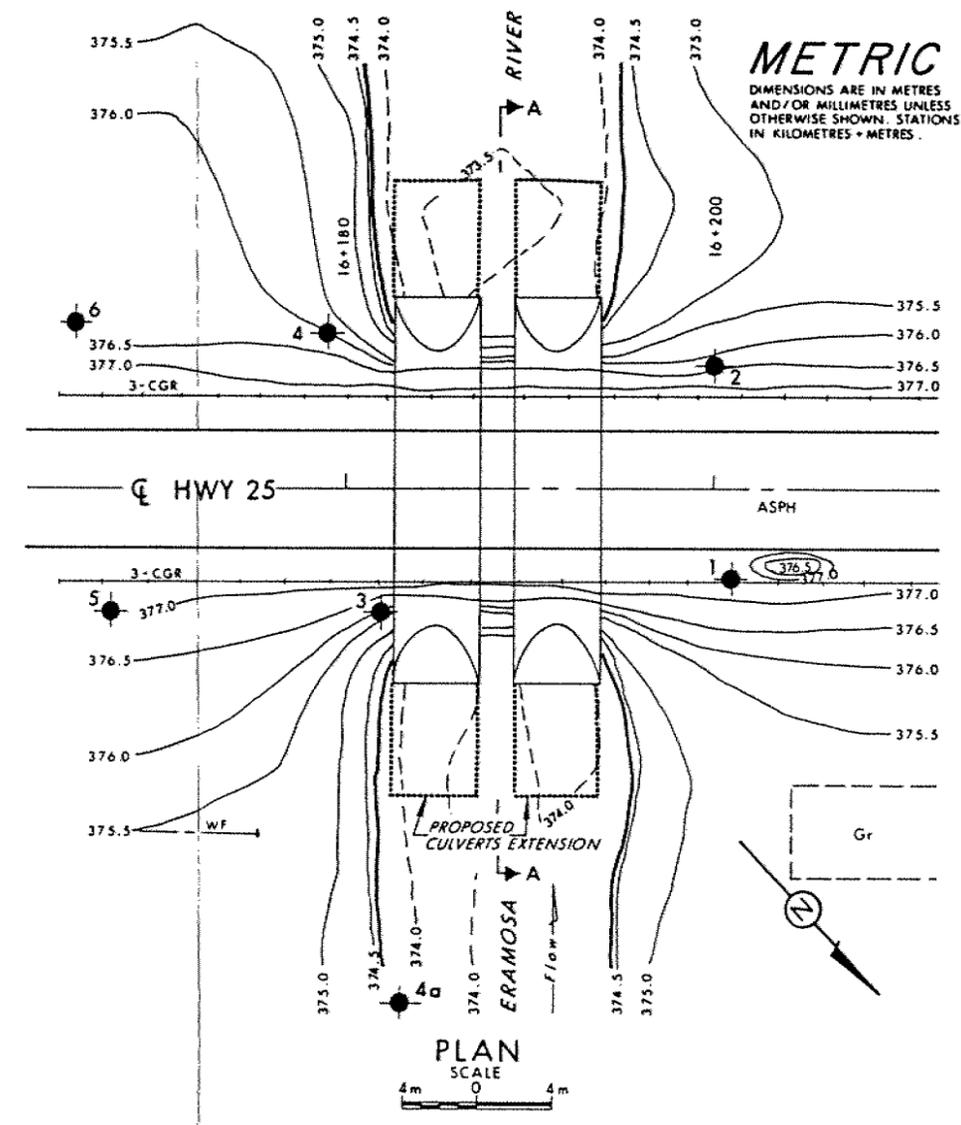
SECTION A-A
SCALE
2m 0 2m

SOIL STRATIGRAPHY LEGEND

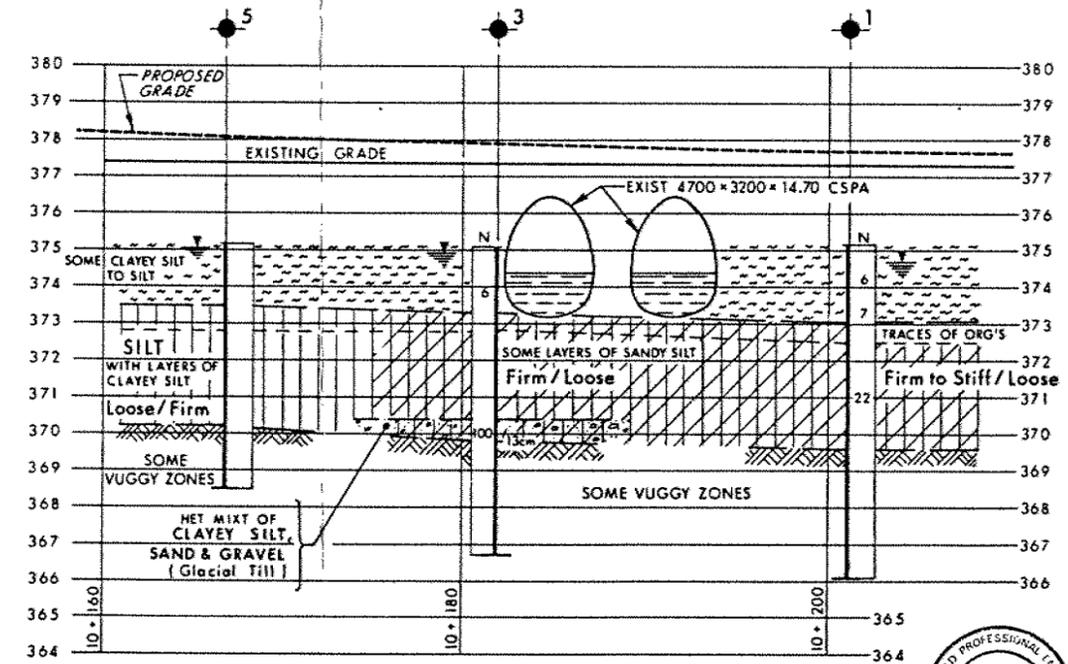
- ORGANICS
SOME CLAYEY SILT TO SAND
- CLAYEY SILT TO SILT
- DOLOMITE BEDROCK
Sound

NOTE
For Subsoil information of B.H.'s 2, 4a & 6 refer to Record of Borehole Sheets.

NOTE
The subsoil information provided reflect the conditions as determined during the original foundation investigation prior to the construction of the structures and related earthworks.

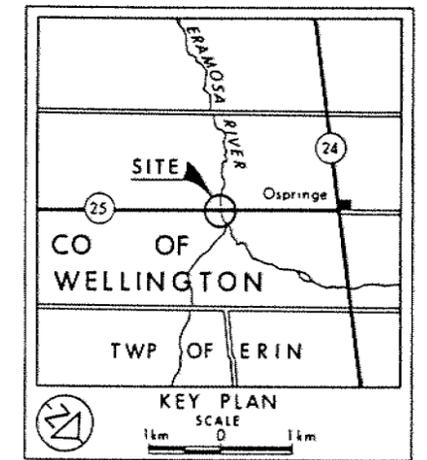


PLAN
SCALE
4m 0 4m



PROFILE HWY 25

SCALES
4m 2 0 4m HOR
2m 1 0 2m VERT



LEGEND

- Bore Hole
- Dynamic Cone Penetration Test (Cone)
- Bore Hole & Cone
- N Blows/0.3m (Std Pen Test, 475 J/blow)
- CONE Blows/0.3m (60° Cone, 475 J/blow)
- Wl at time of investigation 1967 02 and 03

No	ELEVATION	STATION	OFFSET
1	375.2	16+201	4.9m RT
2	375.0	16+200	6.7m LT
3	375.1	16+182	6.7m RT
4	375.1	16+179	8.5m LT
4a	375.2	16+183	28.0m RT
5	375.2	16+167	6.7m RT
6	375.1	16+165	9.1m 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.

NOTE: The complete foundation investigation and design report for this project and other related documents may be examined at the Engineering Materials Office, Downsview. Information contained in this report and related documents is specifically excluded in accordance with the conditions of Section GC 2.01 of OPS Gen.Cand



REV	DATE	BY	DESCRIPTION

Geacres No 40PP-37

HWY No 25	DIST 2
SUBM'D T 5	CHECKED [initials] DATE 1994 04 27
DRAWN R 5	CHECKED [initials] APPROVED [initials]

REF No E-347-25-1; 1993 10