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G.I.-30 SEPT. 1976

GEOCRES No. _____

DIST. 32 REGION _____

W.P. No. _____

CONT. No. _____

W. O. No. 95-11006

STR. SITE No. 14-446

HWY. No. 21

LOCATION Ravenswood Culvert

No of PAGES - —

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. _____

REMARKS: _____

MEMORANDUM

Ontario

To: A. Ho
Head, Structural Section
Southwestern Region

Date: December 14, 1995

Atten: S.A. Sidky

From: Pavements & Foundations Section
Room 315, Central Building

Tel: 235-3731
Fax: 235-5240

Re: Ravenswood Culvert at Sta. 19 + 787 Repair
Highway 21, District 32, Chatham

In response to your letter dated October 31, 1995. The site was inspected on December 7, 1995.

It appears that the pavement is underlain by approximately 2.0 m clayey fill which is followed by native clayey soil. The parameters provided for the design of roadway protection are based on the site inspection and, no borehole was advanced at this location. If the design is based on undrained shear strength parameters, the following values may be used:

Soil Boundary	Soil Type	Design Parameters ϕ	Cu (kPa)	γ (kN/m^3)
El. 199.5 - El. 196.2	Clayey Fill	0	60	18.0
Below El. 196.2	Clay	0	100	19.0

If the construction period extends more than two to three months, it may be advisable to use effective strength parameters. The following effective strength parameters are recommended for the design.

Soil Boundary	Soil Type	Design Parameters ϕ	c'(kPa)	γ (kN/m^3)
El. 199.5 - El. 196.2	Clayey Fill	26	0	18
Below El. 196.2	Clay	28	0	19

M. Vasavithasan, P. Eng.
Foundation Engineer
for
T.C. Kim, P. Eng.
Sr. Foundation Engineer

MV/TCK/mmj

memorandum

RECEIVED
MAR 24 '95

Brad -

Ontario

Geotechnical Section, Southwestern Region, London

Planning & Design
London Region

Fax: (519) 649-3108

To: A. E. Irving, Head
Planning and Design Section
Southwestern Region London

Date: March 21, 1995

Att: Brad Decker

WO 95-11006

Re: Highway 21, Ravenswood Culvert Repair, District #1

A soils investigation was conducted on March 14 at this site. An edge of pavement investigation was conducted left of centre line of Highway 21. Existing pavement structure was found to consist of 150 mm of hot mix over 150 mm Crushed Granular over 150 mm of Br F Sa which was underlain by hot mix pavement. The buried pavement extended to 5.0 m left of the existing surface course and was measured at 60 mm in depth. A brown silty clay was encountered in the outer fill slope. A log of test holes is included with this memo.

RECOMMENDATIONS

Removals

Assume existing Highway 21 pavement depth to be 150 mm. The pavement buried under the north shoulder is assumed to be 6.1 m wide and therefore would be partially located under existing pavement. Assume depth of hot mix to be 60 mm.

Pavement Reinstatement

Provide for a new pavement structure at the culvert removal site to consist of:

40 mm HL4 surface
50 mm HL4 binder
50 mm HL4 lower binder
600 mm Granular "A"

Detour

The existing granular shoulders may be utilized as a base for the detour. For widenings beyond the inner edge of rounding provide for a minimum 300 mm depth of Granular "A". If a hot mix surface is required, recommend 50 mm HL4. Strip all topsoil under the detour. Assume a stripping depth of 80 mm.

Culvert

Foundation problems are not anticipated at this site. The repair section is to be constructed in the original location. Provide Granular "A" backfill as per O.P.S.D. 803.01 or 803.02. Assume F = 1.0 m.

Keith Helwig

Keith Helwig
Pavement Design and Evaluation Officer
For: E. Magni, Head
Geotechnical Section
Southwestern Region London
(519) 681-1441 Ext 3255

KH11/cs

cc: P. Ginn
A. Ho
File K. Helwig (2)

GEOTECHNICAL SURVEY DATA

DATE OF SURVEY	TYPE OF SURVEY
95 03 14	Hand Equipment Investigation

NOTE

- CONDITIONS AND PAVEMENT DEPTHS APPLY ONLY TO THE TIME OF THE SURVEY.
- THE BOUNDARIES BETWEEN STRATA HAVE BEEN ESTABLISHED ONLY AT BOREHOLE LOCATIONS. BETWEEN BOREHOLES THE BOUNDARIES ARE ASSUMED.
- SOILS ARE DESCRIBED ACCORDING TO THE M.T.O. CLASSIFICATION SYSTEM.
- PAVEMENT CORE LOCATIONS WERE ESTABLISHED USING RANDOM NUMBERS UNLESS OTHERWISE SPECIFIED.
- DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN. STATIONS IN KILOMETRES + METRES

ABBREVIATIONS

LSFH	Low Susceptibility to Frost Heave
MSFH	Moderate Susceptibility to Frost Heave
HSFH	High Susceptibility to Frost Heave
MWD	Maximum Wet Density
w	Water Content
w_L	Liquid Limit
I_P	Plasticity Index $= w_L - w_P$
w_{opt}	Optimum Water Content
w_p	Plastic Limit
c_U	Undrained Shear Strength
S_t	Sensitivity $= \frac{\text{Undrained shear strength}}{\text{remoulded shear strength}}$

W.P. ...District #1..... CONTRACT ..... HWY .21.....

KH12/cs

Highway 21, Ravenswood
March 14, 1995

BOREHOLE LOG DATA

Offset From Centre Line Highway 21

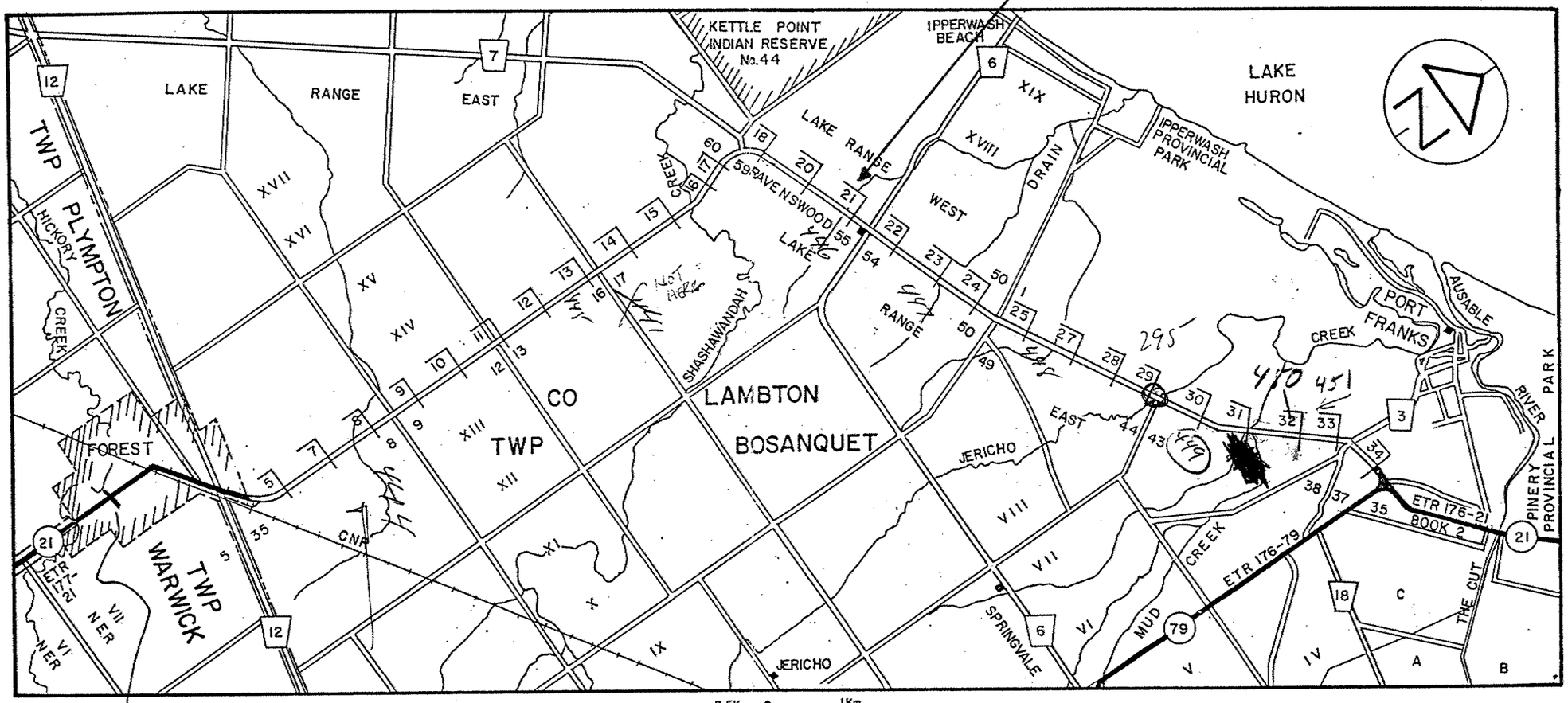
<u>19+798, 3.7 m Lt</u>			
0	-	150	Asph
150	-	300	Cr Gr
300	-	450	Br F Sa - Si Sa
450			N.F.P. Asph

<u>19+798, 8.7 m Lt</u>			
0	-	340	Gr Gran, Very Wet
340	-	400	Asph
400			Cr Gran

<u>19+800, 10.5 m Rt</u>			Datum -1.0
0	-	85	Tops
85	-	900	Br Si Cl Stiff
900	-	1.2	Br Si Cl with Sa Firm

METRIC 176-21
BOOK 1

Site



LARGE CULVERT
3.80 x 1.80
(CONN. LINK?)
443

ENGINEERING & TITLE RECORDS

KING'S HIGHWAY 21

TOWNSHIP
BOSANQUET
COUNTY
LAMBTON
10+000 TO 27+726.517

WO 95-11006

Ontario
Ministry of Transportation and Communications

88-06

(1)

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS ONTARIO DB-27 5-75

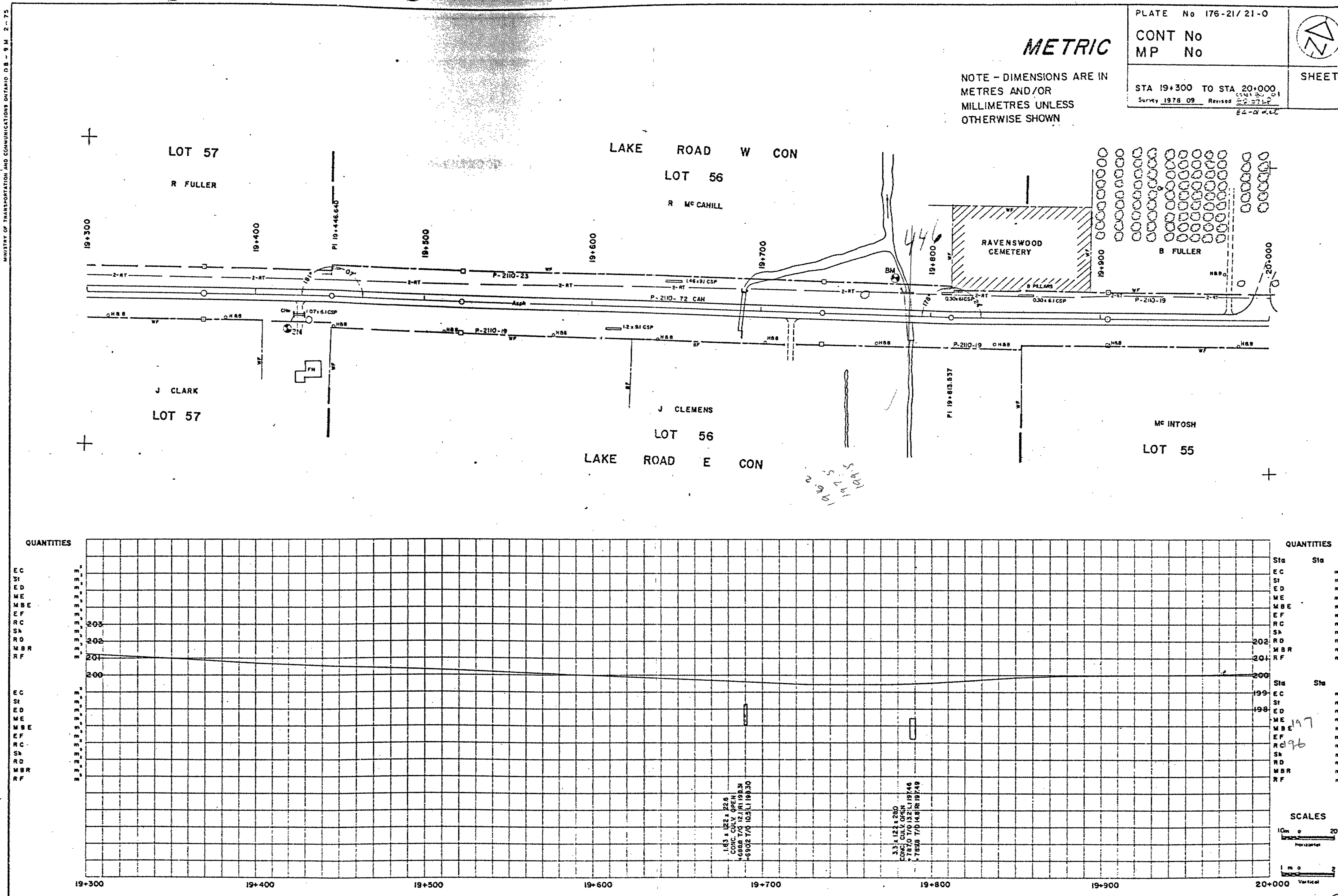


PLATE No 176-21/21-0
CONT No
MP No
SHEET
METRIC
NOTE - DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN
STA 19+300 TO STA 20+000
Survey 1978 09 Revised
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS ONTARIO
LOT 57
R FULLER
LAKE ROAD W CON
LOT 56
R Mc CAHILL
RAVENSWOOD CEMETERY
B FULLER
19+300
19+400
PI 19+446.640
19+500
19+600
19+700
19+800
19+900
20+000
P-2110-23
P-2110-72 CAH
P-2110-19
Asph
1.46 x 9.1 CSP
1.07 x 6.1 CSP
1.2 x 9.1 CSP
0.30 x 6.1 CSP
8 PILLARS
BM
J CLARK
LOT 57
J CLEMENS
LOT 56
LAKE ROAD E CON
PI 19+813.537
Mc INTOSH
LOT 55
QUANTITIES
EC
St
ED
ME
MBE
EF
RC
Sh
RD
MBR
RF
Sta
203
202
201
200
199
198
1.63 x 1.22 x 22.6
CONC. CULV. OPEN
+688.8 T/O 12.1(R) 198.31
+690.2 T/O 10.3(L) 198.30
3.3 x 1.22 x 28.0
CONC. CULV. OPEN
+787.0 T/O 13.2(L) 197.46
+785.8 T/O 14.8(R) 197.49
SCALES
10m 0 20m
Horizontal
1m 0 2m
Vertical

Site appears to be between
Sta. 19+773 & 19+794

fill ≤ 2.0m.

terrain is undulating

may be stiff to very stiff clay

$c_u = 100$ kPa

$\gamma = 19\ kN/m^3$