

DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 31C-14

DIST. 8 REGION _____

W.P. No. _____

CONT. No. _____

W. O. No. 79-46007

STR. SITE No. 28-13

HWY. No. 33

LOCATION GLENORA FERRY DOCK

TERMINAL

=====

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. _____

REMARKS: _____

FILE
Copy



Ontario

Ministry of
Transportation and
Communications

foundation investigation and design report

ENGINEERING MATERIALS OFFICE
PAVEMENT & FOUNDATION DESIGN SECTION

WO 79-46007

DIST

HWY

STR SITE 23-12

Proposed Dock Improvement Stage II
Glenora Ferry Dock Terminal

DISTRIBUTION

T.C. Kingsland (5)
Files

FOUNDATION INVESTIGATION REPORT

For

Proposed Dock Improvement Stage II
Glenora Ferry Dock Terminal
W.O. 79-46007, Site 23-13

INTRODUCTION

This report contains the results of a foundation investigation carried out at the site of the above project. Two borings were carried out on 80 02 12 using wash boring techniques to advance the boreholes to 30 feet and 35 feet below the water surface. Bedrock was proven by obtaining up to 5 feet of BXL size rock core in one of the boreholes. The record of two previous boreholes put down in the same general area in April, 1973 are included in the Appendix of this Report.

SITE DESCRIPTION AND GEOLOGY

The site is located at the Glenora Ferry Dock of Hwy. 33, crossing Adolphus Reach in Prince Edward County.

Local land use can be described as rural residential. The immediate site is located on the flat shores of Adolphus Reach some 10 feet above the water level. A steep bluff rising some 200 feet above the water level is parallel to the shoreline located about 400 feet distant from shore.

The site is located in the physiographic region known as the Prince Edward Peninsula. This region is characterized by shallow deposits overlying limestone bedrock of the Middle Ordovician Trenton and Black River Groups.

SUBSOIL CONDITIONS

Subsoil conditions in the area of concern consist of 15 feet of water overlying 15 feet of loose to compact silty sand over limestone bedrock. The results of grain size distribution testing on representative samples from the silty sand deposit are shown in envelope form on Figure 2.

These tests reveal the composition of the deposit to be a silty sand with some clay and some gravel. Visual classifications indicate the deposit is basically granular in nature, however, exhibiting very slight plasticity. Atterberg Limit testing on samples of the silty sand confirm the visual examination indicating liquid limits of 10 to 12 percent with corresponding plasticity indexes of 1 to 2 percent. The results of Atterberg Limit tests show the fines to be inorganic of very low plasticity, ML zone. The results of Standard Penetration Testing gave 'N' values of 5 to 19 indicating a relative density of loose to compact. The underlying limestone bedrock is medium texture with no open joints and with some thin seams of shale. Based on the rock recovery and R.Q.D. ratio the limestone bedrock is sound and of very good quality.

The location and elevations of the boreholes are shown on Figure 1 in the Appendix. The boundaries between the various soil strata and bedrock, and a brief description of the subsoil types are given on the Record of Borehole Sheets also appended to this report.

DISCUSSION AND RECOMMENDATIONS

It has been proposed to carry out improvements to the Glenora Ferry Dock of Hwy. 33. These improvements will require the construction of a permanent wall to retain fill material as shown on Figure 1. Current proposals call for either a steel sheet pile retaining wall or alternatively a wall constructed of steel 'H' piles and timber lagging.

For estimating the earth pressures on the retaining wall the following parameters are suggested. (We have assumed that some movement of the retaining wall is allowed and hence the coefficient of active earth pressure K_a is to be used for earth pressures behind the retaining wall).

Rock Fill (Assumed)	$\gamma = 125 \text{ lb/cu. ft.}$
	$\gamma' = 63 \text{ lb/cu. ft.}$
	$\phi = 35^\circ$
	$c = 0$
	$k_a = 0.27$

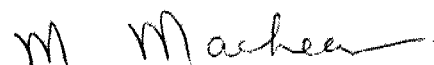
Silty Sand (Overburden)	$\gamma = 120 \text{ lb/cu. ft.}$
	$\gamma' = 58 \text{ lb/cu. ft.}$
	$\phi = 30^\circ$
	$c = 0$
	$k_a = 0.33$
	$k_p = 3.0$

Deadmen may be necessary to achieve adequate factors of safety against sliding and overturning of the retaining wall.


MISCELLANEOUS

The fieldwork was carried out under the supervision of Mr. M. MacLean, Project Foundations Engineer, using equipment rented from Atcost Soil Drilling Inc.

This report was written by Mr. M. MacLean and reviewed by Mr. M. Devata,
Senior Foundations Engineer.

A handwritten signature in cursive script, appearing to read "M MacLean".

M. MacLean, P. Eng.
Project Foundations Engineer

A handwritten signature in cursive script, appearing to read "M. Devata".

M. Devata, P. Eng.
Senior Foundations Engineer

March, 1980.



RECORD OF BOREHOLE No 1A

W P 79-46007 LOCATION Sta. 99 + 77 80' Lt. ORIGINATED BY M.M.
DIST 8 HWY 33 BOREHOLE TYPE BX Casing and Rock Core COMPILED BY M.M.
DATUM Geodetic DATE 80 02 12 CHECKED BY _____

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 (%) GR SA SI CL			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			SHEAR STRENGTH								WATER CONTENT (%)		
								○ UNCONFINED	+ FIELD VANE	● QUICK TRIAXIAL						x LAB VANE	10	20
245.2	Water Surface																	
0.0	Water																	
230.2																		
15.0	Silty Sand Some Clay Some Gravel Compact	+	1	SS	19									19 39 30 12				
			2	SS	15													
			3	SS	14													
215.7																		
29.5	Sound Limestone Bedrock	⊞	4	BXL RC	REC RQD	100% 80%												
210.0																		
35.2	End of Borehole																	

+3, x5: Numbers refer to
Sensitivity

20
15 5 (%) STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE No 2A

W P 79-46007 LOCATION Sta. 99 + 99 43' Lt. ORIGINATED BY M.M.
DIST 8 HWY 33 BOREHOLE TYPE BX Casing COMPILED BY M.M.
DATUM Geodetic DATE 80 02 12 CHECKED BY

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20 40 60 80 100							
								SHEAR STRENGTH							
245.2	Water Surface														
230.2	Water														
15.0	With Organics		1	SS	5										
	Silty Sand Some Clay Some Gravel Loose to Compact		2	SS	6									13 62 21 4	
			3	SS	12									12 42 30 16	
215.2															
30.0	Refusal to Driving Casing Probable Bedrock End of Borehole														

OFFICE REPORT ON SOIL EXPLORATION

*3, *5: Numbers refer to
Sensitivity

20
15 + 5 (%) STRAIN AT FAILURE
10

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 1

W.O. 79-46007

LOCATION STA 99+59 16' LT.

ORIGINATED BY J.P.

W.P.

BORING DATE April 5, 1973

COMPILED BY J.B.

DATUM Geodetic

BOREHOLE TYPE Washbore - BX Casings - AXT Rock Coring

CHECKED BY J.J.

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT				LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE				WATER CONTENT % W_P W W_L 10 20 30				
249.5	Ground level														
0.0	Sand and gravel, some silt and clay, boulders and wood, compact to dense, fill material					240									WL 249.5
			1	SS	27										
			2	RC AXT	Rec 63%										
			3	SS	17										
236.0	Silty sand, traces of gravel and clay, compact					230									3 57 35 5
13.5			4	SS	18										
			5	SS	11										
227.0			6	RC AXT	Rec 80%										
22.5	Limestone (Sound)		7	RC AXT	Rec 96%										
222.1	Bedrock														
27.4	End of borehole					220									

20
15 ϕ 5 % STRAIN AT FAILURE
10

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE 4

W.O. 79-46007

LOCATION STA 99+60 17' RT.

ORIGINATED BY JB

W.P. _____

BORING DATE April 11, 1973

COMPILED BY JB

DATUM Geodetic

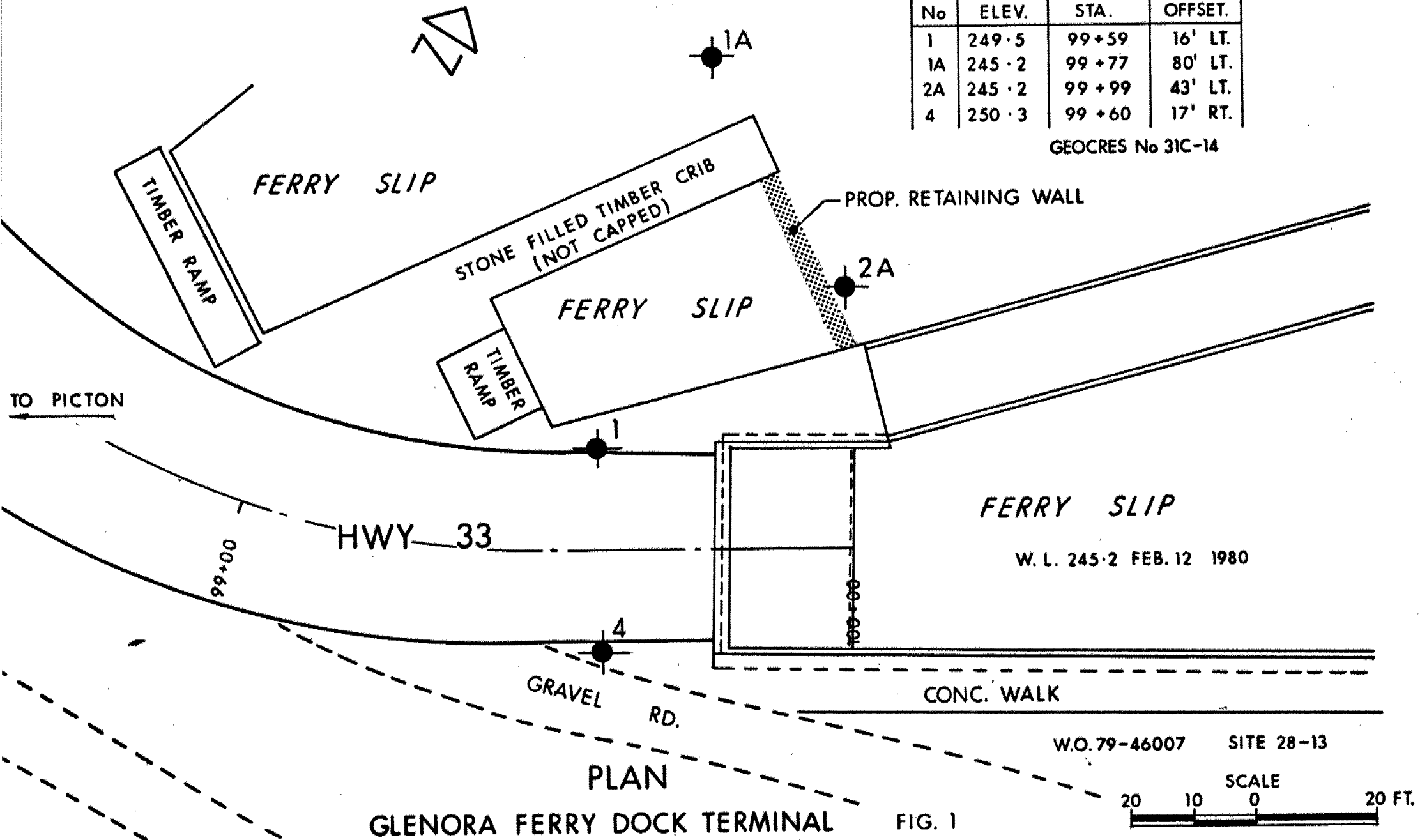
BOREHOLE TYPE Washbore-BX Casing-AXT Rock Core

CHECKED BY JH

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT				LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. O UNCONFINED + FIELD VANE • QUICK TRIAXIAL x LAB VANE				WATER CONTENT % w_p w w_L				
250.3	Ground Level														
0.0	Sand and gravel, some silt & clay, boulders and wood. Fill Material					250									249.0
240.2						240									
10.1	weathered Limestone		1	RC	1.25										
			2	RC	1.35										
			3	RC	1.35										
			4	RC	1.35										
231.4	sound Bedrock		5	RC	97%										
18.9	End of Borehole					230									

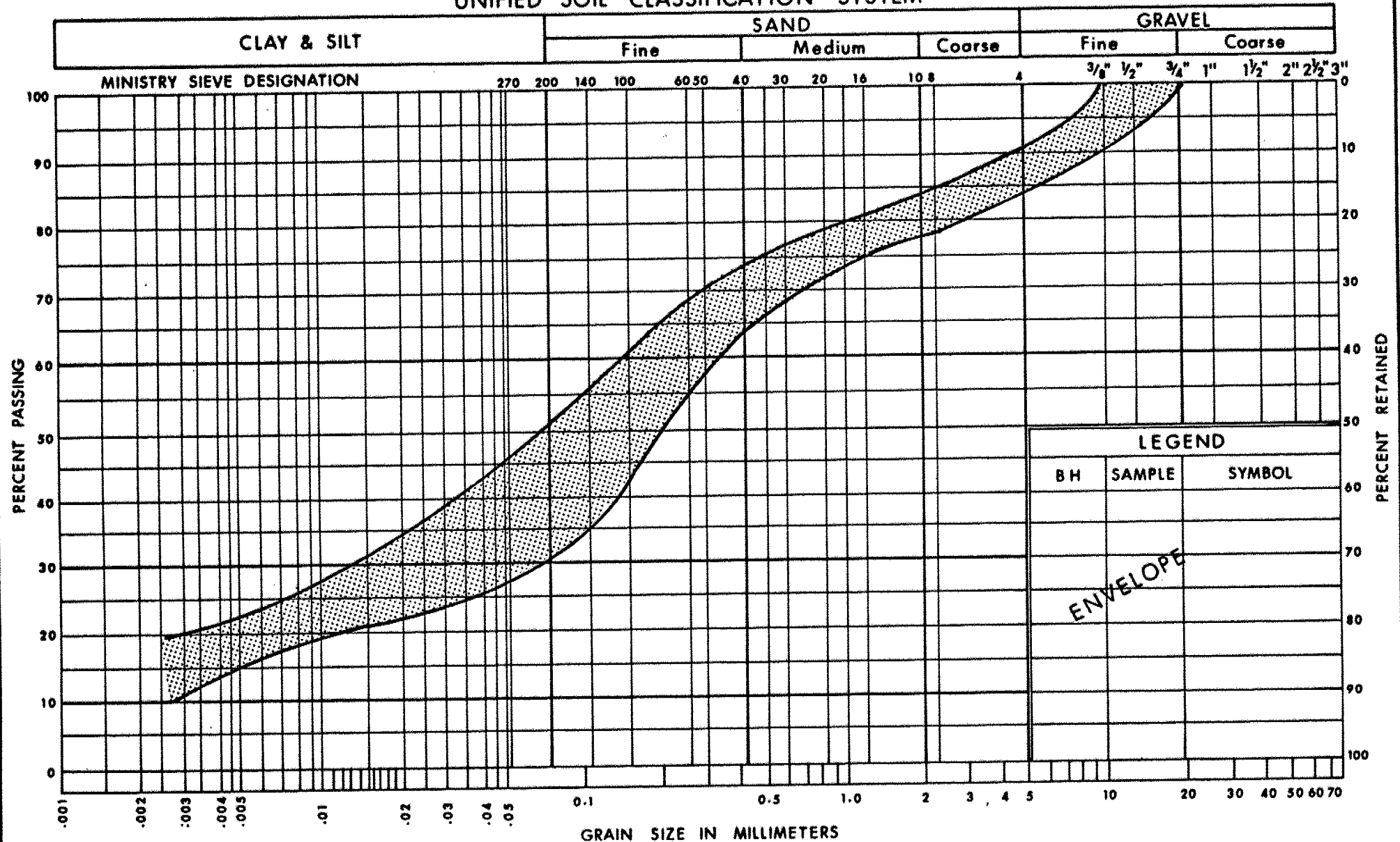
No	ELEV.	STA.	OFFSET.
1	249.5	99+59	16' LT.
1A	245.2	99+77	80' LT.
2A	245.2	99+99	43' LT.
4	250.3	99+60	17' RT.

GEOCREs No 31C-14



PLAN
GLENORA FERRY DOCK TERMINAL FIG. 1

UNIFIED SOIL CLASSIFICATION SYSTEM



Ministry of
Transportation and
Communications

Ontario

ENGINEERING SERVICES BRANCH

GRAIN SIZE DISTRIBUTION
SILTY SAND
SOME GRAVEL SOME CLAY

FIG No 2

WO 79-46007

EXPLANATION OF TERMS USED IN REPORT

'N' VALUE: AN INDICATOR OF SUBSOIL QUALITY. IT IS OBTAINED FROM THE STANDARD PENETRATION TEST (CSA STD. A119.1). SPT 'N' VALUE IS THE NUMBER OF BLOWS REQUIRED TO CAUSE A STANDARD 2 INCH O.D. SPLIT-BARREL SAMPLER TO PENETRATE 12 INCHES INTO UNDISTURBED GROUND IN A BOREHOLE WHEN DRIVEN BY A HAMMER WEIGHING 140 POUNDS, FALLING FREELY A DISTANCE OF 30 INCHES. FOR PENETRATIONS OF LESS THAN 12 INCHES 'N' VALUES ARE INDICATED AS THE NUMBER OF BLOWS FOR THE PENETRATION ACHIEVED. 'N' VALUES CORRECTED FOR OVERBURDEN PRESSURE ARE DENOTED THUS N_c .

DYNAMIC CONE PENETRATION TEST (CSA STD. A119.3): CONTINUOUS PENETRATION OF A CONICAL STEEL POINT (2" O.D. 60 CONE ANGLE) DRIVEN BY 350 FT-LB IMPACTS ON 'A' SIZE DRILL RODS. THE RESISTANCE TO CONE PENETRATION IS MEASURED AS THE NUMBER OF BLOWS FOR EACH 12 INCH ADVANCE OF THE CONICAL POINT INTO THE UNDISTURBED GROUND.

SOIL QUALITY: SOILS ARE DESCRIBED BY THEIR COMPOSITION AND CONSISTENCY OR DENSITY.

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

S_u (PSF)	0 - 250	250 - 500	500 - 1000	1000 - 2000	2000 - 4000	> 4000
	VERY SOFT	SOFT	FIRM	STIFF	VERY STIFF	HARD

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

'N' (BLOW/FT)	0 - 5	5 - 10	10 - 30	30 - 50	> 50
	VERY LOOSE	LOOSE	COMPACT	DENSE	VERY DENSE

ROCK QUALITY: 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 DRILLED IN THAT CORING RUN.

MODIFIED RECOVERY: SUM OF THOSE NATURALLY FRACTURED CORE PIECES, 4"+ 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	2"	2" - 12"	1' - 3'	3' - 10'	> 10'
JOINTING	VERY CLOSE	CLOSE	MOD. CLOSE	WIDE	VERY WIDE
BEDDING	VERY THIN	THIN	MEDIUM	THICK	VERY THICK

ABBREVIATIONS & SYMBOLS



LABORATORY TESTING

TRIAxIAL TESTS ARE DESCRIBED IN TERMS OF WHETHER THEY ARE CONSOLIDATED (C) OR NOT (U) ISOTROPICALLY (I) OR NOT (A) AND SHEARED DRAINED (D) OR UNDRAINED (U) WITH PORE PRESSURE MEASUREMENTS (BAR OVER SYMBOLS) EG. $\bar{C}U$ = CONSOLIDATED ISOTROPIC UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENT UNLESS OTHERWISE SPECIFIED IN REPORT ALL TESTS ARE IN COMPRESSION

FIELD SAMPLING

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

EARTH PRESSURE TERMS

μ COEFFICIENT OF FRICTION
 δ ANGLE OF WALL FRICTION
 k_o COEFFICIENT OF EARTH PRESSURE AT REST
 k_A COEFFICIENT OF ACTIVE EARTH PRESSURE
 k_P COEFFICIENT OF PASSIVE EARTH PRESSURE
 i ANGLE OF INCLINATION OF SURCHARGE
 w SLOPE ANGLE-BACKFACE OF WALL 
 β ANGLE OF SLOPE 
 $N_q, N_c, N_{q,c}$ BEARING CAPACITY FACTORS
 D_f DEPTH OF FOOTING
 B, L FOOTING DIMENSIONS

INDEX PROPERTIES

γ UNIT WEIGHT OF SOIL (BULK DENSITY)
 γ_w UNIT WEIGHT OF WATER
 γ_d UNIT DRY WEIGHT OF SOIL (DRY DENSITY)
 γ' UNIT WEIGHT OF SUBMERGED SOIL
 G_s SPECIFIC GRAVITY OF SOLIDS
 e VOIDS RATIO
 e_o INITIAL VOIDS RATIO
 e_{max} e IN LOOSEST STATE
 e_{min} e IN DENSEST STATE
 D_r RELATIVE DENSITY = $\frac{e_{max} - e}{e_{max} - e_{min}}$
 n POROSITY
 w WATER CONTENT
 w_L LIQUID LIMIT
 w_P PLASTIC LIMIT
 w_S SHRINKAGE LIMIT
 I_P PLASTICITY INDEX = $w_L - w_P$
 I_L LIQUIDITY INDEX = $\frac{w - w_P}{I_P}$
 I_C CONSISTENCY INDEX = $\frac{w_L - w}{I_P}$
 A_c ACTIVITY = $\frac{I_P \text{ of soil}}{2 \mu m \text{ Soil Fraction}}$
 Om ORGANIC MATTER CONTENT
 S_r DEGREE OF SATURATION
 S SENSITIVITY = $\frac{S_u(\text{undisturbed})}{S_u(\text{remolded})}$

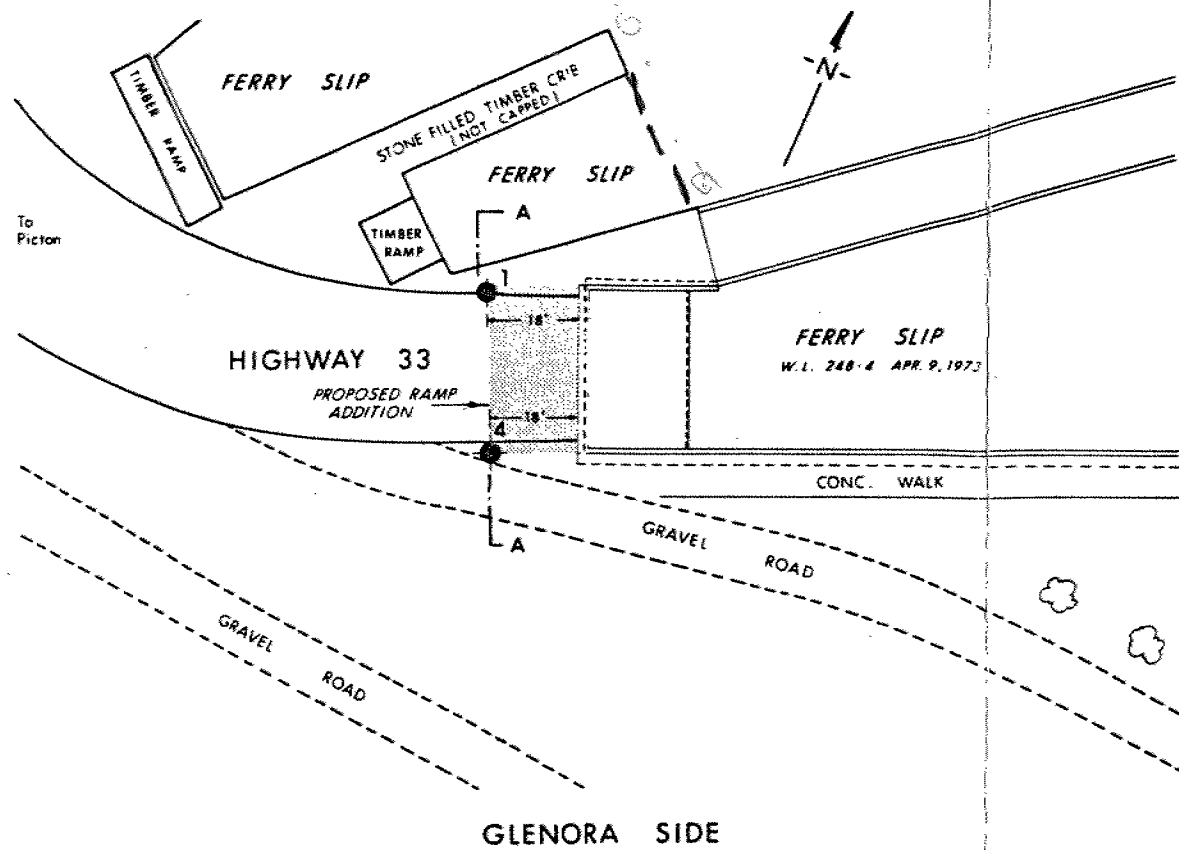
STRENGTH PARAMETERS

ϕ ANGLE OF SHEARING RESISTANCE
 τ_f PEAK SHEAR STRENGTH
 τ_R RESIDUAL SHEAR STRENGTH
 c COHESION INTERCEPT
 $\sigma_1, \sigma_2, \sigma_3$ NORMAL PRINCIPAL STRESSES
 u PORE WATER PRESSURE
 u_e EXCESS u
 r_u PORE PRESSURE RATIO
 q_u UNCONFINED COMPRESSIVE STRENGTH
 s_u UNDRAINED SHEAR STRENGTH
 ϵ LINEAR STRAIN
 γ SHEAR STRAIN
 ν POISSON'S RATIO
 E MODULUS OF ELASTICITY
 G MODULUS OF SHEAR DEFORMATION
 k_s MODULUS OF SUBGRADE REACTION
 m, n STABILITY COEFFICIENTS
 A, B PORE PRESSURE COEFFICIENTS

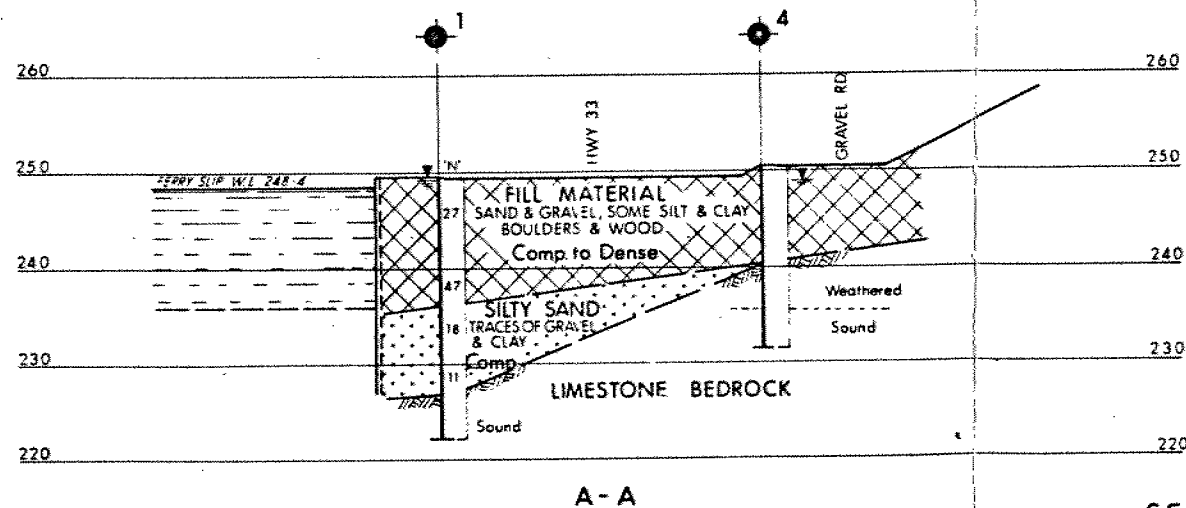
NOTE: EFFECTIVE STRESS PARAMETERS ARE DENOTED BY USE OF APOSTROPHE ABOVE THE SYMBOL, THUS:
 ϕ' = EFFECTIVE ANGLE OF SHEARING RESISTANCE;
 σ' = EFFECTIVE NORMAL STRESS

HYDRAULIC TERMS

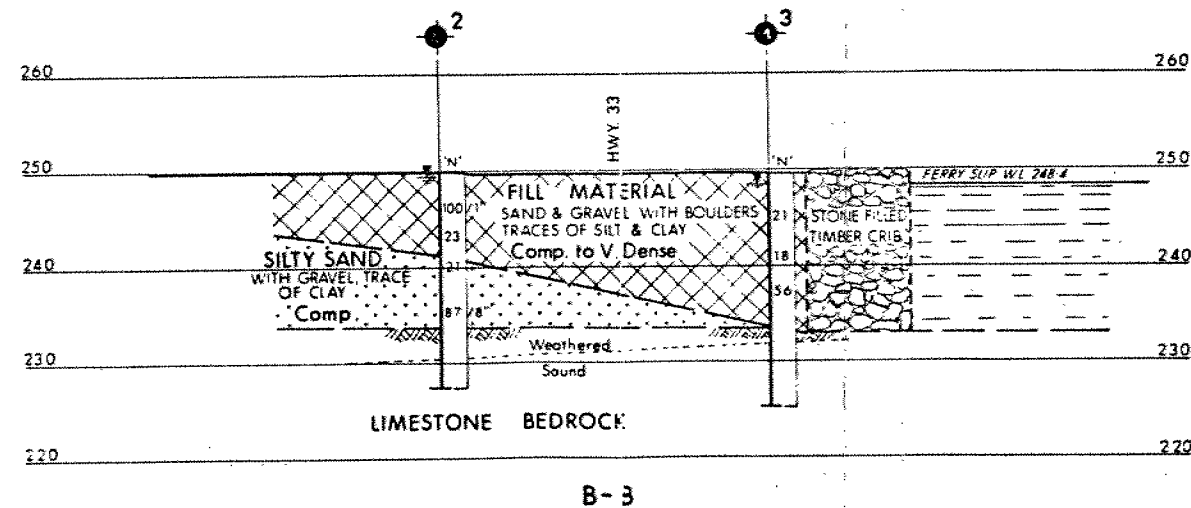
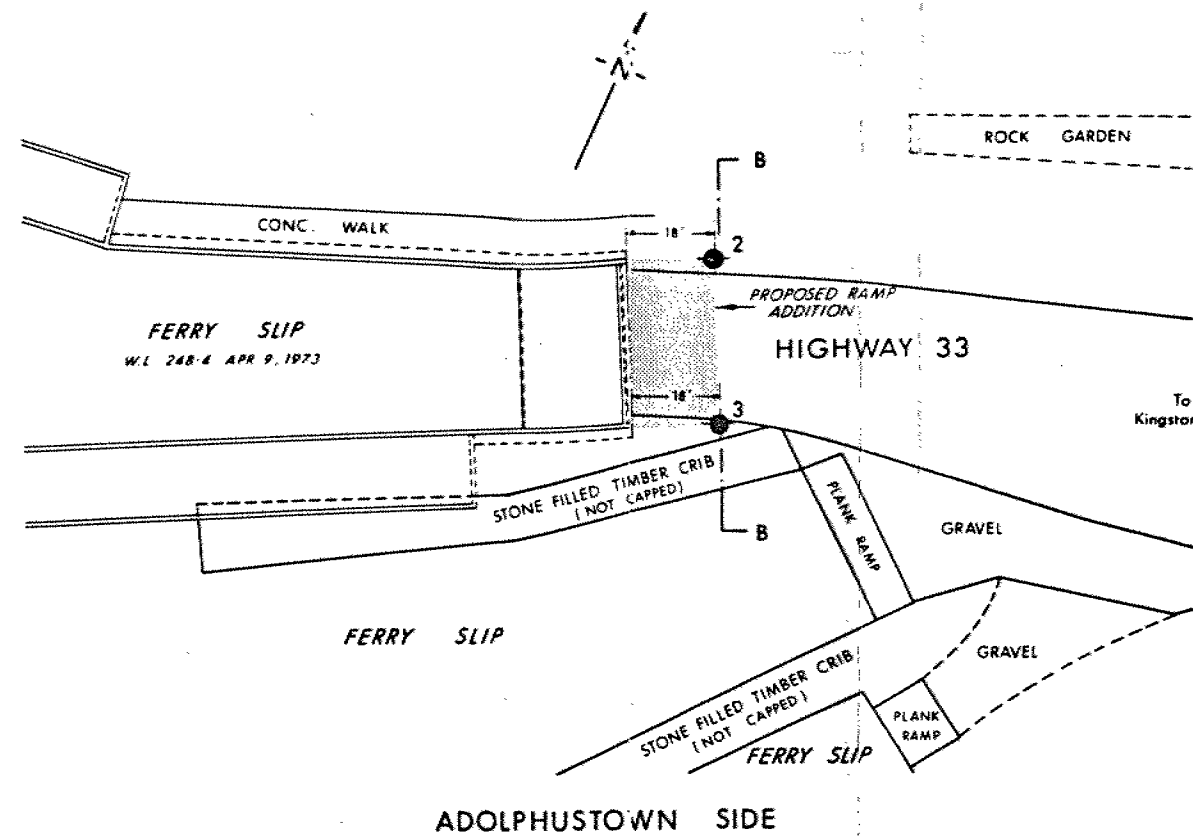
h HYDRAULIC HEAD OR POTENTIAL
 q RATE OF DISCHARGE
 v VELOCITY OF FLOW
 i HYDRAULIC GRADIENT
 j SEEPAGE FORCE PER UNIT VOLUME
 η COEFFICIENT OF VISCOSITY
 k COEFFICIENT OF HYDRAULIC CONDUCTIVITY
 k_h k IN HORIZONTAL DIRECTION
 k_v k IN VERTICAL DIRECTION
 m_v COEFFICIENT OF VOLUME CHANGE
 c_v COEFFICIENT OF CONSOLIDATION
 C_c COMPRESSION INDEX
 C_r RECOMPRESSION INDEX
 d DRAINAGE PATH DISTANCE
 T_v TIME FACTOR
 U DEGREE OF CONSOLIDATION
 O_c OVERCONSOLIDATION RATIO (OCR)



PLANS
20 10 0 SCALE 20 40 FT

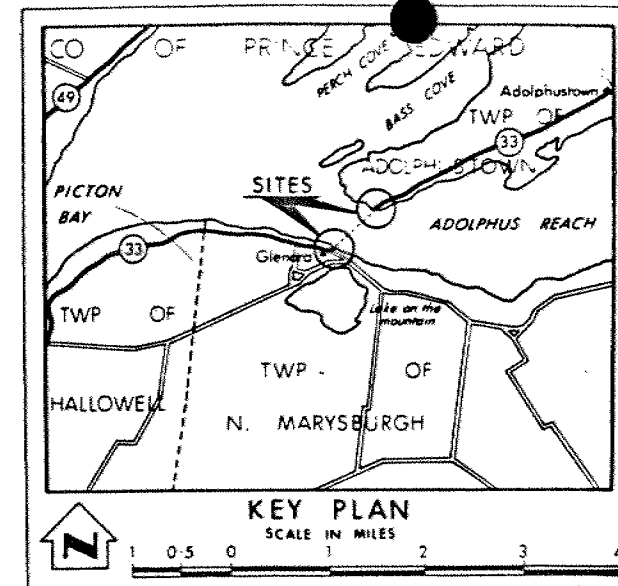


A-A



B-B

SECTIONS
10 5 0 SCALE 10 20 FT



LEGEND

- Bore Hole
- ⊕ Cone Penetration Test
- ⊕ Bore Hole & Cone Test
- ⊕ Water Levels established at time of field investigation, APRIL 1973

NO.	ELEVATION	
1	249.5	AS SHOWN ON PLAN
2	249.9	
3	249.6	
4	250.3	

NOTE

The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence.

REVISIONS	DATE	BY	DESCRIPTION

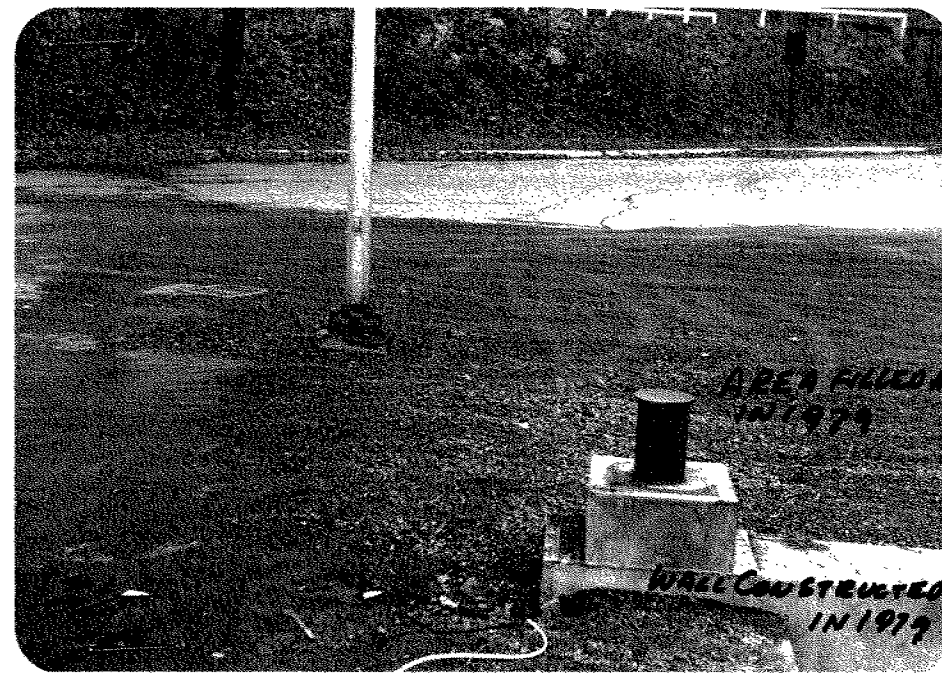
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS—ONTARIO
DESIGN SERVICES BRANCH—FOUNDATIONS OFFICE

PROPOSED RAMP ADDITION AT
GLENORA & ADOLPHUSTOWN
FERRY DOCKS

HIGHWAY NO. 33 DIST. NO. 8
CO. PRINCE EDWARD
TWP. N. MARYSBURGH & ADOLPHUSTOWN

BORE HOLE LOCATIONS & SOIL STRATA

SUBMD. P.P.	CHECKED	W.P. NO.	DRAWING NO.
DRAWN'S	CHECKED	W.D. NO. 73-11006 A	73-11006 A
DATE 24 JULY 1973	SITE NO.	BRIDGE DRAWING NO.	
APPROVED	CONT. NO.		



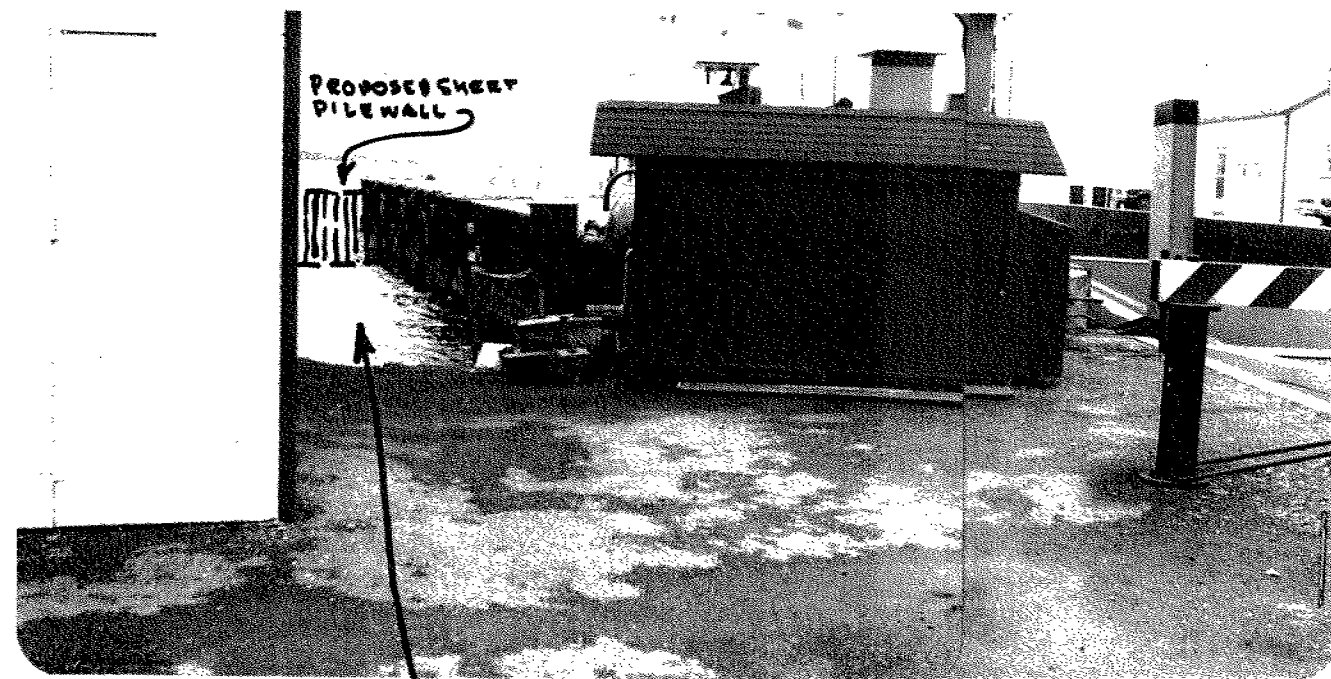
AREA FILLED-IN IN 1979 TO CREATE PARKING



TIMBER CRIBBING TO BE REFACED IN 1980

← TIMBER CRIBBING TO BE REFACED IN 1980

← AREA BEHIND FRAME SHED TO BE FILLED IN



GLENORA FERRY DOCK

AREA TO BE FILLED-IN IN 1980
NOV. / 79

#60-F-29

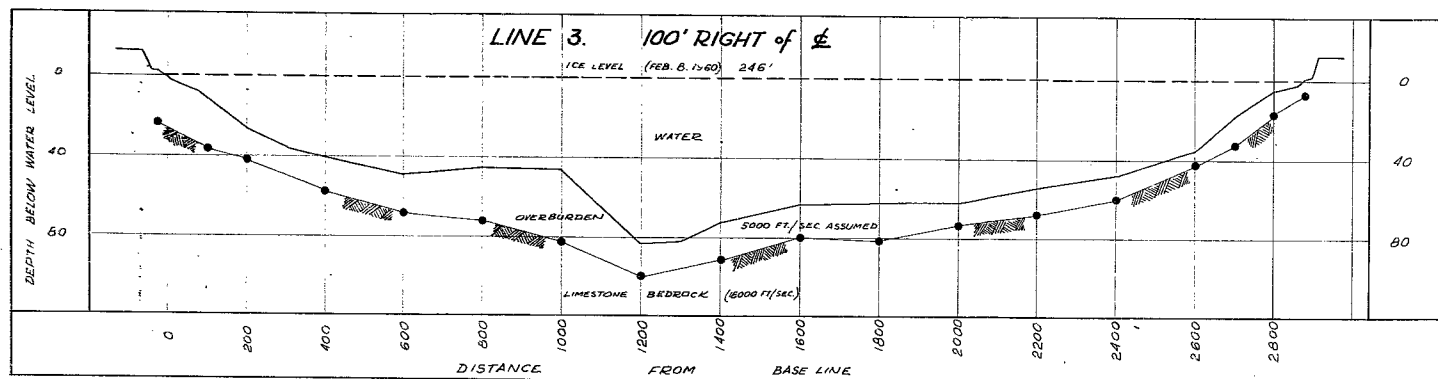
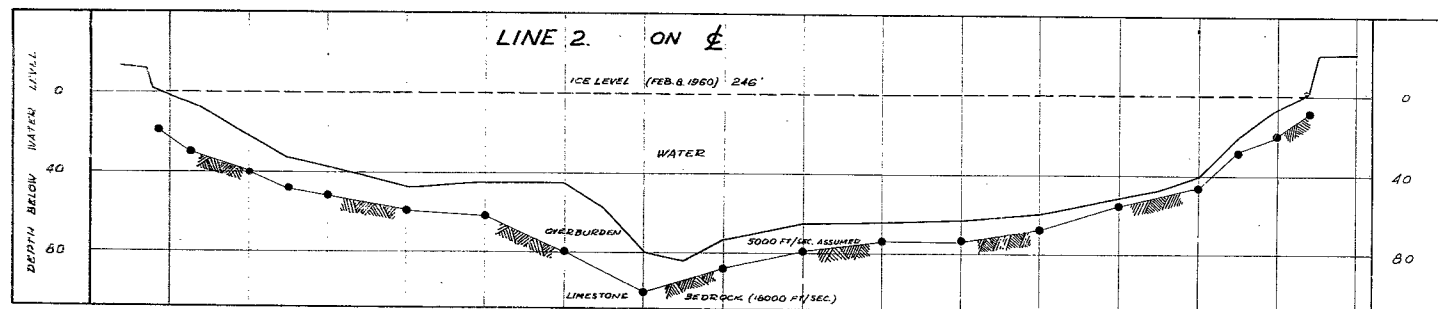
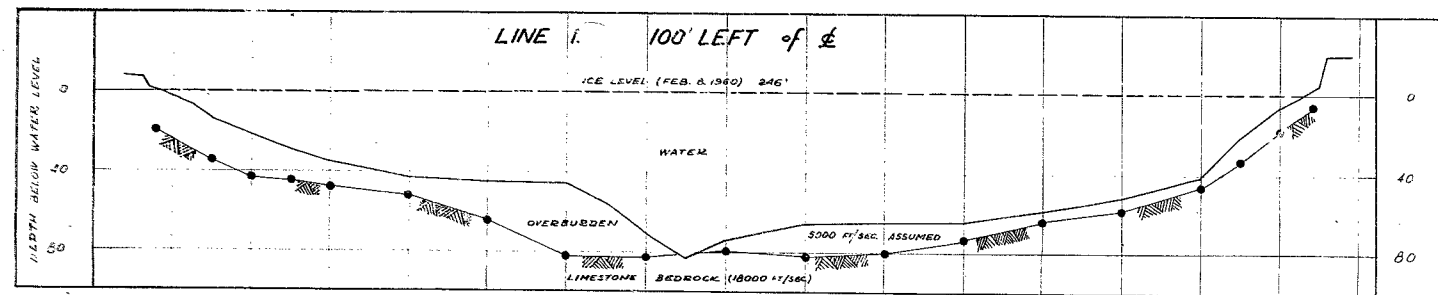
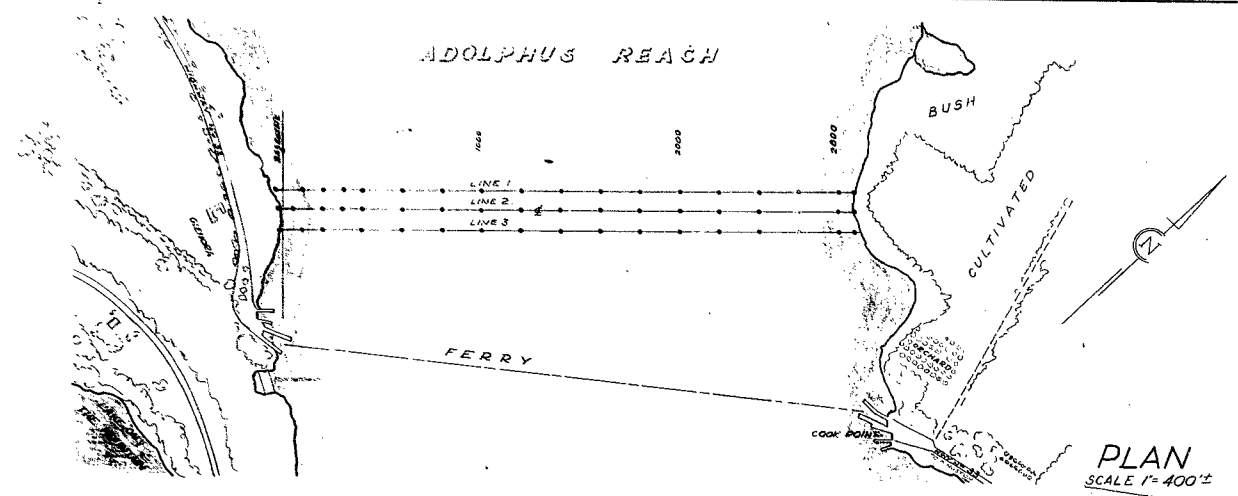
HWY #33

NEAR GLENORA

PROPOSED CROSSING

OF ADOLPHUS REACH

NEAR GLENORA



PI C 2 E
E 335090
2 48 22050
2 12

- NOTE -
THE BOUNDARIES BETWEEN SOIL STRATA HAVE BEEN ESTABLISHED ONLY AT BORE HOLE LOCATIONS. BETWEEN BORE HOLES THE BOUNDARIES ARE ASSUMED FROM GEOLOGICAL EVIDENCE AND MAY BE SUBJECT TO CONSIDERABLE ERROR.

DEPARTMENT OF HIGHWAYS - ONTARIO			
MATERIALS & RESEARCH SECTION			
SEISMIC INVESTIGATION			
AT ADOLPHUS REACH			
PROPOSED			
SHOWING POSITIONS OF HOLES			
HWY. 33	DISTRICT 7-6	COUNTY	
TOWNSHIP NORTH MARYSBURG-ADOLPHUS			
LOCATION NEAR GLENORA FERRY			
DRAWN BY: J. J. J. J.	CHECKED BY: J. J. J. J.	W.P.	
DATE: 4 MARCH 1960	APPROVED BY: J. J. J. J.	DRAWING NO.	
SCALE AS SHOWN		F-60-PL	

10-F-329

Mr. A. M. Toye,
Bridge Engineer.
Materials & Research Section.

March 11, 1960.
D.H.O. SEISMIC INVESTIGATION.
P-60-P.L. (Dist. 3)

Attention: Mr. S. McCombie.

Re: Proposed Crossing of -
Adolphus Reach near
Glenora Ferry - Hwy. 33.

The Foundation Section has carried out a seismic survey at the proposed crossing of Adolphus Reach by Hwy. 33 between Glenora and Adolphus Town, Ontario. This information is submitted in the attached report for your review.

Upon completion of your study of this site and choice of final alignment, it will be necessary to carry out detailed borings to determine the nature of the river bottom sediments, and to confirm the bedrock profile, as established by the seismic work. We shall undertake this work at your request.



LGS/MdeF
Attach.

L. G. Soderman,
PRINCIPAL SOILS AND FOUNDATIONS ENGINEER

cc: Messrs. A. M. Toye (2)
H. A. Tregaskes
D. G. Ramsay
H. J. Ford
L. E. Walker
J. E. Crispier
Foundations Office ✓
Gen. Files.

REPORT ON
SEISMIC INVESTIGATIONS
OF
PROPOSED CROSSING OF
ADOLPHUS REACH
NEAR
GLENORA FERRY
HIGHWAY NO. 33

60 - F - 29

March, 1960.

C O N T E N T S

Page

Introduction

1

General

Procedure

Elevation Survey

Requirements

Geology

2

Bedrock Stratigraphy

Seismic Survey

2

General

Conclusions

3

INTRODUCTION

GENERAL

Between February 15th and February 26th, 1960, a seismic survey was conducted to determine depth to bedrock at the proposed crossing of Adolphus Reach by Hwy. 33 between Glenora and Adolphus Town, Ontario.

Preliminary work on the shorelines was carried out between December 15th and December 18th, 1959. For the main survey, our seismic crew consisted of a geophysicist and two helpers, using the MD-1 refraction seismograph.

PROCEDURE

The seismic survey consisted of three profiles, one along centre line, one a 100' left and one 100' right. Centre line was staked on the ice, starting from a baseline along the S.W. shore. Seismic depth determinations were made at a minimum interval of 200' except near the shoreline where this interval was 100'. An average of 18 determinations was made on each line.

ELEVATION SURVEY

All elevations are referred to water level at 246'. No topographic survey has been made.

The depth of water was obtained by sounding through holes in the ice every 100' along centre line, and every 200' along the other two lines. 100' intervals were also used on these lines close to the shorelines, and in the vicinity of the deep channel at the middle of the crossing.

REQUIREMENTS

The requirements as stipulated by the Foundations Section of

D.H.O. were for a preliminary survey in the area of the proposed crossing.

GEOLOGY

BEDROCK STRATIGRAPHY

The route of Hwy. 33 at and adjacent to the proposed crossing is underlain by Palaeozoic sedimentary strata of the Ordovician system. These strata are essentially fine grained limestones of the Trenton formation, interbedded with thin seams of calcareous shale. The limestone is fossiliferous and dark grey in fresh specimens. When weathered, it is creamy coloured. Steep cliffs of this limestone are exposed at the cement works just East of Picton.

Near Glenora, on the South side of Hwy. 33, the limestone forms a steep, wooded escarpment. Along the S.W. shore, about 500' left of centre line, outcrops are exposed along what appears to be an old shore line. No exposure was found along the N.E. shore, where a 20' cliff of silty clay till marks the end of the crossing.

SEISMIC SURVEY

GENERAL

The results of the seismic survey are presented on the sheet provided with this report. Three profiles and a location map are shown. On each of the profiles, which are drafted at the scale of 1 inch = 40 ft. vertically, and 1 inch = 200 ft. horizontally, the overburden and bedrock surfaces are indicated. Points at which depth to bedrock was determined are indicated by solid circles. Actual velocities are also indicated.

In this type of survey, no actual measurement of the overburden

velocity can be made, therefore an assumed velocity of 5000 feet/second was used in the computations. This is the velocity of water, and is also typical of saturated sediments.

CONCLUSIONS

The profiles are self-explanatory and very little description is needed here. The maximum depth of overburden recorded was 37 feet on the line left of centre line. The three lines show essentially the same structure, and no evidence of faulting was observed. The very consistent high velocity of the limestone is indicative of its dense matrix.

The accuracy of the absolute depth to bedrock on any line depends on the velocity of the overburden, and it is recommended that at least one borehole be put down on each line to check this absolute depth. Since the relative depths along any line are considered to be accurate, it would only be necessary to raise or lower the bedrock elevation to tie in to the borehole.

P. G. Lazenby,
Geophysicist.