

**FOUNDATION INVESTIGATION REPORT
LOW TO MEDIUM EMBANKMENTS
HIGHWAY 11/17 RED ROCK TO NIPIGON
FROM 4.8 KM WEST OF HWY 628 TO 1.5 KM WEST OF HWY 585
G.W.P. 647-89-00**

Geocres Number: 52A-182

VOLUME 2 / 2

Report to

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Date: October 1, 2014

File: 19-1351-237

E-File: H:\19\1351\237 Hwy 11-17 Nipigon\Reports & Memos\Low to Medium Embankments (2013)\Final Report\FIR\Low to Medium Embankments - FIR.docx



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Appendix J	Sta. 19+850 to 19+900, EBL and WBL

Appendices B to J include

- Record of Borehole Sheets
- Laboratory Test Results
- Borehole Locations and Soil Strata Drawings

Appendix B

Highway 11/17 EBL and WBL

Sta. 12+050 to 12+100

Record of Borehole Sheets
Laboratory Test Results
Borehole Location and Soil Strata Drawings

RECORD OF BOREHOLE No 12+050 29R

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 608.3 E 204 734.5 ORIGINATED BY GA
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2013.03.01 - 2013.03.01 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	W _P W W _L	20 40 60	GR SA SI CL			
229.1														
0.0	TOPSOIL: (100mm) Sandy SILT , trace clay, occasional rootlets Loose Brown Dry to Moist						229							0 25 72 3
0.1			1	SS	6		228							
227.6														
1.5	Silty CLAY , occasional silt seams, trace iron oxide Firm Brown		2	SS	6		227							0 0 45 55
			3	SS	2									
		4	SS	0		226								
			5	SS	0		225							
							224							

Continued Next Page

+³, ×³: Numbers refer to Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+050 29R

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 608.3 E 204 734.5 ORIGINATED BY GA
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2013.03.01 - 2013.03.01 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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			WATER CONTENT (%)				
								20 40 60 80 100	○ UNCONFINED + FIELD VANE	W P W W L					
	Continued From Previous Page							● QUICK TRIAXIAL × LAB VANE							
	SILT, trace clay, some sand, occasional sand seam Compact Grey Wet 														

RECORD OF BOREHOLE No 12+056.5 27.5L

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 617.0 E 204 685.7 ORIGINATED BY GA
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2013.03.01 - 2013.03.01 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		<div><div>PLASTIC LIMIT</div><div>NATURAL MOISTURE CONTENT</div><div>LIQUID LIMIT</div></div> <div><div>W_P</div><div>W</div><div>W_L</div></div> <div>WATER CONTENT (%)</div>	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				
229.9								20 40 60 80 100				
0.0	TOPSOIL: (125mm)							20 40 60 80 100				
0.1	SILT, some sand, occasional iron oxide staining Loose Brown Dry to Moist		1	SS	6		229					
228.4												
1.5	Silty CLAY, varved Firm Brown		2	SS	4		228					
	Grey		3	SS	0		227					
			4	SS	0							
							226	3.3 +				
			5	SS	0		225					
							224	3.0 +				
223.8												
6.1	SILT, trace to some clay, trace sand Loose Grey Moist		6	SS	6		223					
			7	SS	7		222					
							221					
	Compact		8	SS	17		220					

Continued Next Page

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

RECORD OF BOREHOLE No 12+056.5 27.5L

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 617.0 E 204 685.7 ORIGINATED BY GA
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2013.03.01 - 2013.03.01 CHECKED BY JPL

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	SHEAR STRENGTH kPa								
							20 40 60 80 100	20 40 60 80 100	20 40 60 80 100	20 40 60 80 100	20 40 60 80 100	20 40 60 80 100	20 40 60 80 100	20 40 60 80 100	20 40 60 80 100	20 40 60 80 100	
	Continued From Previous Page																
	SILT, trace to some clay, trace sand Compact Grey Moist		9	SS	20		219										
							218										
	Dense		10	SS	36											0 2 89 9	
216.5							217										
13.4	END OF BOREHOLE AT 13.4m UPON AUGER REFUSAL. BOREHOLE OPEN TO 13.4m AND WATER LEVEL AT 7.3m UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 3.0m, THEN CUTTINGS TO SURFACE.																

RECORD OF BOREHOLE No 12+060 CL

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 608.3 E 204 712.6 ORIGINATED BY GA
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.01.03 - 2013.01.03 CHECKED BY JPL

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	WATER CONTENT (%)					
228.1 0.0	Start DCPT from surface						228	20 40 60 80 100	20 40 60					
							227							
							226							
							225							
							224							
							223							
							222							
							221							
							220							
							219							

Continued Next Page

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

RECORD OF BOREHOLE No 12+060 CL

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 608.3 E 204 712.6 ORIGINATED BY GA
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.01.03 - 2013.01.03 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	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	WATER CONTENT (%)					
	Continued From Previous Page						218	20 40 60 80 100	20 40 60					
217.7														
10.4	END OF DCPT AT 10.4m.													

RECORD OF BOREHOLE No 12+080 19L

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 634.8 E 204 704.6 ORIGINATED BY GA
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2013.02.28 - 2013.02.28 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT		NATURAL MOISTURE CONTENT		LIQUID LIMIT		UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100	W _P	W	W _L			GR	SA	SI
228.4																				
0.0	TOPSOIL: (150mm)																			
0.2	Sandy PEAT, trace silt, rootlets Dark Brown						228													
227.4																				
0.9	Silty CLAY Soft Brown		1	SS	2		227													
	Grey		2	SS	0		226										0	0	41	59
			3	SS	0		225													
			4	SS	0		224													
224.1	Stiff																			
4.3	SILT, trace to some clay, trace sand Loose to Compact Grey Wet		5	SS	7		223													
			6	SS	18		222													
			7	SS	21		221													
			8	SS	50		220													
	Dense to Very Dense						219													

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+080 19L

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 634.8 E 204 704.6 ORIGINATED BY GA
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2013.02.28 - 2013.02.28 CHECKED BY JPL

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									
	Continued From Previous Page																
217.1	SILT, trace to some clay, trace sand Dense to Very Dense Grey Wet		9	SS	49		218										
11.3	END OF BOREHOLE AT 11.3m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) May22/13 0.1 228.3																

RECORD OF BOREHOLE No 12+080.9 17.8R

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 618.9 E 204 737.2 ORIGINATED BY GA
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2013.02.28 - 2013.02.28 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL LIMIT MOISTURE CONTENT LIQUID LIMIT			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		WATER CONTENT (%)				
226.8								20 40 60 80 100		W _P W W _L				
0.0	Sandy PEAT , trace silt, trace rootlets Dark Brown							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE						
225.6			1	SS	2		226							
1.2	Silty CLAY , varved, trace rootlets Soft to Firm Grey													
			2	SS	0		225							
			3	SS	0		224							
			4	SS	0									
							223							
222.5	Firm													
4.3	SILT , trace to some clay, trace sand, occasional clay seams Loose to Compact Grey Moist		5	SS	4		222							
							221							
			6	SS	11		220							
			7	SS	7		219							
	Loose						218							
			8	SS	13									
	Compact						217							

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+080.9 17.8R

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 618.9 E 204 737.2 ORIGINATED BY GA
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2013.02.28 - 2013.02.28 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				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					
								20 40 60 80 100					
	Continued From Previous Page							<div><div></div><div></div><div></div></div>					
	<div><div>SILT, trace to some clay, trace sand, occasional clay seams Compact Grey Moist</div><div>Dense to Very Dense</div><div>becoming clayey</div></div>		9	SS	49		216						
							215						
			10	SS	53		214						0 0 73 27
213.1													
13.7	END OF BOREHOLE AT 13.7m UPON AUGER REFUSAL. BOREHOLE OPEN TO 12.2m AND WATER LEVEL AT 5.5m UPON COMPLETION. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) May22/13 0.1 226.7												

METRIC

SOIL PROFILE				SAMPLES		GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		SHEAR STRENGTH kPa		WATER CONTENT (%)		UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV	DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	UNCONFINED ○	FIELD VANE +	QUICK TRIAXIAL ●	LAB VANE ×	W _P		
230.6	0.0	Start DCPT from surface													
							230								
							229								
							228								
							227								
							226								
							225								
							224								
							223								
							222								
							221								

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 12+090 29L

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 648.5 E 204 700.4 ORIGINATED BY GA
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.02.28 - 2013.02.28 CHECKED BY JPL

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	WATER CONTENT (%)					
	Continued From Previous Page							20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE						
219.0							220							
11.6	END OF DCPT AT 11.6m.													

METRIC[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 12+090 29R

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 621.6 E 204 751.8 ORIGINATED BY GA
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AB
DATUM Geodetic DATE 2013.02.28 - 2013.02.28 CHECKED BY JPL

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								
	Continued From Previous Page												
216													
215													
214													
213													
212													
211.3													
15.1	END OF DCPT AT 15.1m.												

METRIC[illegible]

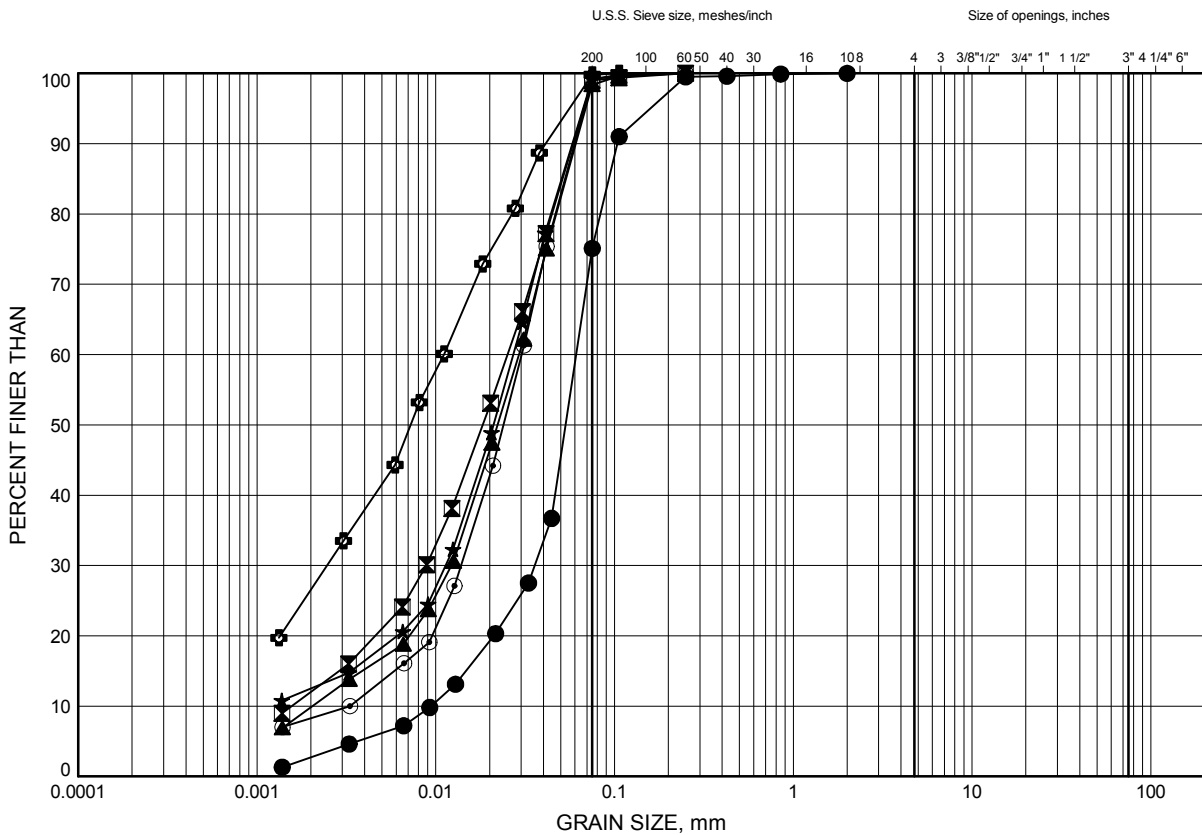
+³, ×³: Numbers refer to Sensitivity

METRIC[illegible]

GRAIN SIZE DISTRIBUTION

FIGURE B1

SANDY SILT to SILT



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+050 29R	1.07	228.05
⊠	12+056.5 27.5L	6.40	223.48
▲	12+056.5 27.5L	12.50	217.38
★	12+080 19L	7.92	220.43
⊙	12+080.9 17.8R	6.40	220.40
⊕	12+080.9 17.8R	12.50	214.30

Date February 2014

WP# 647-89-00



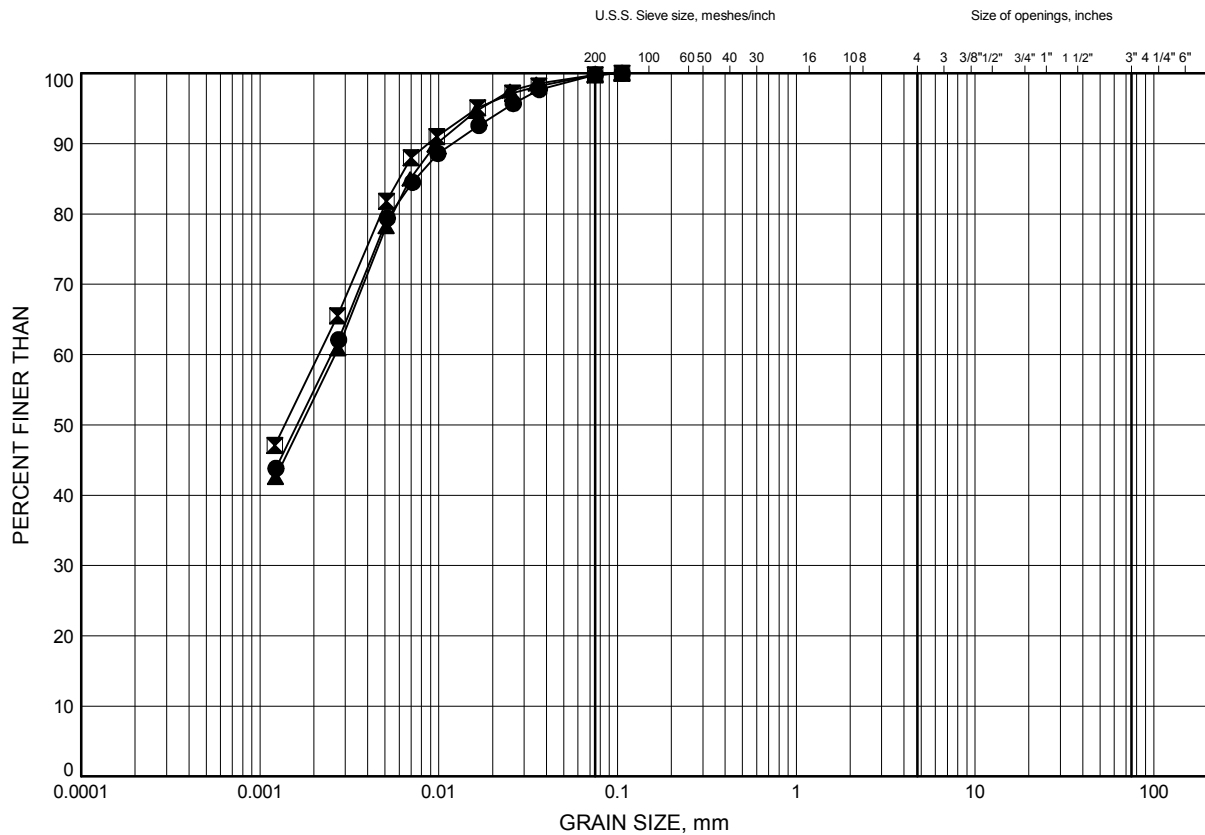
Prep'd AN

Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE B2

SILTY CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+050 29R	2.59	226.53
⊠	12+080 19L	1.83	226.53
▲	12+080.9 17.8R	2.59	224.21

Date February 2014
WP# 647-89-00

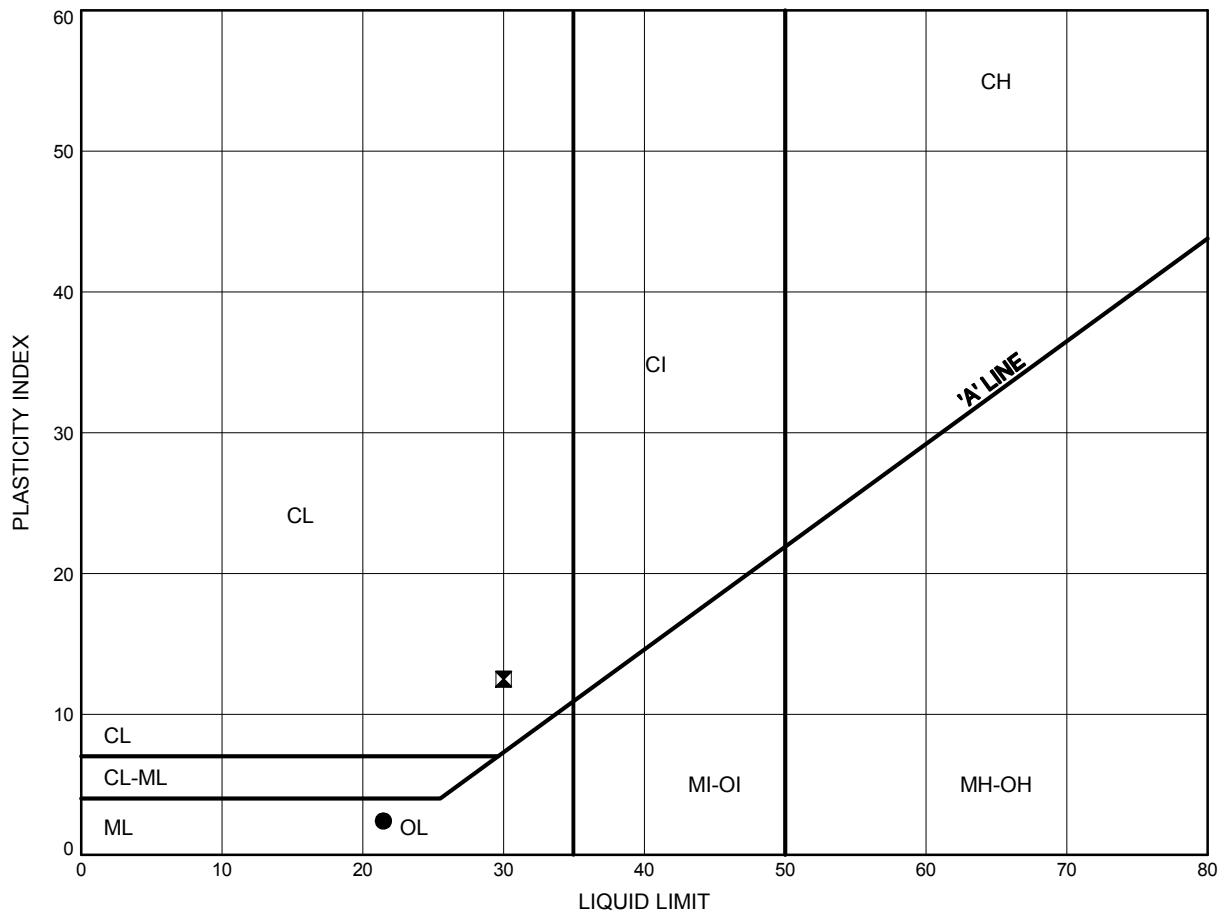


Prep'd AN
Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE B3

SILT



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+056.5 27.5L	6.40	223.48
⊗	12+080.9 17.8R	12.50	214.30

Date February 2014
 WP# 647-89-00



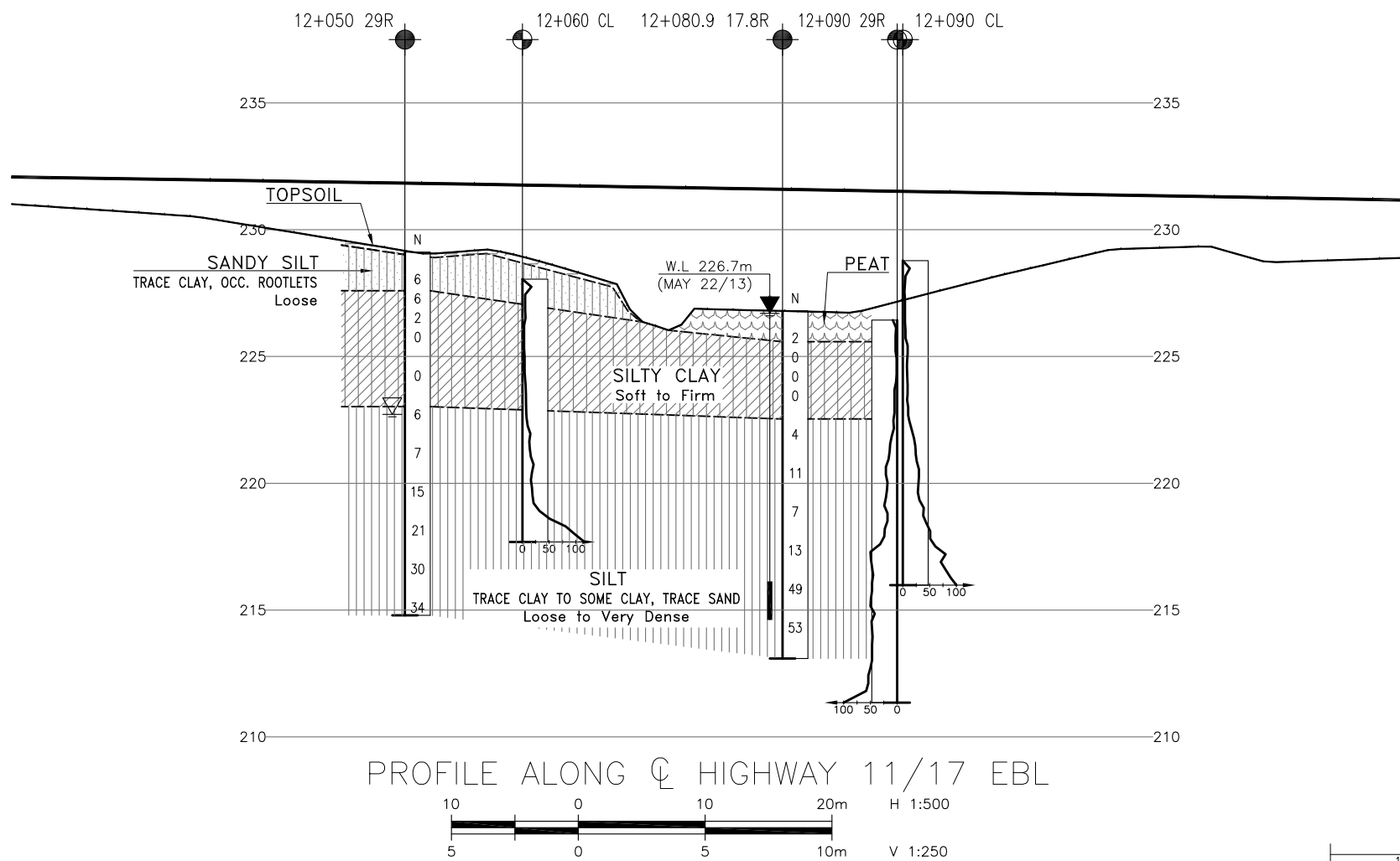
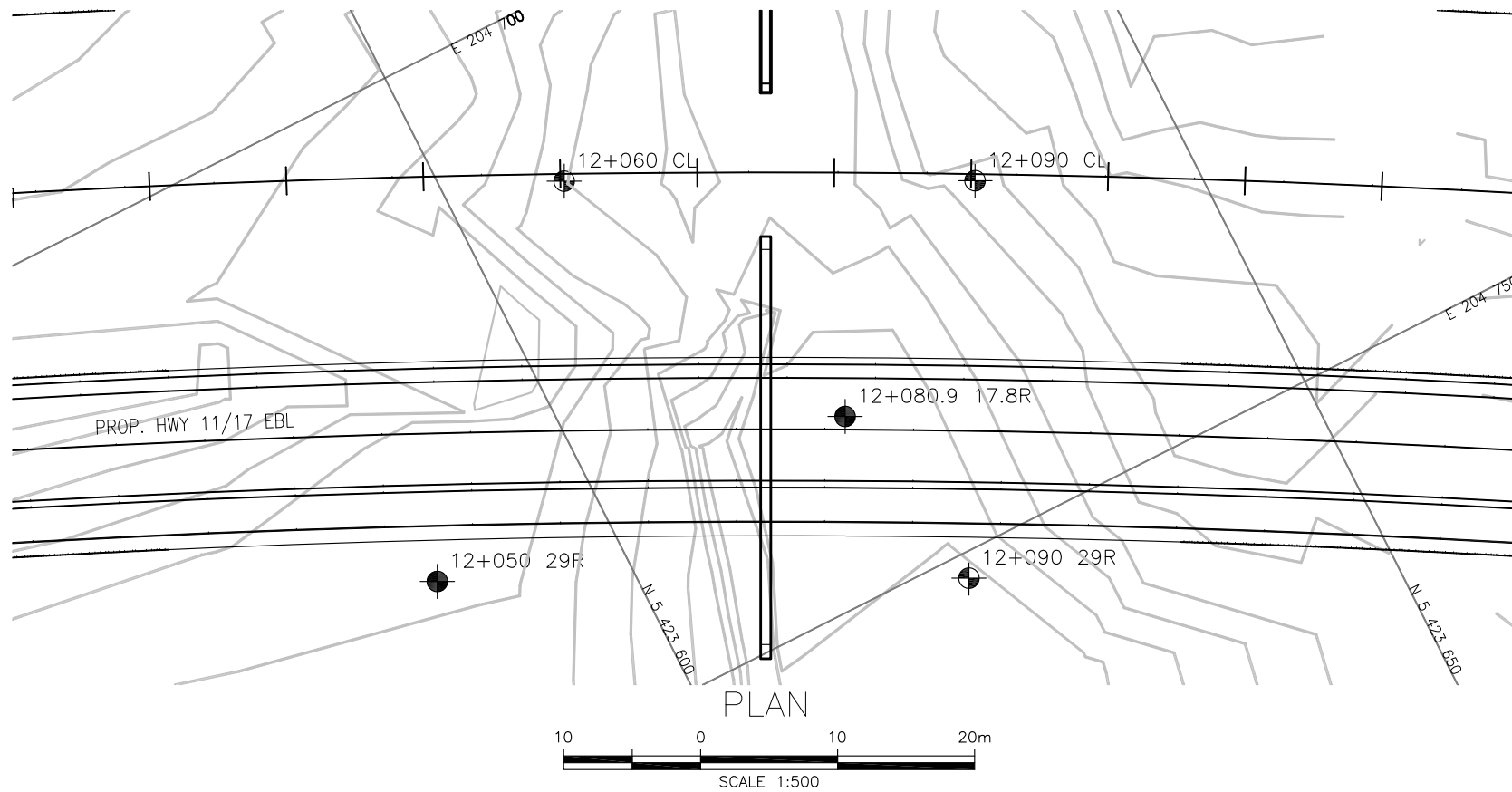
Prep'd AN
 Chkd. MEF

FIGURE B4

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+050 29R	2.59	226.53
⊠	12+080 19L	1.83	226.53
▲	12+080.9 17.8R	2.59	224.21



Prep'd AN
Chkd. MEF

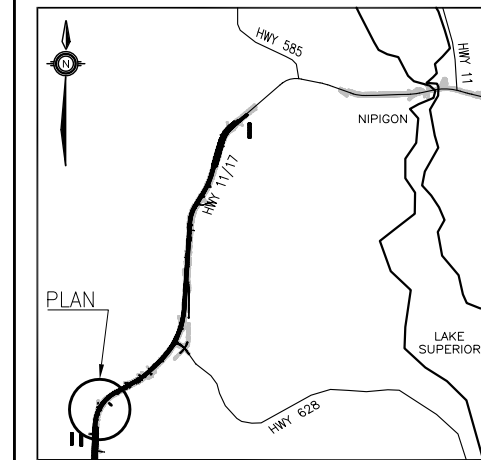


METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN








CONT No 2014-6026
GWP No 647-89-00

HWY 11/17 FOUR LANING
EASTBOUND LANES
(STA. 12+050 TO 12+100)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

	Borehole
	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60° Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
12+050 29R	229.1	5 423 586.9	204 734.5
12+056.5 27.5L	229.9	5 423 617.0	204 685.7
12+060 CL	228.1	5 423 608.3	204 712.6
12+080 19L	228.4	5 423 634.8	204 704.6
12+080.9 17.8R	226.8	5 423 618.9	204 737.2
12+090 29L	230.6	5 423 648.5	204 700.4
12+090 29R	226.4	5 423 621.6	204 751.8
12+090 CL	228.8	5 423 635.1	204 726.1

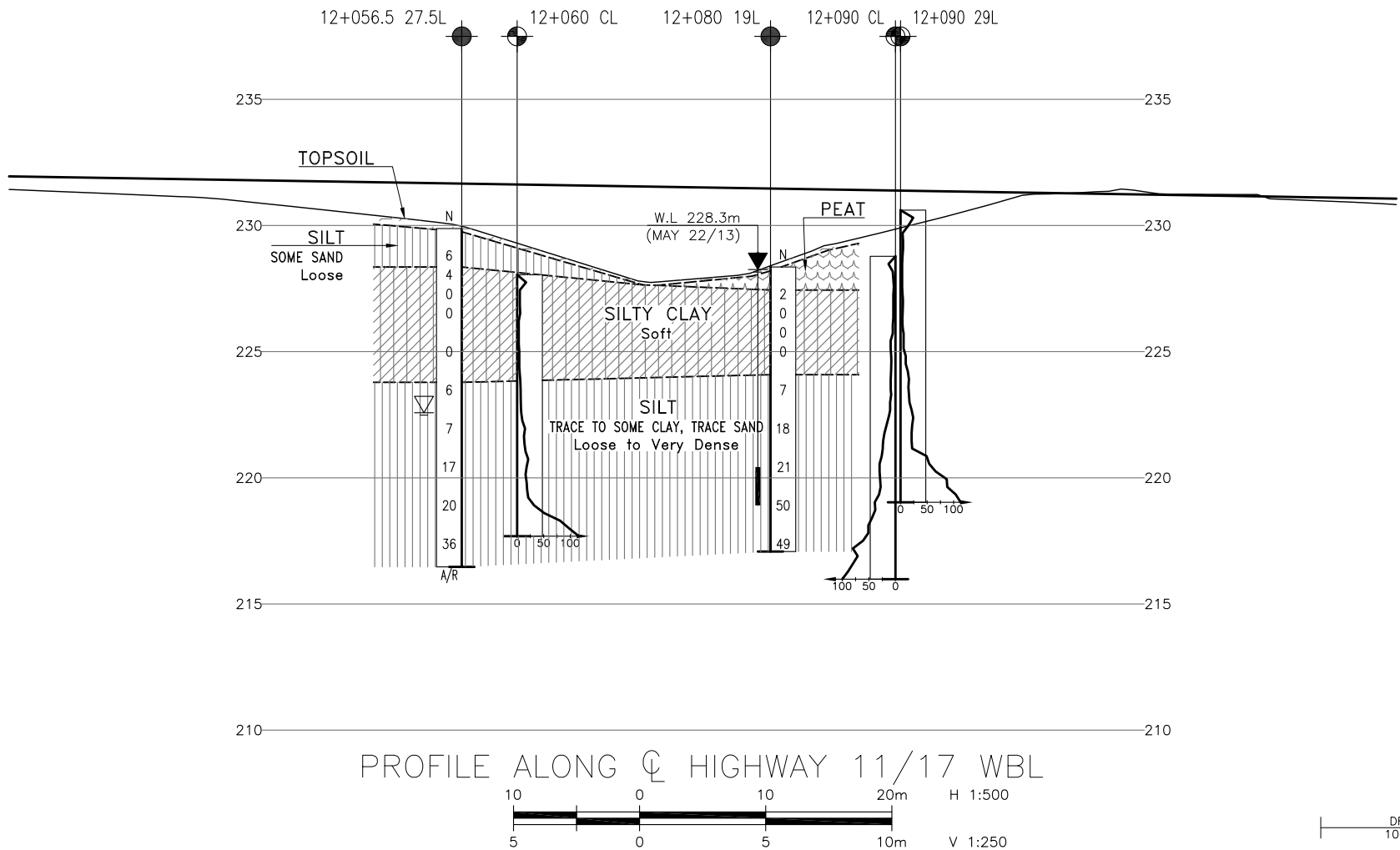
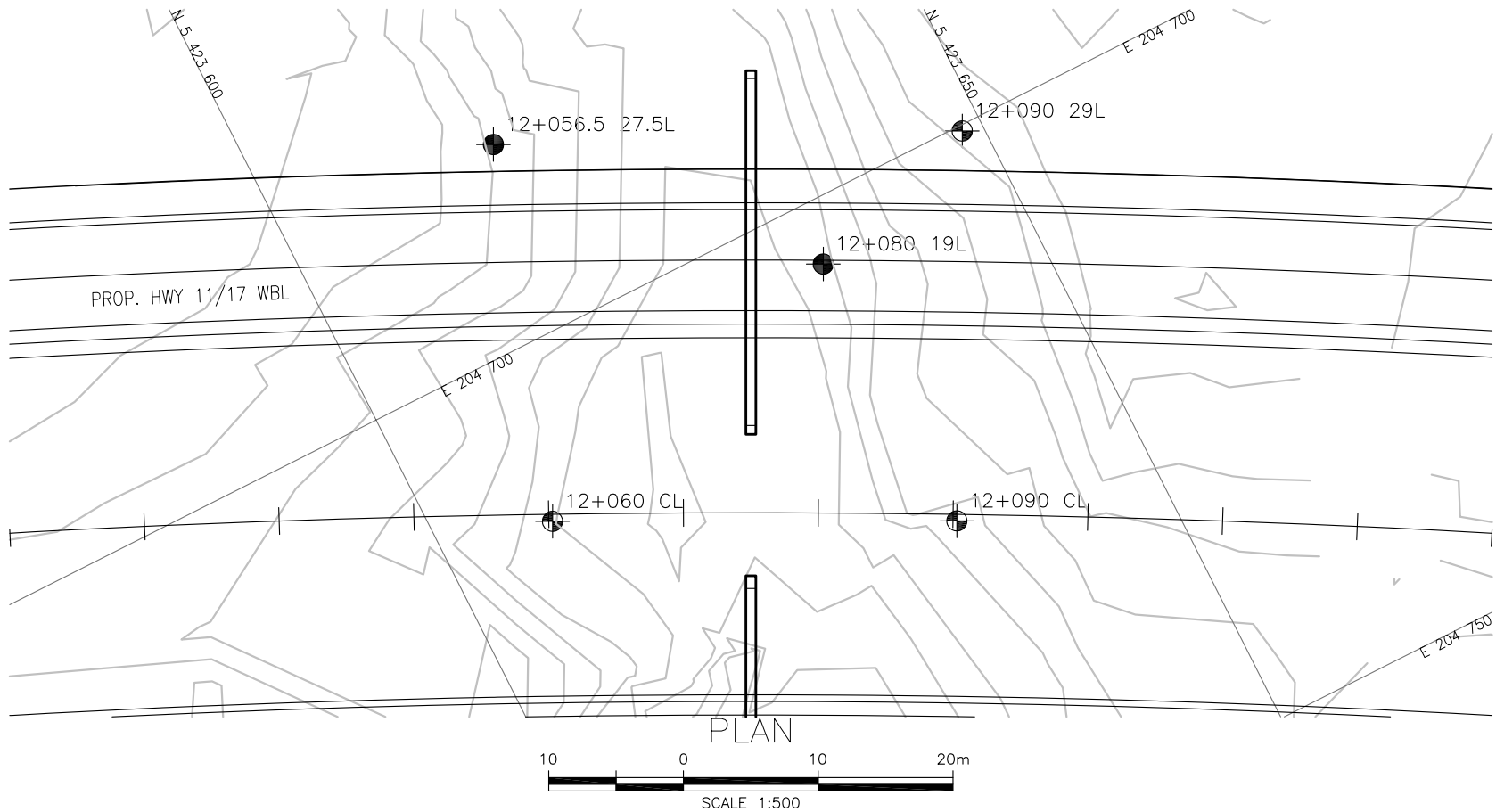
-NOTES-

- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 52A-182

[illegible]

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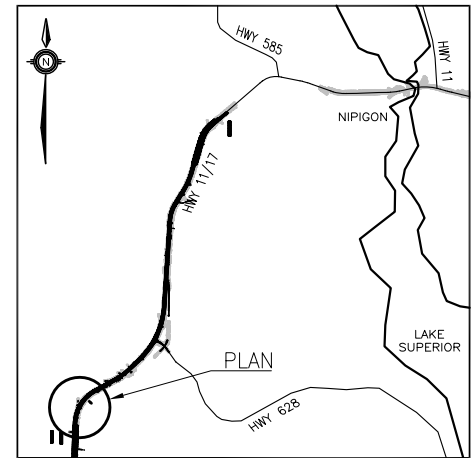


METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No 2014-6026
GWP No 647-89-00

HWY 11/17 FOUR LANING
WESTBOUND LANES
(STA. 12+050 TO 12+100)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

- Borehole
- Cone
- N Blows /0.3m (Std Pen Test, 475J/blow)
- CONE Blows /0.3m (60' Cone, 475J/blow)
- PH Pressure, Hydraulic
- Water Level
- Head Artesian Water
- Piezometer
- 90% Rock Quality Designation (RQD)
- A/R Auger Refusal

NO	ELEVATION	NORTHING	EASTING
12+050 29R	229.1	5 423 586.9	204 734.5
12+056.5 27.5L	229.9	5 423 617.0	204 685.7
12+060 CL	228.1	5 423 608.3	204 712.6
12+080 19L	228.4	5 423 634.8	204 704.6
12+080.9 17.8R	226.8	5 423 618.9	204 737.2
12+090 29L	230.6	5 423 648.5	204 700.4
12+090 29R	226.4	5 423 621.6	204 751.8
12+090 CL	228.8	5 423 635.1	204 726.1

NOTES

- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 52A-182

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	SBP	CHK JPL	CODE
DRAWN	MFA	CHK SBP	SITE
			LOAD
			STRUCT
			DWG 2
			DATE OCT. 2014

DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

Appendix C

Highway 11/17 EBL and WBL

Sta. 12+170 to 12+270

Record of Borehole Sheets
Laboratory Test Results
Borehole Location and Soil Strata Drawings

METRIC

SOIL PROFILE					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES	GROUND WATER CONDITIONS	ELEVATION SCALE
			NUMBER	TYPE	"N" VALUES
227.7 0.0	Start DCPT from surface				
<div>DYNAMIC CONE PENETRATION RESISTANCE PLOT<div>20406080100</div><div>○ UNCONFINED + FIELD VANE● QUICK TRIAXIAL × LAB VANE</div><div>WATER CONTENT (%)<div>PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMITw_pw_Lw</div></div></div>					
<div>227226225224223222221220219218</div>					

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 12+170 29R

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 689.0 E 204 790.5 ORIGINATED BY GA
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.02.27 - 2013.02.27 CHECKED BY JPL

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								
	Continued From Previous Page							20 40 60 80 100 SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					
215.4							217						
12.3	END OF DCPT AT 12.3m.						216						

RECORD OF BOREHOLE No 12+170 CL

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 704.4 E 204 765.9 ORIGINATED BY GA
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.02.27 - 2013.02.27 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE WATER CONTENT (%) 20 40 60 PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT W _p W 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					
229.0 0.0	Start DCPT from surface						229			
							228			
							227			
							226			
							225			
							224			
							223			
							222			
							221			
							220			

Continued Next Page

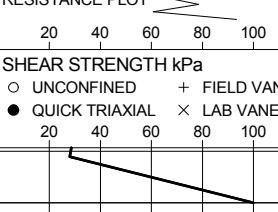
+³, ×³: Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+170 CL

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 704.4 E 204 765.9 ORIGINATED BY GA
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.27 - 2013.02.27 CHECKED BY JPL

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	WATER CONTENT (%)					
	Continued From Previous Page						219							
218.6	END OF DCPT AT 10.4m.													
10.4														

METRIC[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 12+180 19R

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 702.6 E 204 787.3 ORIGINATED BY GA
 HWY 11/17 BOREHOLE TYPE Hollow Stem ugers COMPILED BY AN
 DATUM Geodetic DATE 2013.02.27 - 2013.02.27 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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					WATER CONTENT (%)				
							20	40	60	80	100	W _p	W	W _L			
217.2 10.1	Continued From Previous Page END OF BOREHOLE AT 10.1m UPON AUGER REFUSAL. BOREHOLE OPEN TO 10.1m AND WATER LEVEL AT 6.4m UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 1.5m, THEN CUTTINGS TO SURFACE.																

RECORD OF BOREHOLE No 12+190 29L

1 OF 1

METRIC

WP# 647-89-00 LOCATION N 5 423 737.2 E 204 752.5 ORIGINATED BY GA
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.26 - 2013.02.26 CHECKED BY JPL

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			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			WATER CONTENT (%) PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT w _p w w _L				
228.2									20 40 60 80 100				
0.0	Start DCPT from surface												

+³, ×³: Numbers refer to Sensitivity
 20
15
10
5
0
10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+200 19L

1 OF 1

METRIC

WP# 647-89-00 LOCATION N 5 423 740.2 E 204 766.5 ORIGINATED BY GA
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2013.02.26 - 2013.02.26 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
229.2								20 40 60 80 100		W _P W W _L				
0.0	TOPSOIL: (150mm)							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					GR SA SI CL	
0.2	SILT, trace clay, trace sand Brown Moist							20 40 60 80 100		20 40 60				
228.0			1	SS	8						○			
1.2	Silty CLAY, trace sand, occasional silt seams Soft to Firm Brown		2	SS	2						┌─○─┐		0 2 42 56	
			3	SS	2						○			
			4	SS	0						○			
	Grey		5	SS	0						○			
	Stiff							5.6 +						
223.4														
5.8	SILT, some clay to clayey Firm to Stiff Grey Moist		6	SS	4						○			
			7	SS	14						┌─┐		0 2 80 18	
220.7														
8.5	END OF BOREHOLE AT 8.5m UPON AUGER REFUSAL. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) May22/13 1.0 228.3													

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

METRIC[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 12+210 29R

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 721.5 E 204 811.8 ORIGINATED BY GA
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.26 - 2013.02.26 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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	W P	W	W L	WATER CONTENT (%)		
	Continued From Previous Page							20 40 60 80 100						
								20 40 60 80 100						
215.1								20 40 60 80 100						
12.5	END OF DCPT AT 12.5m.							20 40 60 80 100						

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 12+210 CL

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 737.9 E 204 787.9 ORIGINATED BY GA
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.02.26 - 2013.02.26 CHECKED BY JPL

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								
	Continued From Previous Page							20 40 60 80 100 SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					
216.4							218						
12.5	END OF DCPT AT 12.5m.						217						

METRIC[illegible]

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+230 19R

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 743.2 E 204 814.8 ORIGINATED BY GA
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2013.02.26 - 2013.02.26 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			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					W _p	W	W _L		
	Continued From Previous Page 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) May22/13 0.0 224.9																

RECORD OF BOREHOLE No 12+243 30.7L

1 OF 1

METRIC

WP# 647-89-00 LOCATION N 5 423 783.0 E 204 781.9 ORIGINATED BY GA
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2013.02.25 - 2013.02.25 CHECKED BY JPL

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								
225.8																
0.0	TOPSOIL: (150mm)															
0.2	Silty ORGANIC CLAY , occasional rootlets Dark Brown		1	SS	2		225									
	wood fibres															
224.1																
1.7	SILT , some clay, trace sand Loose Grey Wet		2	SS	2		224									
223.1			3	SS	7											
2.7	Silty CLAY , occasional silt seams Firm Grey		4	SS	6		223									
							222									
			5	SS	8		221									
220.0	cobble at 5.5m															
5.8	END OF BOREHOLE AT 5.8m UPON AUGER REFUSAL. BOREHOLE OPEN TO 5.8m AND WATER LEVEL AT 2.1m UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 1.5m, THEN CUTTINGS TO SURFACE.															

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

RECORD OF BOREHOLE No 12+250 19L

1 OF 1

METRIC

WP# 647-89-00 LOCATION N 5 423 781.7 E 204 796.0 ORIGINATED BY GA
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2013.02.25 - 2013.02.25 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					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						
								20 40 60 80 100						
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE						
							WATER CONTENT (%)							
							PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT w _p w w _L							
226.5														
0.0	TOPSOIL: (150mm)													
0.2	Silty ORGANIC CLAY, occasional sand, trace rootlets Soft Dark Brown		1	SS	2		226							
225.0														
1.4	Silty CLAY, trace sand Soft to Firm Grey		2	SS	2		225							
			3	SS	4		224							
			4	SS	2		223							
221.9														
4.6	Clayey SILT, occasional clay seams Firm Grey		5	SS	5		222							
220.7							221							
5.8	Silty CLAY, trace sand Firm Grey		6	SS	6		220							
219.5														
7.0	END OF BOREHOLE AT 7.0m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE OPEN TO 7.0m AND DRY UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 1.5m, THEN CUTTINGS TO SURFACE.													

ONTMT4S 1237.GPJ 2012TEMPLATE(MTO).GDT 2/20/14

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

METRIC

SOIL PROFILE						
ELEV DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES			GROUND WATER CONDITIONS
			NUMBER	TYPE	"N" VALUES	
229.7 0.0	Start DCPT from surface					
						DYNAMIC CONE PENETRATION RESISTANCE PLOT
						SHEAR STRENGTH kPa
						○ UNCONFINED + FIELD VANE
						● QUICK TRIAXIAL × LAB VANE
						WATER CONTENT (%)
						UNIT WEIGHT
						GR SA SI CL

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 12+265 29L

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 800.0 E 204 797.3 ORIGINATED BY GA
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.02.25 - 2013.02.25 CHECKED BY JPL

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	WATER CONTENT (%)					
219.6	Continued From Previous Page													
10.1	END OF DCPT AT 10.1m.													

RECORD OF BOREHOLE No 12+265 CL

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 423 782.3 E 204 820.3 ORIGINATED BY GA
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2013.02.25 - 2013.02.25 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)									
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa													
								○ UNCONFINED + FIELD VANE													
								● QUICK TRIAXIAL × LAB VANE													
228.1							20	40	60	80	100		PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT						
0.0	TOPSOIL: (125mm)												W _P	W	W _L						
0.1	Silty CLAY Firm to Soft Brown																				
			1	SS	8												0	2	48	50	
			2	SS	6																
			3	SS	4																
	Soft to Firm Grey		4	SS	1																
			5	SS	0																
222.5																					
5.6	Clayey SILT , trace sand Firm Grey		6	SS	4													0	1	71	28
221.0																					
7.2	Silty CLAY Soft to Firm Grey		7	SS	2																
			8	SS	4																

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15 10 5 0
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+265 CL

2 OF 2

METRIC

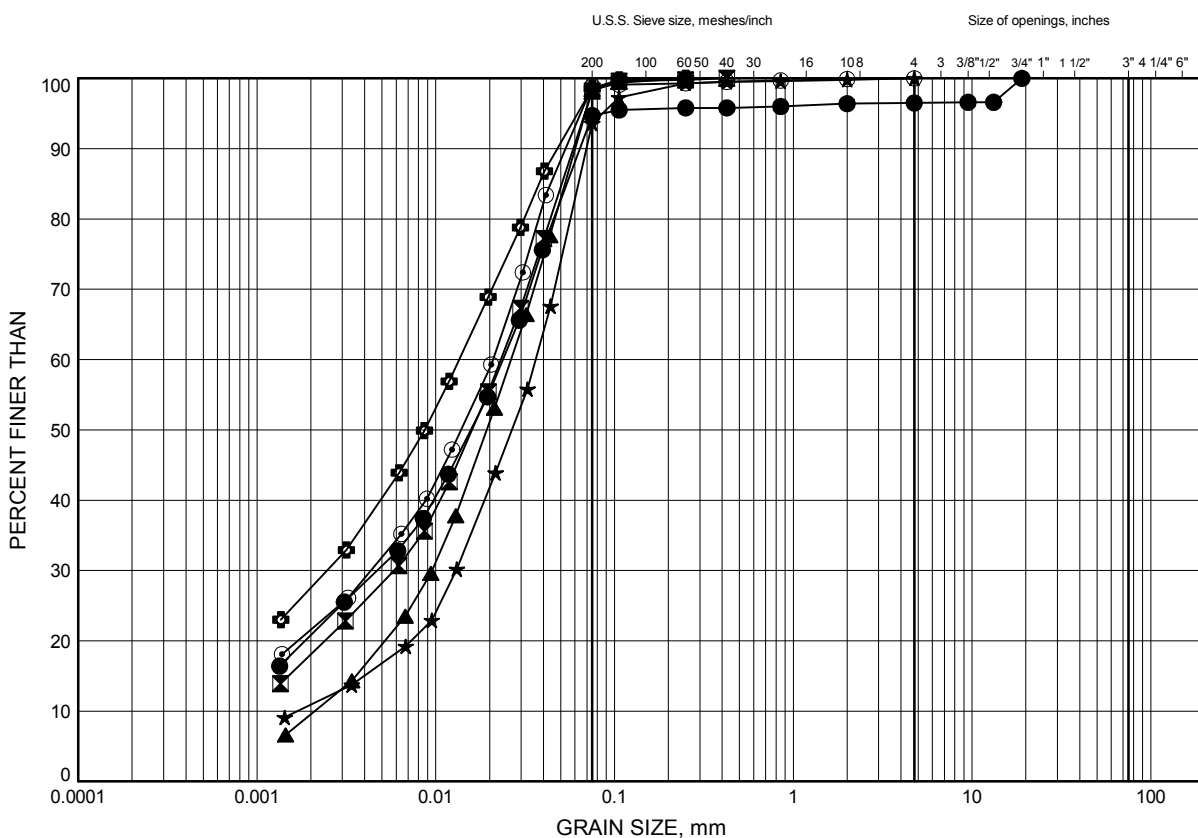
WP# 647-89-00 LOCATION N 5 423 782.3 E 204 820.3 ORIGINATED BY GA
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2013.02.25 - 2013.02.25 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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					WATER CONTENT (%)				
							20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100					W P W W L 20 40 60					
	Continued From Previous Page																
217.5	Silty CLAY Soft to Firm Grey						218										
10.7	END OF BOREHOLE AT 10.7m UPON AUGER REFUSAL. WATER LEVEL AT 10.1m UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 1.2m, THEN CUTTINGS TO SURFACE.																

GRAIN SIZE DISTRIBUTION

FIGURE C1

CLAYEY SILT to SILT



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+180 19R	6.40	220.86
⊠	12+200 19L	7.92	221.32
▲	12+230 19R	4.88	219.97
★	12+243 30.7L	2.59	223.21
⊙	12+250 19L	4.88	221.62
⊕	12+265 CL	6.40	221.74

Date February 2014

WP# 647-89-00



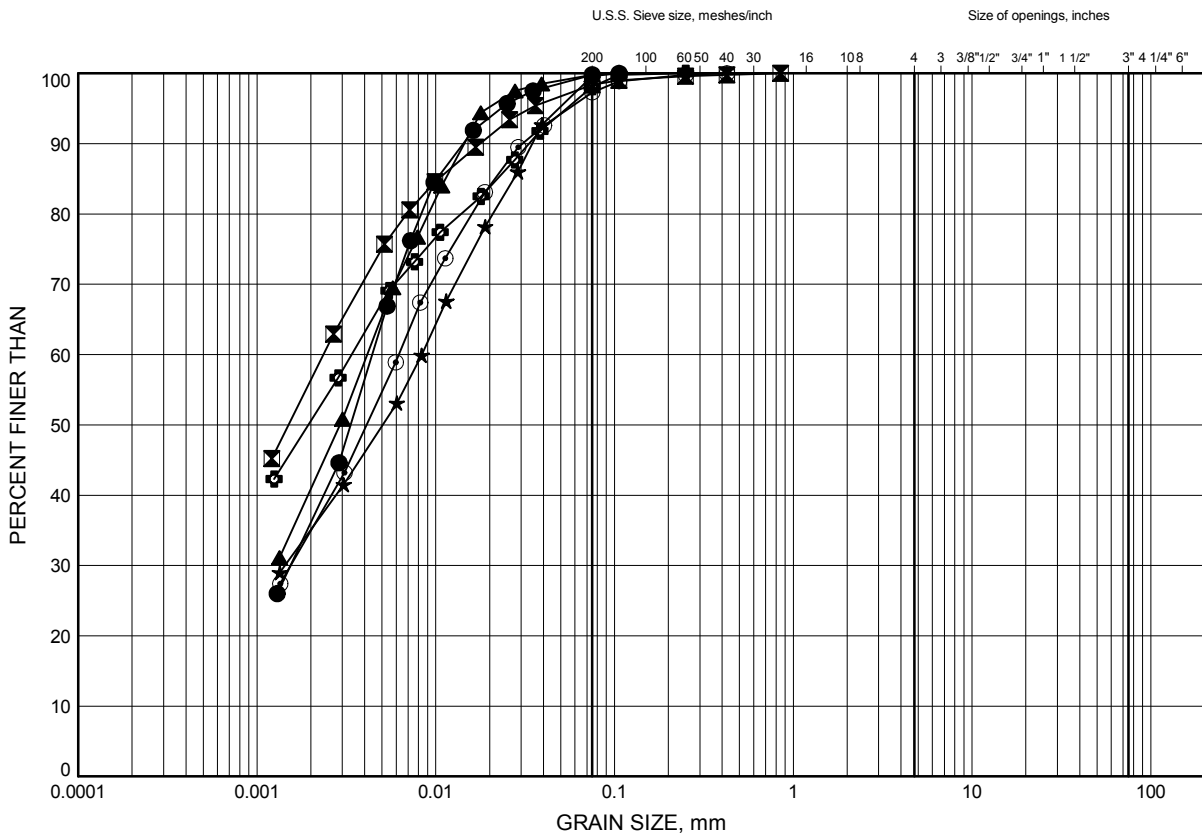
Prep'd AN

Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE C2

SILTY CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+180 19R	2.59	224.67
⊠	12+200 19L	1.83	227.41
▲	12+230 19R	2.59	222.26
★	12+243 30.7L	4.88	220.92
⊙	12+250 19L	1.83	224.67
⊕	12+265 CL	1.07	227.08

Date February 2014
WP# 647-89-00

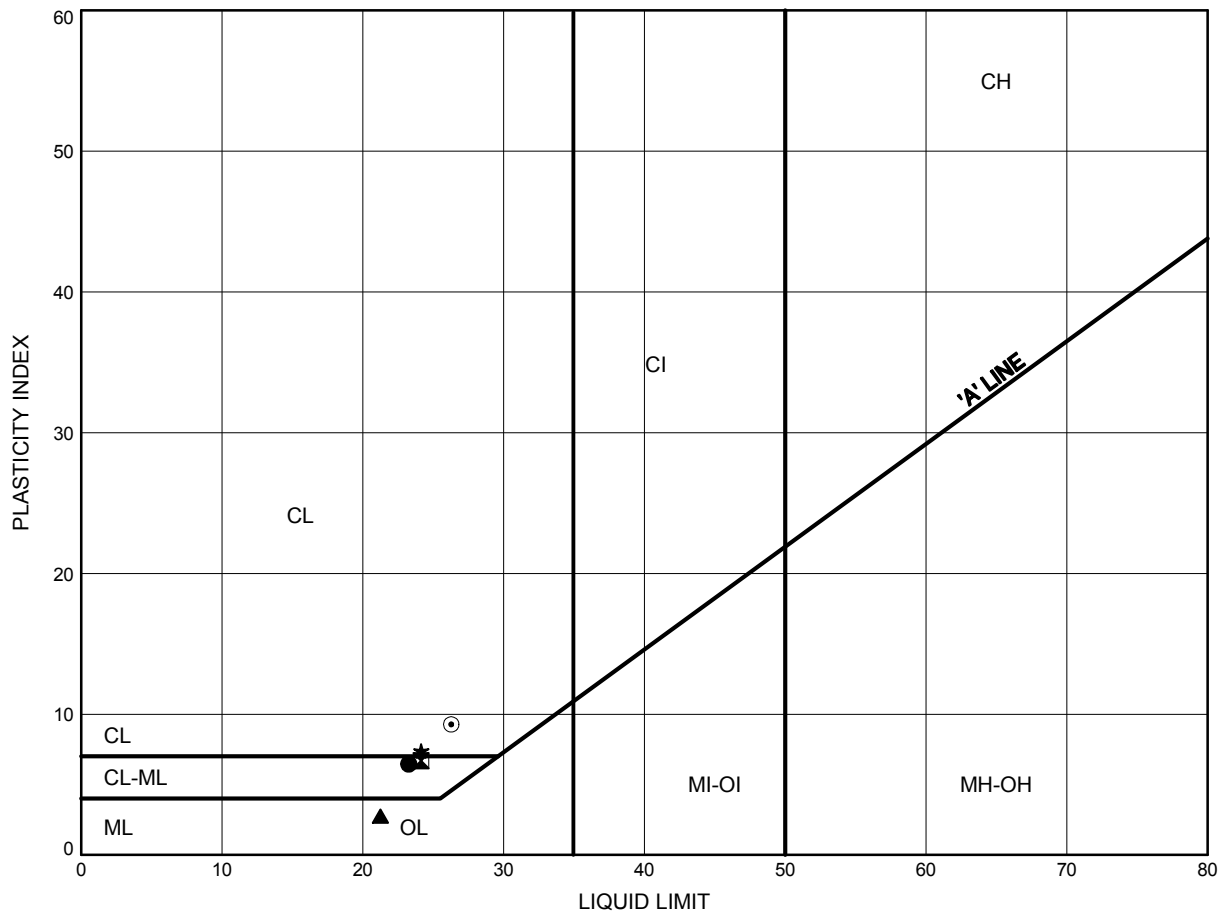


Prep'd AN
Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE C3

CLAYEY SILT to SILT



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+180 19R	6.40	220.86
⊠	12+200 19L	7.92	221.32
▲	12+230 19R	4.88	219.97
★	12+250 19L	4.88	221.62
⊙	12+265 CL	6.40	221.74

Date February 2014
 WP# 647-89-00

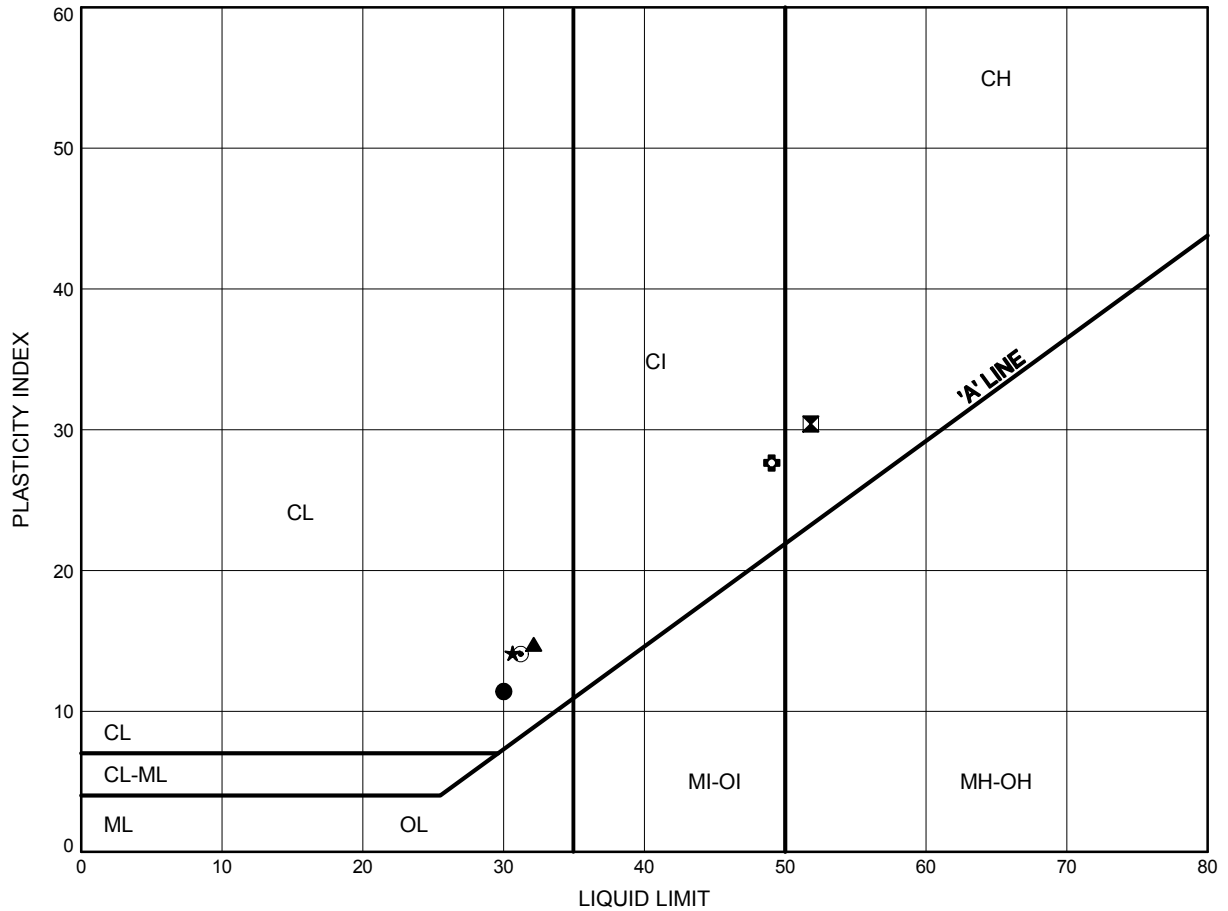


Prep'd AN
 Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE C4

SILTY CLAY



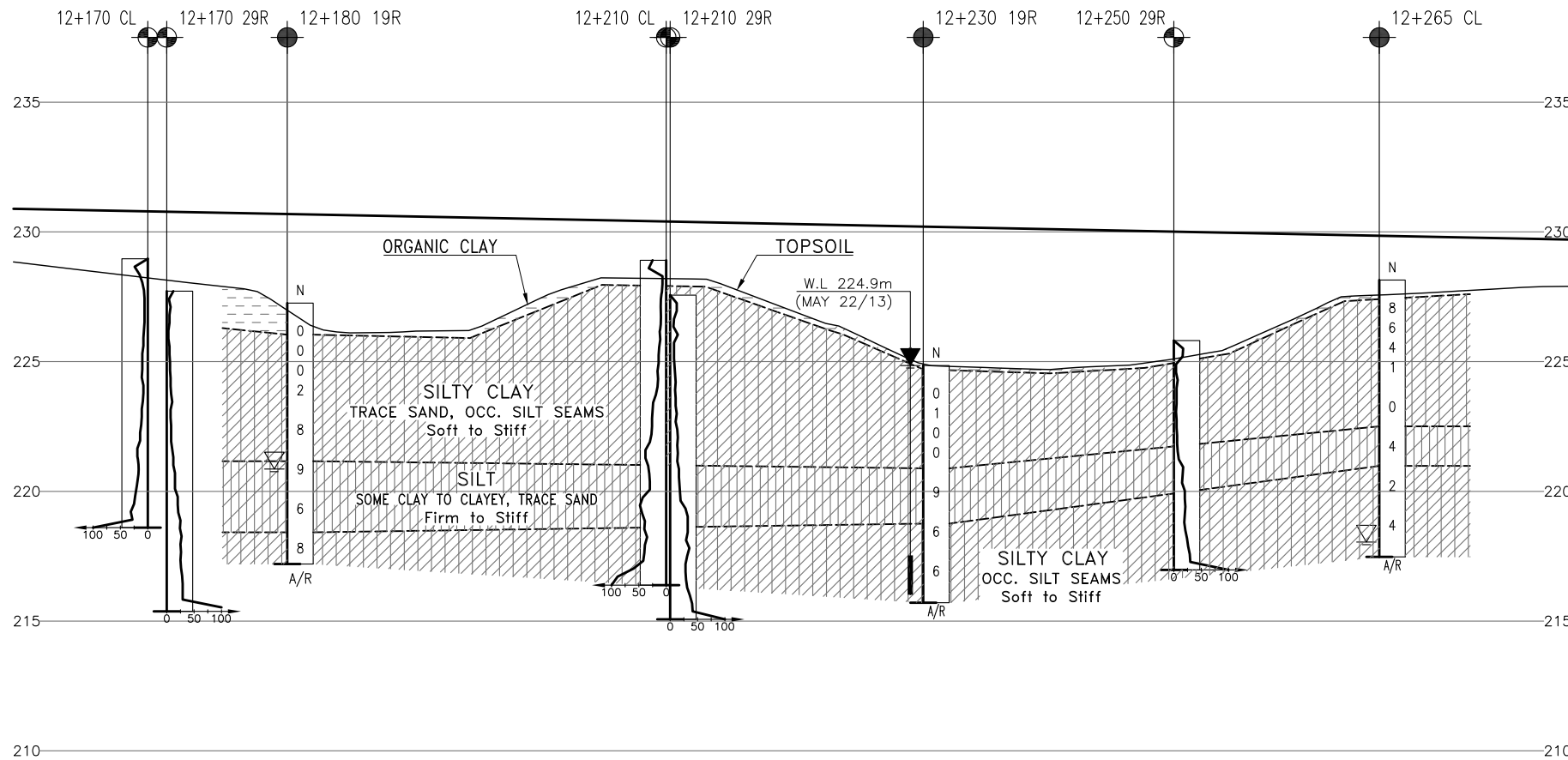
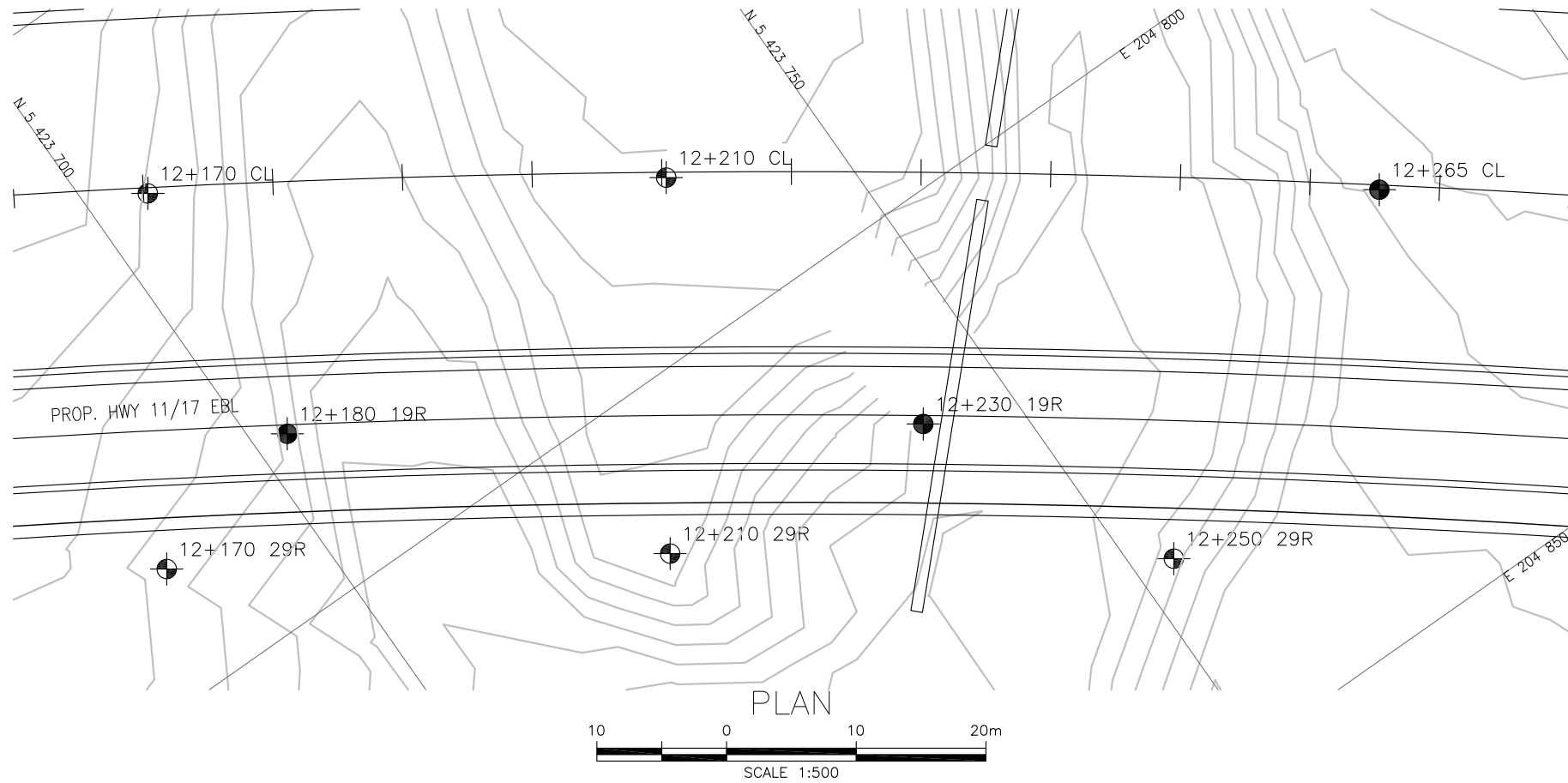
LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+180 19R	2.59	224.67
⊠	12+200 19L	1.83	227.41
▲	12+230 19R	2.59	222.26
★	12+243 30.7L	4.88	220.92
⊙	12+250 19L	1.83	224.67
⊕	12+265 CL	1.07	227.08

Date February 2014
WP# 647-89-00



Prep'd AN
Chkd. MEF



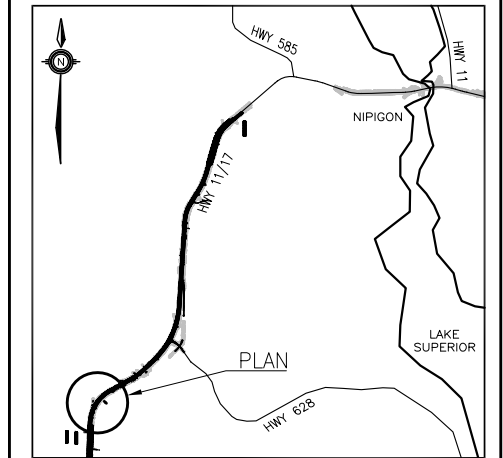
PROFILE ALONG CL HIGHWAY 11/17 EBL

METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No 2014-6026
GWP No 647-89-00

HWY 11/17 FOUR LANING
EASTBOUND LANES
(STA. 12+170 TO 12+270)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

	Borehole
	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
12+170 29R	227.7	5 423 689.0	204 790.5
12+170 CL	229.0	5 423 704.4	204 765.9
12+180 19R	227.3	5 423 702.6	204 787.3
12+190 29L	228.2	5 423 737.2	204 752.5
12+200 19L	229.2	5 423 740.2	204 766.5
12+210 29R	227.6	5 423 721.5	204 811.8
12+210 CL	228.9	5 423 737.9	204 787.9
12+230 19R	224.9	5 423 743.2	204 814.8
12+243 30.7L	225.8	5 423 783.0	204 781.9
12+250 19L	226.5	5 423 781.7	204 796.0
12+250 29R	225.8	5 423 753.0	204 834.4
12+265 29L	229.7	5 423 800.0	204 797.3
12+265 CL	228.1	5 423 782.3	204 820.3

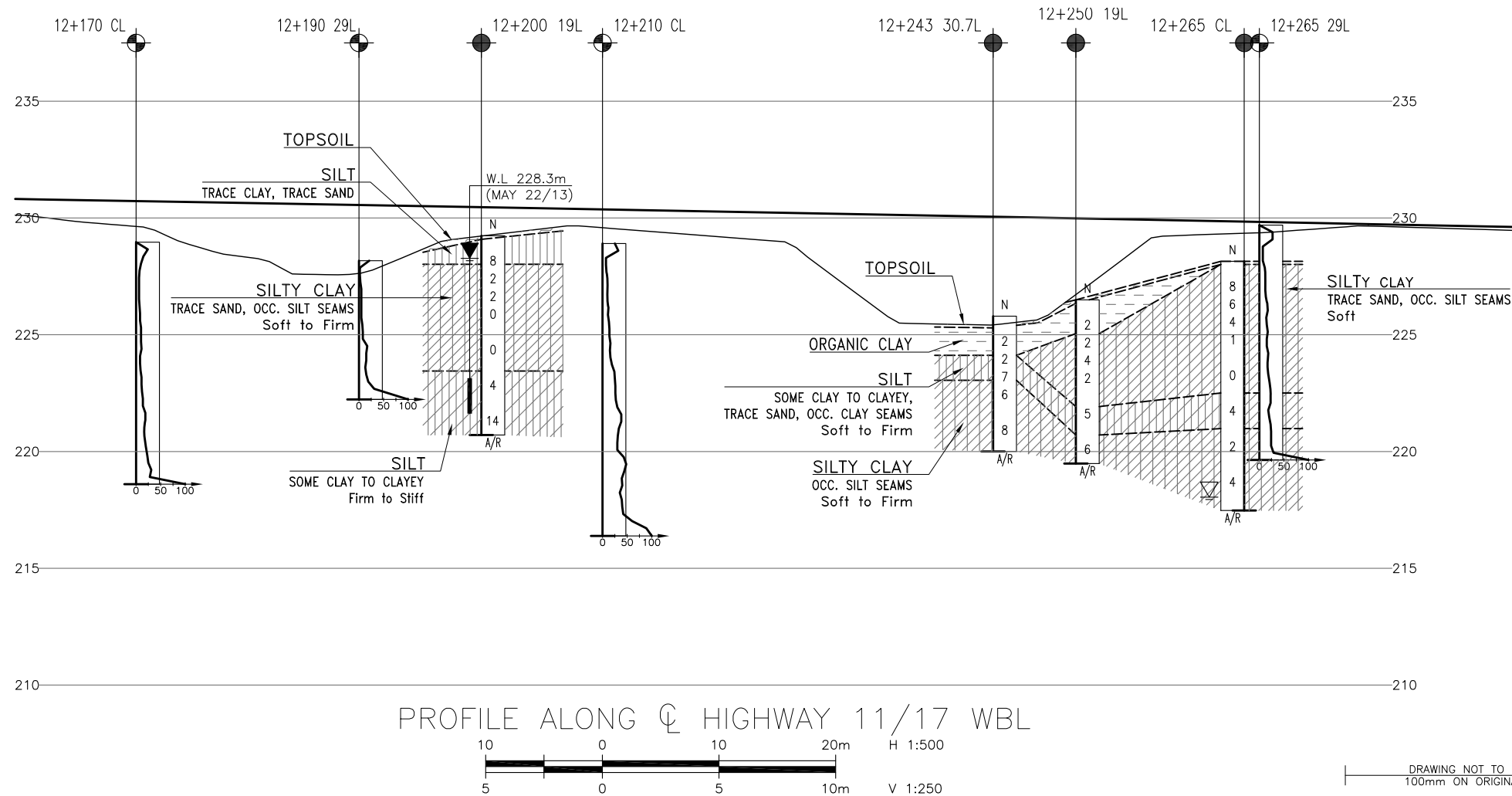
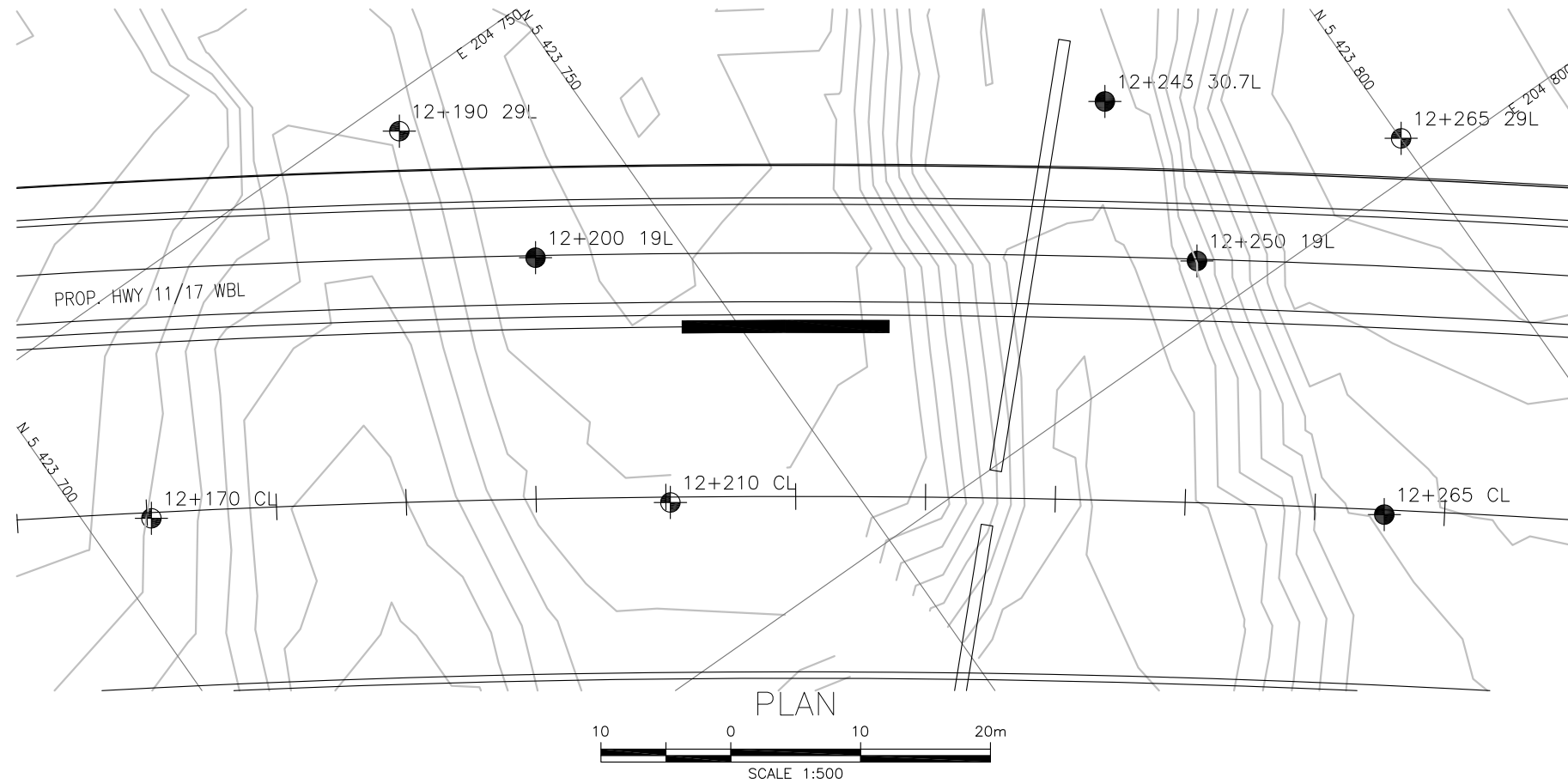
NOTES

- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRIS No. 52A-182

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	SBP	CHK JPL	CODE
DRAWN	MFA	CHK SBP	SITE
LOAD	DATE	OCT. 2014	
STRUCT	DWG	3	

DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

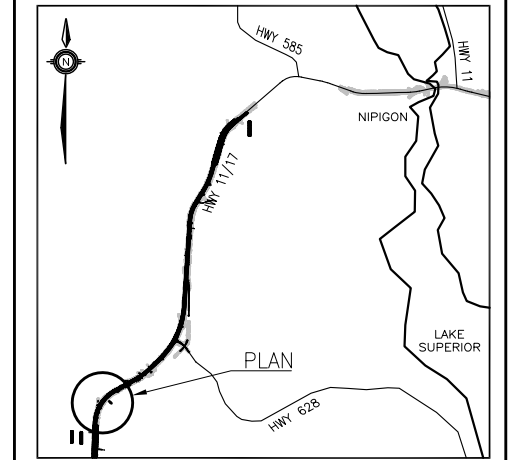


METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN








CONT No 2014-6026 ()
GWP No 647-89-00

HWY 11/17 FOUR LANING WESTBOUND LANES (STA. 12+170 TO 12+270) BOREHOLE LOCATIONS AND SOIL STRATA	
---	--



KEYPLAN

LEGEND

	Borehole
	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60° Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
12+170 29R	227.7	5 423 689.0	204 790.5
12+170 CL	229.0	5 423 704.4	204 765.9
12+180 19R	227.3	5 423 702.6	204 787.3
12+190 29L	228.2	5 423 737.2	204 752.5
12+200 19L	229.2	5 423 740.2	204 766.5
12+210 29R	227.6	5 423 721.5	204 811.8
12+210 CL	228.9	5 423 737.9	204 787.9
12+230 19R	224.9	5 423 743.2	204 814.8
12+243 30.7L	225.8	5 423 783.0	204 781.9
12+250 19L	226.5	5 423 781.7	204 796.0
12+250 29R	225.8	5 423 753.0	204 834.4
12+265 29L	229.7	5 423 800.0	204 797.3
12+265 CL	228.1	5 423 782.3	204 820.3

-NOTES-

- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 52A-182

[illegible]

Appendix D

Highway 11/17 EBL

Sta. 12+420 to 12+540

Record of Borehole Sheets
Laboratory Test Results
Borehole Location and Soil Strata Drawings

RECORD OF BOREHOLE No 12+430 19R

1 OF 2

METRIC

WP# _____ LOCATION N 5 423 890.2 E 204 944.2 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.14 - 2013.02.14 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					WATER CONTENT (%)				GR	SA	SI	CL	
								20	40	60	80	100	W _P	W	W _L						
226.6																					
0.0																					
0.2																					
225.9																					
0.7																					

Continued Next Page

+³, ×³: Numbers refer to Sensitivity

20
15 10 5 0
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+430 19R

2 OF 2

METRIC

WP# _____ LOCATION N 5 423 890.2 E 204 944.2 ORIGINATED BY ES
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.02.14 - 2013.02.14 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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			WATER CONTENT (%)				
								○ UNCONFINED + FIELD VANE			w _P w w _L				
								● QUICK TRIAXIAL × LAB VANE							
	Continued From Previous Page							20 40 60 80 100							
	Silty CLAY , trace sand Firm Grey						216								
			10	SS	0							○			
							215	8.6 +							
			11	SS	1		214					○			
							213								
			12	SS	0							○			
211.6 14.9	Stiff						212	3.0 +							
	END OF BOREHOLE AT 14.9m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.														

ONTMT4S 1237.GPJ 2012TEMPLATE(MTO).GDT 2/20/14

METRIC

SOIL PROFILE											
ELEV DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT	REMARKS & GRAIN SIZE DISTRIBUTION (%)
			NUMBER			TYPE	"N" VALUES	20 40 60 80 100	w _p	w	w _L
225.9 0.0	ORGANICS	[diagonal hatching]								kN/m³	
0.2	Sandy SILT, some clay, trace roots, occasional wood fibres Compact Brown Moist	[horizontal dashes]	1	SS	13						
225.0 0.8	Silty CLAY, trace sand, trace sand seams, trace organics Firm to Soft Brown occasional silt seams, occational oxide staining	[cross-hatching]	2	SS	5	225					
	Brown to Grey	[vertical lines]	3	SS	3	224					
	Grey	[dotted pattern]	4	SS	0	223					
		[diagonal hatching]	5	SS	0	222					
		[vertical lines]	6	SS	0	221					
		[cross-hatching]	7	SS	0	220					
		[diagonal hatching]	8	SS	0	218					
		[vertical lines]	9	SS	0	217					
		[cross-hatching]				216					

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 12+455 28R

2 OF 2

METRIC

WP# _____ LOCATION N 5 423 900.0 E 204 968.3 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.14 - 2013.02.14 CHECKED BY JPL


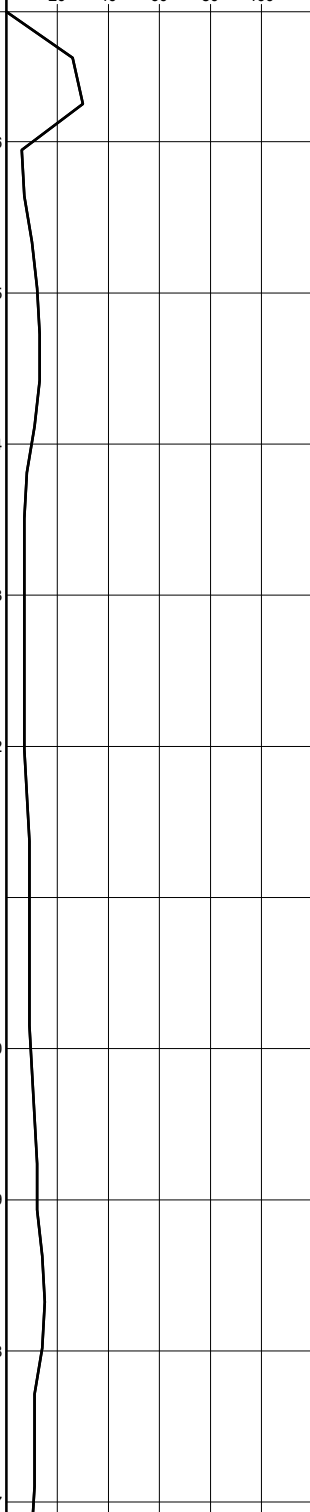
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE				WATER CONTENT (%) W _p W W _L				
211.6	Continued From Previous Page Silty CLAY , trace sand, trace sand seams, trace organics Firm to Soft Grey		10	SS	0		215									
							214									
			11	SS	0		213									0 0 45 55
			12	SS	0		212									
14.3	END OF BOREHOLE AT 14.3m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.															

RECORD OF BOREHOLE No 12+455 CL

1 OF 2

METRIC

WP# _____ LOCATION N 5 423 921.0 E 204 949.8 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.13 - 2013.02.13 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT  SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT W _p — W — W _L WATER CONTENT (%)	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
226.8 0.0	Start DCPT from surface										

Continued Next Page

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

RECORD OF BOREHOLE No 12+455 CL

2 OF 2

METRIC

WP# _____ LOCATION N 5 423 921.0 E 204 949.8 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.13 - 2013.02.13 CHECKED BY JPL

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									
	Continued From Previous Page							20	40	60	80	100					
							216										
							215										
							214										
							213										
211.9							212										
14.9	END OF DCPT AT 14.9m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.																

METRIC

SOIL PROFILE			SAMPLES		GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT		UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa	W _P	W		
226.0 0.0 0.1	TOPSOIL: (100mm) Clayey SILT, occasional rootlets Brown						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					
224.9 1.1	Silty CLAY, trace sand Firm to Soft Brown		1	SS	10							
			2	SS	5							
			3	SS	0							
	Grey		4	SS	1							
			5	SS	0							
	Firm		6	SS	3							
			7	SS	1							
			8	SS	1							

+³, ×³: Numbers refer to Sensitivity

METRIC

SOIL PROFILE						SAMPLES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		UNIT WEIGHT	REMARKS & GRAIN SIZE DISTRIBUTION (%)		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT	WATER CONTENT (%)	γ	kN/m ³	GR SA SI C		
	Continued From Previous Page													
212.9	Silty CLAY, trace sand Firm Grey		9	SS	2			216						
215														
214														
213														
212														
13.1	Gravelly SAND, some silt Loose Grey Moist to Wet		10	SS	2									
211.7	END OF BOREHOLE AT 14.3m. BOREHOLE OPEN TO 14.3m AND WATER LEVEL AT 12.2m UPON COMPLETION.													
14.3														
	Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) May22/13 3.1 222.9													

+³, ×³: Numbers refer to Sensitivity

METRIC[illegible]

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+505 28R

2 OF 2

METRIC

WP# _____ LOCATION N 5 423 931.3 E 205 005.5 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.12 - 2013.02.12 CHECKED BY JPL

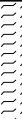
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa	WATER CONTENT (%)					
	Continued From Previous Page							20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	20 40 60					
213.6							215							
12.2	END OF DCPT AT 12.2m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.						214							

RECORD OF BOREHOLE No 12+505 CL

1 OF 2

METRIC

WP# _____ LOCATION N 5 423 953.1 E 204 988.0 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.13 - 2013.02.13 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				WATER CONTENT (%)				GR	SA	SI	CL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
								20	40	60	80	100	W _P	W						W _L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
225.2	0.0	ORGANICS , rootlets, occasional wood fibres Loose Dark Brown (FROZEN)		1	SS	2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															</

Continued Next Page



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

RECORD OF BOREHOLE No 12+505 CL

2 OF 2

METRIC

WP# _____ LOCATION N 5 423 953.1 E 204 988.0 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.13 - 2013.02.13 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					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							
								WATER CONTENT (%)							
	Continued From Previous Page						20	40	60	80	100	PLASTIC LIMIT W P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W L	
214.8	Silty CLAY , trace sand, trace silt seams Soft Grey						10.3								
10.4	Gravelly SAND , some silt Compact Grey Wet		10	SS	16										
213.6															
11.6	END OF BOREHOLE AT 11.6m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.														

RECORD OF BOREHOLE No 12+520 19R

1 OF 2

METRIC

WP# _____ LOCATION N 5 423 947.4 E 205 011.5 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.13 - 2013.02.13 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				WATER CONTENT (%)				GR	SA	SI	CL	
								20	40	60	80	100	20	40						60
226.3																				
0.0	ORGANICS																			
0.1	Sandy SILT , trace roots and organics		1	SS	17		226													
225.5	Compact Brown Moist																			
0.8	Silty CLAY , trace sand, trace rootlets, occasional organics		2	SS	13		225													
	Stiff to Firm Brown																			
			3	SS	6		224											0	0	
	occasional silt seams		4	SS	7		223											43	57	
			5	SS	6		222													
	occasional sand seams		6	SS	3		221													
	Stiff						220													
	Grey		7	SS	3		219													
	Firm																			
218.3			8	SS	22		218													
8.0	SAND and GRAVEL , some silt, occasional cobbles																			
	Compact Grey Wet																			
			9	SS	40		217											44	37	
216.3																		19	(SI+CL)	

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+520 19R

2 OF 2

METRIC

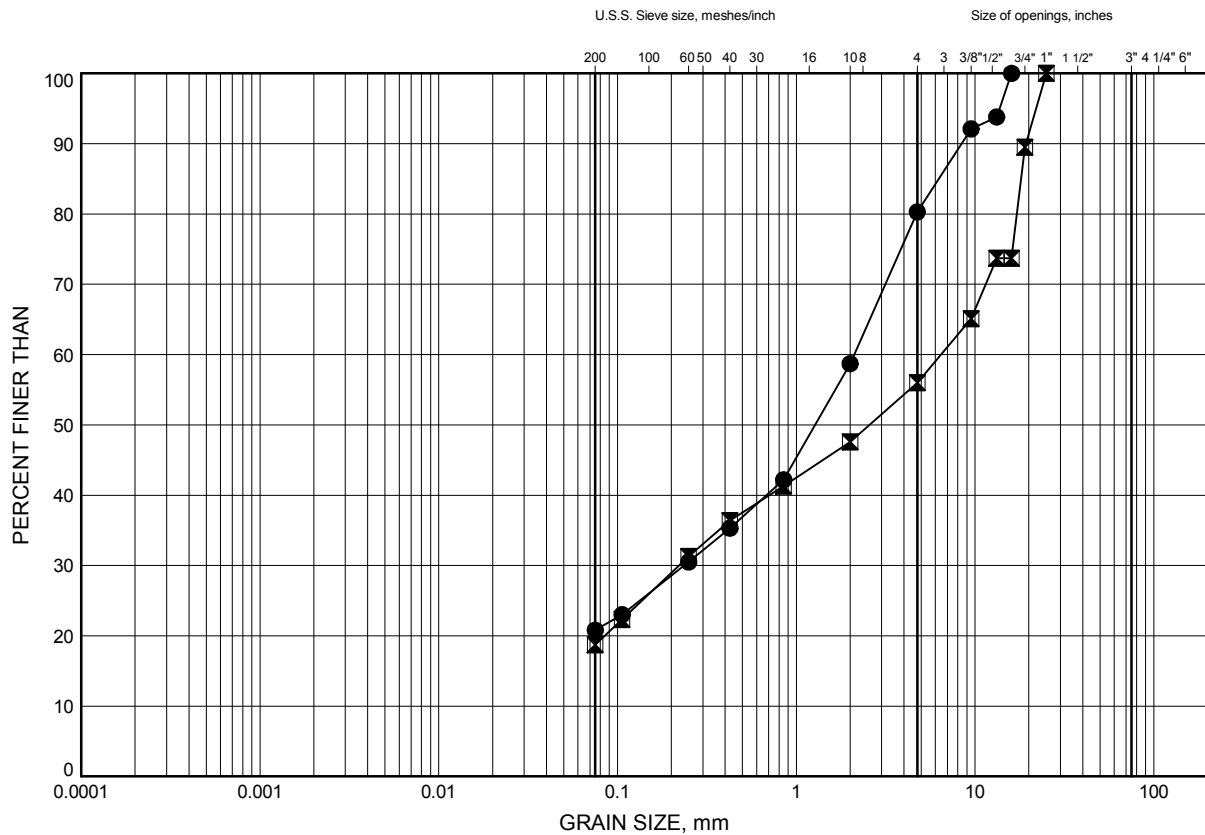
WP# _____ LOCATION N 5 423 947.4 E 205 011.5 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.13 - 2013.02.13 CHECKED BY JPL

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									
9.9	Continued From Previous Page END OF BOREHOLE AT 9.9m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.																

GRAIN SIZE DISTRIBUTION

FIGURE D1

GRAVELLY SAND to SAND & GRAVEL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+480 19R	14.02	211.99
⊠	12+520 19R	9.45	216.80

Date February 2014

WP#



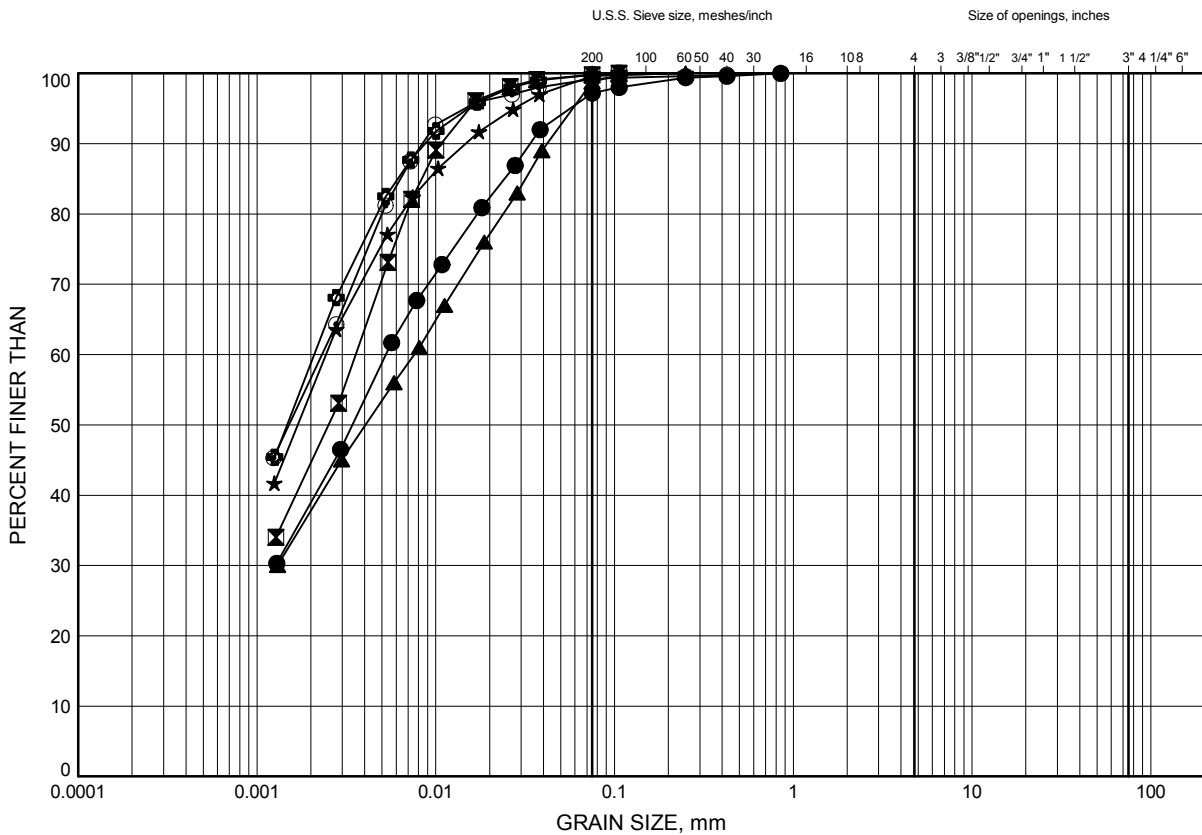
Prep'd AN

Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE D2

SILTY CLAY



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+430 19R	1.07	225.49
⊠	12+430 19R	4.88	221.68
▲	12+455 28R	9.45	216.44
★	12+455 28R	12.50	213.39
⊙	12+480 19R	1.83	224.18
⊕	12+480 19R	9.45	216.56

Date February 2014

WP#



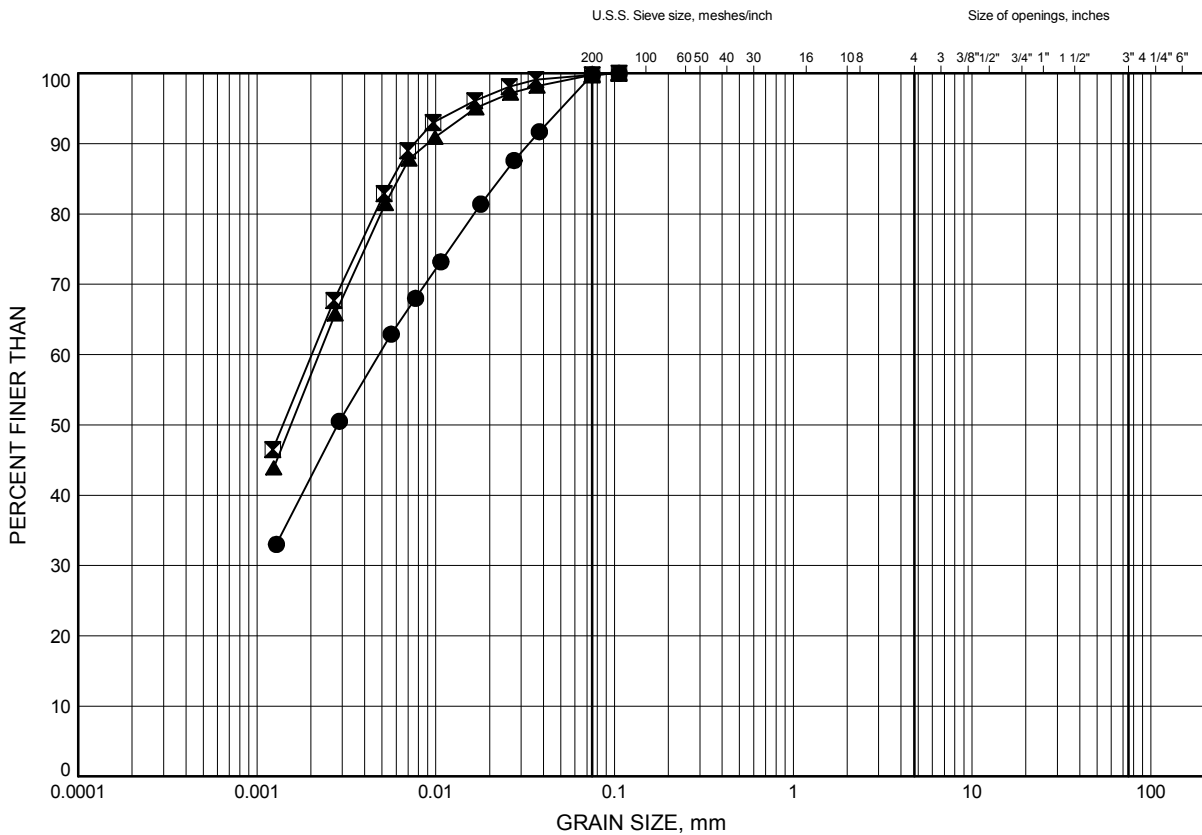
Prep'd AN

Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE D3

SILTY CLAY



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+505 CL	4.88	220.34
⊠	12+505 CL	9.45	215.77
▲	12+520 19R	1.83	224.42

Date February 2014

WP#



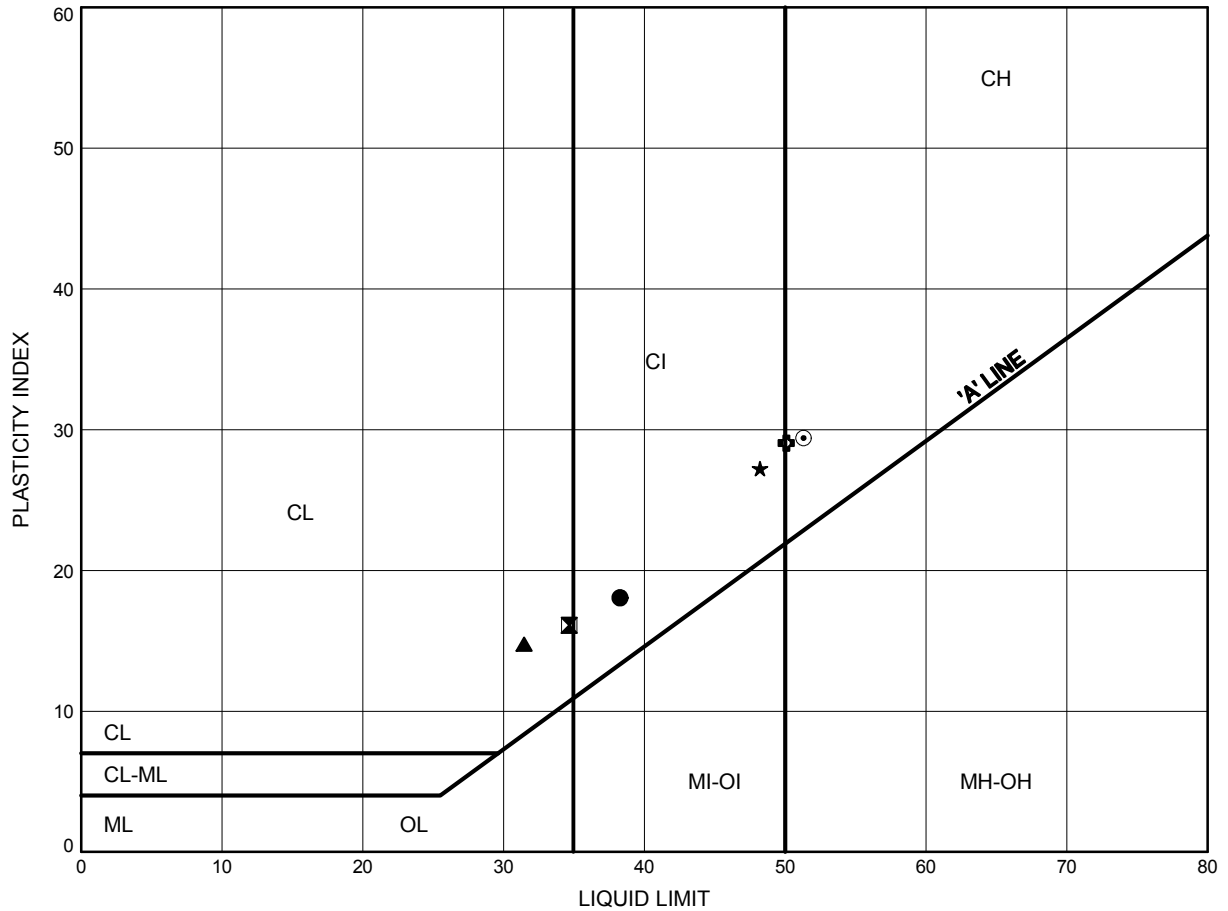
Prep'd AN

Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE D4

SILTY CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+430 19R	1.07	225.49
⊠	12+430 19R	4.88	221.68
▲	12+455 28R	9.45	216.44
★	12+455 28R	12.50	213.39
⊙	12+480 19R	1.83	224.18
⊕	12+480 19R	9.45	216.56

Date February 2014

WP#



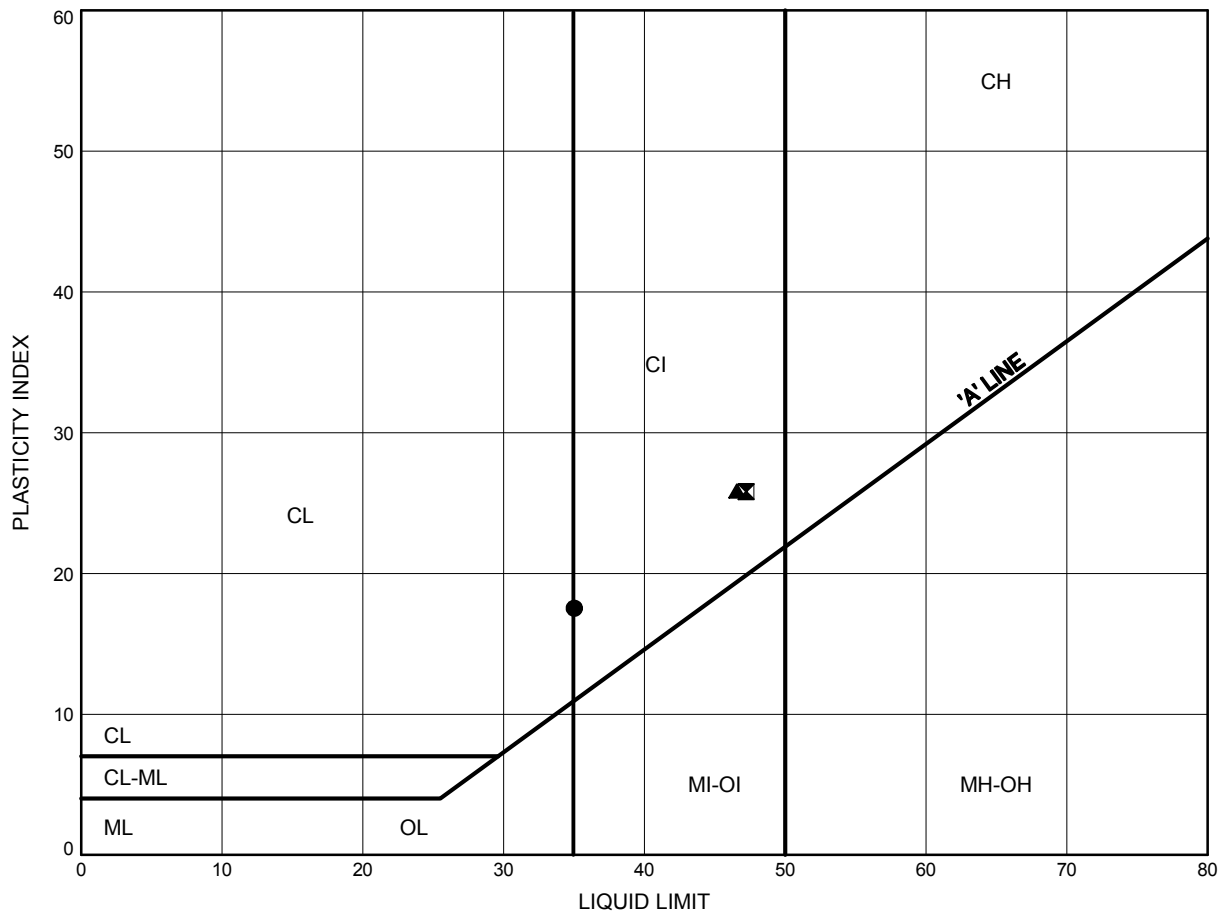
Prep'd AN

Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE D5

SILTY CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+505 CL	4.88	220.34
⊠	12+505 CL	9.45	215.77
▲	12+520 19R	1.83	224.42

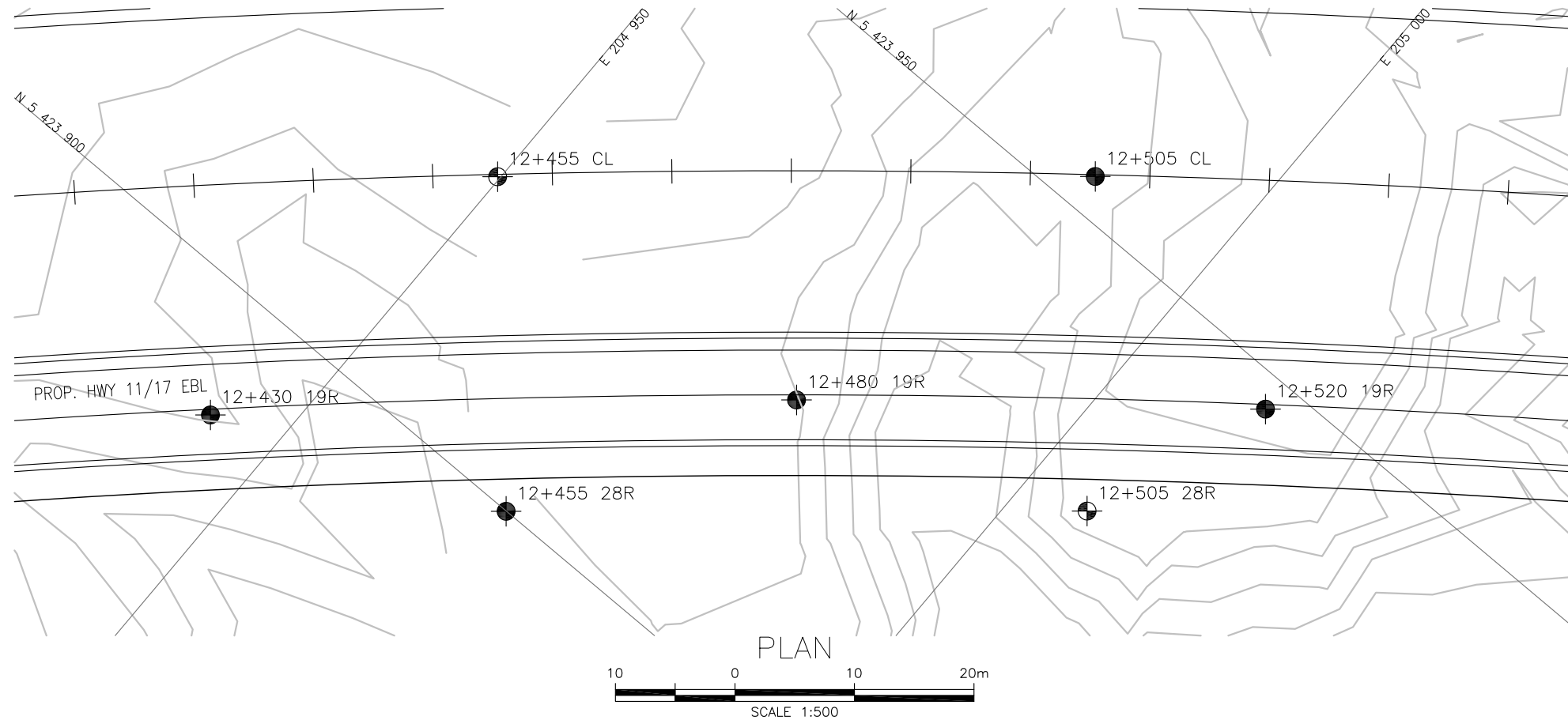
Date February 2014

WP#



Prep'd AN

Chkd. MEF



METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



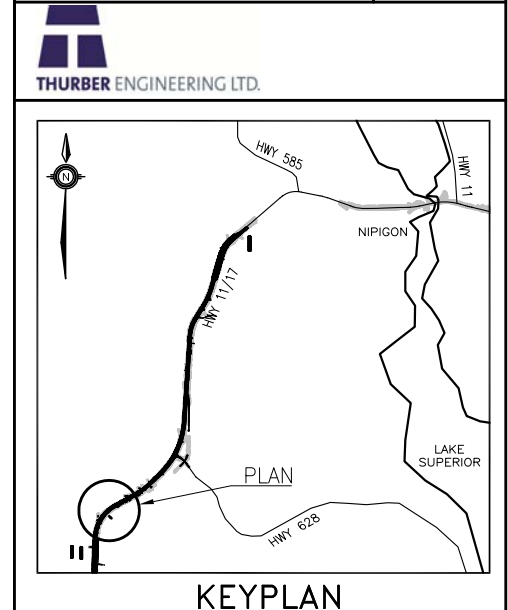
CONT No 2014-6026
GWP No 647-89-00

HWY 11/17 FOUR LANING
EASTBOUND LANES
(STA. 12+420 TO 12+540)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.

SHEET

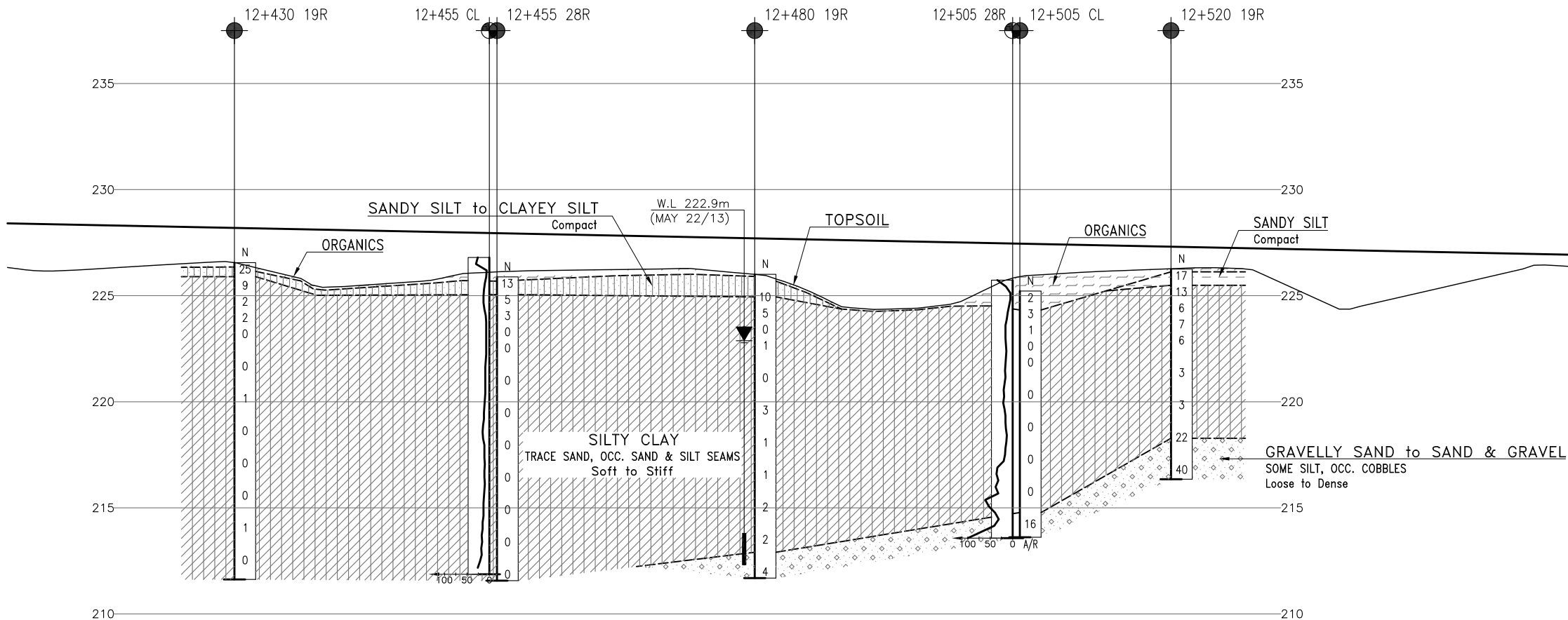


LEGEND			
	Borehole		
	Cone		
N	Blows /0.3m (Std Pen Test, 475J/blow)		
CONE	Blows /0.3m (60' Cone, 475J/blow)		
PH	Pressure, Hydraulic		
	Water Level		
	Head Artesian Water		
	Piezometer		
90%	Rock Quality Designation (RQD)		
A/R	Auger Refusal		

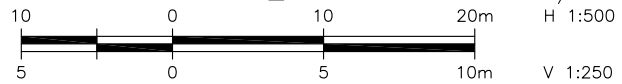
NO	ELEVATION	NORTHING	EASTING
12+430 19R	226.6	5 423 890.2	204 944.2
12+455 28R	225.9	5 423 900.0	204 968.3
12+455 CL	226.8	5 423 921.0	204 949.8
12+480 19R	226.0	5 423 922.7	204 980.9
12+505 28R	225.7	5 423 931.3	205 005.5
12+505 CL	225.2	5 423 953.1	204 988.0
12+520 19R	226.3	5 423 947.4	205 011.5

- NOTES-**
- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
 - This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 52A-182



PROFILE ALONG ϕ HIGHWAY 11/17 EBL



DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

REVISIONS			
DATE	BY	DESCRIPTION	
DESIGN SBP	CHK JPL	CODE	LOAD
DRAWN MFA	CHK SBP	SITE	STRUCT
			DWG 5

Appendix E

Highway 11/17 EBL and WBL

Sta. 12+650 to 13+100





Record of Borehole Sheets
Laboratory Test Results
Borehole Location and Soil Strata Drawings

RECORD OF BOREHOLE No 12+750 19R

1 OF 1

METRIC

WP# _____ LOCATION N 5 424 067.4 E 205 203.9 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.08 - 2013.02.08 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT						UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)									
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa																
								20 40 60 80 100											PLASTIC LIMIT		NATURAL MOISTURE CONTENT		LIQUID LIMIT	
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE											W P		W		W L	
							WATER CONTENT (%)																	
220.9							221																	
0.0	Silty CLAY , trace sand, trace organics Brown (FROZEN)		1	SS	7																			
220.3																								
0.6	PEAT , layered with silty clay Very Loose Dark Brown Wet		2	SS	0		220																	
			3	SS	0		219																	
218.7																								
2.3	Silty CLAY , layered with peat Soft to Very Soft Grey		4	SS	0		218																	
			5	SS	2																			
217.4																								
3.5	Sandy SILT , trace gravel Loose Grey Moist						217																	
216.6																								
4.3	END OF BOREHOLE AT 4.3m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPUG AND CUTTINGS TO SURFACE.																							

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

METRIC

[illegible]

RECORD OF BOREHOLE No 12+776 27R

1 OF 1

METRIC

WP# _____ LOCATION N 5 424 072.7 E 205 230.2 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.08 - 2013.02.08 CHECKED BY JPL

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	WATER CONTENT (%)					
220.8 0.0	Start DCPT from surface							20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	20 40 60					
							220							
							219							
							218							
							217							
							216							
215.2 5.6	END OF DCPT AT 5.6m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.													

ONTMT4S 1237.GPJ 2012TEMPLATE(MTO).GDT 2/21/14

RECORD OF BOREHOLE No 12+776 CL

1 OF 1

METRIC

WP# _____ LOCATION N 5 424 096.6 E 205 217.5 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.08 - 2013.02.08 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL LIQUID LIMIT MOISTURE CONTENT			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					WATER CONTENT (%)				
221.5								20	40	60	80	100					
0.0	Clayey SILT with organics and rootlets		1	SS	46												
221.0	Dark Brown																
0.5	(FROZEN)						221										
	SAND , some gravel																
220.4	Loose																
220.2	Brown		2	SS	5											151	
1.1	Moist																
1.3	ORGANICS , occasional wood fibres																
	Dark Brown						220										
	Silty CLAY , trace to some sand, trace organics, occasional silt seams		3	SS	6												
	Firm to Soft																
	Mottled Brown/Grey																
	Grey		4	SS	1		219										
	occasional silt seam																
			5	SS	1		218										0 0 59 41
	Firm							14.3									
							217										
			6	SS	0												
215.9							216										
5.6	END OF BOREHOLE AT 5.6m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.																

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+800 19R

1 OF 2

METRIC

WP# _____ LOCATION N 5 424 091.6 E 205 247.7 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.08 - 2013.02.08 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	W _P W W _L	GR SA SI CL			
220.6														
0.0	ORGANICS Dark Brown (FROZEN)		1	SS	5		▼					375		
219.8							220							
0.8	Sandy SILT , trace roots		2	SS	5					○				
219.4	Loose Brown									○				
1.2	Moist													
	Silty CLAY , some sand, trace rootlets Firm to Soft Brown to Grey		3	SS	5		219			○				
			4	SS	1		218			○				
	occasional sand seams													
	Grey		5	SS	0		217			○				
	Soft						2.4							
			6	SS	0		216			┌───┐ ┌─┐				
							10.0							
			7	SS	0		214			○				
							12.5							
			8	SS	0		213			┌───┐ ┌─┐				
							6.4							
			9	SS	100/ .025					○				
211.2														
219.4	Silty SAND													
9.5	Grey Moist													

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15 10 5 10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+800 19R

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 091.6 E 205 247.7 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.08 - 2013.02.08 CHECKED BY JPL

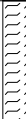







SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					WATER CONTENT (%)				
								20	40	60	80	100	W _p	W	W _L		
	Continued From Previous Page END OF BOREHOLE AT 9.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Feb.14/13 0.8 219.8 May22/13 0.2 220.4																

RECORD OF BOREHOLE No 12+826 28R

1 OF 2

METRIC

WP# _____ LOCATION N 5 424 096.3 E 205 274.8 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.07 - 2013.02.07 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					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						
								20 40 60 80 100						
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE						
							WATER CONTENT (%)							
							PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT w _p w w _L							
220.3														
0.0	ORGANICS , wood fibres Dark Brown (FROZEN)		1	SS	19		220						406	
219.5														
0.8	SILT , trace to some sand, trace clay, trace gravel Loose Brown Wet		2	SS	4		219							
	sandy Grey		3	SS	3		218							
	some clay, some sand, occasional organic seams		4	SS	1		217							
			5	SS	1									
216.0														
4.3	Silty CLAY , trace sand Stiff to Firm Grey		6	SS	6		216							
							215							
	Soft		7	SS	0		214							
							213							
			8	SS	0		212							
	Firm						211							
	occasional sand seam		9	SS	0									

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+826 28R

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 096.3 E 205 274.8 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.07 - 2013.02.07 CHECKED BY JPL

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									WATER CONTENT (%)			
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE												
	Continued From Previous Page							20	40	60	80	100	20	40	60					
203.9 <																				

ONTMT4S 1237.GPJ 2012TEMPLATE(MTO).GDT 2/21/14

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 12+826 CL

2 OF 3

METRIC

WP# _____ LOCATION N 5 424 120.8 E 205 261.2 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.06 - 2013.02.06 CHECKED BY JPL

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	WATER CONTENT (%)					
	Continued From Previous Page							20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	20 40 60					
210														
209														
208														
207														
206														
205														
204														
203														
202														
201														

Continued Next Page

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

RECORD OF BOREHOLE No 12+826 CL

3 OF 3

METRIC

WP# _____ LOCATION N 5 424 120.8 E 205 261.2 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.06 - 2013.02.06 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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	W P	W	W L	WATER CONTENT (%)		
	Continued From Previous Page						20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE							
196.2														
24.7	END OF DCPT AT 24.7m UPON REFUSAL. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.													

RECORD OF BOREHOLE No 12+850 19R

1 OF 3

METRIC

WP# _____ LOCATION N 5 424 115.8 E 205 291.4 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.06 - 2013.02.07 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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			WATER CONTENT (%)				
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE							
								20 40 60 80 100			20 40 60				
220.3															
0.0	ORGANICS , wood fibres Dark Brown (FROZEN)		1	SS	72		220						398		
219.5															
0.8	Sandy SILT , trace rootlets Loose Brown Moist		2	SS	5		219								
	trace wood fibres Grey		3	SS	3										
	occasional sand seams		4	SS	1		218								
217.2															
3.0	Silty CLAY , trace to some sand, trace rootlets, occasional organics seams Soft to Firm Grey		5	SS	0		217								
	occasional sand seams		6	SS	0		216								
	Firm						215	3.4							
	trace sand, occasional silt seams		7	SS	0		214								
	Stiff						213	3.1							
			8	SS	4										
							212	5.8							
			9	SS	2		211								

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity


20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+850 19R

2 OF 3

METRIC

WP# _____ LOCATION N 5 424 115.8 E 205 291.4 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.06 - 2013.02.07 CHECKED BY JPL

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								WATER CONTENT (%)		
								○ UNCONFINED	+	FIELD VANE								
								● QUICK TRIAXIAL	×	LAB VANE								
	Continued From Previous Page							20	40	60	80	100	20	40	60			
	Silty CLAY , trace sand Firm Grey						210											
			10	SS	0													
			11	SS	0													
			12	SS	0													
			13	SS	0													

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15
10
5
0
(%) STRAIN AT FAILURE

METRIC

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 12+876 28R

1 OF 2

METRIC

WP# _____ LOCATION N 5 424 120.5 E 205 318.5 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.05 - 2013.02.05 CHECKED BY JPL

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								
220.1 0.0	Start DCPT from surface						220	20 40 60 80 100					
							219						
							218						
							217						
							216						
							215						
							214						
							213						
							212						
							211						

Continued Next Page

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

RECORD OF BOREHOLE No 12+876 28R

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 120.5 E 205 318.5 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.05 - 2013.02.05 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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	W P	W	W L	WATER CONTENT (%)		
	Continued From Previous Page						20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE							
							210							
							209							
							208							
							207							
							206							
							205							
							204							
							203							
202.6 17.6	END OF DCPT AT 17.6m UPON REFUSAL. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.													

RECORD OF BOREHOLE No 12+876 CL

1 OF 3

METRIC

WP# _____ LOCATION N 5 424 145.0 E 205 305.0 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.05 - 2013.02.06 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				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					
220.6								20 40 60 80 100					
0.0								20 40 60 80 100					
0.1	ORGANICS: (50mm)		1	SS	4								
220.0	SAND, trace to some silt, trace to some gravel, trace roots, trace rootlets												
0.6	Loose Brown Moist												
	SAND and SILT, trace clay		2	SS	9								0 56 40 4
	Loose Brown Moist												
			3	SS	8								No recovery
	Very Loose Grey		4	SS	2								
	occasional wood fibres		5	SS	1								
216.5													
4.1	Silty CLAY, trace sand												
	Stiff Grey		6	SS	0								0 1 70 29
	occasional sand seams		7	SS	2								
	Firm												
			8	SS	0								
			9	SS	2								

Continued Next Page

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

RECORD OF BOREHOLE No 12+876 CL

2 OF 3

METRIC

WP# _____ LOCATION N 5 424 145.0 E 205 305.0 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.05 - 2013.02.06 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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				WATER CONTENT (%)				
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE								
								20 40 60 80 100	20 40 60 80 100	20 40 60 80 100						
	Continued From Previous Page							5.3 +								
			10	SS	0		210						○			
							209	6.6 +								
			11	SS	0		208						○			
							207	4.9 +								
			12	SS	0		206						○			
							205	5.4 +						○		
			13	SS	0		204									
							203	5.2 +								
	occasional sand seams		14	SS	0		202						○			
							201	4.3 +								
	trace sand		15	SS	0								○			
	Stiff															

Continued Next Page

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

RECORD OF BOREHOLE No 12+876 CL

3 OF 3

METRIC

WP# _____ LOCATION N 5 424 145.0 E 205 305.0 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.05 - 2013.02.06 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT W _p NATURAL MOISTURE CONTENT W LIQUID LIMIT W _L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	Continued From Previous Page		16	SS	7						
198.8			17	SS	5						
21.8	SAND, some gravel, occasional cobbles Grey Moist										
195.8											
24.8	END OF BOREHOLE AT 24.8m UPON REFUSAL. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.										

RECORD OF BOREHOLE No 12+899 19L

1 OF 2

METRIC

WP# _____ LOCATION N 5 424 172.8 E 205 315.9 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.12 - 2013.02.12 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					WATER CONTENT (%)				GR	SA	SI	CL	
220.9								20	40	60	80	100									
0.0																					
0.1	ORGANICS: (100mm)																				
	SILT , some sand, some clay, trace gravel, trace roots, trace organics		1	SS	16																
220.3	Very Stiff																				
0.6	Brown (FROZEN)																				
	SAND , some silt to silty, occasional organics, trace rootlets		2	SS	7		220														
	Loose																				
	Brown																				
	Moist		3	SS	6		219													0 71 29 (SI+CL)	
218.6																					
2.3	SILT , trace to some sand, occasional sand seam, occasional wood fibres		4	SS	2		218														
	Very Loose																				
	Grey		5	SS	0																
	Wet						217														
			6	SS	2		216														
							215	2.3													
214.8																					
6.1	Silty CLAY , trace sand seams		7	SS	0		214														
	Firm																				
	Grey																				
			8	SS	0		213													0 0 80 20	
							212	11.0													
			9	SS	3																
	trace sand						211														

Continued Next Page

+³, ×³: Numbers refer to Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+899 19L

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 172.8 E 205 315.9 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.12 - 2013.02.12 CHECKED BY JPL

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								
	Continued From Previous Page															
	Silty CLAY , trace sand, trace sand seams Firm Grey		10	SS	3		210									
			11	SS	0		209									
	Soft						208									
			12	SS	0		207									
206.0	Firm															
14.9	END OF BOREHOLE AT 14.9m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.															

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

RECORD OF BOREHOLE No 12+900 19R

1 OF 2

METRIC

WP# _____ LOCATION N 5 424 140.4 E 205 335.8 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.05 - 2013.02.05 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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					WATER CONTENT (%)					
								○ UNCONFINED + FIELD VANE					w P w w L					
								● QUICK TRIAXIAL × LAB VANE										
220.2							20	40	60	80	100	20	40	60				
0.0	ORGANICS , occasional wood fibres Dark Brown (FROZEN)		1	SS	13											408		
219.7																		
0.5	SAND and SILT , trace rootlets, occasional oxide staining, trace silt seams Loose Brown Moist		2	SS	3								○					
														○				
218.7																		
1.5	Silty CLAY , trace organics, trace rootlets, occasional oxide staining, occasional silt seam Firm to Soft Grey		3	SS	4								○					
	occasional sand seam		4	SS	2								○					
217.3																		
2.9	Silty CLAY Soft Grey <																	

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15 10 5 0
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+900 19R

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 140.4 E 205 335.8 ORIGINATED BY ES
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.02.05 - 2013.02.05 CHECKED BY JPL

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									WATER CONTENT (%)
	Continued From Previous Page							<div><div>20406080100</div><div>○ UNCONFINED + FIELD VANE</div><div>● QUICK TRIAXIAL × LAB VANE</div></div>				<div><div>204060</div><div>○</div></div>					
	Silty CLAY Stiff Grey						210										
			10	SS	2			209									
	Firm								5.4								
207.8							208										
12.4	SAND , some gravel Compact Grey		11	SS	20												
207.3	Moist																
12.9	END OF BOREHOLE AT 12.9m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.																

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

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 12+926 28R

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 144.7 E 205 362.3 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.04 - 2013.02.04 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL LIMIT MOISTURE LIQUID CONTENT LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE						
	Continued From Previous Page							20 40 60 80 100		20 40 60			GR SA SI CL	
206.2	Silty CLAY Firm Grey							5.0 +					0 0 30 70 OED: e ₀ =1.220 C _c =0.280 C _u =0.020 G _s =2.700	
			1	TW										
								5.1 +						
			10	SS	0									
								5.4 +						
13.6	SAND and GRAVEL , some silt to silty, trace clay Compact Grey Moist		11	SS	14								44 31 25 (SI+CL)	
204.7														
15.1	END OF BOREHOLE AT 15.1m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.													

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+926 29L

1 OF 2

METRIC

WP# _____ LOCATION N 5 424 194.6 E 205 334.7 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.12 - 2013.02.12 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				WATER CONTENT (%)				GR	SA	SI	CL	
								○ UNCONFINED ● QUICK TRIAXIAL	+ FIELD VANE × LAB VANE											
220.4																				
0.0	ORGANICS: (50mm)		1	SS	22															
219.6	SAND , trace gravel, trace roots, trace rootlets Compact Brown (FROZEN)																			
0.9	SAND, some silt, trace roots Compact Brown to Grey Moist to Wet		2	SS	11															
218.6			3	SS	5															
1.8	SILT, trace to some sand, trace clay Loose Grey Wet																			
			4	SS	1															
			5	SS	0															
216.3																				
4.1	Silty CLAY, trace sand Soft to Firm Grey		6	SS	0															
	occasional sand seam		7	SS	0															
	Soft																			
			8	SS	0															
	occasional silt seam		9	SS	0															

220

219

218

217

216

215

214

213

212

211

20

40

60

80

100

20

40

60

5.2

+

11

+

0

8

67

25

Field vane reading
>80kPa

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+926 29L

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 194.6 E 205 334.7 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.12 - 2013.02.12 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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				WATER CONTENT (%)				
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE				W P W W L				
	Continued From Previous Page							20	40	60	80	100	20	40	60	
	Silty CLAY , trace sand Firm Grey						210	6.0 +								
			10	SS	0									○		
							209									
								6.5 +								
			11	SS	0		208							○		
							207	6.9 +								
			12	SS	0									○		
							206									
205.5								5.8 +								
14.9	END OF BOREHOLE AT 14.9m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.															

METRIC

SOIL PROFILE					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES	"N" VALUES	GROUND WATER CONDITIONS
			NUMBER	TYPE	
220.6					
0.0	Start DCPT from surface				
<div>DYNAMIC CONE PENETRATION RESISTANCE PLOT<div>20406080100</div><div>○ UNCONFINED + FIELD VANE● QUICK TRIAXIAL × LAB VANE</div><div>PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMITW_P W W_L</div><div>WATER CONTENT (%)</div><div>204060</div></div>					
ELEVATION SCALE					
220					
219					
218					
217					
216					
215					
214					
213					
212					
211					
<div>UNIT WEIGHT γ kN/m³</div>					
<div>REMARKS & GRAIN SIZE DISTRIBUTION (%)GR SA SI CL</div>					

+³, ×³: Numbers refer to Sensitivity

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 12+950 19L

1 OF 2

METRIC

WP# _____ LOCATION N 5 424 197.8 E 205 361.2 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.11 - 2013.02.11 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
220.5								20	40	60	80	100		
0.0	ORGANICS: (100mm)													
0.1	SAND , some gravel, mixed with organics, trace roots, trace rootlets Brown to Dark Brown (FROZEN)		1	SS	30									
219.9														
0.6	SAND , some silt to silty, trace rootlets Loose Brown Moist		2	SS	6									
218.6														
			3	SS	1									
1.8	SILT , trace sand Very Loose Grey Wet													
			4	SS	1									
	trace clay													
			5	SS	2									
216.2														
4.3	Silty CLAY , trace to some sand Soft to Firm Grey		6	SS	0									
	occasional sand seams		7	SS	1									
	Firm													
	occasional silt seams		8	SS	0									
			9	SS	2									

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

METRIC[illegible]

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 12+950 19R

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 164.6 E 205 379.6 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.04 - 2013.02.04 CHECKED BY JPL

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								
	Continued From Previous Page															
	Silty CLAY Firm Grey		10	SS	0		209									
							208									
			11	SS	0		207									
206.9																
12.9	SAND and GRAVEL , trace silt Compact to Very Dense Grey Wet						206									
			12	SS	100/ .100											
205.1																
14.7	END OF BOREHOLE AT 14.7m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.															

RECORD OF BOREHOLE No 12+976 1R

1 OF 2

METRIC

WP# _____ LOCATION N 5 424 192.3 E 205 392.6 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.03 - 2013.02.03 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)						
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						WATER CONTENT (%)						
220.5								20	40	60	80	100		PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT				
0.0	ORGANICS: (100mm)													W _P	W	W _L				
0.2	SILT , some sand, trace clay, trace roots, trace rootlets Dark Brown (FROZEN)		1	SS	7		220													
219.7																				
0.8	Silty CLAY , trace to some sand, trace rootlets Firm Brown		2	SS	6		219													
			3	SS	4															
			4	SS	2		218													
217.6																				
2.9	Silty CLAY Firm Grey		5	SS	1		217													
	Firm							5.4	+											
			6	SS	0		216													
								5.0	+											
			7	SS	0		214													
	Stiff							4.2	+											
			8	SS	1		213													
	Firm							5.5	+											
			9	SS	2		211													

Continued Next Page





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

RECORD OF BOREHOLE No 12+976 1R

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 192.3 E 205 392.6 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.03 - 2013.02.03 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				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						PLASTIC LIMIT W _P NATURAL MOISTURE CONTENT W LIQUID LIMIT W _L WATER CONTENT (%)
	Continued From Previous Page							20 40 60 80 100						
209.5	Silty CLAY Firm Grey		10	SS	100/ 100		210							
11.0	Sandy SILT , trace clay, trace gravel Dense to Very Dense Grey Wet						209							
208.3														
12.2	Sandy GRAVEL , some silt to silty Compact Grey Moist		11	SS	14		208							41 30 29 (SI+CL)
207.3														
13.2	END OF BOREHOLE AT 13.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.													

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 12+976 28R

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 168.9 E 205 406.0 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.03 - 2013.02.03 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT <div> <p>20 40 60 80 100</p> <p>SHEAR STRENGTH kPa</p> <p>○ UNCONFINED + FIELD VANE</p> <p>● QUICK TRIAXIAL × LAB VANE</p> </div>	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								
	Continued From Previous Page												
207.1													
12.7	END OF DCPT AT 12.7m UPON REFUSAL. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.												

RECORD OF BOREHOLE No 12+976 29L

1 OF 2

METRIC

WP# _____ LOCATION N 5 424 218.8 E 205 378.4 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.11 - 2013.02.11 CHECKED BY JPL

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	WATER CONTENT (%)					
220.3 0.0	Start DCPT from surface						20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	20 40 60						
220														
219														
218														
217														
216														
215														
214														
213														
212														
211														

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15 10 5 0
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 12+976 29L

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 218.8 E 205 378.4 ORIGINATED BY ES
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.02.11 - 2013.02.11 CHECKED BY JPL

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	WATER CONTENT (%)					
	Continued From Previous Page													
206.5 13.8	END OF DCPT AT 15.6m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.													

RECORD OF BOREHOLE No 13+000 19L

1 OF 2

METRIC

WP# _____ LOCATION N 5 424 221.7 E 205 404.3 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.11 - 2013.02.11 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				WATER CONTENT (%)				GR	SA	SI	CL	
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE												
220.3																				
0.0																				
0.1	ORGANICS: (100mm)																			
	Sandy SILT , some gravel, trace organics		1	SS	48		220													
219.7	Dense Brown (FROZEN)																			
0.6	Silty CLAY , trace sand, trace rootlets		2	SS	5		219													
	Firm to Soft Brown																			
			3	SS	4		218													
	Grey																			
	occasional silt seams		4	SS	2		217													
	occasional oxide staining		5	SS	2		216													
	Firm		6	SS	0		215													
			7	SS	2		214													
	Stiff		8	SS	2		213													
			9	SS	9		212													
210.7							211													
9.6	SAND , trace silt																			
	Loose																			
	Grey																			

Continued Next Page

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

RECORD OF BOREHOLE No 13+000 19L

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 221.7 E 205 404.3 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.11 - 2013.02.11 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT			LIQUID LIMIT	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					WATER CONTENT (%)					
								20	40	60	80	100	W _p	W	W _L			
	Continued From Previous Page																	
209.9	Wet						210											
10.4	END OF BOREHOLE AT 10.4m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.																	

RECORD OF BOREHOLE No 13+000 19R

1 OF 2

METRIC

WP# _____ LOCATION N 5 424 188.4 E 205 422.7 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.03 - 2013.02.03 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					
								20 40 60 80 100					
219.9													
0.0	ORGANICS: (125mm) (FROZEN)		1	SS	10								
0.1	Sandy SILT , trace roots, trace organics												
219.3	Compact Brown Moist		2	SS	5								
0.6	Silty CLAY , trace to some sand, trace roots												
	Firm Brown												
			3	SS	3								
	oxide staining		4	SS	2								
	Grey												
			5	SS	0								
	Firm												
			6	SS	0								
	Stiff												
			7	SS	2								
			8	SS	0								
211.0													
8.8	SAND , trace gravel, trace silt, occasional cobbles												
	Very Dense		9	SS	50/								
	Grey				.100								
210.3	Wet												
9.6	END OF BOREHOLE AT 9.6m UPON AUGER REFUSAL ON PROBABLE												

Continued Next Page

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

RECORD OF BOREHOLE No 13+000 19R

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 188.4 E 205 422.7 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.03 - 2013.02.03 CHECKED BY JPL

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									
	Continued From Previous Page																
	BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.																

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

METRIC

[illegible]

RECORD OF BOREHOLE No 13+026 28R

1 OF 1

METRIC

WP# _____ LOCATION N 5 424 193.1 E 205 449.8 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.02 - 2013.02.02 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				WATER CONTENT (%)					
								20 40 60 80 100	○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE			W _P W W _L					
219.9								20	40	60	80	100	20	40	60		
0.0	ORGANICS: (175mm)																
0.2	Sandy SILT, some clay, trace wood fibres, trace roots		1	SS	32										○		
219.2	Dense Brown																
0.8	(FROZEN)																
	Silty CLAY, trace sand, trace roots, varved		2	SS	4		219								○		
	Firm																
	Brown																
			3	SS	5		218								○		0 1 43 56
	occasional sand seam																
			4	SS	2										○		
	occasional oxide staining, occasional silt seam						217										
	Grey																
			5	SS	0										○		
							216										
								9.4	+								
			6	SS	0		215								○		0 0 46 54
							214										
			7	SS	1										○		
							213										
								6.1	+								
			8	SS	1		212								○		
	Stiff						211										
210.9																	
9.0	END OF BOREHOLE AT 9.0m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.																

ONTMT4S 1237 GPJ 2012TEMPLATE(MTO).GDT 2/21/14

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 13+026 29L

1 OF 2

METRIC

WP# _____ LOCATION N 5 424 252.3 E 205 445.1 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.09 - 2013.02.09 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa			WATER CONTENT (%)				GR	SA	SI	CL	
								20 40 60 80 100	W _P W W _L										
220.2								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE											
0.0	Sandy SILT , some clay, trace to some gravel, occasional cobbles Dense Brown (FROZEN)		1	SS	38		220								16	27	38	19	
219.4																			
0.8	Silty CLAY , trace sand seams, occasional wood fibres Firm to Soft Brown		2	SS	5		219												
	trace rootlets		3	SS	5		218												
	Mottled Brown/Grey occasional sand seams Soft Grey		4	SS	0		217												
			5	SS	0		216	9.0											
			6	SS	0		215												
	Firm		7	SS	0		214	12.0								0	0	53 47	
			8	SS	2		213	5.4											
							212												
	Stiff						211	6.1											
			9	SS	1														

Continued Next Page

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

RECORD OF BOREHOLE No 13+026 29L

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 252.3 E 205 445.1 ORIGINATED BY ES
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.02.09 - 2013.02.09 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							
								20 40 60 80 100							
								<div><div></div><div></div><div></div><div></div><div></div></div>				<div><div>PLASTIC LIMIT</div><div>NATURAL MOISTURE CONTENT</div><div>LIQUID LIMIT</div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div><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+³, ×³: Numbers refer to Sensitivity 20 15 10 5 0 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 13+049 18R

1 OF 2

METRIC

WP# _____ LOCATION N 5 424 212.8 E 205 464.7 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.01 - 2013.02.01 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				WATER CONTENT (%)					
219.7								20	40	60	80	100					
0.0	ORGANICS , trace clay Dark Brown (FROZEN)		1	SS	18												
219.1																	
0.6	Silty CLAY , trace sand Firm Brown		2	SS	5												
			3	SS	6												
			4	SS	3												
	Grey																
			5	SS	0												
	occasional sand pockets		6	SS	0												
			7	SS	0												
	Stiff																
	some sand, trace gravel		8	SS	3												
211.0																	
8.7	SAND and GRAVEL , some silt to silty, occasional cobbles Compact Grey Wet																
			9	SS	11												
209.8																	

Continued Next Page

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

RECORD OF BOREHOLE No 13+049 18R

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 212.8 E 205 464.7 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.01 - 2013.02.01 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			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	W _p	W	W _L		
9.9	Continued From Previous Page END OF BOREHOLE AT 9.9m UPON AUGER REFUSAL ON PROBABLE BEDROCK. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Feb.14/13 3.5 216.2 May22/13 0.3 219.4																

RECORD OF BOREHOLE No 13+050 19L

1 OF 2

METRIC

WP# _____ LOCATION N 5 424 245.9 E 205 448.0 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.09 - 2013.02.09 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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					WATER CONTENT (%)								
								○ UNCONFINED + FIELD VANE					w P w w L								
								● QUICK TRIAXIAL × LAB VANE													
220.2							20	40	60	80	100										
0.0	SILT , some sand, some clay, some gravel, trace sand seam, occasional cobbles, trace organics Very Dense Brown (FROZEN)																				

Continued Next Page


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

RECORD OF BOREHOLE No 13+050 19L

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 245.9 E 205 448.0 ORIGINATED BY ES
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.02.09 - 2013.02.09 CHECKED BY JPL




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									WATER CONTENT (%)			
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE												
	Continued From Previous Page							20	40	60	80	100	20	40	60					
207.1 13.0	Silty CLAY , trace sand Firm Grey						210		7.7											
			10	SS	0															
				11	SS	0				5.5										
	END OF BOREHOLE AT 13.0m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.																			

RECORD OF BOREHOLE No 13+076 06R

1 OF 1

METRIC

WP# _____ LOCATION N 5 424 236.4 E 205 482.5 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.02 - 2013.02.02 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)						
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)					
								○ UNCONFINED + FIELD VANE							w _p w w _L					
								● QUICK TRIAXIAL × LAB VANE												
220.0							20	40	60	80	100	20	40	60	GR	SA	SI	CL		
0.0	ORGANICS: (200mm) (FROZEN)		1	SS	9															
0.2	SILT , some sand, trace clay, trace gravel, trace roots, trace rootlets Brown Moist																			
219.3																				
0.8	Silty CLAY , trace to some sand, varved Firm to Soft Brown to Grey		2	SS	3															
			3	SS	2															
	Brown		4	SS	1															
	trace silt pockets, occasional oxide staining Soft Grey		5	SS	0															
			6	SS	0															
	Firm																			
			7	SS	0												0	0	36	64
			8	SS	2															
211.5																				
8.5	END OF BOREHOLE AT 8.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.																			

ONTMT4S 1237.GPJ 2012TEMPLATE(MTO).GDT 2/21/14

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

METRIC

SOIL PROFILE				SAMPLES		GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT		UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	W P W W L			
219.3 0.0	Start DCPT from surface						219						
							218						
							217						
							216						
							215						
							214						
							213						
211.8 7.5	END OF DCPT AT 7.5m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.						212						

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 13+077 28L

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 266.6 E 205 466.9 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.09 - 2013.02.09 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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	W _p	W	W _L	WATER CONTENT (%)		
	Continued From Previous Page						20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE							
204.5	END OF DCPT AT 15.2m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.													

METRIC

[illegible]

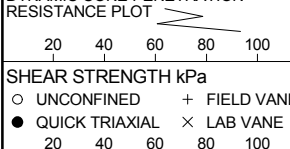
+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 13+100 19L

2 OF 2

METRIC

WP# _____ LOCATION N 5 424 270.1 E 205 491.8 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.09 - 2013.02.09 CHECKED BY JPL

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								
	Continued From Previous Page												
206.9							209						
							208						
							207						
13.0	END OF DCPT AT 13.0m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.												

RECORD OF BOREHOLE No 13+100 4.9R

1 OF 2

METRIC

WP# _____ LOCATION N 5 424 248.9 E 205 503.0 ORIGINATED BY _____
 HWY _____ BOREHOLE TYPE _____ COMPILED BY _____
 DATUM Geodetic DATE 2013.02.01 - 2013.02.01 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 kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
220.2														
0.0														
219.9	ORGANICS: (100mm)													
0.3	SILT, some sand, trace roots, trace rootlets Brown (FROZEN)		1	SS	16									
	Silty CLAY, trace to some sand, trace rootlets, trace organics Firm to soft Brown		2	SS	5									
	Brown/Grey		3	SS	1									
	trace sand, occasional sand seam Soft Grey		4	SS	0									
			5	SS	0									0 0 59 41
							5.5							
			6	SS	0									
							2.9							
			7	SS	1									
	Firm						7.0							
			8	SS	1									
							4.7							
			9	SS	2									
210.2														

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15 10 5 0
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 13+100 4.9R

2 OF 2

METRIC

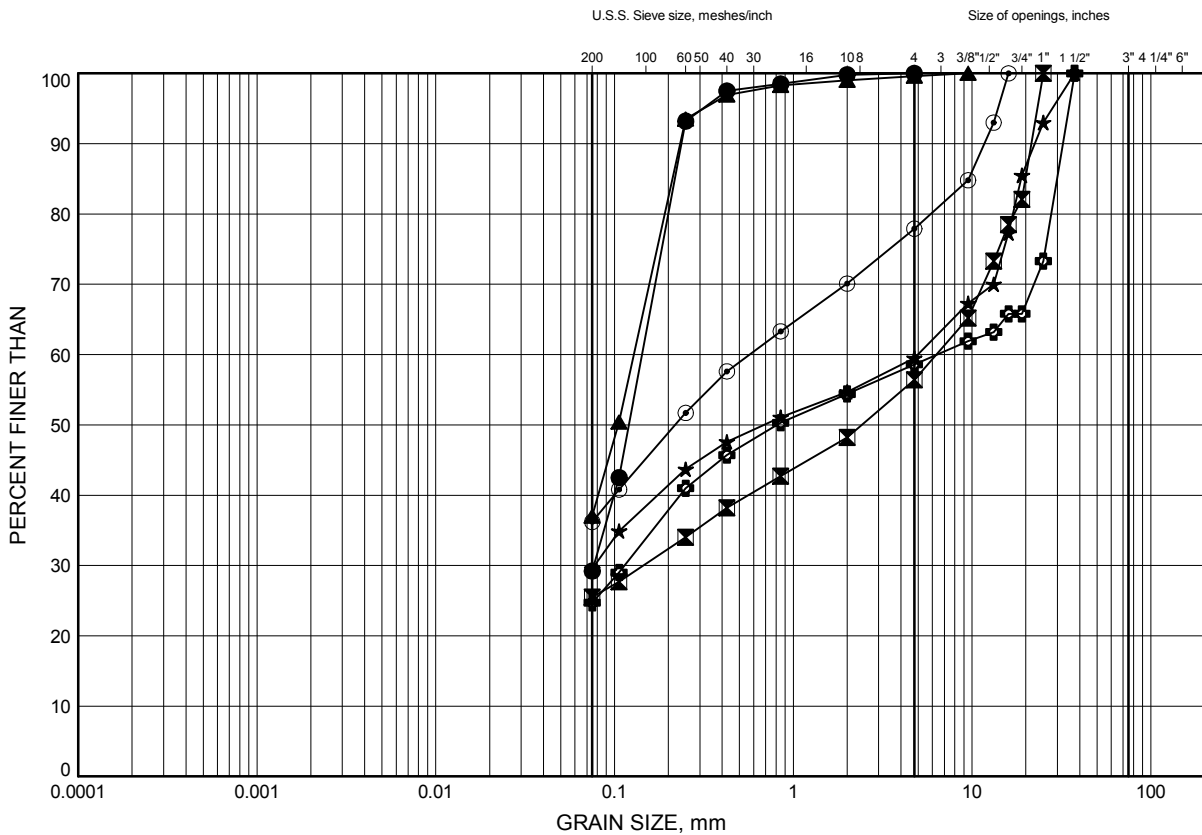
WP# _____ LOCATION N 5 424 248.9 E 205 503.0 ORIGINATED BY _____
 HWY _____ BOREHOLE TYPE _____ COMPILED BY _____
 DATUM Geodetic DATE 2013.02.01 - 2013.02.01 CHECKED BY _____

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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					WATER CONTENT (%)				
							20	40	60	80	100	W _p	W	W _L			
	Continued From Previous Page																
10.0	Possible SAND and GRAVEL (augers grinding)	◊ ◊ ◊ ◊ ◊ ◊ ◊ ◊ ◊ ◊					210										
209.5		◊ ◊ ◊ ◊ ◊ ◊ ◊ ◊ ◊ ◊															
10.6	END OF BOREHOLE AT 10.6m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.																

GRAIN SIZE DISTRIBUTION

FIGURE E1

SAND to SAND & GRAVEL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+899 19L	1.83	219.09
⊠	12+926 28R	14.02	205.77
▲	12+950 19L	1.07	219.40
★	12+976 1R	12.50	208.00
⊙	13+026 29L	12.50	207.66
⊕	13+049 18R	9.24	210.42

Date February 2014

WP#



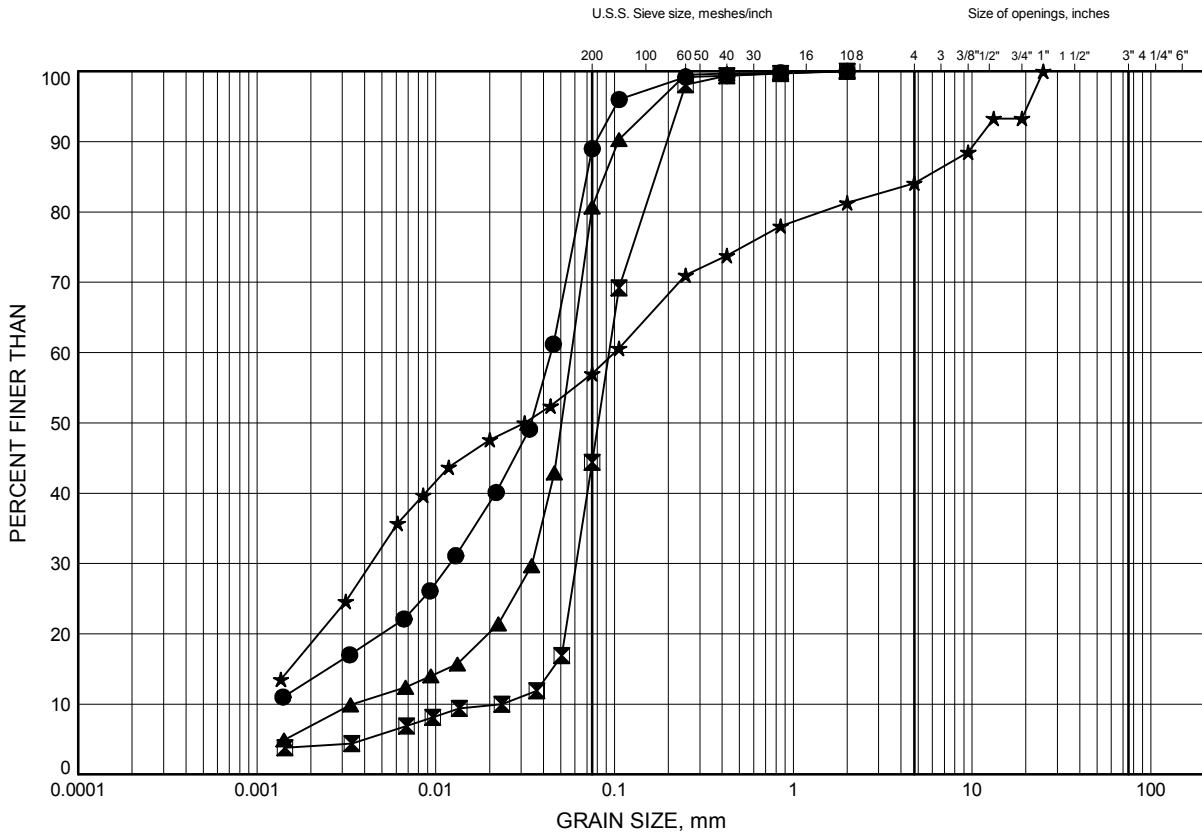
Prep'd AN

Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE E2

SILT, Some SAND to SANDY



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+826 28R	2.59	217.72
◻	12+876 CL	1.07	219.58
▲	12+926 29L	2.59	217.84
★	13+026 29L	0.30	219.85

Date February 2014

WP#



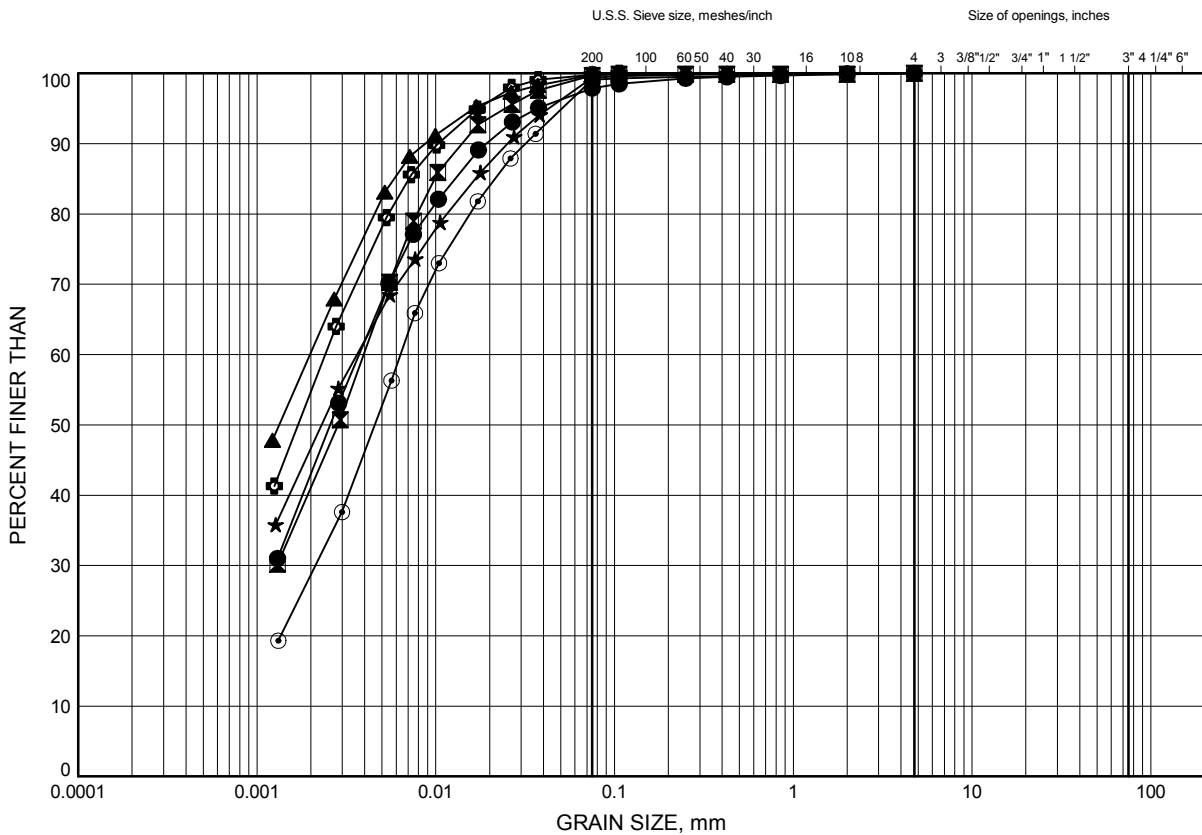
Prep'd AN

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GRAIN SIZE DISTRIBUTION

FIGURE E3

SILTY CLAY



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+750 19R	0.30	220.64
⊠	12+776 CL	3.35	218.15
▲	12+826 28R	6.40	213.91
★	12+850 19R	15.54	204.73
⊙	12+876 CL	4.88	215.77
⊕	12+876 CL	20.12	200.53

Date February 2014

WP#



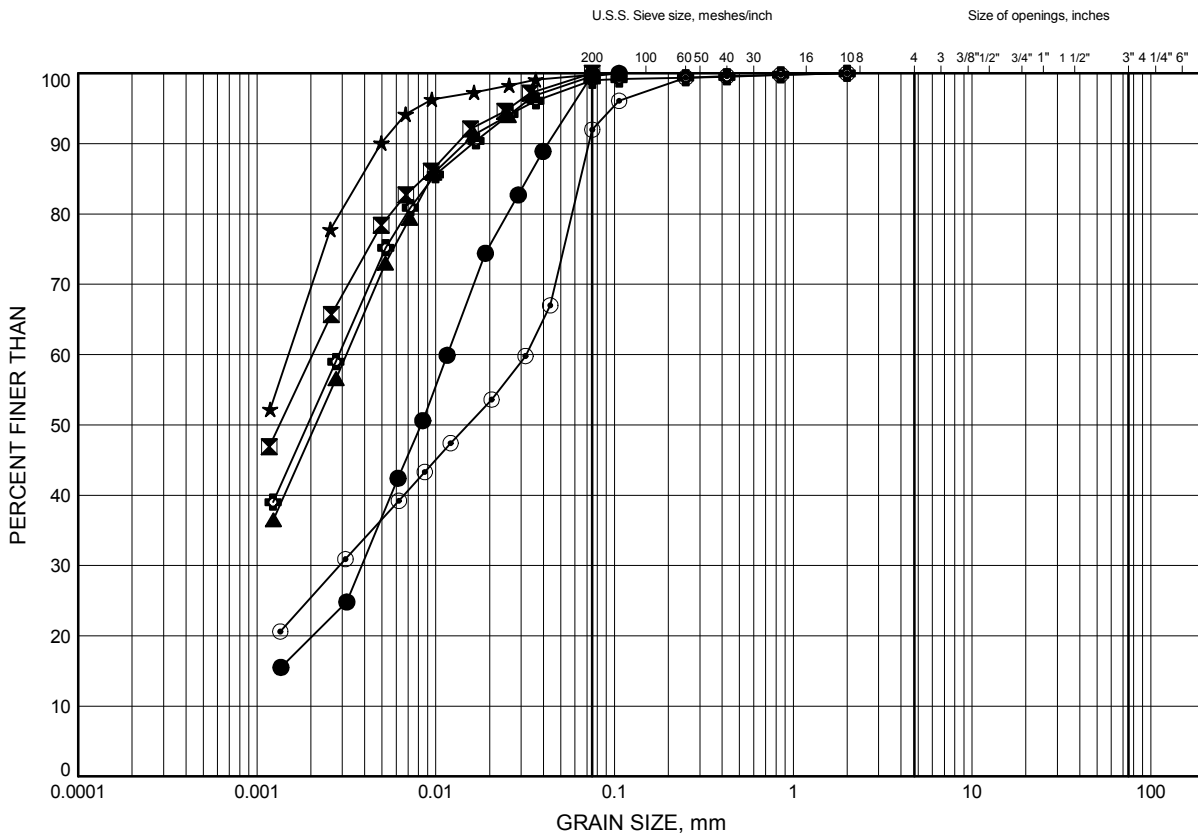
Prep'd AN

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GRAIN SIZE DISTRIBUTION

FIGURE E4

SILTY CLAY



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+899 19L	7.92	212.99
⊠	12+900 19R	1.83	218.36
▲	12+926 28R	7.92	211.87
★	12+926 28R	10.97	208.82
⊙	12+926 29L	7.92	212.51
⊕	12+950 19R	1.07	218.69

Date February 2014

WP#



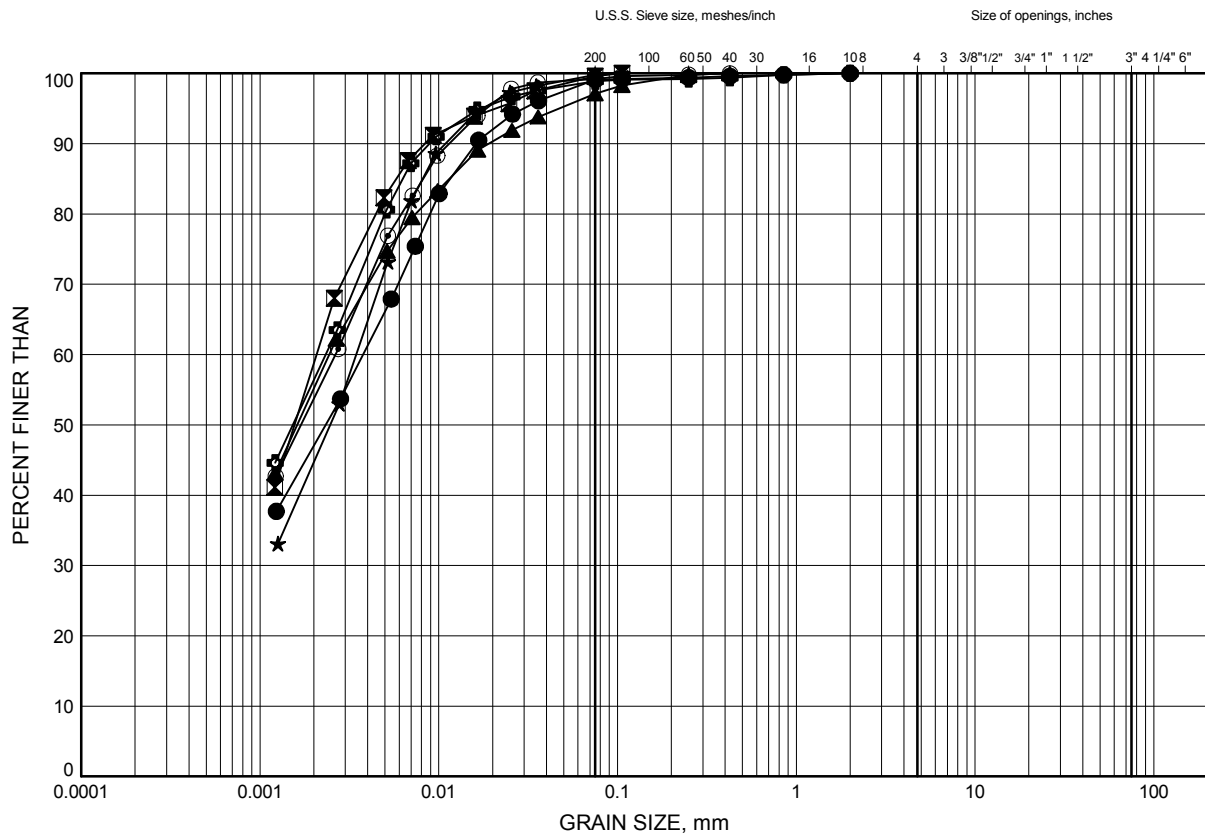
Prep'd AN

Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE E5

SILTY CLAY



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+950 19R	12.50	207.26
⊠	12+976 1R	2.59	217.90
▲	13+000 19L	1.07	219.24
★	13+000 19L	3.35	216.96
⊙	13+000 19R	4.88	215.01
⊕	13+026 28R	1.83	218.08

Date February 2014

WP#



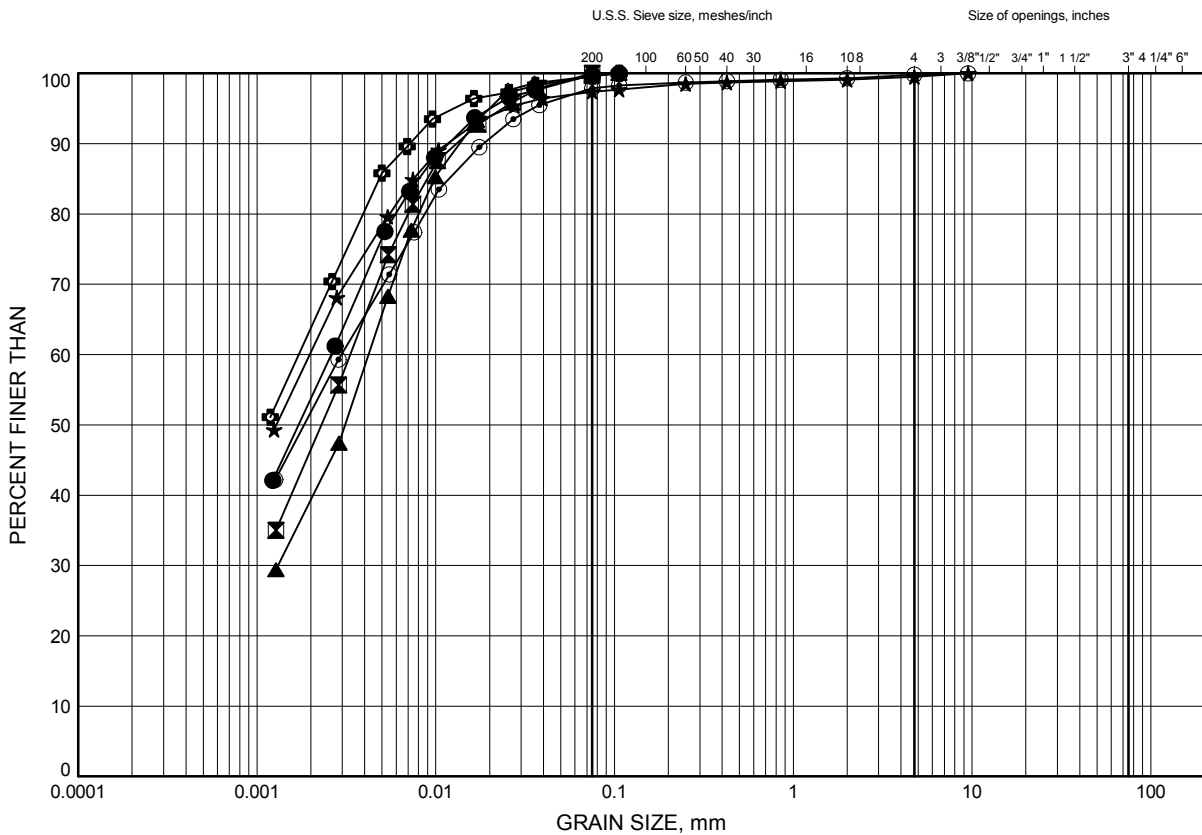
Prep'd AN

Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE E6

SILTY CLAY



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	13+026 28R	4.88	215.04
⊠	13+026 29L	6.40	213.76
▲	13+049 18R	2.59	217.08
★	13+050 19L	1.07	219.09
⊙	13+050 19L	12.50	207.66
⊕	13+076 06R	6.40	213.63

Date February 2014

WP#



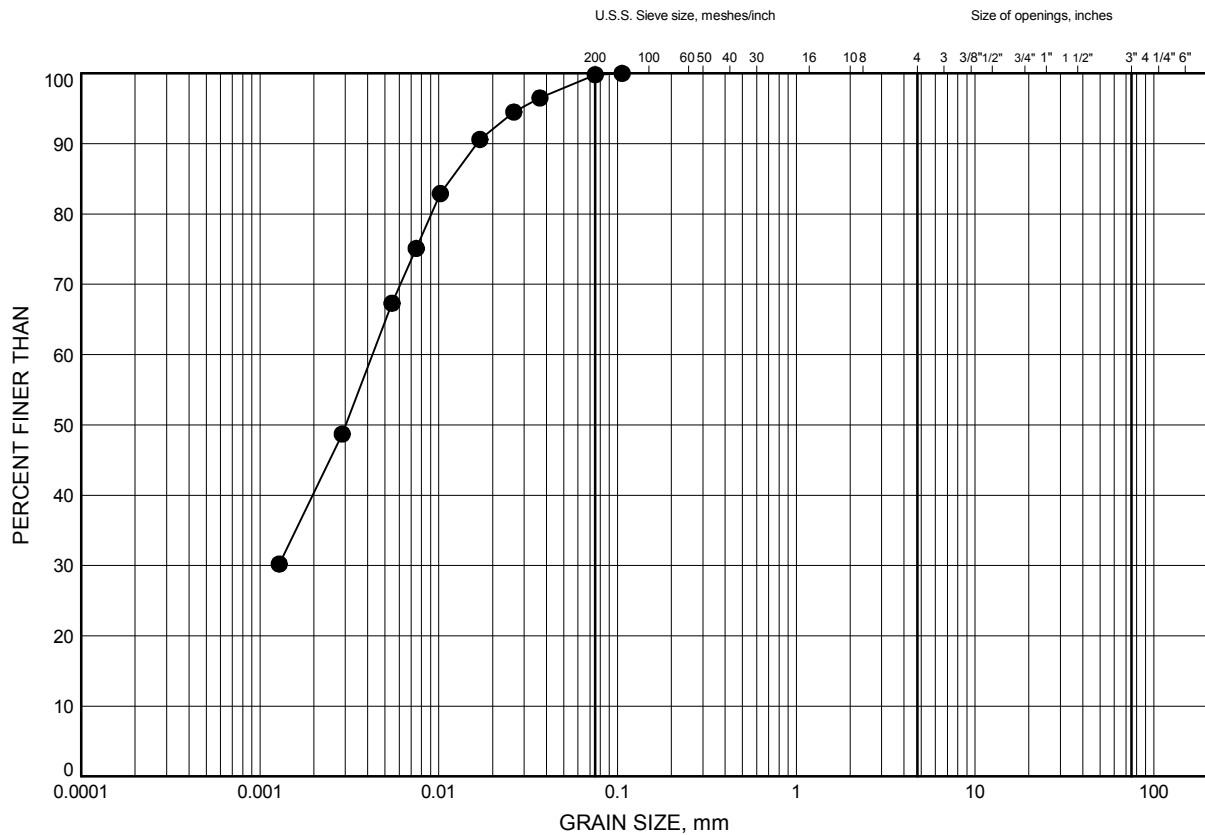
Prep'd AN

Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE E7

SILTY CLAY



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	13+100 4.9R	3.35	216.80

Date February 2014

WP#



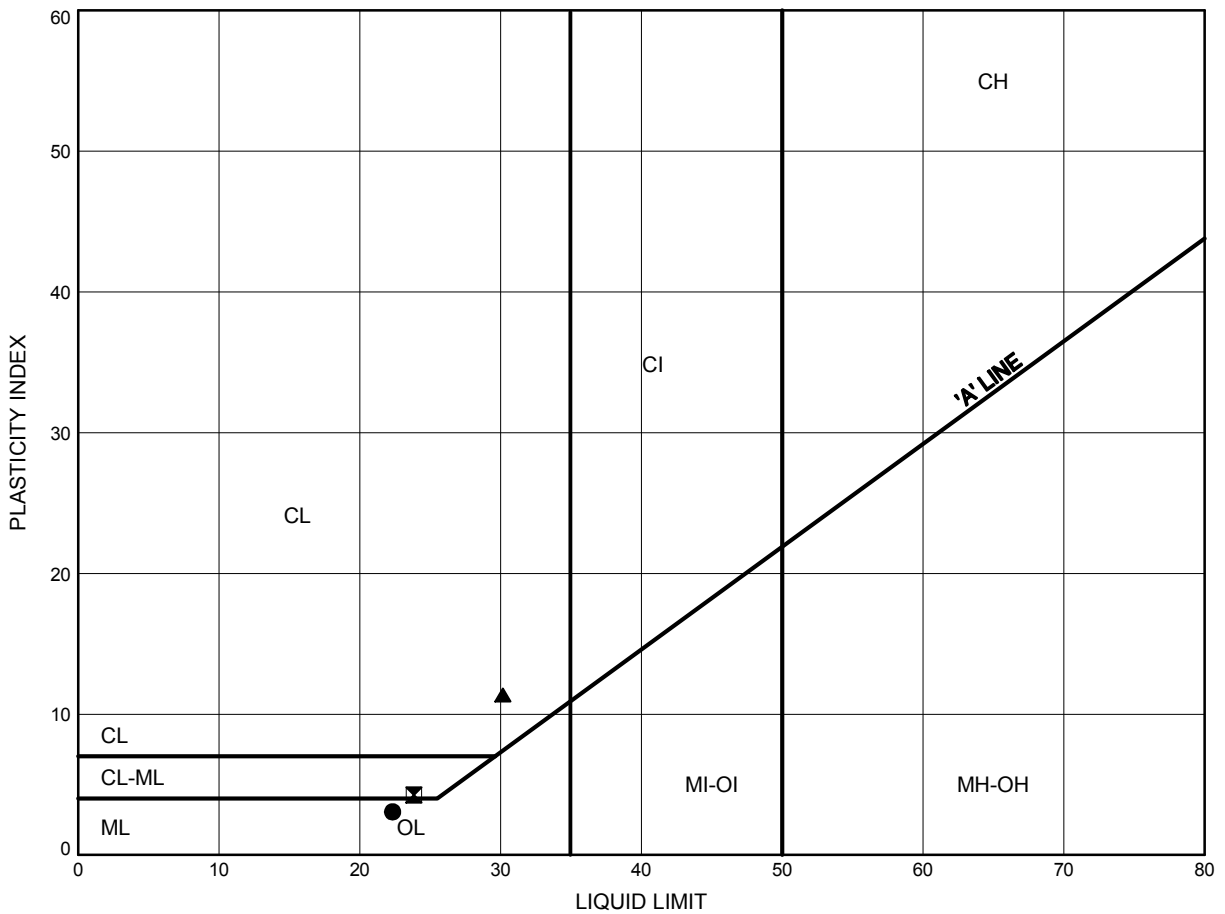
Prep'd AN

Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE E8

SILT, Some SAND to SANDY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+826 28R	2.59	217.72
⊠	12+950 19L	3.35	217.11
▲	13+026 29L	0.30	219.85

Date February 2014

WP#



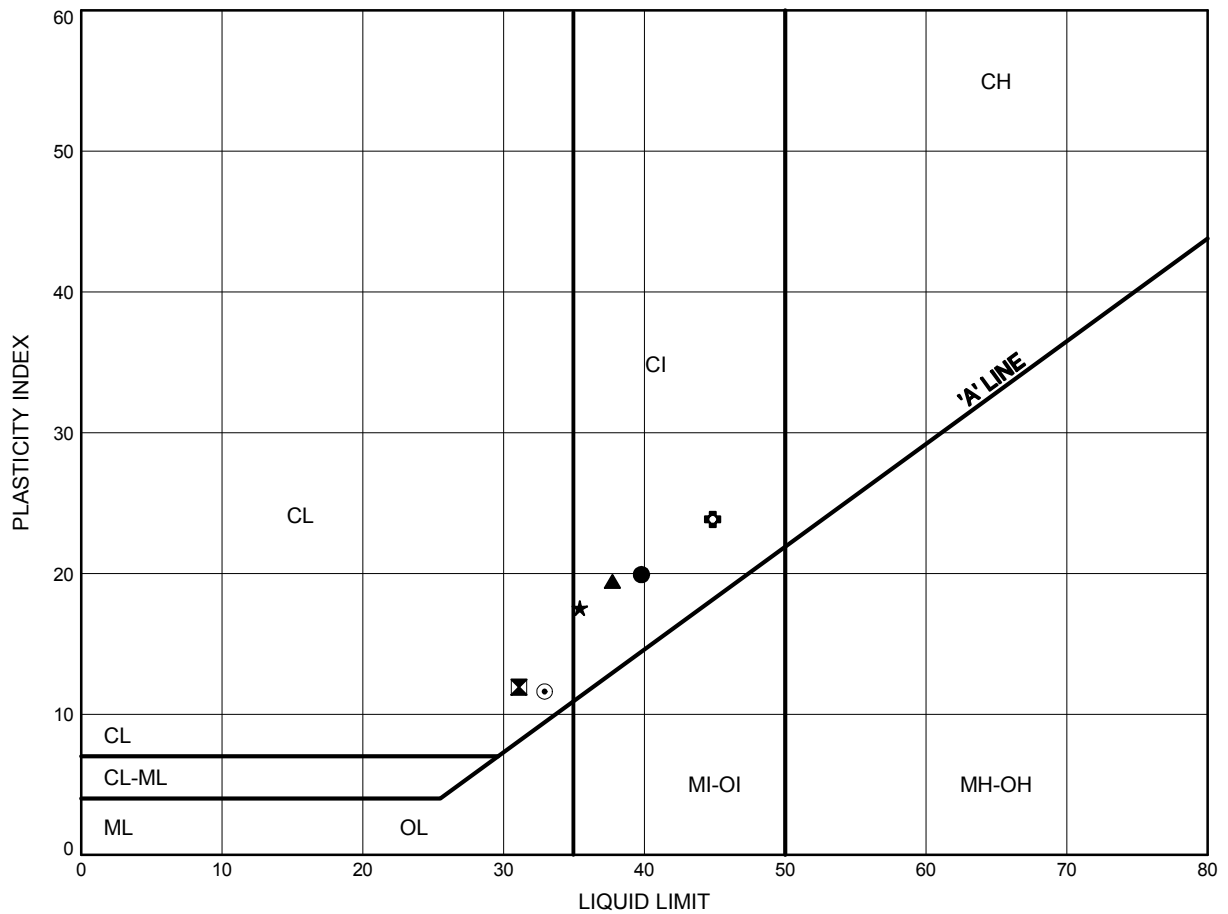
Prep'd AN

Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE E9

SILTY CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+750 19R	0.30	220.64
⊠	12+776 CL	3.35	218.15
▲	12+850 19R	15.54	204.73
★	12+850 19R	24.69	195.59
⊙	12+876 CL	4.88	215.77
⊕	12+876 CL	20.12	200.53

Date February 2014

WP#



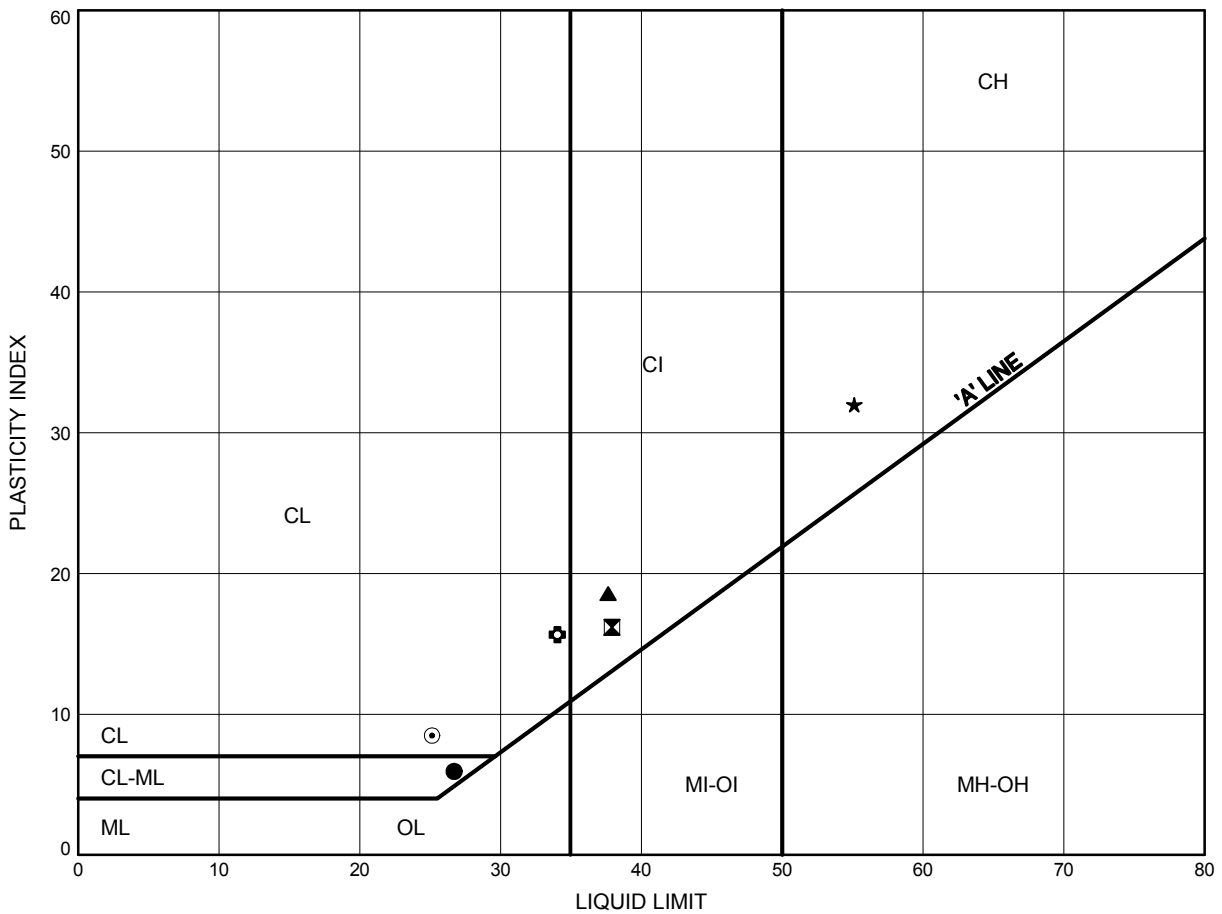
Prep'd AN

Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE E10

SILTY CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+899 19L	7.92	212.99
⊠	12+900 19R	1.83	218.36
▲	12+926 28R	7.92	211.87
★	12+926 28R	10.97	208.82
⊙	12+926 29L	7.92	212.51
⊕	12+950 19L	7.92	212.54

Date February 2014

WP#



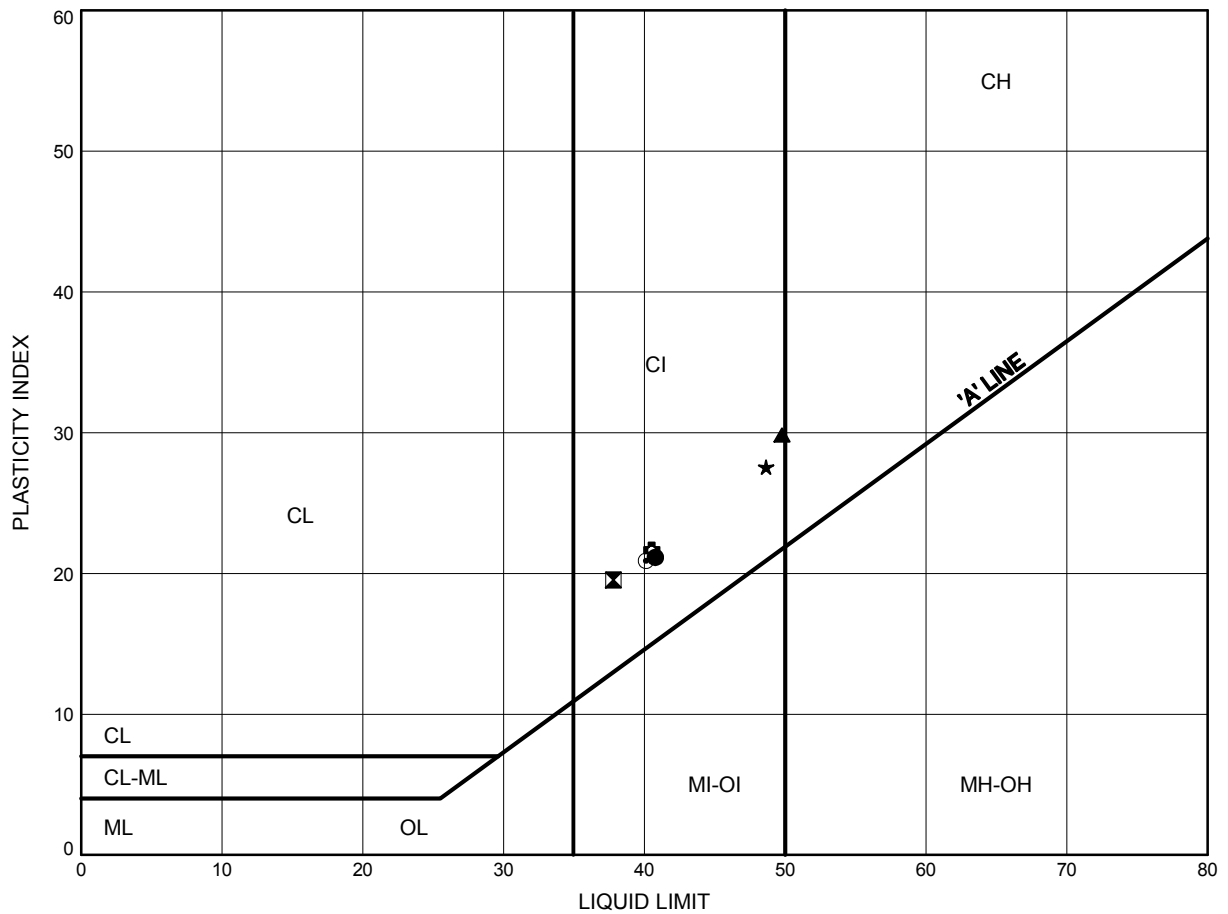
Prep'd AN

Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE E11

SILTY CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	12+950 19R	1.07	218.69
⊠	12+950 19R	12.50	207.26
▲	12+976 1R	2.59	217.90
★	13+000 19L	1.07	219.24
⊙	13+000 19L	3.35	216.96
⊕	13+000 19R	4.88	215.01

Date February 2014

WP#



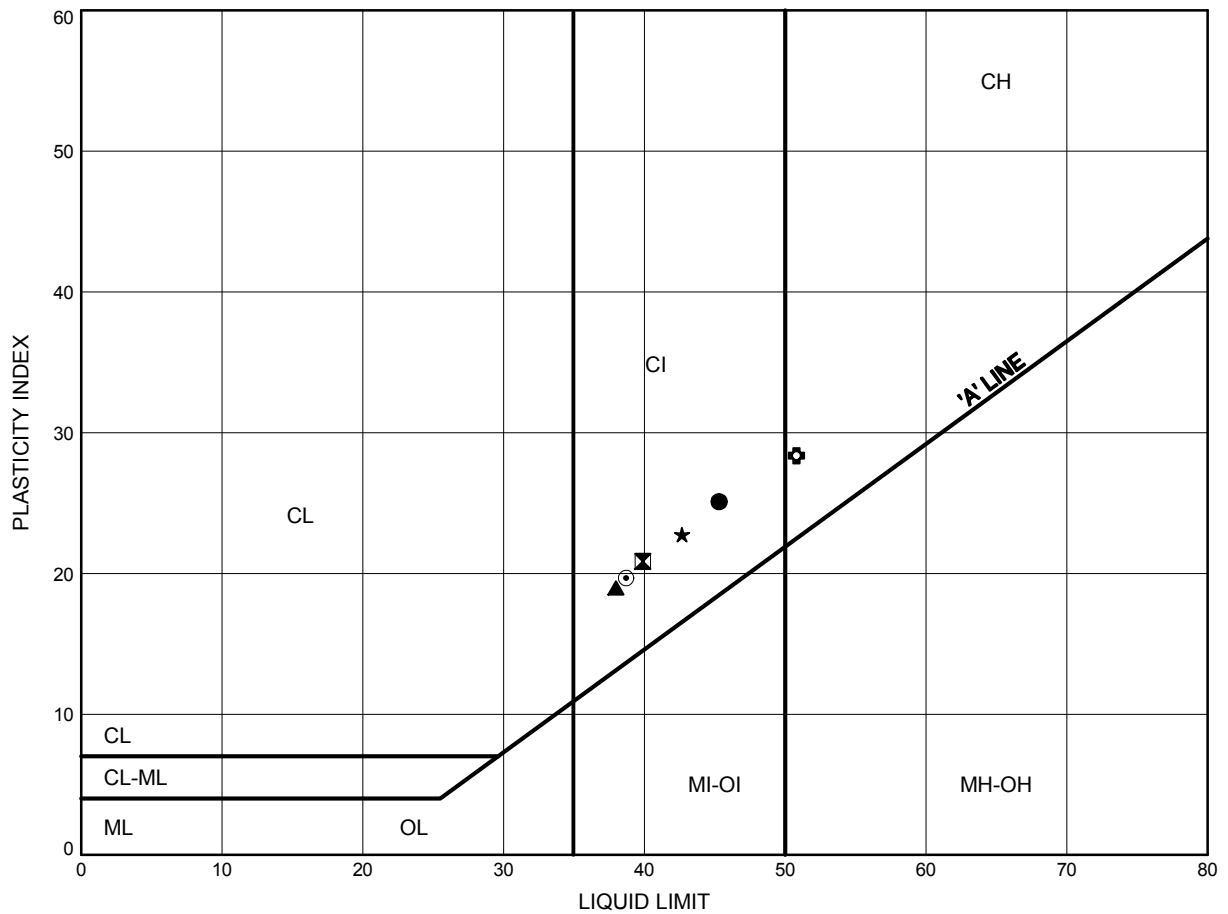
Prep'd AN

Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE E12

SILTY CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	13+026 28R	1.83	218.08
⊠	13+026 28R	4.88	215.04
▲	13+026 29L	6.40	213.76
★	13+026 29L	10.97	209.18
⊙	13+049 18R	2.59	217.08
⊕	13+050 19L	1.07	219.09

Date February 2014

WP#



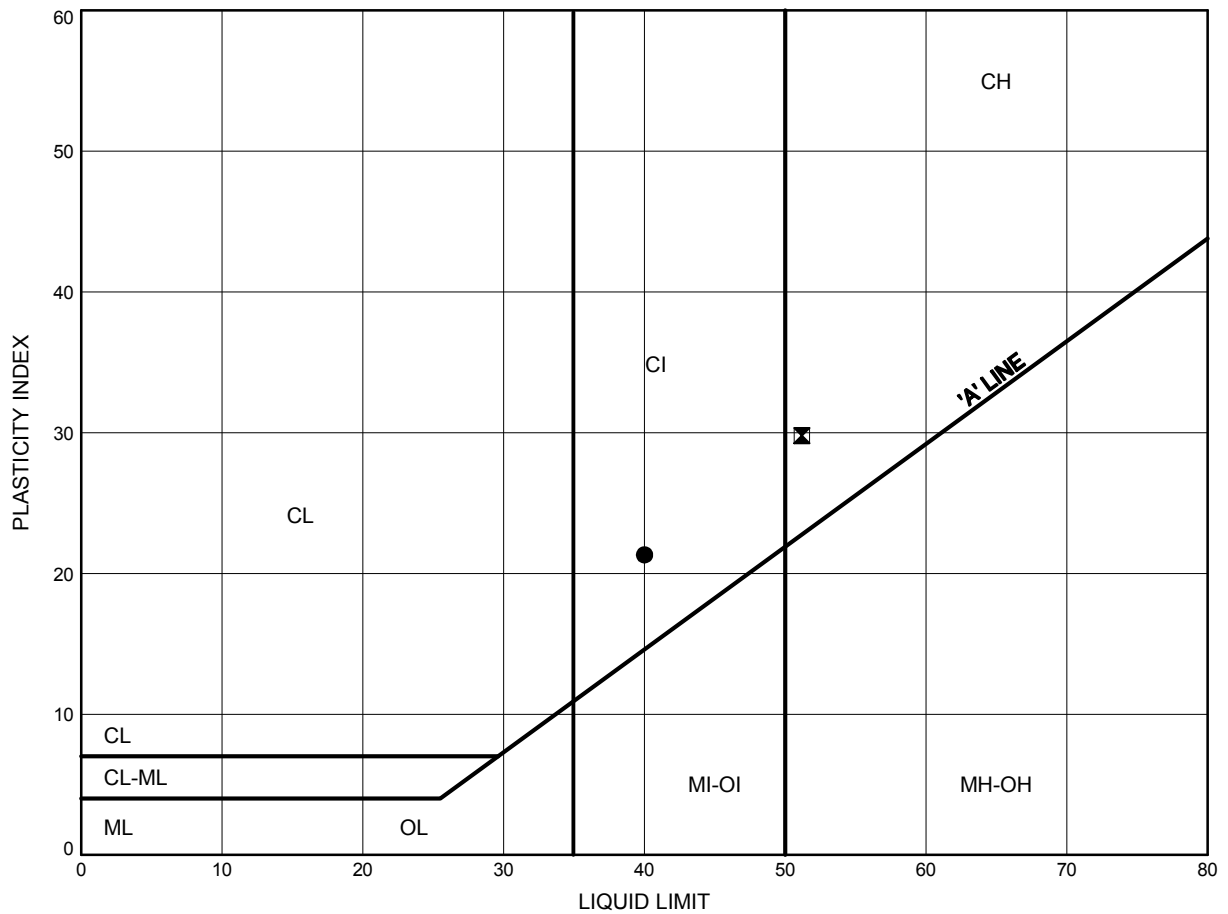
Prep'd AN

Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE E13

SILTY CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	13+050 19L	12.50	207.66
⊠	13+076 06R	6.40	213.63

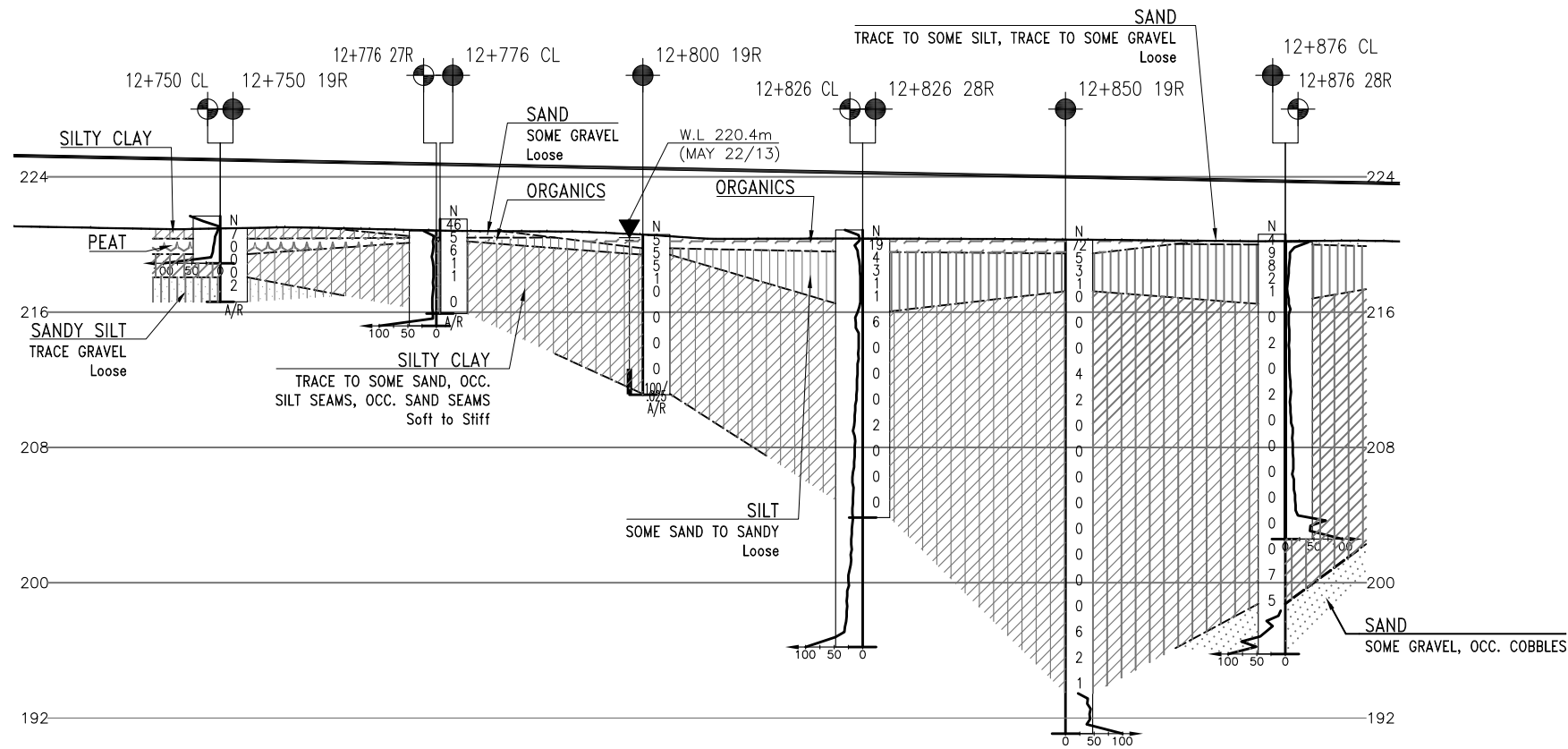
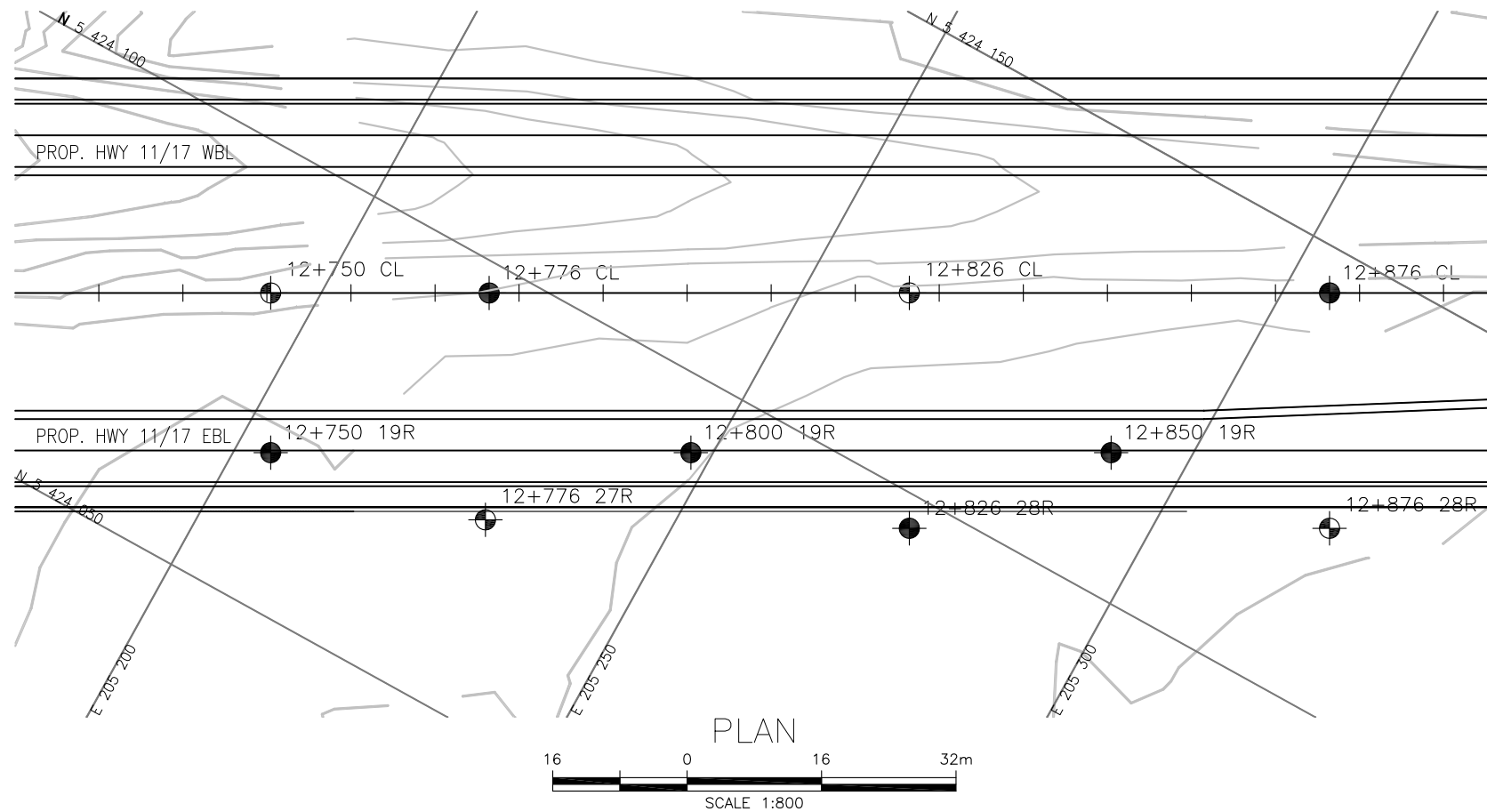
Date February 2014

WP#



Prep'd AN

Chkd. MEF



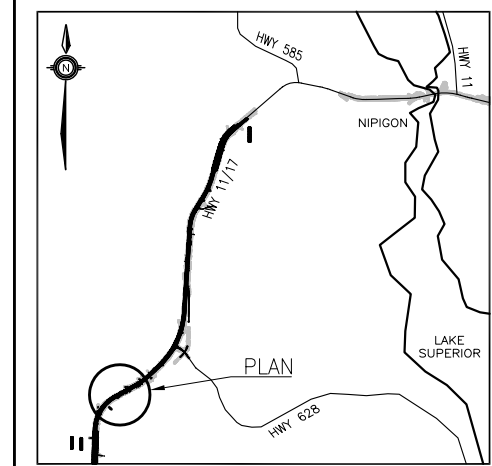
METRIC

DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No 2014-6026
GWP No 647-89-00

HWY 11/17 FOUR LANING
EASTBOUND LANES
(STA. 12+750 TO 12+880)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

- Borehole
- Cone
- N Blows /0.3m (Std Pen Test, 475J/blow)
- CONE Blows /0.3m (60' Cone, 475J/blow)
- PH Pressure, Hydraulic
- Water Level
- Head Artesian Water
- Piezometer
- 90% Rock Quality Designation (RQD)
- A/R Auger Refusal

NO	ELEVATION	NORTHING	EASTING
12+750 19R	221.0	5 424 067.4	205 203.9
12+750 CL	221.7	5 424 084.0	205 194.7
12+776 27R	220.8	5 424 072.7	205 230.2
12+776 CL	221.5	5 424 096.6	205 217.5
12+800 19R	220.6	5 424 091.6	205 247.7
12+826 28R	220.3	5 424 096.3	205 274.8
12+826 CL	220.9	5 424 120.8	205 261.2
12+850 19R	220.3	5 424 115.8	205 291.4
12+876 28R	220.1	5 424 120.5	205 318.5
12+876 CL	220.6	5 424 145.0	205 305.0

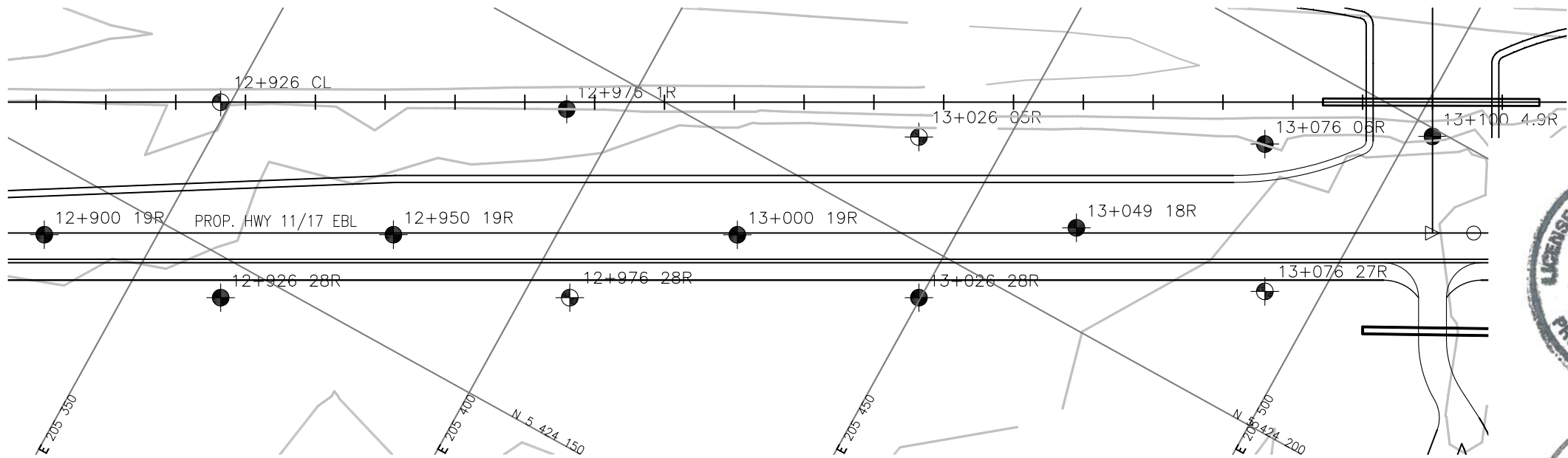
-NOTES-

- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 52A-182

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	SBP	CHK JPL	CODE
DRAWN	MFA	CHK SBP	SITE
LOAD	DATE	OCT. 2014	
STRUCT	DWG	6	

DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING



13+026 28R	219.9	5 424 193.1	205 449.8
13+026 29L	220.2	5 424 243.0	205 422.2
13+049 18R	219.7	5 424 212.8	205 464.7
13+050 19L	220.2	5 424 245.9	205 448.0
13+076 06R	220.0	5 424 236.4	205 482.5
13+076 27R	219.3	5 424 217.9	205 492.7
13+077 28L	219.7	5 424 266.6	205 466.9
13+100 19L	219.9	5 424 270.1	205 491.8
13+100 4.9R	220.2	5 424 248.9	205 503.0

METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

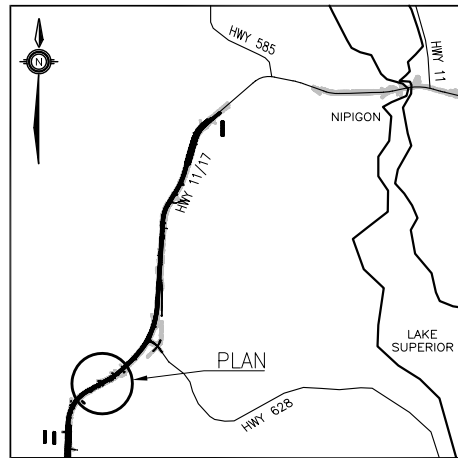


CONT No 2014-6026
GWP No 647-89-00

HWY 11/17 FOUR LANING
EASTBOUND LANES
(STA. 12+900 TO 13+100)
BOREHOLE LOCATIONS AND SOIL STRATA



SHEET



KEYPLAN

LEGEND

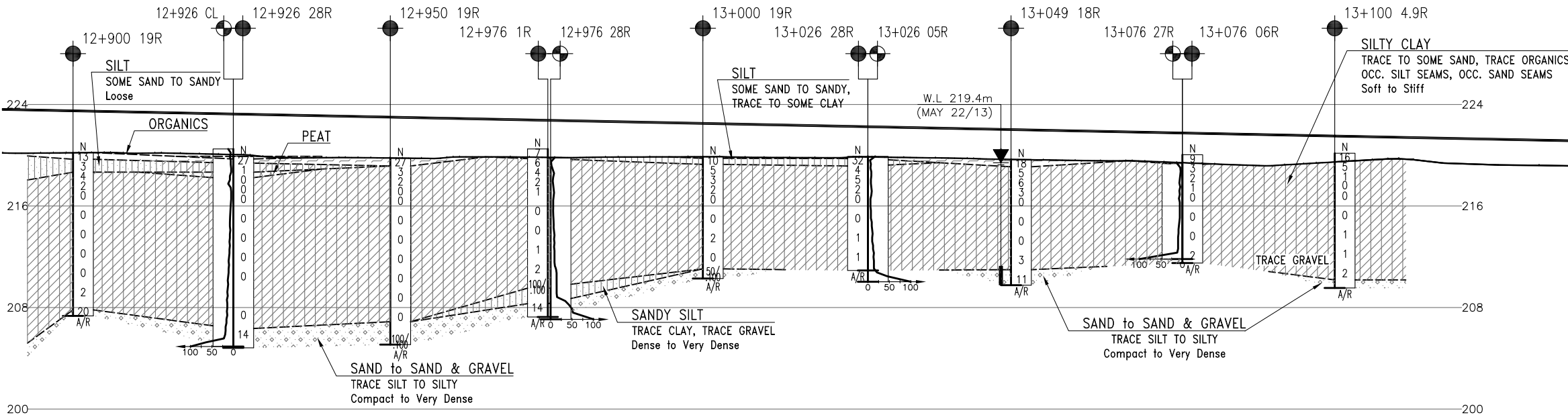
	Borehole
	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
12+899 19L	220.9	5 424 172.8	205 315.9
12+900 19R	220.2	5 424 140.4	205 335.8
12+926 28R	219.8	5 424 144.7	205 362.3
12+926 29L	220.4	5 424 194.6	205 334.7
12+926 CL	220.6	5 424 169.2	205 348.7
12+950 19L	220.5	5 424 197.8	205 361.2
12+950 19R	219.8	5 424 164.6	205 379.6
12+976 1R	220.5	5 424 192.3	205 392.6
12+976 28R	219.8	5 424 168.9	205 406.0
12+976 29L	220.3	5 424 218.8	205 378.4
13+000 19L	220.3	5 424 221.7	205 404.3
13+000 19R	219.9	5 424 188.4	205 422.7
13+026 05R	219.9	5 424 213.2	205 438.6

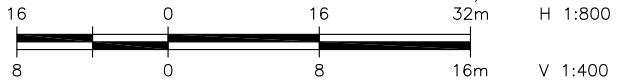
NOTES

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GEOCRES No. 52A-182



PROFILE ALONG CL HIGHWAY 11/17 EBL

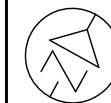


DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	SBP	CHK JPL	CODE
DRAWN	MFA	CHK SBP	SITE
			STRUCT
			DWG 7
			DATE OCT. 2014

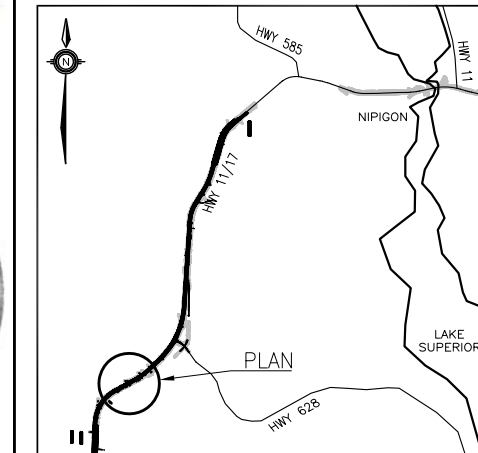
METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No 2014-6026
GWP No 647-89-00



HWY 11/17 FOUR LANING
WESTBOUND LANES
(STA. 12+900 TO 13+100)
BOREHOLE LOCATIONS AND SOIL STRATA

SHEET



KEYPLAN

LEGEND

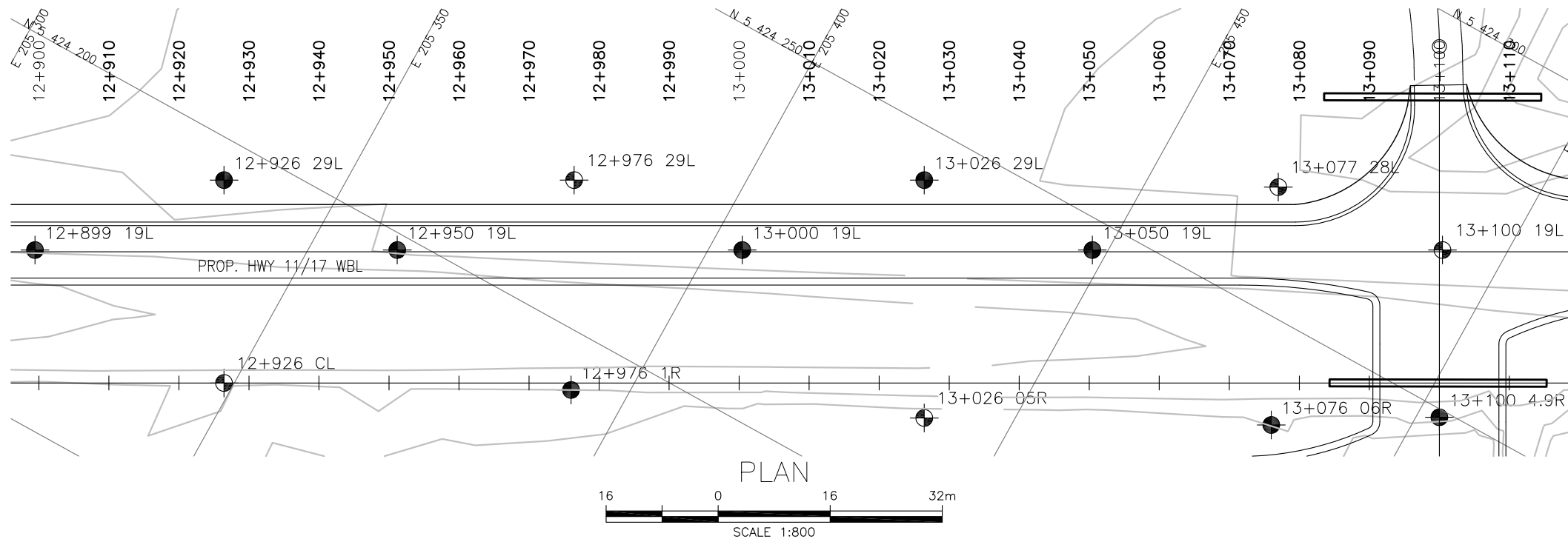
- Borehole
- Cone
- N Blows /0.3m (Std Pen Test, 475J/blow)
- CONE Blows /0.3m (60' Cone, 475J/blow)
- PH Pressure, Hydraulic
- Water Level
- Head Artesian Water
- Piezometer
- 90% Rock Quality Designation (RQD)
- A/R Auger Refusal

NO	ELEVATION	NORTHING	EASTING
12+899 19L	220.9	5 424 172.8	205 315.9
12+900 19R	220.2	5 424 140.4	205 335.8
12+926 28R	219.8	5 424 144.7	205 362.3
12+926 29L	220.4	5 424 194.6	205 334.7
12+926 CL	220.6	5 424 169.2	205 348.7
12+950 19L	220.5	5 424 197.8	205 361.2
12+950 19R	219.8	5 424 164.6	205 379.6
12+976 1R	220.5	5 424 192.3	205 392.6
12+976 28R	219.8	5 424 168.9	205 406.0
12+976 29L	220.3	5 424 218.8	205 378.4
13+000 19L	220.3	5 424 221.7	205 404.3
13+000 19R	219.9	5 424 188.4	205 422.7
13+026 05R	219.9	5 424 213.2	205 438.6

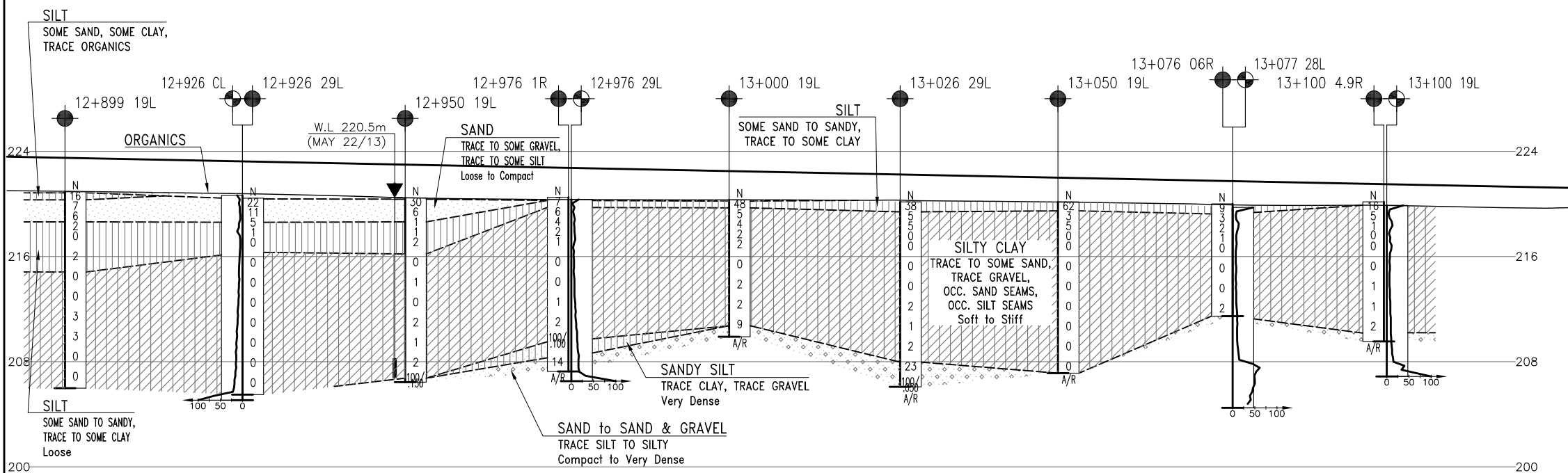
NOTES

- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

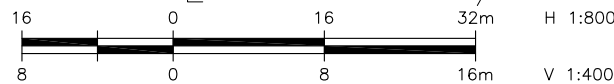
GEOCRES No. 52A-182



13+026 28R	219.9	5 424 193.1	205 449.8
13+026 29L	220.2	5 424 243.0	205 422.2
13+049 18R	219.7	5 424 212.8	205 464.7
13+050 19L	220.2	5 424 245.9	205 448.0
13+076 06R	220.0	5 424 236.4	205 482.5
13+076 27R	219.3	5 424 217.9	205 492.7
13+077 28L	219.7	5 424 266.6	205 466.9
13+100 19L	219.9	5 424 270.1	205 491.8
13+100 4.9R	220.2	5 424 248.9	205 503.0



PROFILE ALONG CL HIGHWAY 11/17 WBL



DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	SBP	CHK JPL	CODE
DRAWN	MFA	CHK SBP	SITE
LOAD	DATE	OCT. 2014	DWG 8

Appendix F

Highway 11/17 EBL and WBL

Sta. 13+300 to 13+450

Record of Borehole Sheets
Laboratory Test Results
Borehole Location and Soil Strata Drawings

RECORD OF BOREHOLE No 13+300 19L

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 366.9 E 205 666.8 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.11 - 2013.02.12 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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					WATER CONTENT (%)								
								○ UNCONFINED + FIELD VANE					w _p w w _L								
								● QUICK TRIAXIAL × LAB VANE													
215.9							20	40	60	80	100										
0.0	ORGANICS: (175mm)																				
0.2	Silty CLAY Firm Brown																				
	trace roots, trace rootlets		1	SS	3																
			2	SS	2											0 0 39 61					
	silt seams		3	SS	0																
	Grey		4	SS	0																
			5	SS	0											0 0 54 46					
			6	SS	0																

Continued Next Page

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

RECORD OF BOREHOLE No 13+300 19L

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 366.9 E 205 666.8 ORIGINATED BY ES
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.02.11 - 2013.02.12 CHECKED BY MEF

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									WATER CONTENT (%)				
								20 40 60 80 100									20 40 60				
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE													
	Continued From Previous Page																				
	Silty CLAY Firm Grey								3.2 +												
			9	SS	2		205														
							204		3.8 +												
			10	SS	2																
							203														
202.6	Stiff								3.8 +												
13.4 202.3	Possible SAND and GRAVEL (augers grinding)																				
13.7	END OF BOREHOLE AT 13.7m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE OPEN AND WATER LEVEL AT 3.8m UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 2.3m, THEN CUTTINGS TO SURFACE.																				

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

RECORD OF BOREHOLE No 13+300 19R

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 333.7 E 205 685.2 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.13 - 2013.02.14 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				GR	SA	SI	CL	
216.5						▽												
0.0	ICE: (175mm)																	
216.2	TOPSOIL: (125mm)																	
0.3	Silty Clay , trace roots, trace rootlets, topsoil stained Firm to Soft Brown																	
			1	SS	3													
			2	SS	1													
	Brown to Grey																	
			3	SS	0												0 0 37 63	
	Grey		4	SS	0													
	Soft							4.2 +										
			5	SS	0													
	Firm						3.3 +											
	trace sand seams		6	SS	0													
							2.9 +											
			7	SS	0											0 0 53 47		
			8	SS	1													

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15 10 5 0
(%) STRAIN AT FAILURE

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 13+321 17.4L

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 375.5 E 205 685.5 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.02.11 - 2013.02.11 CHECKED BY MEF

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						
215.5														
0.0	ORGANICS: (175mm)													
0.2	Silty CLAY, trace organics Brown (FILL, FROZEN)		1	SS	21									
213.8														
1.7	SAND, some silt to silty, trace clay Loose to Compact Brown Moist (FILL)		2	SS	5									
			3	SS	2									
			4	SS	26									
211.9														
211.8	ORGANICS													
3.7	Silty CLAY, trace roots, trace rootlets Firm to Soft Brown to Grey		5	SS	3									
	Grey		6	SS	0									
	Soft													
			7	SS	1									
			8	SS	2									

Continued Next Page



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

RECORD OF BOREHOLE No 13+321 17.4L

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 375.5 E 205 685.5 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.02.11 - 2013.02.11 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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				WATER CONTENT (%)							
								20 40 60 80 100	○ UNCONFINED + FIELD VANE	● QUICK TRIAXIAL × LAB VANE	W _P W W _L								
	Continued From Previous Page																		
203.0	Silty CLAY Firm Grey						205		3.1 +										
			9	SS	2														
12.5	SAND , some silt to silty, trace clay Loose Grey Wet		10	SS	6		203												
201.4			11	SS	100/ .075														
14.1	END OF BOREHOLE AT 14.1m UPON REFUSAL ON PROBABLE BEDROCK OR BOULDER. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 1.5m, THEN CUTTINGS TO SURFACE.																		

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

METRIC

SOIL PROFILE					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES		
			NUMBER	TYPE	"N" VALUES
GROUND WATER CONDITIONS					
ELEVATION SCALE	<div>DYNAMIC CONE PENETRATION RESISTANCE PLOT<div>20406080100</div><div>SHEAR STRENGTH kPa<div>○ UNCONFINED + FIELD VANE● QUICK TRIAXIAL × LAB VANE</div></div><div>PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT<div>w P w w L</div></div><div>WATER CONTENT (%)<div>204060</div></div></div>				
UNIT WEIGHT	γ				
REMARKS & GRAIN SIZE DISTRIBUTION (%)	GR SA SI CL				
215.4 0.0	Auger to 0.8m due to frozen material				
214.7 0.8	Start DCPT at 0.8m				
215					
214					
213					
212					
211					
210					
209					
208					
207					
206					

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 13+324 27L

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 385.3 E 205 683.4 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.02.09 - 2013.02.09 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE WATER CONTENT (%) 20 40 60 PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT W _p W 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					
	Continued From Previous Page									
200.2										
15.2	END OF DCPT AT 15.2m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.									

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 13+325 30R

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 336.2 E 205 712.4 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.02.14 - 2013.02.14 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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	W P	W	W L	WATER CONTENT (%)		
	Continued From Previous Page						20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	20 40 60						
200.6							205							
							204							
							203							
							202							
							201							
14.9	END OF DCPT AT 14.9m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.													

RECORD OF BOREHOLE No 13+340 19R

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 353.2 E 205 720.2 ORIGINATED BY GA
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2013.02.20 - 2013.02.20 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT		UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	W _P W W _L	WATER CONTENT (%)			
								SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					
214.2								20 40 60 80 100		20 40 60			
0.0	TOPSOIL: (150mm)												
0.2	Silty CLAY, trace rootlets, trace organics						214						
	Firm Brown												
	occasional rootlets		1	SS	4							91	
							213						
			2	SS	3								0 1 31 68
							212						
	trace sand seams		3	SS	0								
							211						
	Grey		4	SS	0								
							210	3.5					
			5	SS	0								
							209	3.6					
						208							
		6	SS	1									
						207	3.1						
		7	SS	2								0 1 50 49	
						206	2.7						
	trace gravel		8	SS	2								

Continued Next Page

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

RECORD OF BOREHOLE No 13+340 19R

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 353.2 E 205 720.2 ORIGINATED BY GA
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2013.02.20 - 2013.02.20 CHECKED BY MEF






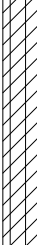


SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE							
								WATER CONTENT (%)							
	Continued From Previous Page						20	40	60	80	100	PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	
201.7	Silty CLAY , trace gravel Firm Grey		9	SS	4		2.8								
12.5	Gravelly SAND , trace silt Very Loose to Loose Grey Moist to Wet		10	SS	2		4.2								
200.5	Unable to take SPT sample at 13.7m (auger filled with gravelly sand)														
13.7	END OF BOREHOLE AT 13.7m. BOREHOLE OPEN TO 13.1m AND WATER LEVEL AT 11.9m UPON COMPLETION. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) May22/13 1.3 212.9														

RECORD OF BOREHOLE No 13+350 19L

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 391.1 E 205 710.3 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.02.09 - 2013.02.09 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				W P W W L								
								○ UNCONFINED + FIELD VANE				WATER CONTENT (%)								
								● QUICK TRIAXIAL × LAB VANE												
215.1							20	40	60	80	100									
0.0	Gravelly SAND , trace to some silt, trace clay, trace cobbles Brown Moist (FILL)		1	GS			215							○					29 50 21 (SI+CL)	
			1	SS	23		214								○					
213.6																				
1.5	Silty CLAY , some sand Firm Brown (FILL)		2	SS	6		213								○					
212.9																○				
2.2	ORGANIC SILT , trace to some sand, trace clay Loose Grey Moist			3	SS		4	212								○				
212.2																				
2.9	Silty CLAY , some sand, trace gravel, trace roots, trace rootlets Soft to Stiff Dark Brown			4	SS		11	211												
	wood fragments		5	SS	2		210										○			
	Stiff						209								○					
			6	SS	1	208														
	Grey		7	SS	2	207									○					
	Soft																			
							206													
			8	SS	2															

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 13+350 19L

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 391.1 E 205 710.3 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.02.09 - 2013.02.09 CHECKED BY MEF

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									WATER CONTENT (%)		
								20	40	60	80						100	20	40
Continued From Previous Page																			
201.5	Silty CLAY Soft Grey						205	2.7											
			9	SS	1														
			10	SS	0														
13.6	SAND and SILT , trace gravel Very Loose Grey Wet						202	2.5											
200.8			11	SS	1		201												
14.3	END OF BOREHOLE AT 14.3m. BOREHOLE OPEN TO 12.6m AND WATER LEVEL AT 5.2m UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 2.3m, THEN CUTTINGS TO SURFACE.																		





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

RECORD OF BOREHOLE No 13+368.4 24.6L

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 404.8 E 205 722.9 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.02.08 - 2013.02.08 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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				W P W W L					
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE				WATER CONTENT (%)					
								20 40 60 80 100	20 40 60								
215.2	0.0	Sandy SILT , some clay, trace to some gravel, trace cobbles Loose Brown Moist (FILL)					215								3 27 55 15		
				1	SS	8											No recovery
				2	SS	7											
		3	SS	6													
212.3	2.9	Silty CLAY , trace silt seams Soft to Firm Grey					212								0 0 44 56		
				4	SS	2											
				5	SS	4											
		Stiff					211										
				6	SS	4											
				7	SS	1											
		Firm					210										
				8	SS	1											
							209										
							208										
							207										
							206										

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 13+368.4 24.6L

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 404.8 E 205 722.9 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.02.08 - 2013.02.08 CHECKED BY MEF

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									WATER CONTENT (%)			
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE												
	Continued From Previous Page							20	40	60	80	100	20	40	60					
	Silty CLAY , trace silt seams Firm Grey						205	3.3												
			9	SS	0									○						
	Soft						204													
								2.5 +												
			10	SS	1		203							○						
							202	2.2 +												
201.7 13.4	SILT , some sand, trace clay Loose Grey Wet		11	SS	6		201							○						
200.8 14.3	END OF BOREHOLE AT 14.3m. BOREHOLE OPEN TO 12.3m AND WATER LEVEL AT 5.0m UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 1.1m, THEN CUTTINGS TO SURFACE.																			

RECORD OF BOREHOLE No 13+375 30R

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 361.2 E 205 756.5 ORIGINATED BY GA
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2013.02.23 - 2013.02.23 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					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							WATER CONTENT (%)		
								20 40 60 80 100							w _p w w _L		
212.1								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE									
0.0	ORGANIC SILT , some clay to clayey, trace sand, trace rootlets Dark Brown Loose to Very Loose Moist						212										
			1	SS	2		211							○			
			2	SS	2		210							○			
	trace grey sand seams																
			3	SS	0									○			
209.1																	
3.0	Silty CLAY , trace organics Soft to Firm Grey		4	SS	0		209							○			
							208										
			5	SS	0									○			
							207										
	Firm							3.7									
	trace sand seams		6	SS	0		206							○			
							205										
			7	SS	0		204							○			
								3.9									
							203							○			

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15 10 5 0
(%) STRAIN AT FAILURE

METRIC

+³, ×³: Numbers refer to Sensitivity

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

METRIC


[illegible]

RECORD OF BOREHOLE No 13+380 07R

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 383.6 E 205 749.1 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY MFA
 DATUM Geodetic DATE 2014.03.25 - 2014.03.25 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					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							WATER CONTENT (%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
								<div><div><div>20406080100</div><div></div></div></div> <div>○ UNCONFINED + FIELD VANE</div> <div>● QUICK TRIAXIAL × LAB VANE</div>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
218.4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
0.0	SAND , some silt, trace to some gravel Very Dense Brown to Reddish Brown Frozen to 1.7m (FILL)		1	GS			218																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															

Continued Next Page

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

RECORD OF BOREHOLE No 13+380 07R

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 383.6 E 205 749.1 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY MFA
DATUM Geodetic DATE 2014.03.25 - 2014.03.25 CHECKED BY MEF

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								
	Continued From Previous Page							20	40	60	80	100				
			9	SS	1											
			10	SS	1											
205.1																
13.3	END OF BOREHOLE AT 13.3m. BOREHOLE OPEN TO 11.4m AND DRY UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 1.7m, THEN CUTTINGS TO SURFACE.															

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 13+400 19L

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 416.1 E 205 752.9 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.12 - 2013.02.12 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				GR	SA	SI	CL
215.8								20 40 60 80 100		W _p W W _L							
0.0	SAND , some gravel Brown (FILL, FROZEN)							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE									
215.4								20 40 60 80 100									
0.5	Silty Clay Soft to Firm Brown Moist Grey Stiff trace silty sand seams Firm																
		1	SS	2			215										
		2	SS	2			214										
		3	SS	3													
							213										
		4	SS	5													
							212										
		5	SS	0			211										

Continued Next Page

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

RECORD OF BOREHOLE No 13+400 19L

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 416.1 E 205 752.9 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.02.12 - 2013.02.12 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
								20 40 60 80 100	W P W W L					
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE							
	Continued From Previous Page							20 40 60 80 100	20 40 60				GR SA SI CL	
201.0 14.8	Silty Clay Firm Grey													

RECORD OF BOREHOLE No 13+405.9 23.5R

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 382.7 E 205 779.7 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.02.13 - 2013.02.13 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			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		WATER CONTENT (%)				
								20 40 60 80 100	w P w w L					
216.0								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE						
0.0	TOPSOIL: (200mm)						216	20 40 60 80 100		20 40 60				
0.2	Silty CLAY, topsoil staining Firm to Soft Brown													
			1	SS	3		215							0 0 38 62
			2	SS	2		214							
			3	SS	0		213							
		trace silt seams Brown/Grey		4	SS	0	212							
		Firm					211							
				5	SS	0	210							
		Grey												
			6	SS	0	209								
			7	SS	1	208							0 0 51 49	
	Soft					207								
			8	SS	1									

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 13+405.9 23.5R

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 382.7 E 205 779.7 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.02.13 - 2013.02.13 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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			WATER CONTENT (%)				
								20 40 60 80 100	○ UNCONFINED + FIELD VANE	W P W W L					
	Continued From Previous Page							● QUICK TRIAXIAL × LAB VANE							
	Silty CLAY Firm Grey						206		3.4 +						
			9	SS	2		205						○		
							204	2.2 +							
			10	SS	1		203						○		
							202						○		
201.3			11	SS	4										
14.8	END OF BOREHOLE AT 14.8m. BOREHOLE OPEN AND DRY UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 2.6m, THEN CUTTINGS TO SURFACE.							2.3 +							

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

RECORD OF BOREHOLE No 13+424.6 5.7L

1 OF 3

METRIC

WP# 647-89-00 LOCATION N 5 424 417.4 E 205 780.3 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.06 - 2013.02.07 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	W _P	W	W _L	WATER CONTENT (%)	kN/m ³	GR SA SI CL			
216.9																	
0.0	SAND , some gravel, trace organics Brown Frozen (FILL)																
215.9							216										
1.0	Organic CLAY , with peat Brown (FROZEN)		1	SS	12												
215.4																	
1.5	Silty CLAY , trace sand Soft to Firm Brown		2	SS	3		215										
			3	SS	1		214										
	trace silt seams Grey		4	SS	3												
							213										
	Stiff							3.2 +									
			5	SS	2		212									0 2 44 54	
	Firm						211		4.7 +								
			6	SS	4												
							210										
								2.9 +									
	varved		7	SS	2		209										
							208										
			8	SS	1												
							207										

Continued Next Page

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

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 13+424.6 5.7L

3 OF 3

METRIC

WP# 647-89-00 LOCATION N 5 424 417.4 E 205 780.3 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.06 - 2013.02.07 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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					WATER CONTENT (%)				
							20	40	60	80	100	W _p	W	W _L			
196.7	Continued From Previous Page		15	SS	100/												
20.2	END OF BOREHOLE AT 20.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK OR BOULDER. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 1.5m, THEN CUTTINGS TO SURFACE.				175												

METRIC

[illegible]

(%) STRAIN AT FAILURE

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 13+425 30L

3 OF 3

METRIC

WP# 647-89-00 LOCATION N 5 424 438.4 E 205 768.0 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.07 - 2013.02.07 CHECKED BY MEF

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	WATER CONTENT (%)					
	Continued From Previous Page BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.													

RECORD OF BOREHOLE No 13+425 30R

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 387.7 E 205 800.0 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.13 - 2013.02.13 CHECKED BY MEF

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	WATER CONTENT (%)					
216.3 0.0	Start DCPT from surface						20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	20 40 60						
216														
215														
214														
213														
212														
211														
210														
209														
208														
207														

Continued Next Page

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

RECORD OF BOREHOLE No 13+425 30R

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 387.7 E 205 800.0 ORIGINATED BY ES
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.02.13 - 2013.02.13 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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 40 60	W _p W W _L				
	Continued From Previous Page						206 205 204 203 202							
201.3 14.9	END OF DCPT AT 14.9m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.													

RECORD OF BOREHOLE No SB-01

1 OF 2

METRIC

WP# 607189-0237 LOCATION N 5 424 383.5 E 205 713.3 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2013.05.07 - 2013.05.07 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				W P W W L				GR	SA	SI	CL
								20 40 60 80 100				WATER CONTENT (%)							
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE											
215.7																			
0.0	ORGANICS: (50mm) SAND , some gravel, occasional cobble Loose Brown Moist (FILL) Sandy silt layer (410mm) at 0.9m																		
			1	SS	6		215												
213.9			2	SS	6		214												
1.8	Silty CLAY , some sand to sandy, occasional organic seams (25mm to 75mm) Firm to Very Soft Brown (Possible FILL)																		
			3	SS	3		213												
			4	SS	0		212												
	Organics seam (200mm thick) at 4.5m		5	SS	2		211												
							210												
209.3	Wood fibres, trace roots and trace rootlets		6	SS	1		209												
6.4	Silty CLAY , trace sand Very Soft Grey																		
			7	SS	0		208												
							207												
			8	SS	1		206												

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No SB-01

2 OF 2

METRIC

WP# 607189-0037 LOCATION N 5 424 383.5 E 205 713.3 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2013.05.07 - 2013.05.07 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				WATER CONTENT (%)				GR	SA	SI	CL		
								20 40 60 80 100	○ UNCONFINED + FIELD VANE			W _P W W _L									
Continued From Previous Page											● QUICK TRIAXIAL × LAB VANE										

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+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No SB-02

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 402 5 E 205 718 3 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers/NQ Coring COMPILED BY AN
 DATUM Geodetic DATE 2013.05.04 - 2013.05.06 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
215.1								20 40 60 80 100		w _p	w	w _L		
	TOPSOIL: (50mm)							○ UNCONFINED + FIELD VANE						
	SAND, some silt, some clay, trace gravel Loose Brown Moist (FILL)		1	SS	5			● QUICK TRIAXIAL x LAB VANE						
213.7								20 40 60 80 100						
1.4	Silty CLAY, some sand to sandy Soft Brown (Possible FILL)		2	SS	3									0 23 48 29
	Layer of peat (50mm) at 2.6m		3	SS	3									
	Grey		4	SS	4									
	Layer of peat (75mm) at 4.6m													
210.5														
4.6	Silty CLAY, trace sand Very Soft Grey		5	SS	3									
			6	SS	0									
	Occasional sand seams		7	SS	0									
			8	SS	0									0 0 33 67

Continued Next Page

+ 3 X 3 Numbers refer to
Sensitivity

20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No SB-02

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 402.5 E 205 718.3 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers/NQ Coring COMPILED BY AN
 DATUM Geodetic DATE 2013 05 04 - 2013 05 06 CHECKED BY MEF

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES		20	40	60	80	100	
	Continued From Previous Page						SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT W _p — W — W _L	
							WATER CONTENT (%)					
							20	40	60	80	100	GR SA SI CL
201.3	Silty CLAY, trace sand Very Soft Grey		9	SS	0		3.0					
			10	SS	2		3.0					0 0 41 59
13.8	Silty SAND, trace gravel Very Loose Grey Wet		11	SS	0							
200.6												
14.5	BEDROCK, gneiss, grey Sub-vertical fracture at 14.5m Occasional quartz interbeds Sub-vertical fractures at 14.7m (150mm), 15.5m (25mm), 15.7m (100mm) Quartz interbeds (25mm thick) at 14.8m, 16.1m, 16.2m Sub-horizontal fractures at 14.9m, 15.1m, 15.4m, 15.5m, 16.1m Sub-vertical fractures (75mm to 100mm long) at 16.4m, 16.5m, 17.7m		1	RUN								RUN #1 TCR=100% SCR=67% RQD=67% UCS=126MPa (Average) RUN #2 TCR=100% SCR=100% RQD=90% UCS=115MPa (Average) RUN #3 TCR=100% SCR=100% RQD=100% UCS=86MPa (Average)
			2	RUN								
			3	RUN								
197.3	END OF BOREHOLE AT 17.8m Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 3.0m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV (m) 2013 05 09 4.9 208.1											

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

RECORD OF BOREHOLE No SB-03

1 OF 2

METRIC

WP# 60718910237 LOCATION N 5 424 344.9 E 205 733.6 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers/NQ Coring COMPILED BY AN
 DATUM Geodetic DATE 2013.05.09 - 2013.05.09 CHECKED BY MEF

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	WATER CONTENT (%)					
212.8														
0.0	Organic CLAY , with peat, some sand, trace rootlets Dark Brown Wet													
212.0														
0.8	Silty CLAY , trace sand, trace roots and rootlets Very Soft to Soft Brown		1	SS	1									
			2	SS	2									0 0 36 64
			3	SS	1									
	Grey		4	SS	0									
			5	SS	0									
			6	SS	0									
	Occasional sand seams		7	SS	0									
			8	SS	0									0 0 25 75

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

METRIC

[illegible]



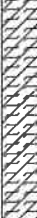


+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No SB-04

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 424 381.6 E 205 694.8 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE NW Casing COMPILED BY AN
 DATUM Geodetic DATE 2014 05 07 - 2014 05 07 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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											WATER CONTENT (%)		
								○ UNCONFINED + FIELD VANE											w _p w w _L		
								● QUICK TRIAXIAL × LAB VANE													
214.8							20	40	60	80	100										
0.0	SAND, some gravel Loose to Compact Reddish Brown Moist (FILL)		1	SS	9																
213.6			2	SS	15																
	Silty CLAY, some sand, occasional cobbles Stiff Brown to Grey (FILL) Occasional wood fibres																				
			3	SS	12																
			4	SS	10																
			5	SS	8																
210.2																					
4.6	ORGANIC CLAY, some sand, with roots, rootlets and wood fibres Firm Dark Brown		6	SS	4																
208.7																					
6.1	Sandy Clayey SILT, with wood fibres Soft to Firm Dark Grey Wet		7	SS	4																
207.8																					
7.0	Silty CLAY, occasional silt seams Very Soft Grey																				
			8	SS	0																
			9	SS	0																
														</							

Continued Next Page

+³ ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

METRIC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100			
								SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE 20 40 60 80 100			
Continued From Previous Page							WATER CONTENT (%) 20 40 60				

[illegible]

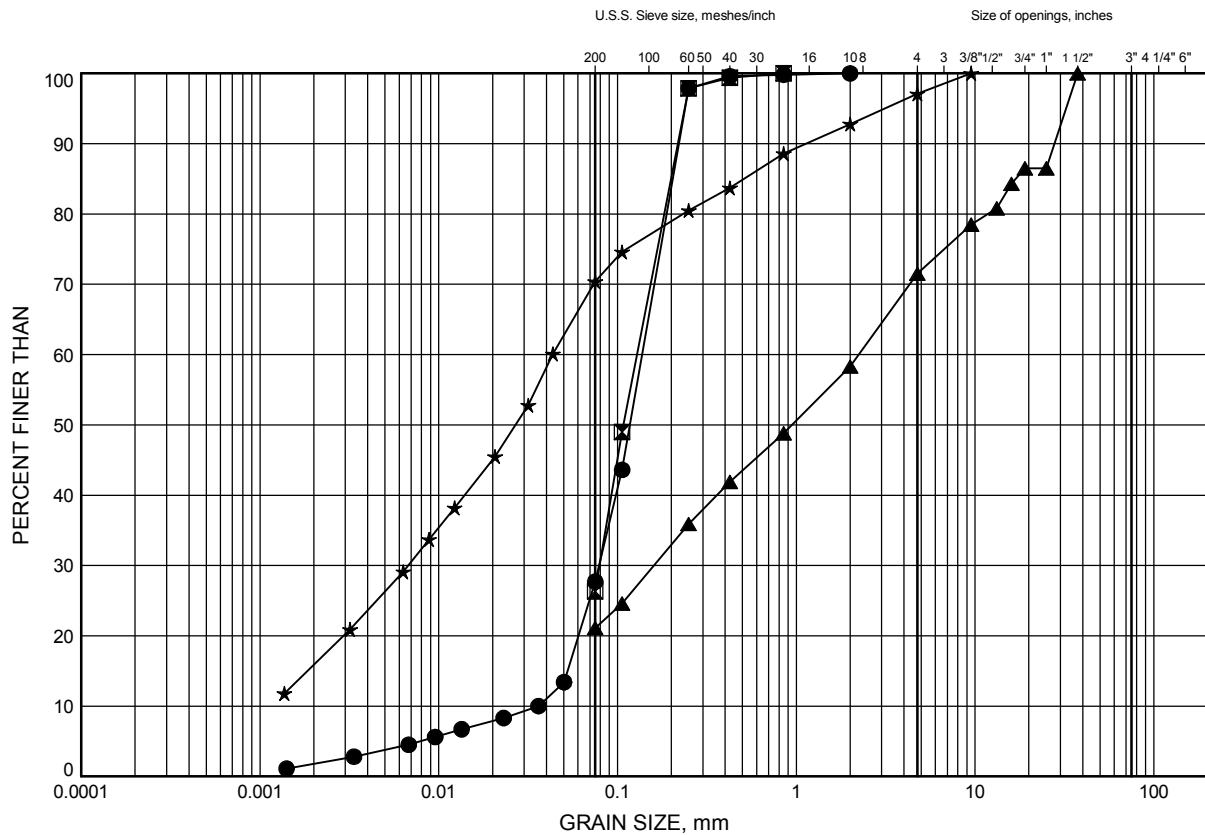
ONTMT4S 1237.GPJ 2012TEMPLATE(MTO)GDT 6/6/14

+ 3 x 3: Numbers refer to Sensitivity

GRAIN SIZE DISTRIBUTION

FIGURE F1

SANDY SILT to GRAVELLY SAND FILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	13+318 01L	1.07	218.03
◻	13+321 17.4L	2.59	212.87
▲	13+350 19L	0.46	214.67
★	13+368.4 24.6L	1.07	214.09

Date June 2014
WP# 647-89-00

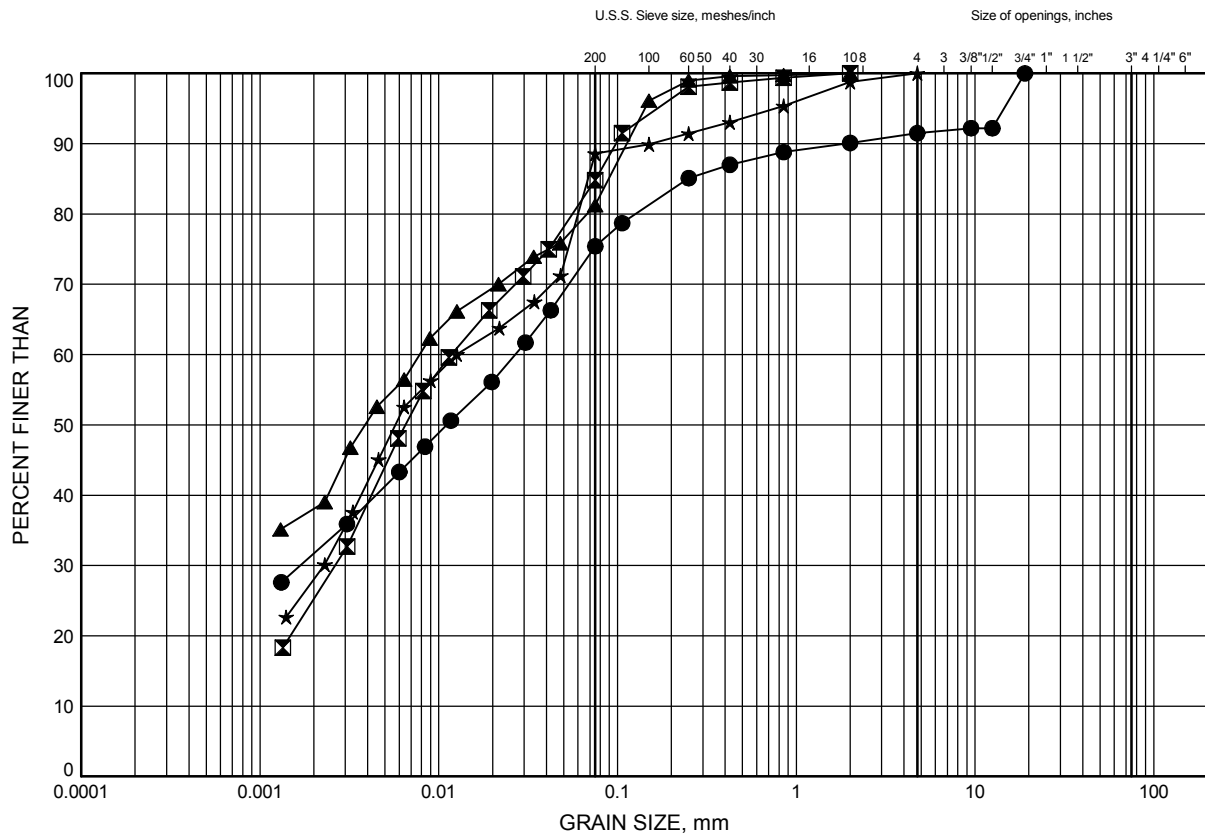


Prep'd MFA
Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE F2

SILTY CLAY FILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	13+350 19L	3.35	211.78
⊠	13+380 07R	3.35	215.05
▲	SB-01	2.59	213.11
★	SB-04	1.07	213.73

Date June 2014
WP# 647-89-00

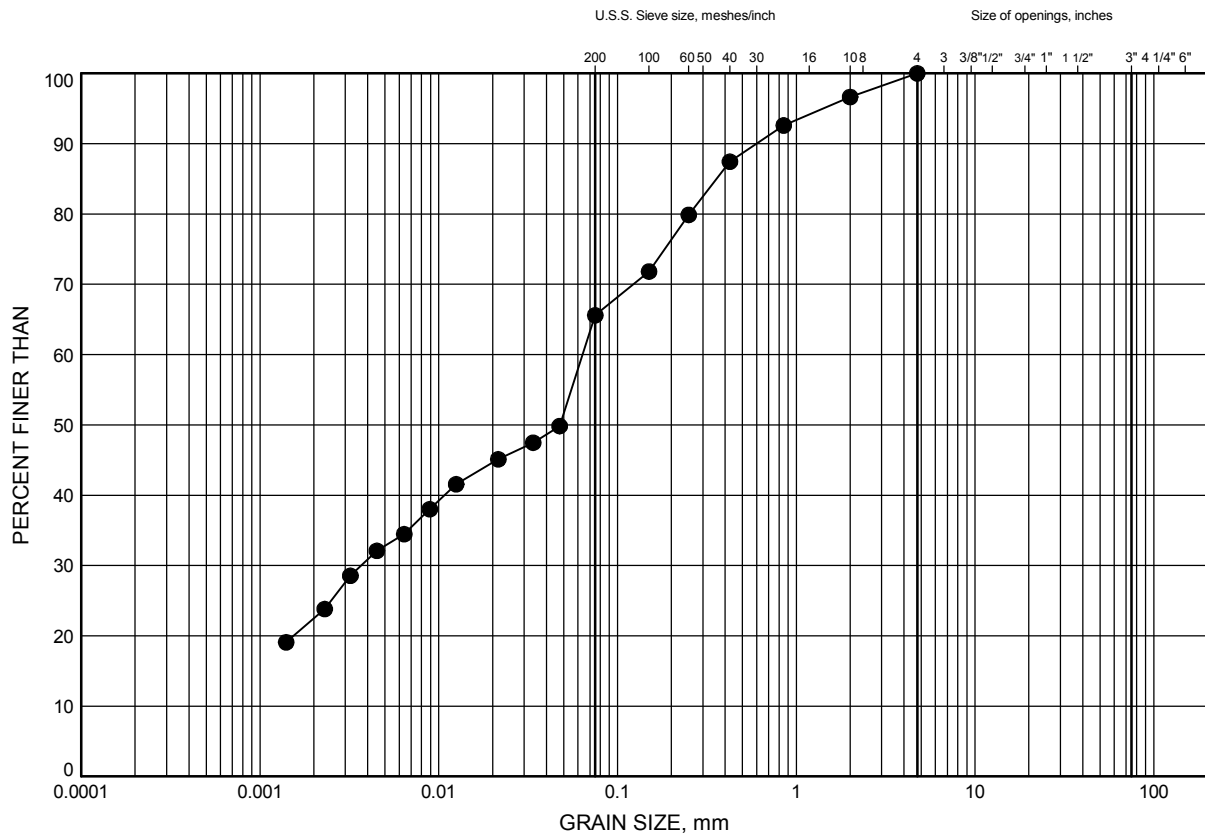


Prep'd MFA
Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE F3

SANDY CLAYEY SILT



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	SB-04	6.40	208.40

Date June 2014
WP# 647-89-00

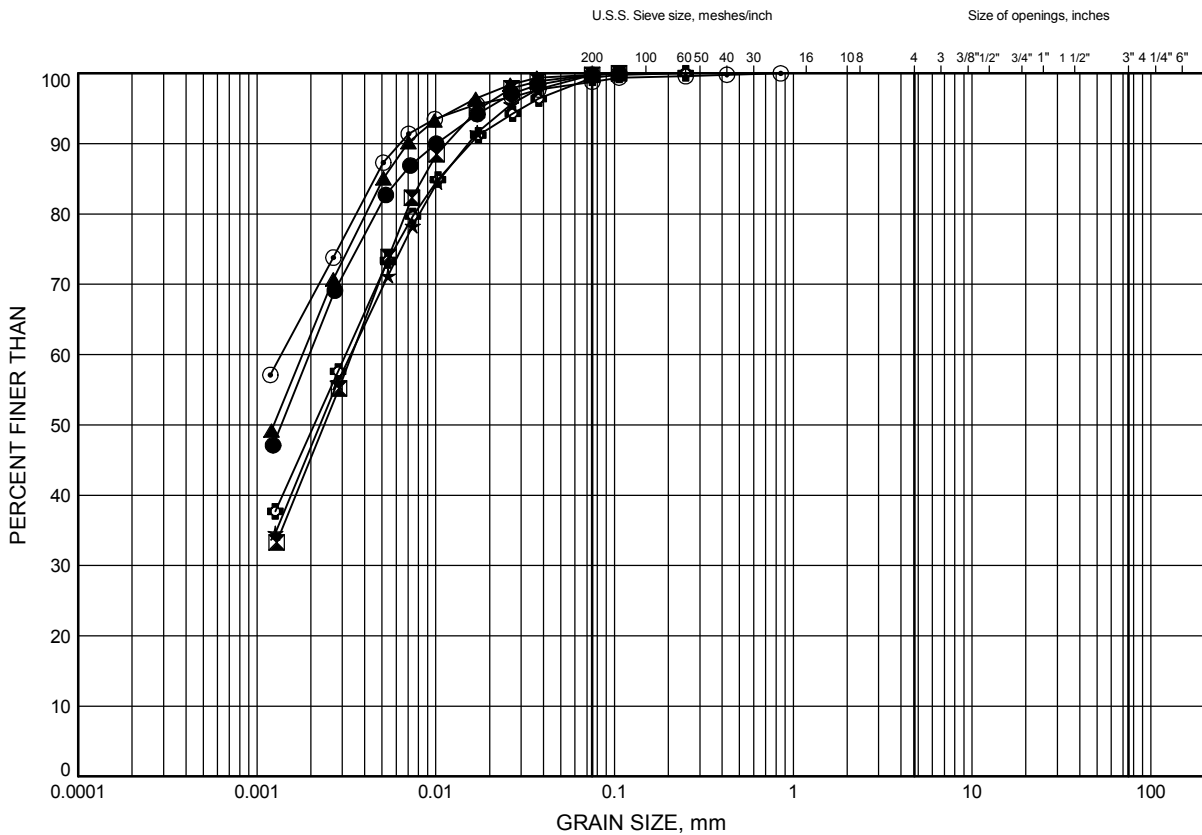


Prep'd MFA
Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE F4

SILTY CLAY



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	13+300 19L	1.83	214.09
⊠	13+300 19L	4.88	211.04
▲	13+300 19R	2.59	213.91
★	13+300 19R	7.92	208.57
⊙	13+340 19R	1.83	212.38
⊕	13+340 19R	7.92	206.29

Date June 2014
 WP# 647-89-00

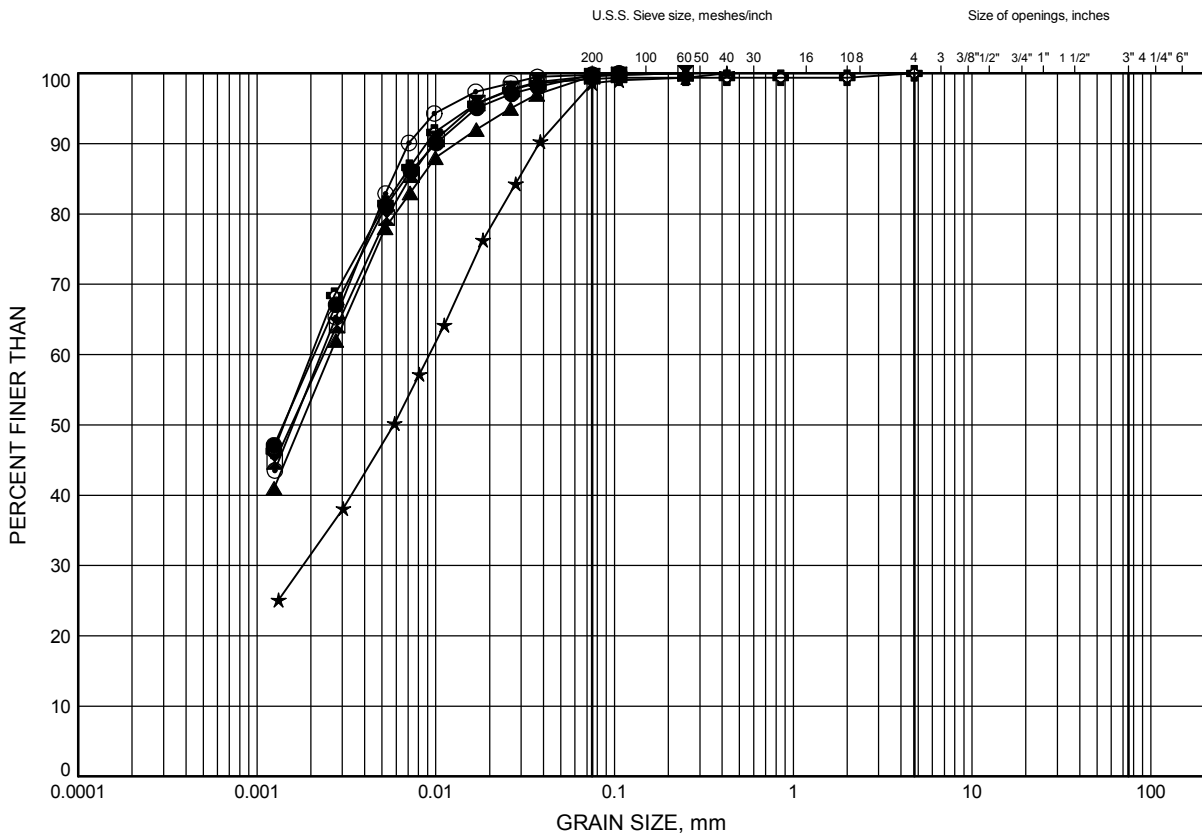


Prep'd MFA
 Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE F5

SILTY CLAY



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	13+350 19L	9.45	205.68
⊠	13+368.4 24.6L	4.88	210.28
▲	13+375 30R	6.40	205.74
★	13+375 30R	12.50	199.64
⊙	13+400 19L	7.92	207.90
⊕	13+400 19L	12.50	203.33

Date June 2014

WP# 647-89-00



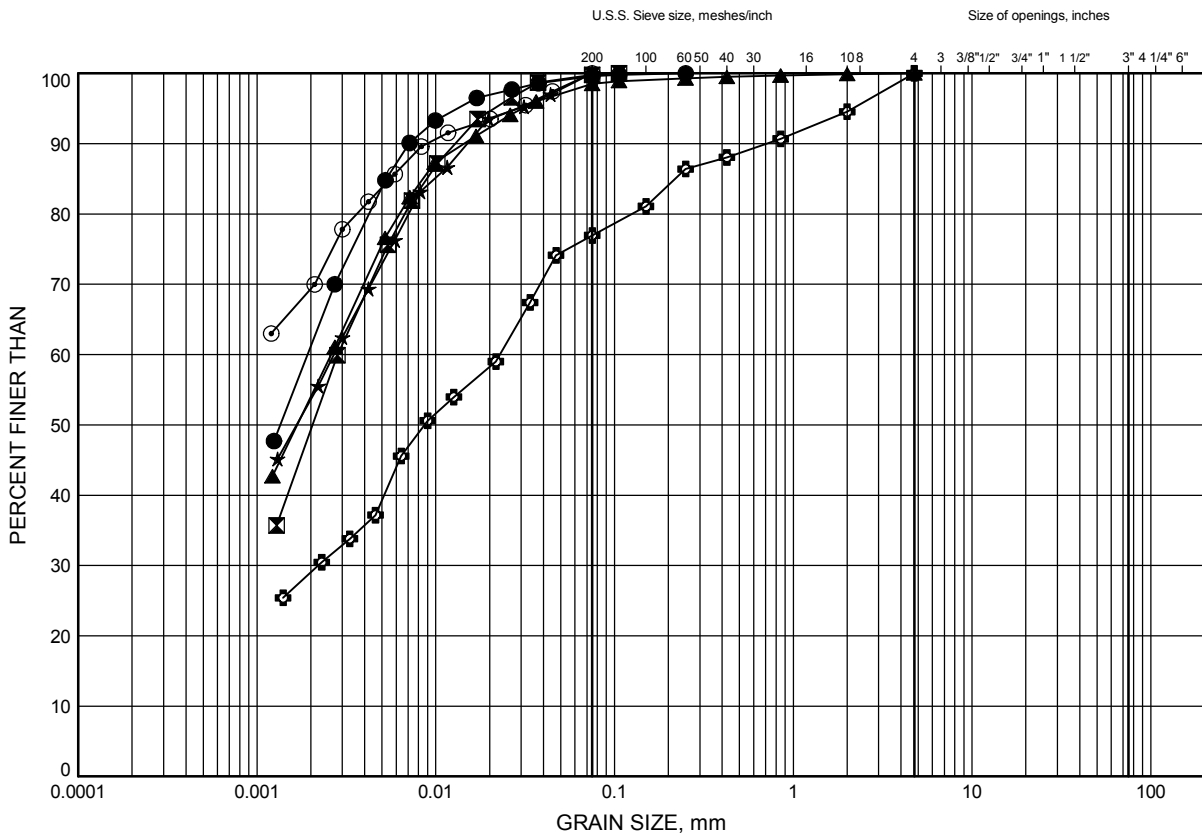
Prep'd MFA

Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE F6

SILTY CLAY



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	13+405.9 23.5R	1.07	214.98
⊠	13+405.9 23.5R	7.92	208.12
▲	13+424.6 5.7L	4.88	212.05
★	SB-01	7.92	207.78
⊙	SB-01	12.50	203.20
⊕	SB-02	1.83	213.27

Date June 2014

WP# 647-89-00



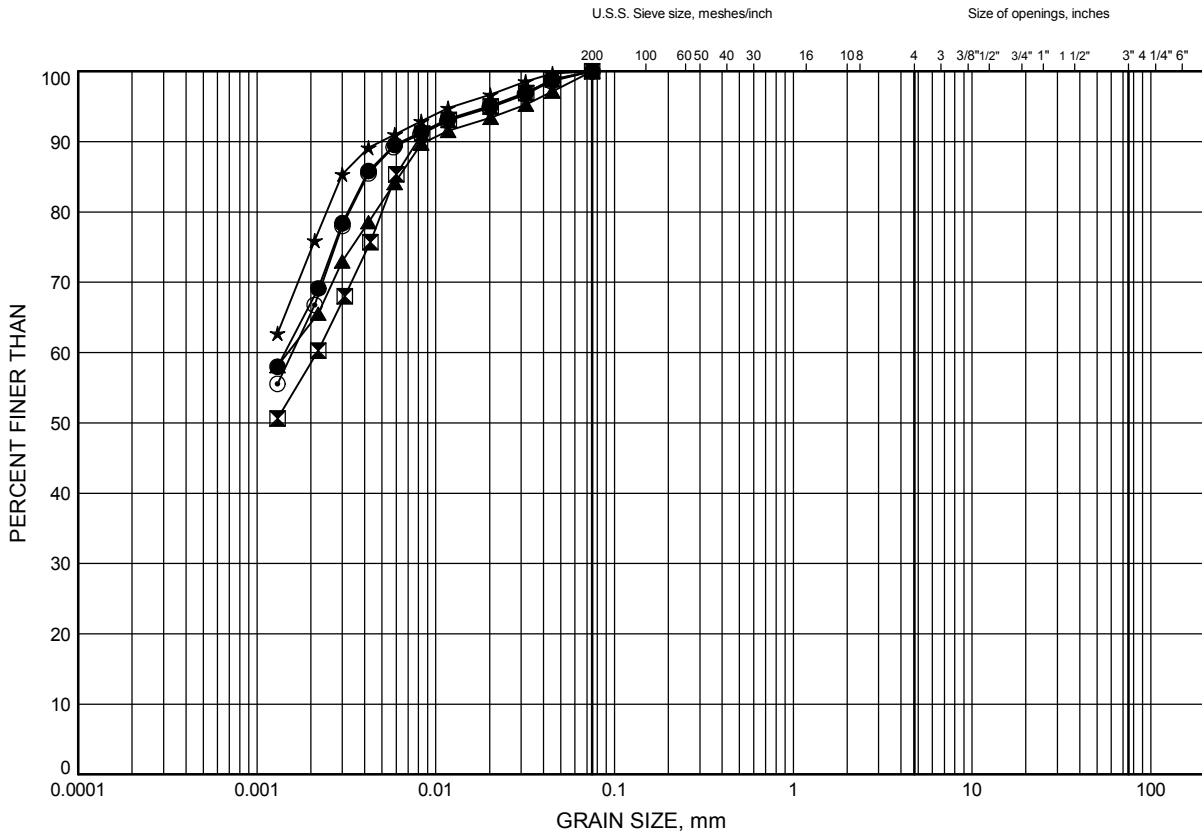
Prep'd MFA

Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE F7

SILTY CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	SB-02	9.45	205.65
⊠	SB-02	12.50	202.60
▲	SB-03	1.83	210.97
★	SB-03	9.45	203.35
⊙	SB-04	9.45	205.35

Date June 2014

WP# 647-89-00



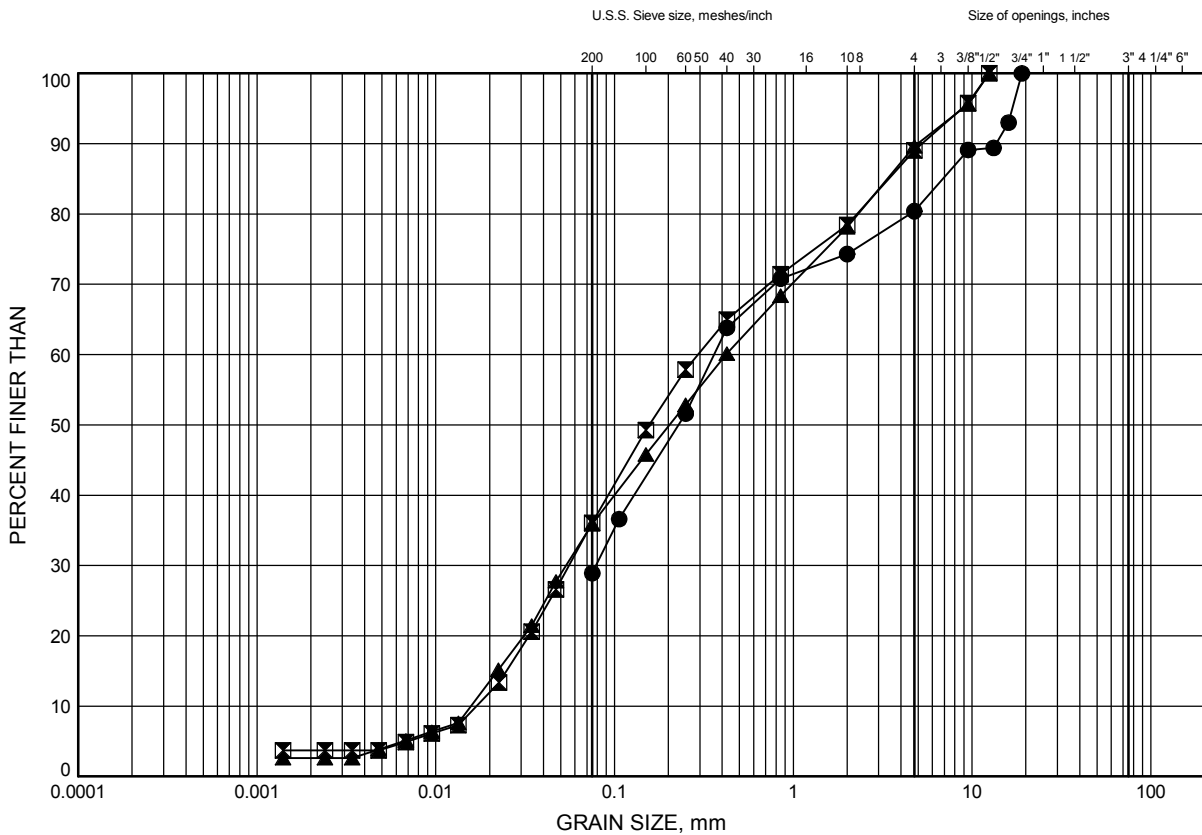
Prep'd MFA

Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE F8

SANDY SILT to SILTY SAND



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	13+424.6 5.7L	17.07	199.86
⊠	SB-01	15.54	200.16
▲	SB-03	14.02	198.78

Date June 2014
 WP# 647-89-00

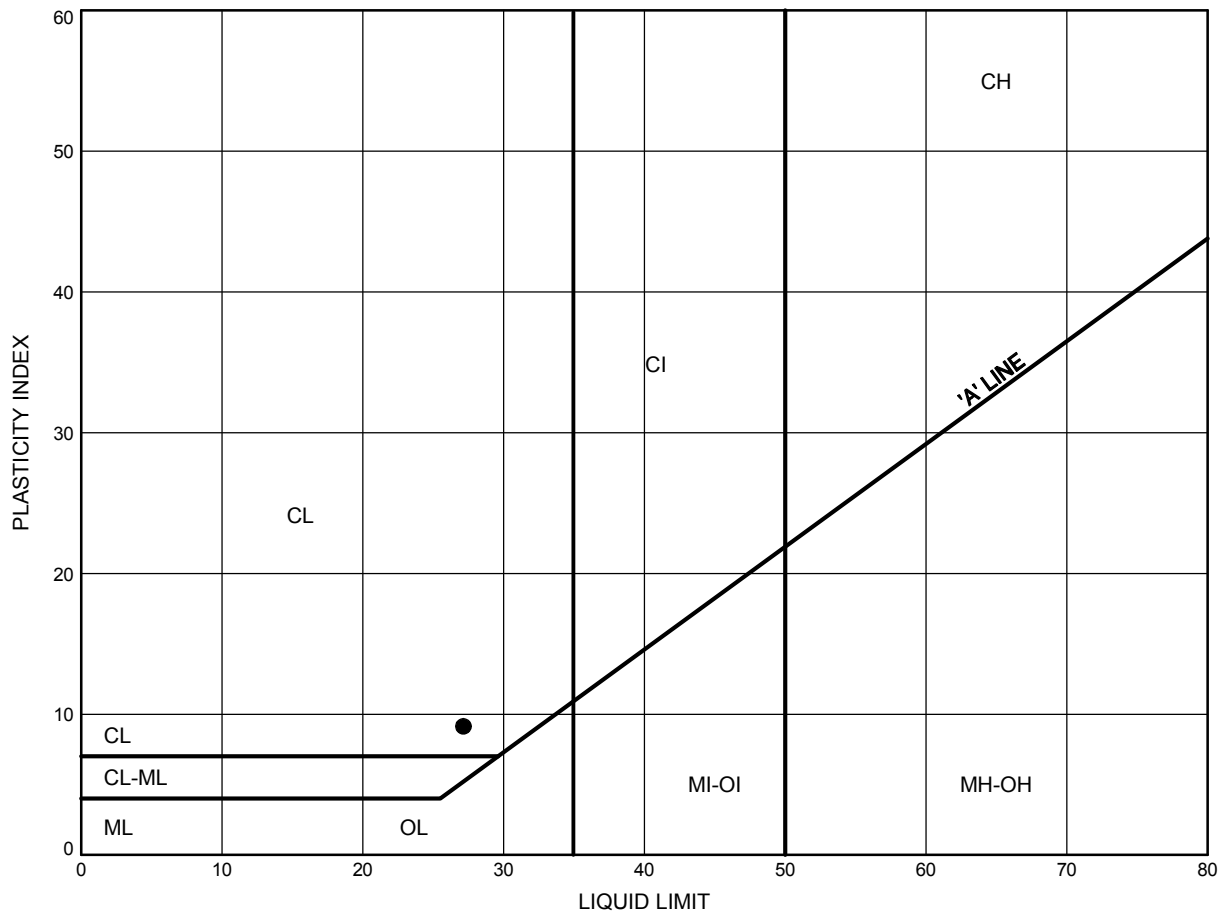


Prep'd MFA
 Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE F9

SANDY SILT FILL



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	13+368.4 24.6L	1.07	214.09

Date June 2014
 WP# 647-89-00

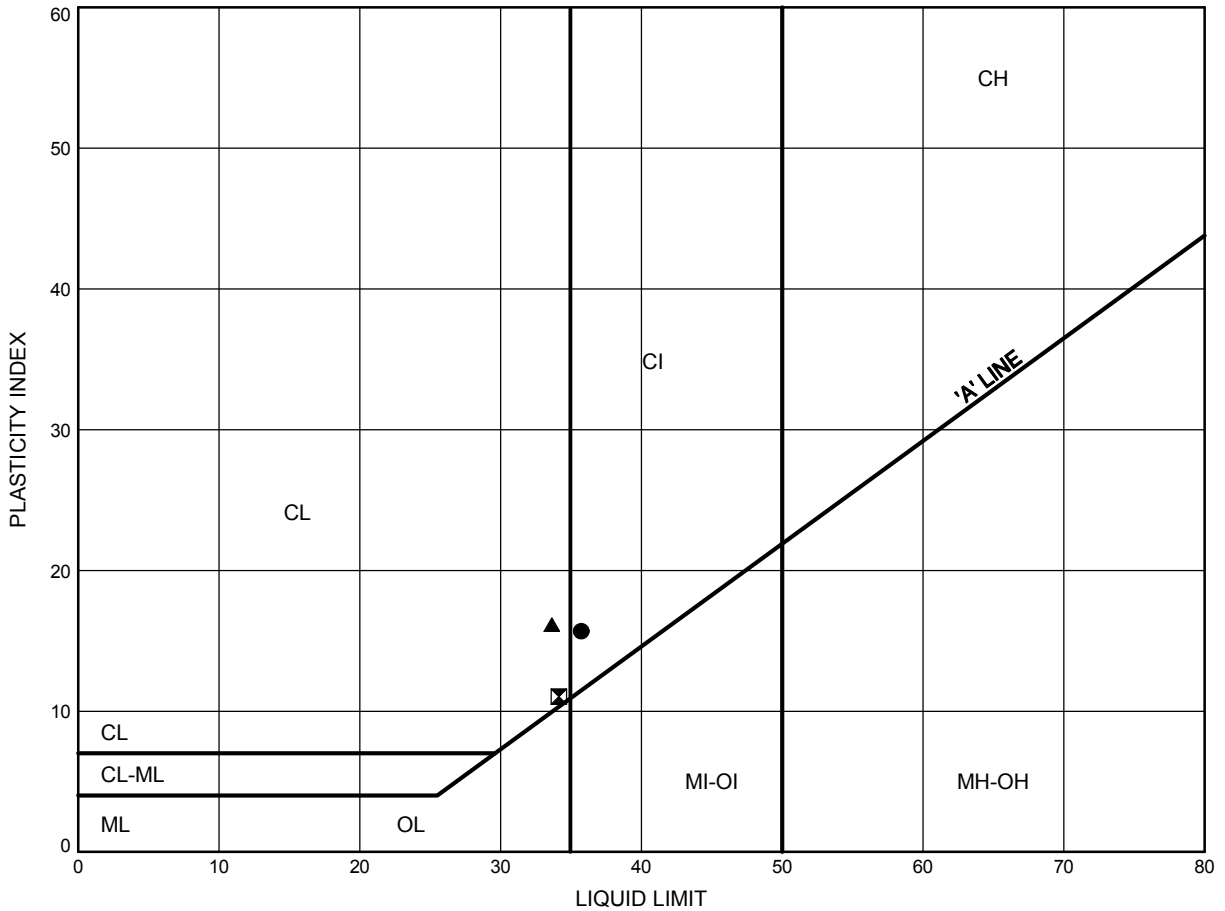


Prep'd MFA
 Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE F10

SILTY CLAY FILL



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	13+350 19L	3.35	211.78
⊠	13+380 07R	3.35	215.05
▲	SB-01	2.59	213.11

Date June 2014
 WP# 647-89-00

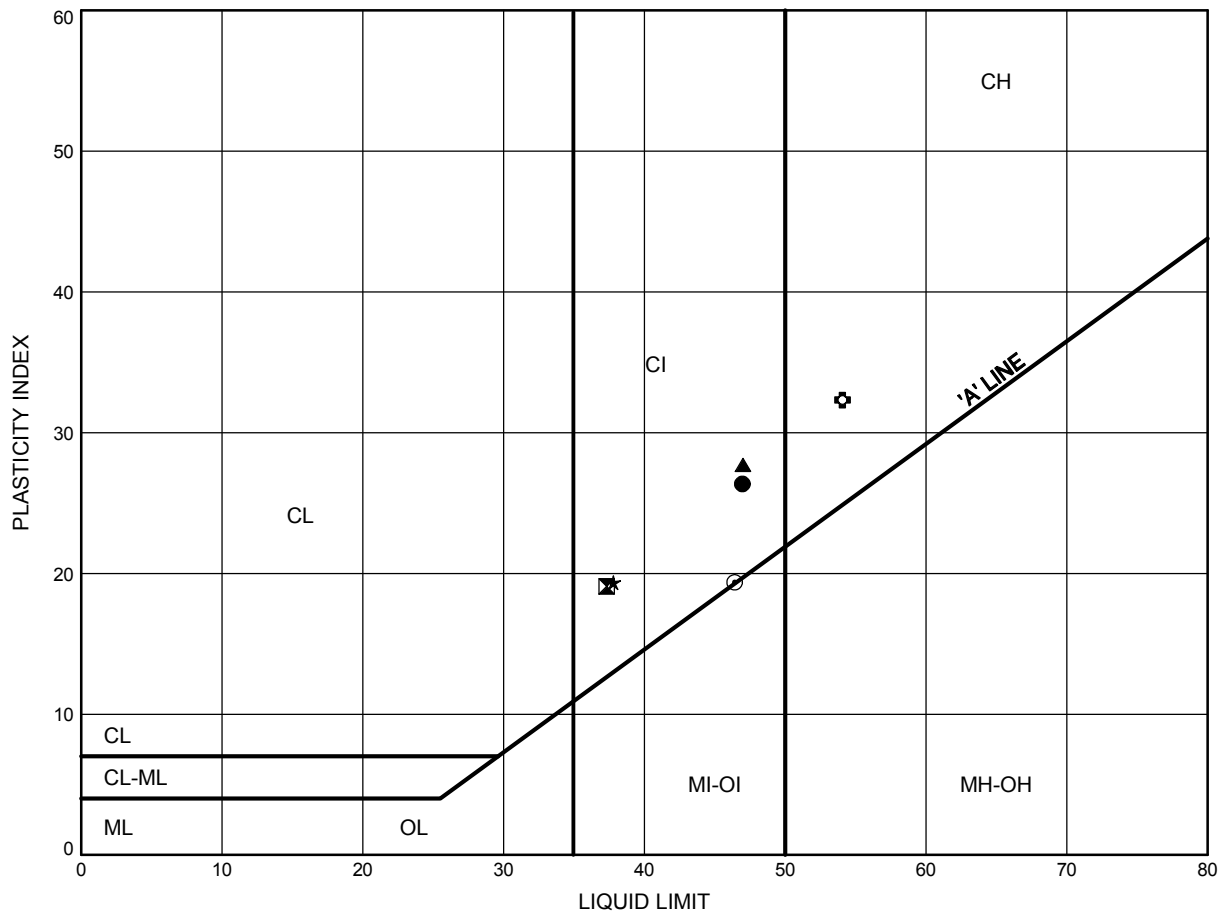


Prep'd MFA
 Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE F11

SILTY CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	13+300 19L	1.83	214.09
⊠	13+300 19L	4.88	211.04
▲	13+300 19R	2.59	213.91
★	13+300 19R	7.92	208.57
⊙	13+321 17.4L	4.88	210.59
⊕	13+321 17.4L	10.97	204.49

Date June 2014
 WP# 647-89-00

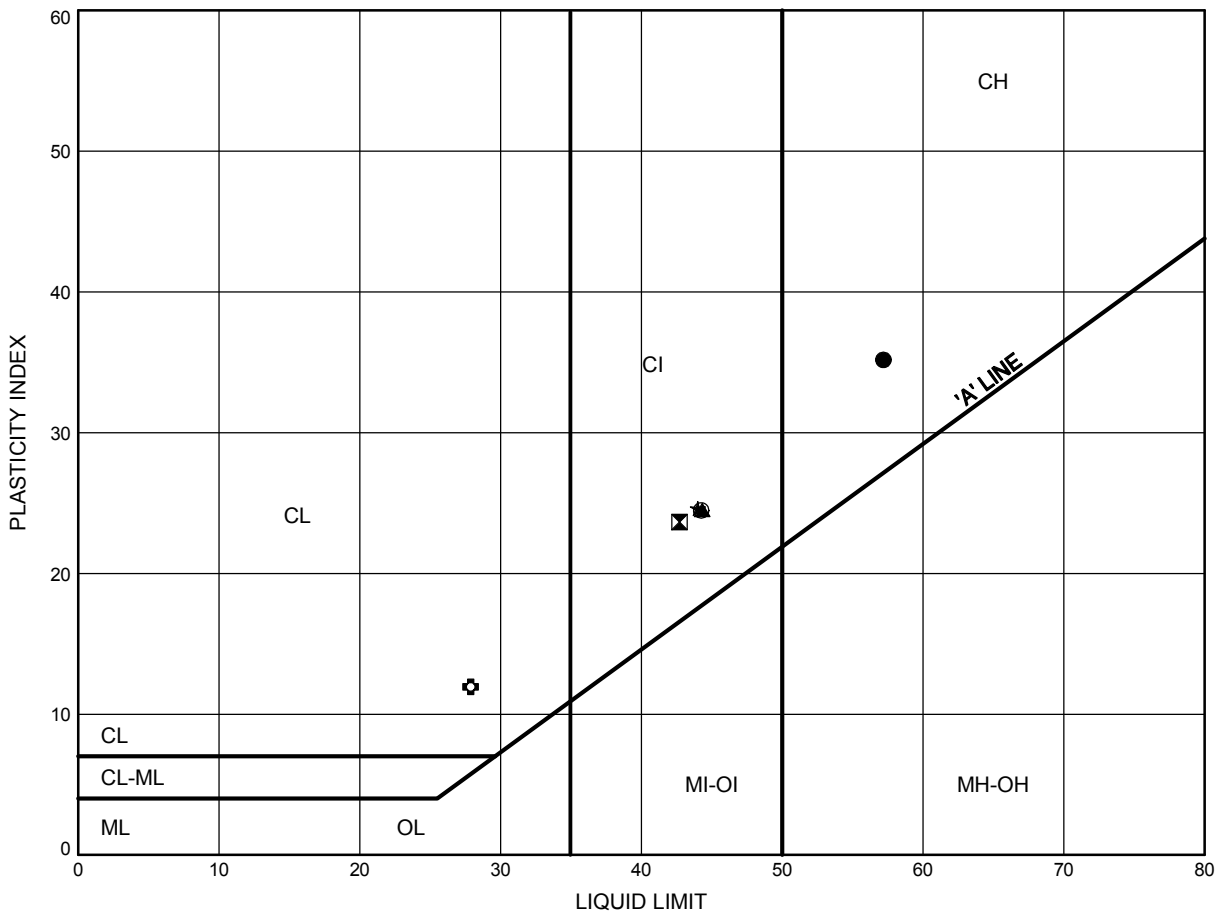


Prep'd MFA
 Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE F12

SILTY CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	13+340 19R	1.83	212.38
⊠	13+340 19R	7.92	206.29
▲	13+350 19L	9.45	205.68
★	13+368.4 24.6L	4.88	210.28
⊙	13+375 30R	6.40	205.74
⊕	13+375 30R	12.50	199.64

Date June 2014
 WP# 647-89-00

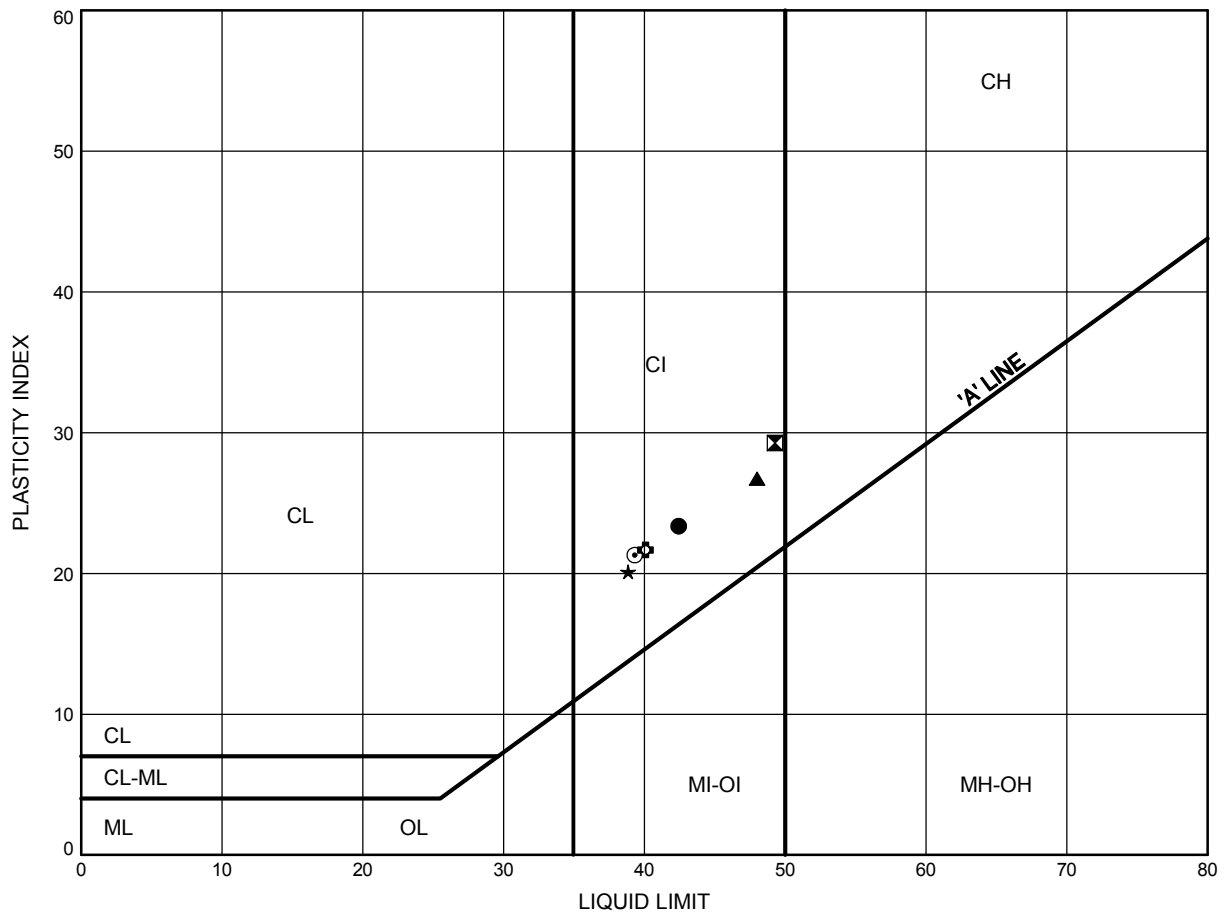


Prep'd MFA
 Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE F13

SILTY CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	13+400 19L	7.92	207.90
⊠	13+400 19L	12.50	203.33
▲	13+405.9 23.5R	1.07	214.98
★	13+405.9 23.5R	7.92	208.12
⊙	13+424.6 5.7L	4.88	212.05
⊕	SB-01	7.92	207.78

Date June 2014

WP# 647-89-00



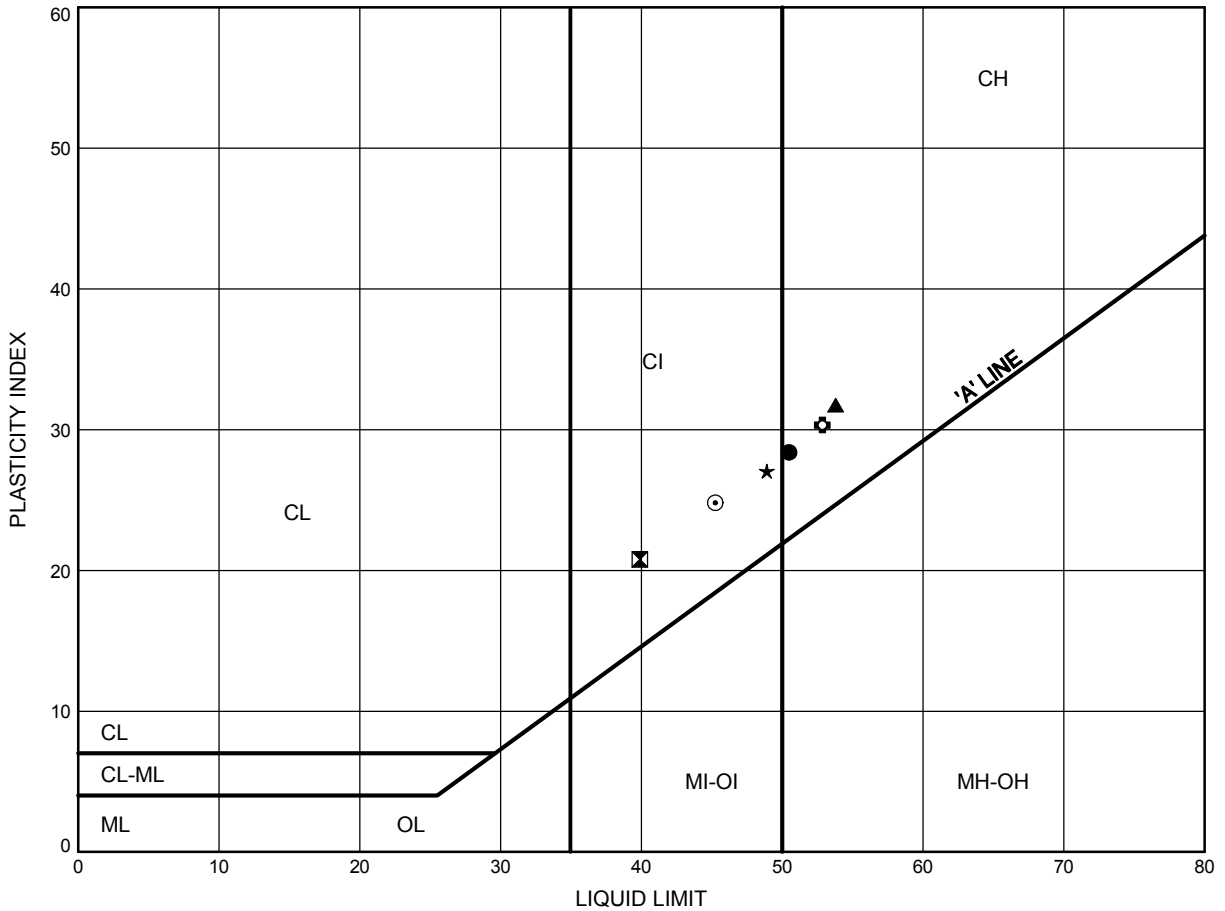
Prep'd MFA

Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE F14

SILTY CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	SB-01	12.50	203.20
⊠	SB-02	1.83	213.27
▲	SB-02	9.45	205.65
★	SB-02	12.50	202.60
⊙	SB-03	1.83	210.97
⊕	SB-03	9.45	203.35

Date June 2014
 WP# 647-89-00

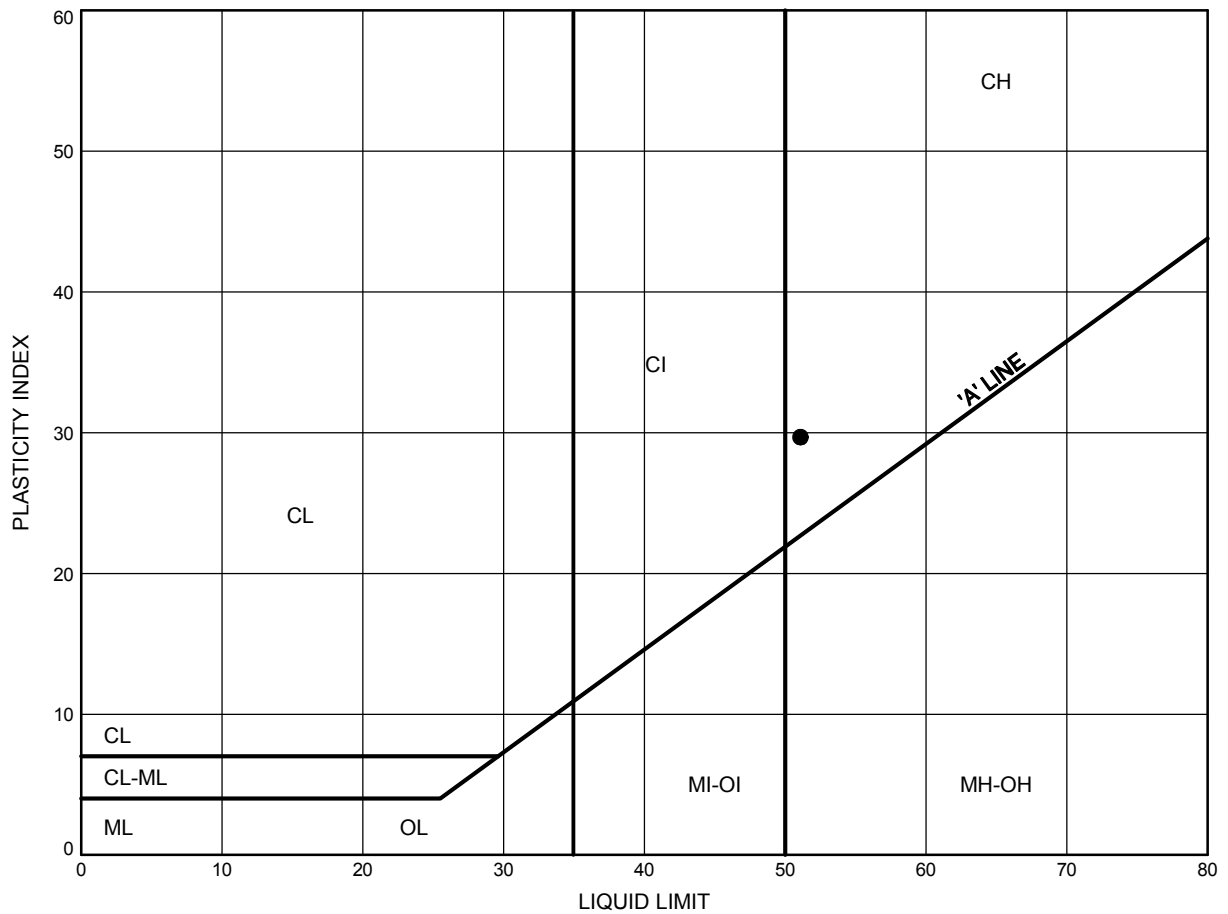


Prep'd MFA
 Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE F15

SILTY CLAY



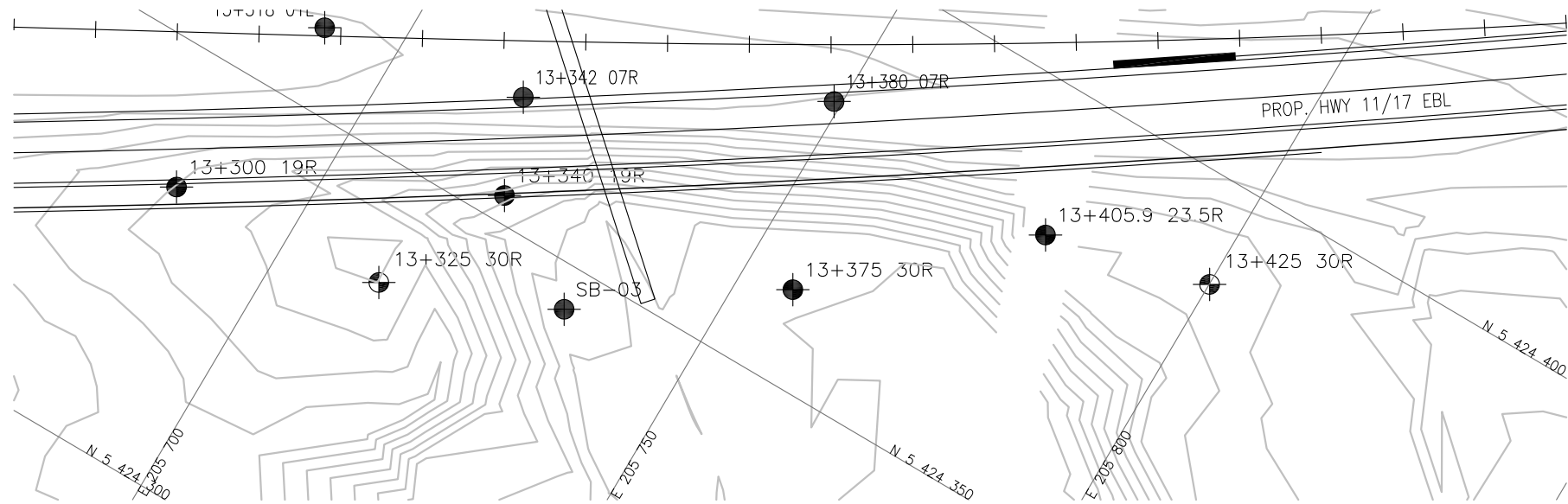
LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	SB-04	9.45	205.35

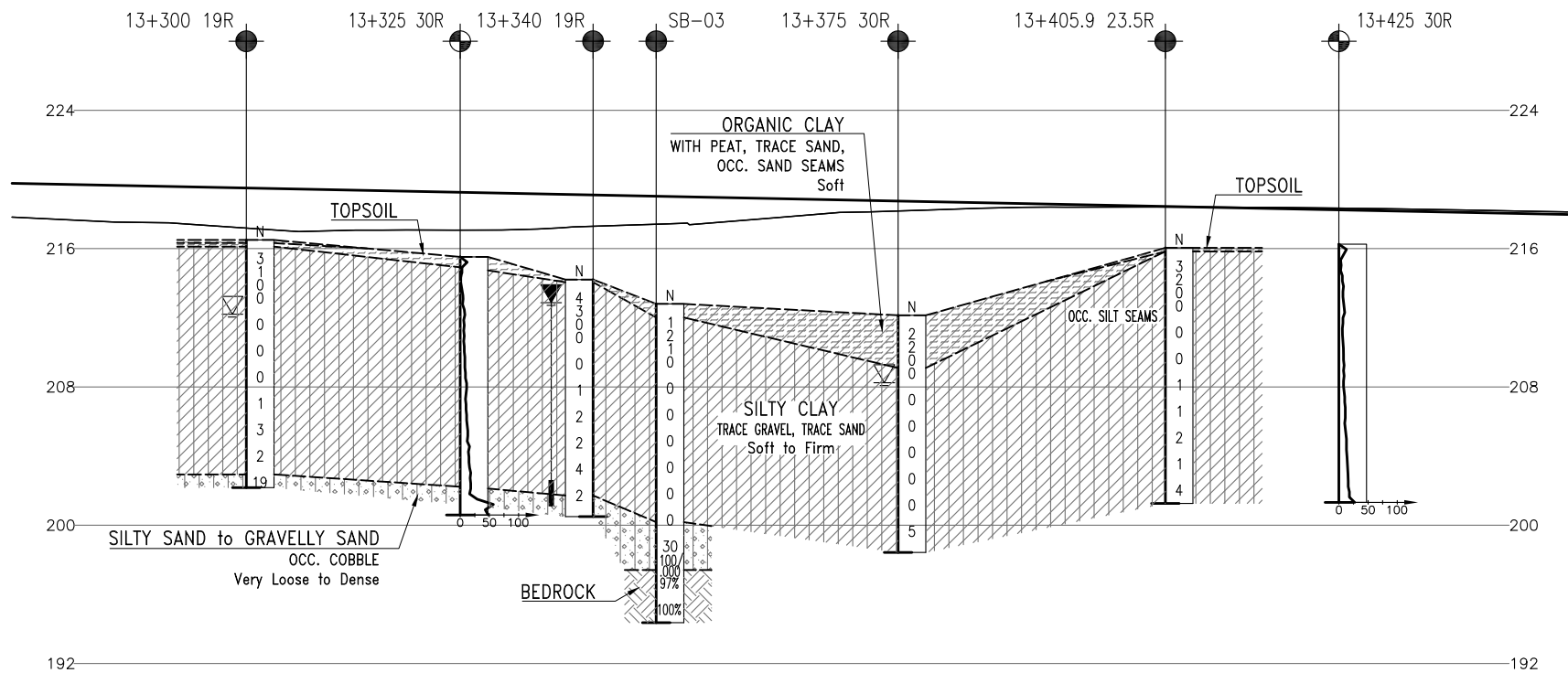
Date June 2014
 WP# 647-89-00



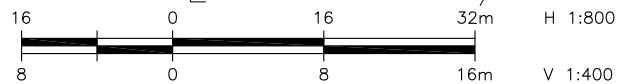
Prep'd MFA
 Chkd. MEF



13+425 30L	218.5	5 424 438.4	205 768.0
13+425 30R	216.3	5 424 387.7	205 800.0
SB-03	212.8	5 424 344.9	205 733.6
13+342 07R	218.7	5 424 364.6	205 716.1
13+380 07R	218.4	5 424 383.6	205 749.1



PROFILE ALONG C HIGHWAY 11/17 EBL

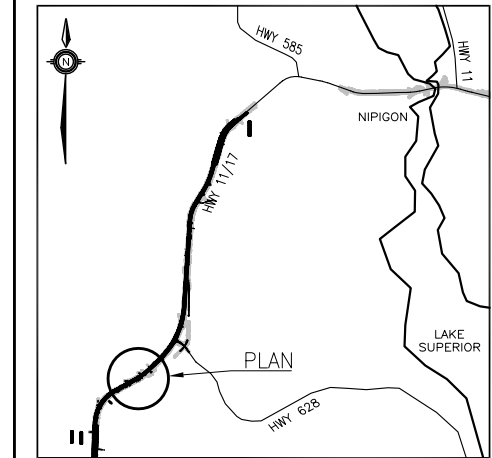


METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No 2014-6026
GWP No 647-89-00

HWY 11/17 FOUR LANING
EASTBOUND LANES
(STA. 13+300 TO 13+450)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

- Borehole
- Cone
- N Blows /0.3m (Std Pen Test, 475J/blow)
- CONE Blows /0.3m (60' Cone, 475J/blow)
- PH Pressure, Hydraulic
- Water Level
- Head Artesian Water
- Piezometer
- 90% Rock Quality Designation (RQD)
- A/R Auger Refusal

NO	ELEVATION	NORTHING	EASTING
13+300 19L	215.9	5 424 366.9	205 666.8
13+300 19R	216.5	5 424 333.7	205 685.2
13+321 17.4L	215.5	5 424 375.5	205 685.5
13+324 27L	215.4	5 424 385.3	205 683.4
13+325 30R	215.5	5 424 336.2	205 712.4
13+340 19R	214.2	5 424 353.2	205 720.2
13+350 19L	215.1	5 424 391.1	205 710.3
13+368.4 24.6L	215.2	5 424 404.8	205 722.9
13+375 30R	212.1	5 424 361.2	205 756.5
13+379.1 11.2L	215.7	5 424 398.6	205 738.8
13+400 19L	215.8	5 424 416.1	205 752.9
13+405.9 23.5R	216.0	5 424 382.7	205 779.7
13+424.6 5.7L	216.9	5 424 417.4	205 780.3

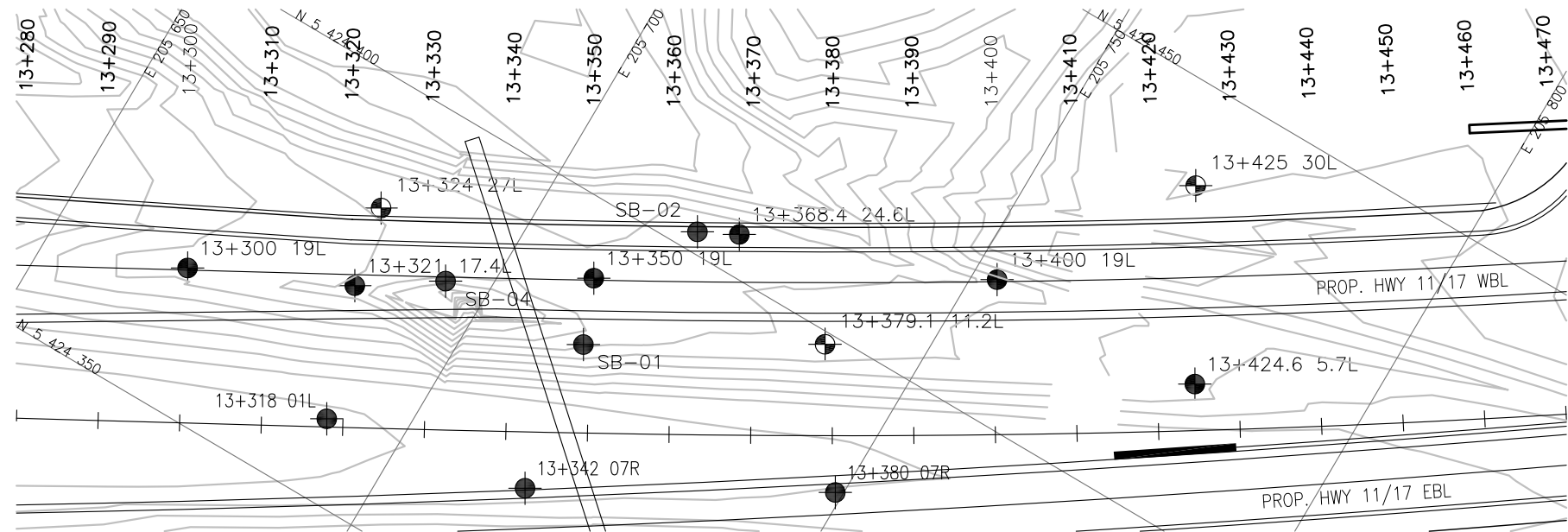
NOTES

- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

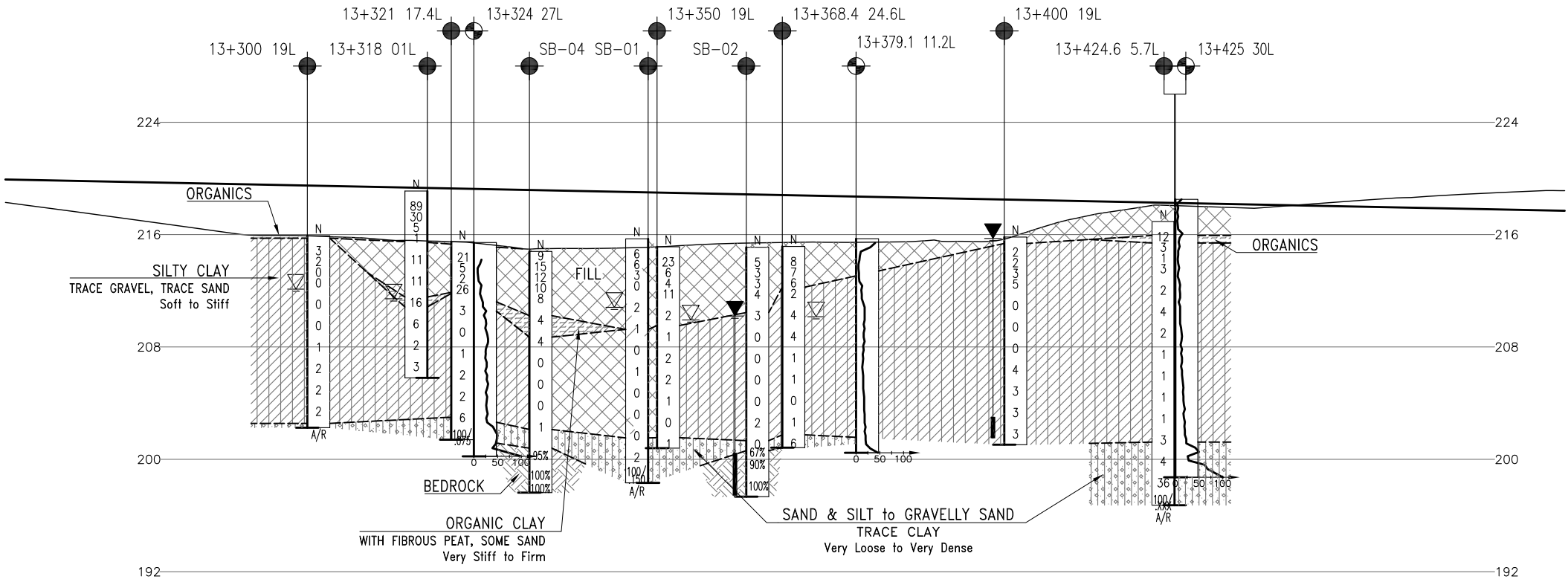
GEOCRES No. 52A-182

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	SBP	CHK JPL	CODE
DRAWN	MFA	CHK SBP	SITE
LOAD	DATE	OCT. 2014	
STRUCT	DWG	9	

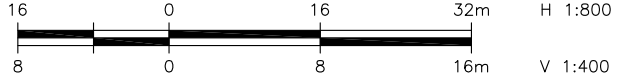
DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING



13+425 30L	218.5	5 424 438.4	205 768.0
13+425 30R	216.3	5 424 387.7	205 800.0
13+318 01L	219.1	5 424 359.7	205 690.8
SB-01	215.7	5 424 383.5	205 713.3
SB-02	215.1	5 424 402.5	205 718.3
SB-04	214.8	5 424 381.6	205 694.8



PROFILE ALONG C HIGHWAY 11/17 WBL

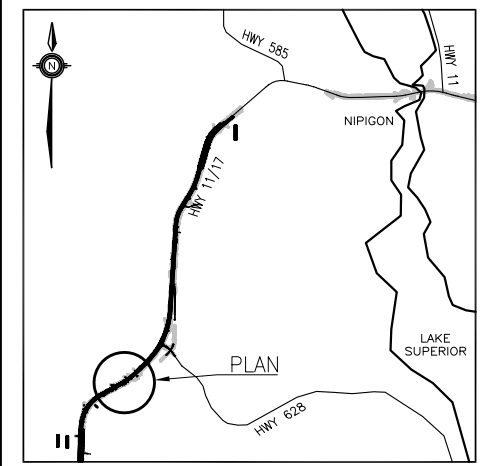


METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No 2014-6026
GWP No 647-89-00

HWY 11/17 FOUR LANING
WESTBOUND LANES
(STA. 13+300 TO 13+450)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

- Borehole
- Cone
- N
- Blows /0.3m (Std Pen Test, 475J/blow)
- CONE
- Blows /0.3m (60' Cone, 475J/blow)
- PH
- Pressure, Hydraulic
- Water Level
- Head Artesian Water
- Piezometer
- 90%
- Rock Quality Designation (RQD)
- A/R
- Auger Refusal

NO	ELEVATION	NORTHING	EASTING
13+300 19L	215.9	5 424 366.9	205 666.8
13+300 19R	216.5	5 424 333.7	205 685.2
13+321 17.4L	215.5	5 424 375.5	205 685.5
13+324 27L	215.4	5 424 385.3	205 683.4
13+325 30R	215.5	5 424 336.2	205 712.4
13+340 19R	214.2	5 424 353.2	205 720.2
13+350 19L	215.1	5 424 391.1	205 710.3
13+368.4 24.6L	215.2	5 424 404.8	205 722.9
13+375 30R	212.1	5 424 361.2	205 756.5
13+379.1 11.2L	215.7	5 424 398.6	205 738.8
13+400 19L	215.8	5 424 416.1	205 752.9
13+405.9 23.5R	216.0	5 424 382.7	205 779.7
13+424.6 5.7L	216.9	5 424 417.4	205 780.3

NOTES

- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 52A-182

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	SBP	CHK JPL	CODE
DRAWN	MFA	CHK SBP	SITE
LOAD	DATE	OCT. 2014	
STRUCT	DWG	10	

DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

Appendix G

Highway 11/17 EBL Sta. 16+250 to 16+460

Record of Borehole Sheets
Laboratory Test Results
Borehole Location and Soil Strata Drawings

RECORD OF BOREHOLE No 16+260 19R

1 OF 1

METRIC

WP# 647-89-00 LOCATION N 5 426 826.2 E 207 025.5 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.01.29 - 2013.01.29 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					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						
							WATER CONTENT (%)							
							20 40 60 80 100							
							20 40 60 80 100							
							20 40 60 80 100							
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+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 16+300 29R

1 OF 1

METRIC

WP# 647-89-00 LOCATION N 5 426 865.4 E 207 038.2 ORIGINATED BY ES
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.01.30 - 2013.01.30 CHECKED BY JPL

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								
231.3 0.0	Start DCPT from surface												
226.6 4.6	END OF DCPT AT 4.6m UPON REFUSAL.												

RECORD OF BOREHOLE No 16+302 1R

1 OF 1

METRIC

WP# 647-89-00 LOCATION N 5 426 868.8 E 207 010.3 ORIGINATED BY ES
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.01.29 - 2013.01.29 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					WATER CONTENT (%)				GR	SA	SI	CL	
232.9								20	40	60	80	100									
0.0	ORGANICS, wood fibres, roots amd rootlets		1	SS	10																
232.5	Dark Brown																				
0.4	Frozen																				
	Silty CLAY, trace sand, trace rootlets, trace organic staining		2	SS	7		232														
	Firm to Soft																				
	Brown																				
			3	SS	3		231														
	occasional oxide staining																				
	varved		4	SS	0		230														
	Brown/Grey																				
	Grey		5	SS	0																
							229														
	Soft							4.0													
			6	SS	0		228												0	0	
																		41	59		
	Firm						227		4.7												
			7	SS	0																
							226														
								3.7													
	trace sand pockets		8	SS	1		225														
							224		4.3												
223.7			9	SS	100/																
9.2	END OF BOREHOLE AT 9.2m ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.				.075																

ONTMT4S 1237.GPJ 2012TEMPLATE(MTO).GDT 2/20/14

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

RECORD OF BOREHOLE No 16+335.2 21.2R

1 OF 1

METRIC

WP# 647-89-00 LOCATION N 5 426 900.6 E 207 032.7 ORIGINATED BY ES
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.01.30 - 2013.01.30 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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			WATER CONTENT (%)					
								<div><div>○ UNCONFINED</div><div>● QUICK TRIAXIAL</div></div>	<div><div>+ FIELD VANE</div><div>× LAB VANE</div></div>							
								20 40 60 80 100	20 40 60 80 100	W _P W W _L						
233.0	ORGANICS , roots and rootlets, occasional wood fibres Dark Brown Frozen		1	SS	9		233							88		
			2	SS	8		232									
231.3	Silty CLAY , trace sand, trace rootlets, occasional oxide staining Firm to Soft Brown		3	SS	5		231									
			4	SS	2											
			5	SS	2	230										
	Grey															
	Stiff						229									
	Firm						228									
226.9							227									
6.1	Probable SAND Compact		7	SS	20									No recovery		
226.1																
6.8	END OF BOREHOLE AT 6.8m UPON AUGER REFUSAL ON PROBABLE BEDROCK. ARTESIAN CONDITION NOTED UPON BOREHOLE COMPLETION. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Feb.14/13 Destroyed															

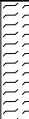


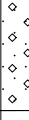
ONTMT4S 1237.GPJ 2012TEMPLATE(MTO).GDT 2/20/14

RECORD OF BOREHOLE No 16+370 29R

1 OF 1

METRIC

WP# 647-89-00 LOCATION N 5 426 935.0 E 207 040.8 ORIGINATED BY ES
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.01.31 - 2013.01.31 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL LIQUID MOISTURE LIMIT CONTENT LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa			WATER CONTENT (%)					
								○ UNCONFINED + FIELD VANE			W P W W L					
								● QUICK TRIAXIAL × LAB VANE								
233.2							20	40	60	80	100	20	40	60		
0.0	ORGANICS , roots and rootlets Dark Brown Frozen		1	SS	12		233								111	
232.4																
0.8	Silty CLAY , trace sand, trace rootlets Firm to Soft Brown		2	SS	7		232						○			
			3	SS	6											0 1 58 41
	Brown to Grey		4	SS	2		231						○			
	Grey		5	SS	0		230						○			
	Soft						229									
			6	SS	1		228						○			
	Firm															
227.1																
6.1	SAND and GRAVEL , some silt Dense Grey Moist		7	SS	44		227						○			40 38 22 (SI+CL)
226.3																
6.9	END OF BOREHOLE AT 6.9m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO SURFACE.															

ONTMT4S 1237.GPJ 2012TEMPLATE(MTO).GDT 2/20/14

RECORD OF BOREHOLE No 16+370 CL

1 OF 1

METRIC

WP# 647-89-00 LOCATION N 5 426 937.2 E 207 013.9 ORIGINATED BY ES
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.01.30 - 2013.01.30 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT		NATURAL MOISTURE CONTENT		LIQUID LIMIT		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		W P		W		W L			
233.8								○ UNCONFINED	+ FIELD VANE								
0.0	Start DCPT from surface							● QUICK TRIAXIAL	× LAB VANE								

ONTMT4S 1237.GPJ 2012TEMPLATE(MTO).GDT 2/20/14

RECORD OF BOREHOLE No 16+405 19R

1 OF 1

METRIC

WP# 647-89-00 LOCATION N 5 426 970.9 E 207 035.1 ORIGINATED BY ES
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.01.31 - 2013.01.31 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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			WATER CONTENT (%)								
								○ UNCONFINED + FIELD VANE											
								● QUICK TRIAXIAL × LAB VANE											
232.3							20	40	60	80	100		W _P	W	W _L				
0.0	ORGANICS: (125mm) Frozen		1	SS	12									○					
0.2	Silty CLAY , trace sand, trace rootlets Stiff to Firm Brown Frozen		2	SS	5								┌───○───┐			0	1	54	45
			3	SS	4									○					
	Grey		4	SS	2									○					
			5	SS	1										○				
	Firm		6	SS	1			7.4					┌───┐						

ONTMT4S 1237.GPJ 2012TEMPLATE(MTO).GDT 2/20/14

+³, ×³: Numbers refer to
Sensitivity

20
15
10





(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 16+435 CL

1 OF 1

METRIC

WP# 647-89-00 LOCATION N 5 427 002.0 E 207 018.2 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.05 - 2013.02.05 CHECKED BY JPL

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								
233.0								20 40 60 80 100								
0.0	ICE						233									
232.4																
0.6	PEAT, with roots and rootlets: (410mm) Black		1	GS										354		
232.0																
1.0	Silty CLAY, trace sand, trace organics Firm to Soft Brown		1	SS	2		232									
				2	SS		3									0 1 54 45
								231								
	Brown/Grey			3	SS		0									
				4	SS	0	230									
	Firm						229									
				5	SS	0										
						228										
	trace silt seams					227										
			6	SS	1									0 2 41 57		
						226										
225.6																
7.4	END OF BOREHOLE AT 7.4m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE OPEN AND WATER LEVEL AT 1.0m UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 2.2m, THEN CUTTINGS TO SURFACE.															

ONTMT4S 1237.GPJ 2012TEMPLATE(MTO).GDT 2/20/14

RECORD OF BOREHOLE No 16+460 19L

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 427 028.2 E 207 000.9 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.04 - 2013.02.04 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT		NATURAL MOISTURE CONTENT		LIQUID LIMIT		UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		W P		W		W L			GR	SA	SI	CL	
								○ UNCONFINED	+ FIELD VANE												
								● QUICK TRIAXIAL	× LAB VANE												
235.0								20 40 60 80 100													
0.0	TOPSOIL: (200mm)						235														
0.2	Silty CLAY , trace sand, trace organics, trace rootlets Stiff to Firm Dark Brown to Brown						235														
			1	SS	10		234														
			2	SS	7																
			3	SS	3																
			4	SS	3																
				Brown/Grey																	
				Stiff																	
				Grey																	
			5	SS	2		230											0 1 39 60			
	Firm																				
			6	SS	1		229														
			7	SS	2		228														
											</										

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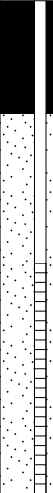

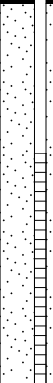
+³, ×³: Numbers refer to Sensitivity 20 15 10 5 0 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 16+460 19L

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 427 028.2 E 207 000.9 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.04 - 2013.02.04 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					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									
Continued From Previous Page							20 40 60 80 100					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT W P W W L					
							20 40 60 80 100					20 40 60					
223.1	Silty CLAY , trace sand Firm Grey						225	2.4									
			9	SS	3		224										
11.9	Gravelly silty SAND , trace clay Loose Grey Wet						223										
10			SS	4													
221.8							222										
13.3	END OF BOREHOLE AT 13.3m UPON AUGER REFUSAL. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Feb14/13 2.1 232.9 May22/13 0.4 234.7																

RECORD OF BOREHOLE No 16+460 29L

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 427 028.9 E 206 990.9 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.05 - 2013.02.05 CHECKED BY JPL

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	WATER CONTENT (%)					
234.2 0.0	Start DCPT from surface						<p>○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE</p>							
234														
233														
232														
231														
230														
229														
228														
227														
226														
225														

224.2

Continued Next Page

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

RECORD OF BOREHOLE No 16+460 29L

2 OF 2

METRIC

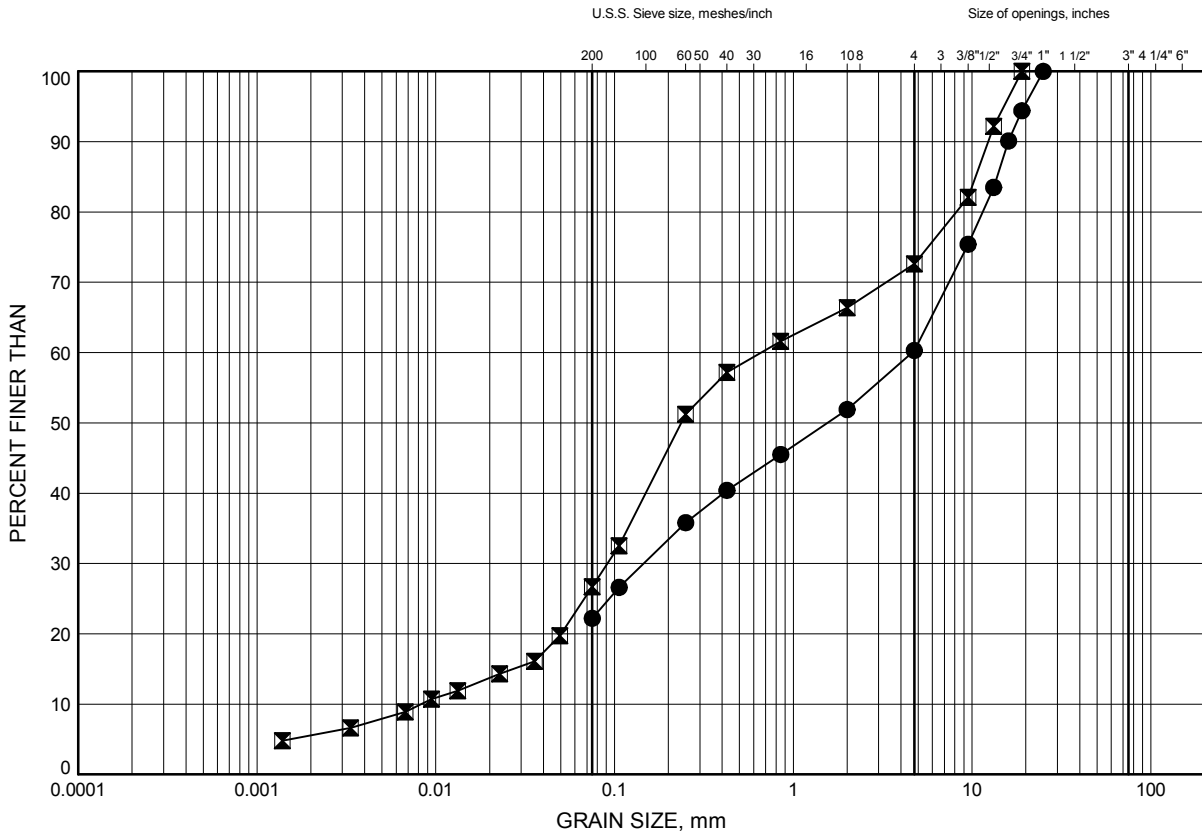
WP# 647-89-00 LOCATION N 5 427 028.9 E 206 990.9 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.02.05 - 2013.02.05 CHECKED BY JPL

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	WATER CONTENT (%)					
10.0	Continued From Previous Page END OF DCPT AT 10.0m UPON REFUSAL ON PROBABLE BEDROCK OR BOULDER. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.													

GRAIN SIZE DISTRIBUTION

FIGURE G1

GRAVELLY, SILTY SAND to SAND & GRAVEL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	16+370 29R	6.40	226.80
⊠	16+460 19L	12.50	222.53

Date February 2014
 WP# 647-89-00

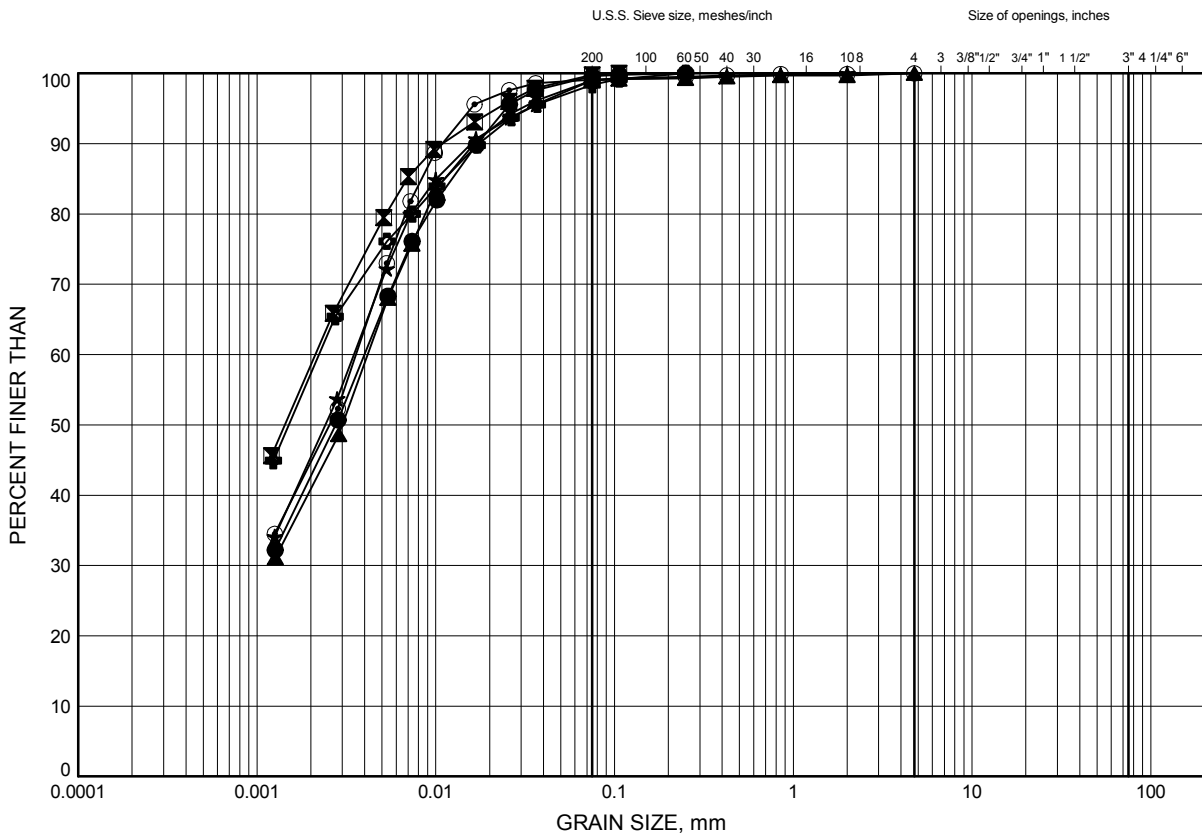


Prep'd AN
 Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE G2

SILTY CLAY



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	16+260 19R	2.59	229.27
⊠	16+302 1R	4.88	228.02
▲	16+370 29R	1.83	231.37
★	16+405 19R	1.07	231.28
⊙	16+435 CL	1.83	231.16
⊕	16+435 CL	6.40	226.59

Date February 2014

WP# 647-89-00



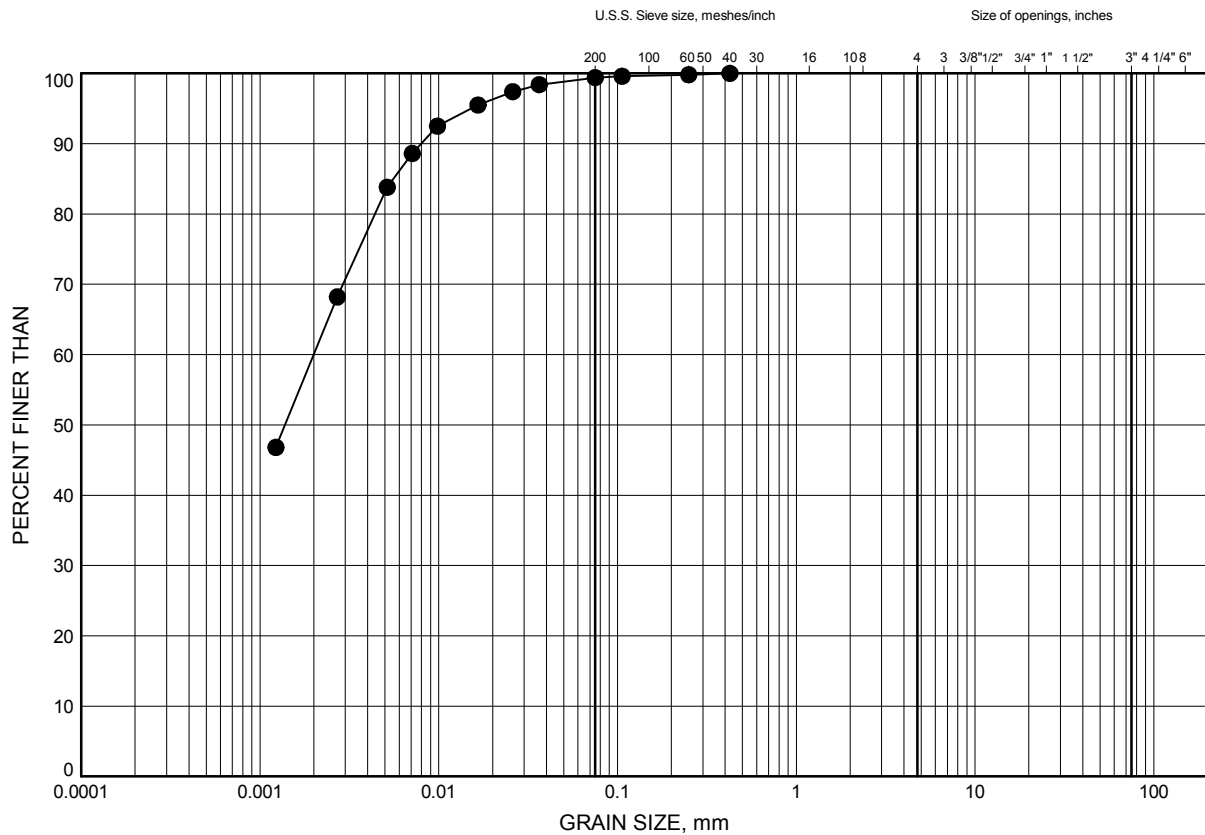
Prep'd AN

Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE G3

SILTY CLAY



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	16+460 19L	4.88	230.15

Date February 2014
 WP# 647-89-00

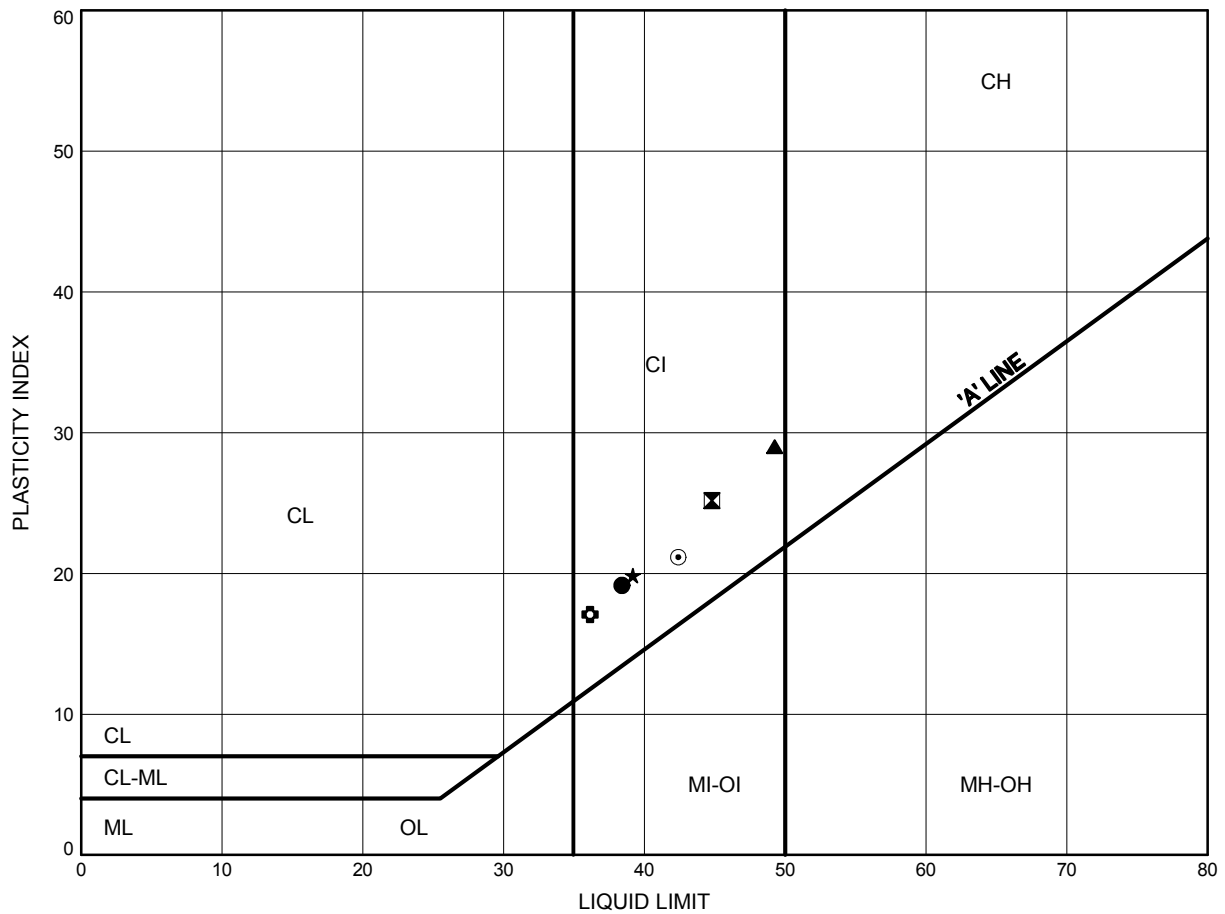


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 Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE G4

SILTY CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	16+260 19R	2.59	229.27
⊠	16+302 1R	4.88	228.02
▲	16+335.2 21.2R	3.35	229.61
★	16+370 29R	1.83	231.37
⊙	16+405 19R	1.07	231.28
⊕	16+435 CL	1.83	231.16

Date February 2014
 WP# 647-89-00

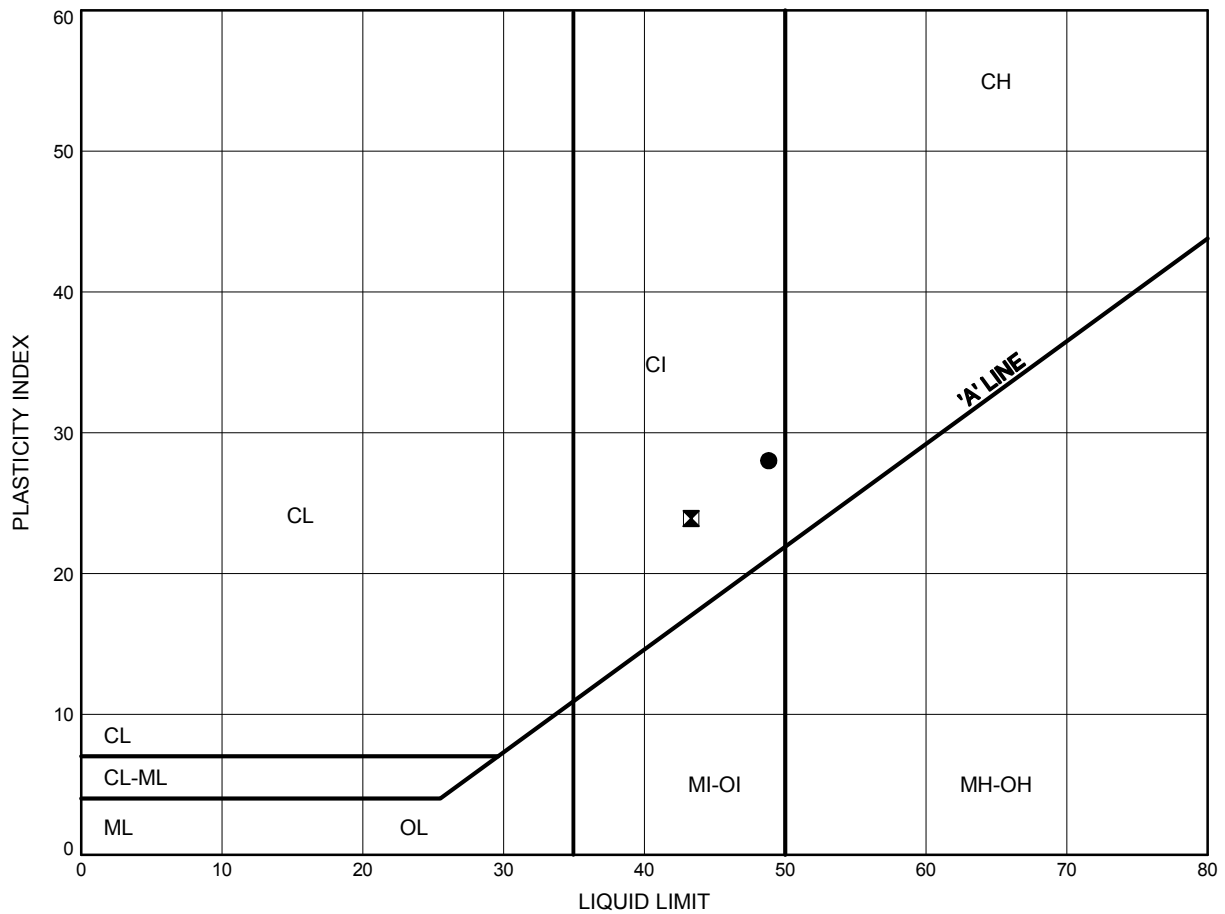


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ATTERBERG LIMITS TEST RESULTS

FIGURE G5

SILTY CLAY



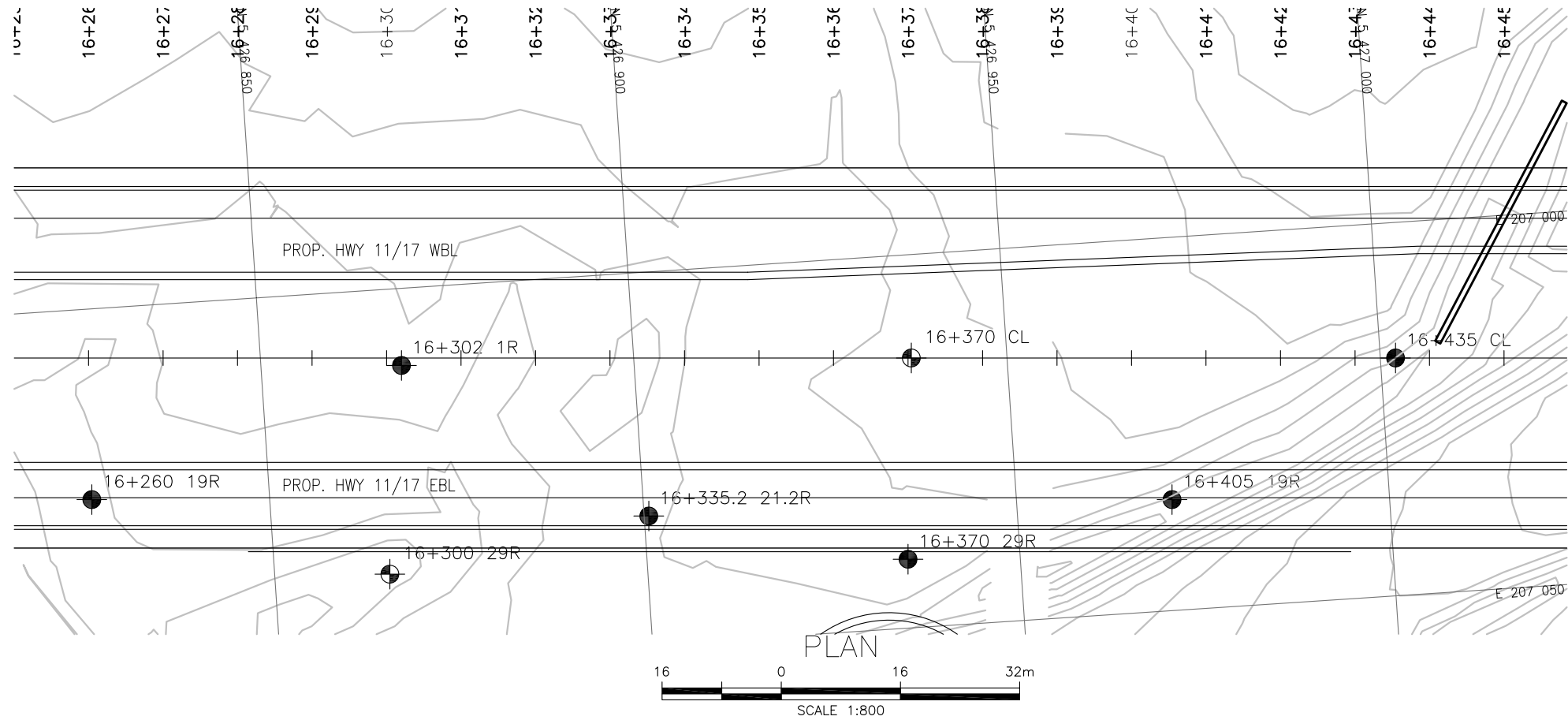
LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	16+435 CL	6.40	226.59
⊠	16+460 19L	4.88	230.15

Date February 2014
 WP# 647-89-00



Prep'd AN
 Chkd. MEF



METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

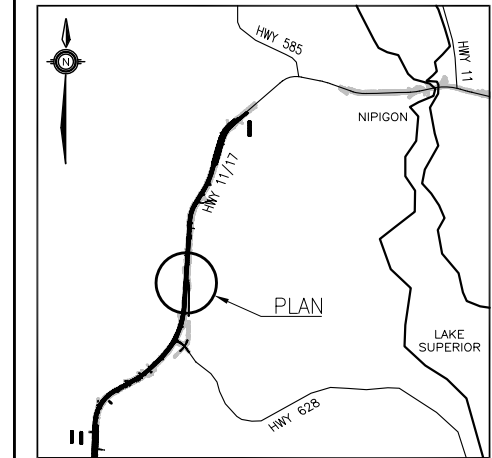


CONT No 2014-6026
GWP No 647-89-00

HWY 11/17 FOUR LANING
EASTBOUND & WESTBOUND LANES
(STA. 16+250 TO 16+460)
BOREHOLE LOCATIONS AND SOIL STRATA



SHEET



KEYPLAN

LEGEND

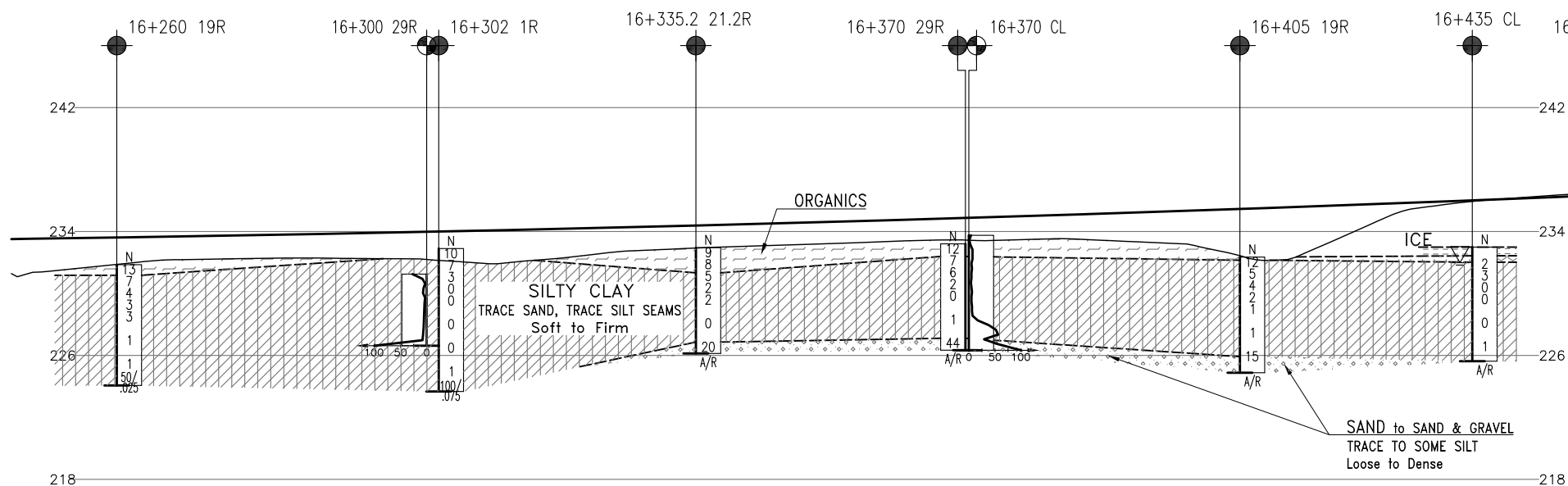
	Borehole
	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
16+260 19R	231.9	5 426 826.2	207 025.5
16+300 29R	231.3	5 426 865.4	207 038.2
16+302 1R	232.9	5 426 868.8	207 010.3
16+335.2 21.2R	233.0	5 426 900.6	207 032.7
16+370 29R	233.2	5 426 935.0	207 040.8
16+370 CL	233.8	5 426 937.2	207 013.9
16+405 19R	232.3	5 426 970.9	207 035.1
16+435 CL	233.0	5 427 002.0	207 018.2
16+460 19L	235.0	5 427 028.2	207 000.9
16+460 29L	234.2	5 427 028.9	206 990.9

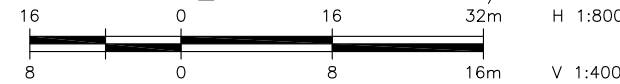
-NOTES-

- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 52A-182



PROFILE ALONG CL HIGHWAY 11/17 EBL



DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	SBP	CHK JPL	CODE
DRAWN	MFA	CHK SBP	SITE
LOAD	DATE	OCT. 2014	
STRUCT	DWG	11	

Appendix H

Highway 11/17 EBL and WBL

Sta. 16+830 to 16+940

Record of Borehole Sheets
Laboratory Test Results
Borehole Location and Soil Strata Drawings

RECORD OF BOREHOLE No 16+850 19R

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 427 414.9 E 207 064.6 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.02 - 2013.02.02 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
242.2								20 40 60 80 100						
0.0	TOPSOIL: (275mm)							20 40 60 80 100						
241.9								20 40 60 80 100						
0.3	Silty CLAY, trace sand Firm to Soft Brown													
			1	SS	3									0 2 36 62
			2	SS	4									
	Brown to Grey													
	with silt seams		3	SS	1									
	Grey													
			4	SS	2									
	Soft													
			5	SS	2									0 1 36 63
	Firm													
			6	SS	1									
	Very Soft													
			1	TW										0 0 32 68
														OED: e _s =1.530 C _c =0.400 C _u =0.028 G _s =2.750
	Soft													
	trace sand seams		7	SS	4									

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15 10 5 0
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 16+850 19R

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 427 414.9 E 207 064.6 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.02 - 2013.02.02 CHECKED BY JPL

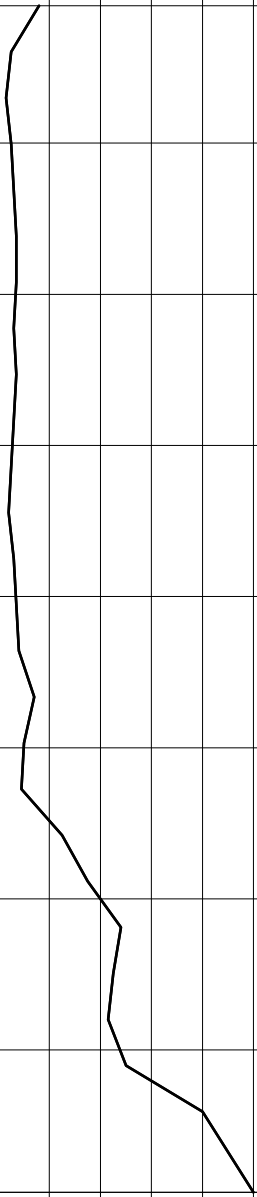
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE									
							20	40	60	80	100						
232.1	Continued From Previous Page	✓✓															
10.1	SAND, some gravel, trace cobbles Very Dense Grey Wet		8	SS	51												
229.8			9	SS	100/												
12.4	END OF BOREHOLE AT 12.4m UPON AUGER REFUSAL ON PROBABE BEDROCK. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Feb.10/13 0.7 241.5 Feb.14/13 0.5 241.7 May22/13 1.3* 243.5 * ABOVE GROUND SURFACE ARTESIAN PRESSURE ENCOUNTERED				.125												

RECORD OF BOREHOLE No 16+850 29L

1 OF 1

METRIC

WP# 647-89-00 LOCATION N 5 427 418.1 E 207 016.7 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.02.02 - 2013.02.02 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			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				
244.8								20 40 60 80 100		20 40 60		
0.0	Start DCPT from surface											
237.0	END OF DCPT AT 7.8m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.											
7.8												

ONTMT4S 1237.GPJ 2012TEMPLATE(MTO).GDT 2/21/14

RECORD OF BOREHOLE No 16+863.3 23.9L

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 427 430.5 E 207 022.6 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.02.02 - 2013.02.02 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				WATER CONTENT (%)				GR	SA	SI	CL
243.7								20 40 60 80 100											
0.0	TOPSOIL: (175mm)							20 40 60 80 100											
0.2	Silty CLAY , trace roots, trace rootlets Firm to Soft Dark Brown																		
			1	SS	6		243												
			2	SS	5		242												
	Grey		3	SS	1		241												
			4	SS	1		240												
		Very Soft																	
237.1																			
		Soft																	
6.6																			
		trace sand																	
237.1			6	SS	2		239												
6.6																			

Continued Next Page

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

RECORD OF BOREHOLE No 16+863.3 23.9L

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 427 430.5 E 207 022.6 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.02 - 2013.02.02 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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					WATER CONTENT (%)				
							20	40	60	80	100	W _p	W	W _L			
233.4	Continued From Previous Page																
10.2	END OF BOREHOLE AT 10.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE OPEN TO 9.0m AND WATER LEVEL AT 3.2m UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 1.5m, THEN CUTTINGS TO SURFACE.																

METRIC

[illegible]


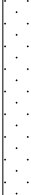
+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 16+875 29R

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 427 439.2 E 207 076.2 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.01 - 2013.02.01 CHECKED BY JPL

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								
								20	40	60	80					
Continued From Previous Page																
234.2																
10.3	SAND , some gravel Very Dense Brown Wet		9	SS	100/ .150		234									
232.8							233									
11.7	END OF BOREHOLE AT 11.7m UPON AUGER REFUSAL ON PROBABLE BEDROCK OR BOULDER. BOREHOLE OPEN TO 10.0m AND WATER LEVEL AT 3.5m UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 2.4m, THEN CUTTINGS TO SURFACE.															

METRIC

SOIL PROFILE						
ELEV DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES			GROUND WATER CONDITIONS
			NUMBER	TYPE	"N" VALUES	
243.4	Frozen up to 0.3m					
0.0						
243.0						
0.3	Start DCPT at 0.3m					
						DYNAMIC CONE PENETRATION RESISTANCE PLOT
						SHEAR STRENGTH kPa
						○ UNCONFINED + FIELD VANE
						● QUICK TRIAXIAL × LAB VANE
						WATER CONTENT (%)
						P L A S T I C N A T U R A L L I Q U I D W E T H O G E T M O I S T U R E C O N T E N T L I M I T
						UNIT WEIGHT γ
						kN/m³
						REMARKS & GRAIN SIZE DISTRIBUTION (%)
						GR SA SI CL

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 16+875 CL

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 427 441.1 E 207 047.3 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.02.01 - 2013.02.01 CHECKED BY JPL

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	WATER CONTENT (%)					
	Continued From Previous Page							20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	20 40 60					
228.4							233							
14.9	END OF DCPT AT 14.9m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.						232							
							231							
							230							
							229							

METRIC[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 16+896.5 28.2L

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 427 464.0 E 207 020.5 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.03 - 2013.02.03 CHECKED BY JPL

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									
	Continued From Previous Page																
232.1	SAND, trace silt, trace gravel Loose Grey						233										
	Very Dense		9	SS	100/ .225												
11.2	END OF BOREHOLE AT 11.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK OR BOULDER. BOREHOLE OPEN TO 8.3m AND WATER LEVEL AT 2.6m UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 1.7m, THEN CUTTINGS TO SURFACE.																

RECORD OF BOREHOLE No 16+902.2 16.7R 1 OF 1 METRIC

WP# 647-89-00 LOCATION N 5 427 466.7 E 207 065.7 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
DATUM Geodetic DATE 2013.01.31 - 2013.01.31 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				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					
245.4								20 40 60 80 100					
0.0	TOPSOIL: (150mm)							20 40 60 80 100					
0.2	Silty CLAY , trace sand, trace gravel Stiff to Soft Brown		1	SS	9		245						
			2	SS	11		244						
			3	SS	7		243						
			4	SS	3		242						
							241						
	Grey		5	SS	1		240						
			6	SS	2		239						
	Stiff						238						
	trace gravel, occasional cobbles		7	SS	10								
237.1													
8.2	END OF BOREHOLE AT 8.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK OR BOULDER. BOREHOLE OPEN AND WATER LEVEL AT 4.6m UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 1.8m, THEN CUTTINGS TO SURFACE.												

ONTMT4S 1237.GPJ 2012TEMPLATE(MTO).GDT 2/21/14

RECORD OF BOREHOLE No 16+910 19L

1 OF 1

METRIC

WP# 647-89-00 LOCATION N 5 427 477.3 E 207 030.6 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.02.04 - 2013.02.04 CHECKED BY JPL

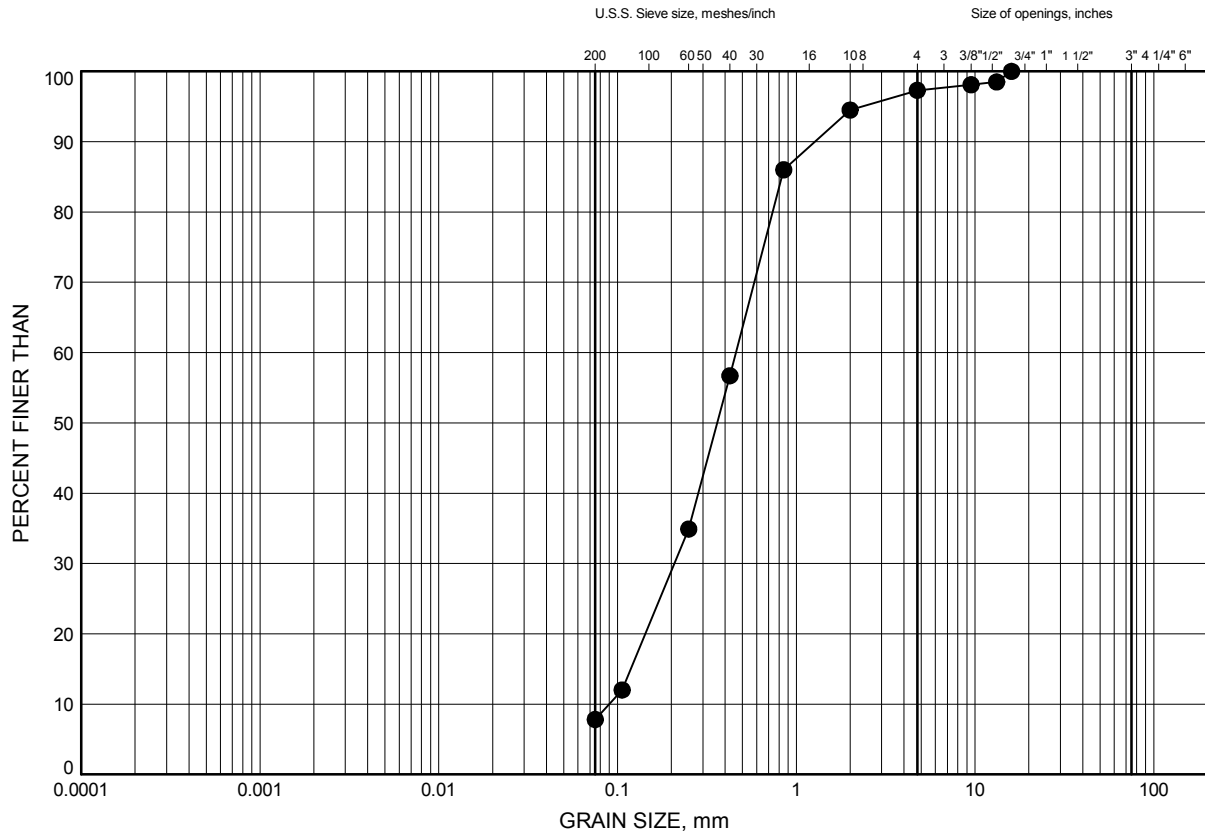
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					
244.9								20 40 60 80 100					
0.0	TOPSOIL: (225mm)						245	20 40 60 80 100					
0.2	Silty CLAY , trace sand Stiff to Firm to Soft Brown							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					
			1	SS	10		244	20 40 60 80 100					
			2	SS	3		243	20 40 60 80 100					
	Brown to Grey		3	SS	6		242	20 40 60 80 100					
	Grey		4	SS	0		241	20 40 60 80 100					
	Firm		5	SS	1		240	20 40 60 80 100					
			6	SS	7		239	20 40 60 80 100					
237.3							238	20 40 60 80 100					
7.6	SAND, some gravel, trace silt		7	SS	100/		237	20 40 60 80 100					
236.9	Grey				200/			20 40 60 80 100					
8.0	Moist							20 40 60 80 100					
END OF BOREHOLE AT 8.0m UPON AUGER REFUSAL ON PROBABLE BEDROCK OR BOULDER. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Feb.10/13 1.5 243.4 Feb.14/13 1.3 243.6 May22/13 1.0* 245.9 * ABOVE GROUND SURFACE ARTESIAN PRESSURE NOTED													

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

GRAIN SIZE DISTRIBUTION

FIGURE H1

SAND



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	16+896.5 28.2L	9.75	233.57

Date February 2014
 WP# 647-89-00

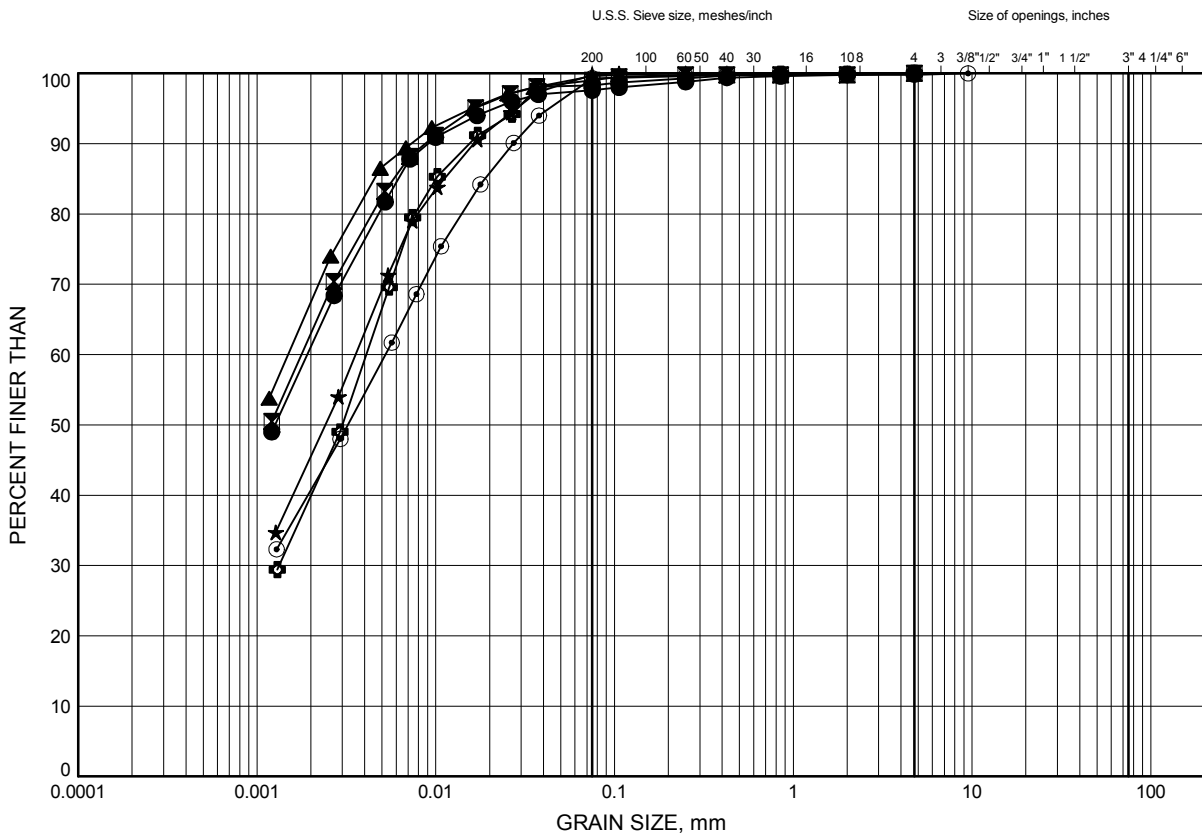


Prep'd AN
 Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE H2

SILTY CLAY



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	16+850 19R	1.07	241.13
⊠	16+850 19R	4.88	237.32
▲	16+850 19R	7.92	234.27
★	16+863.3 23.9L	3.35	240.30
⊙	16+875 29R	9.45	235.03
⊕	16+896.5 28.2L	1.83	241.49

Date February 2014

WP# 647-89-00



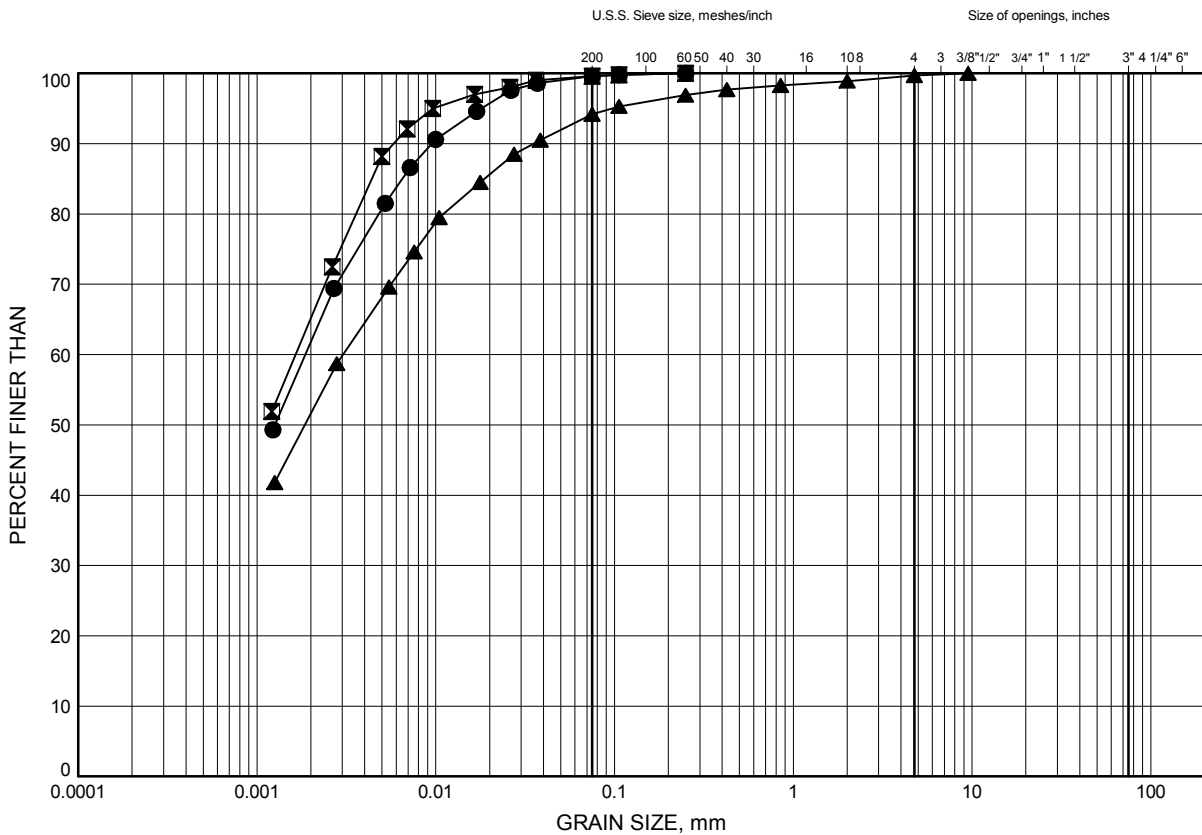
Prep'd AN

Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE H3

SILTY CLAY



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	16+902.2 16.7R	2.59	242.77
⊠	16+910 19L	1.83	243.11
▲	16+910 19L	6.40	238.54

Date February 2014

WP# 647-89-00



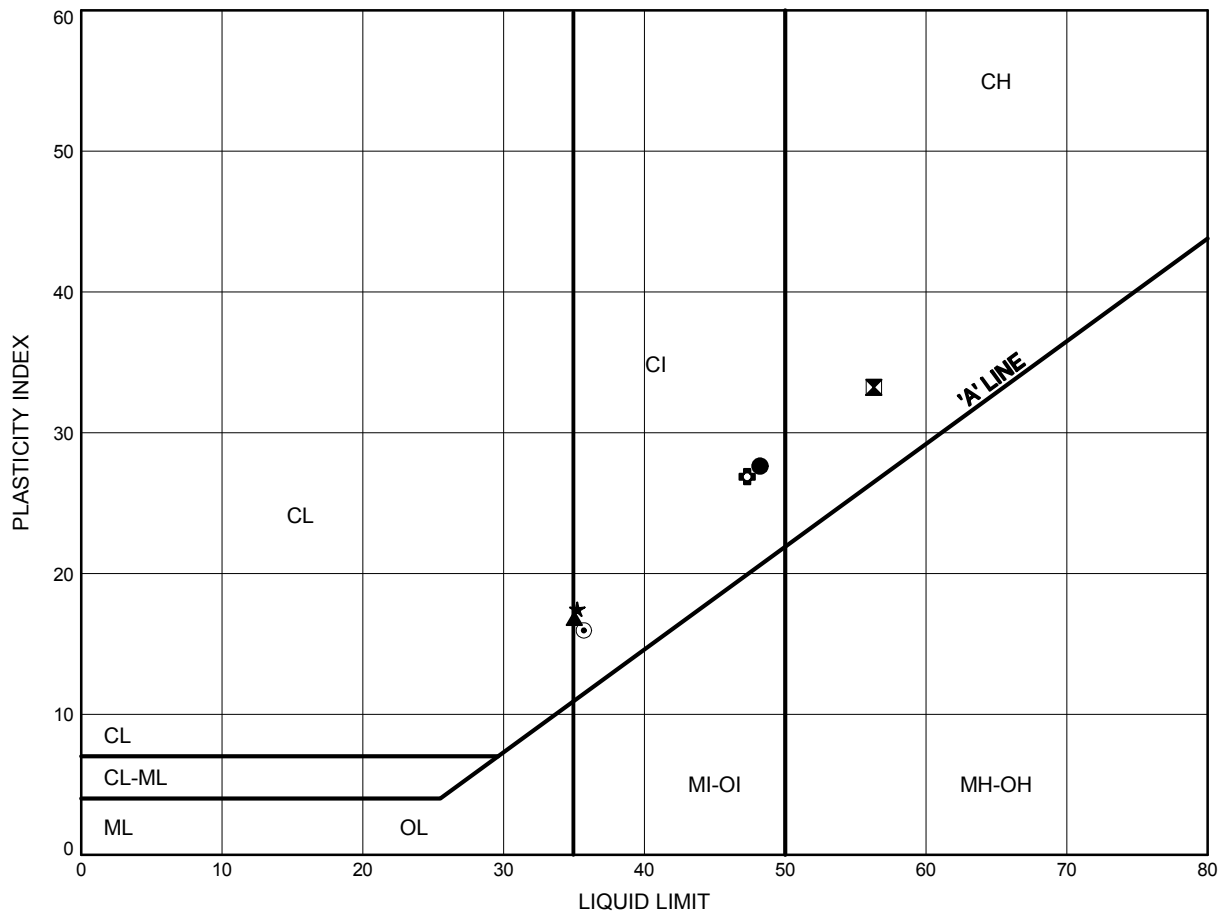
Prep'd AN

Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE H4

SILTY CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	16+850 19R	4.88	237.32
⊠	16+850 19R	7.92	234.27
▲	16+863.3 23.9L	3.35	240.30
★	16+875 29R	9.45	235.03
⊙	16+896.5 28.2L	1.83	241.49
⊕	16+902.2 16.7R	2.59	242.77

Date February 2014
 WP# 647-89-00

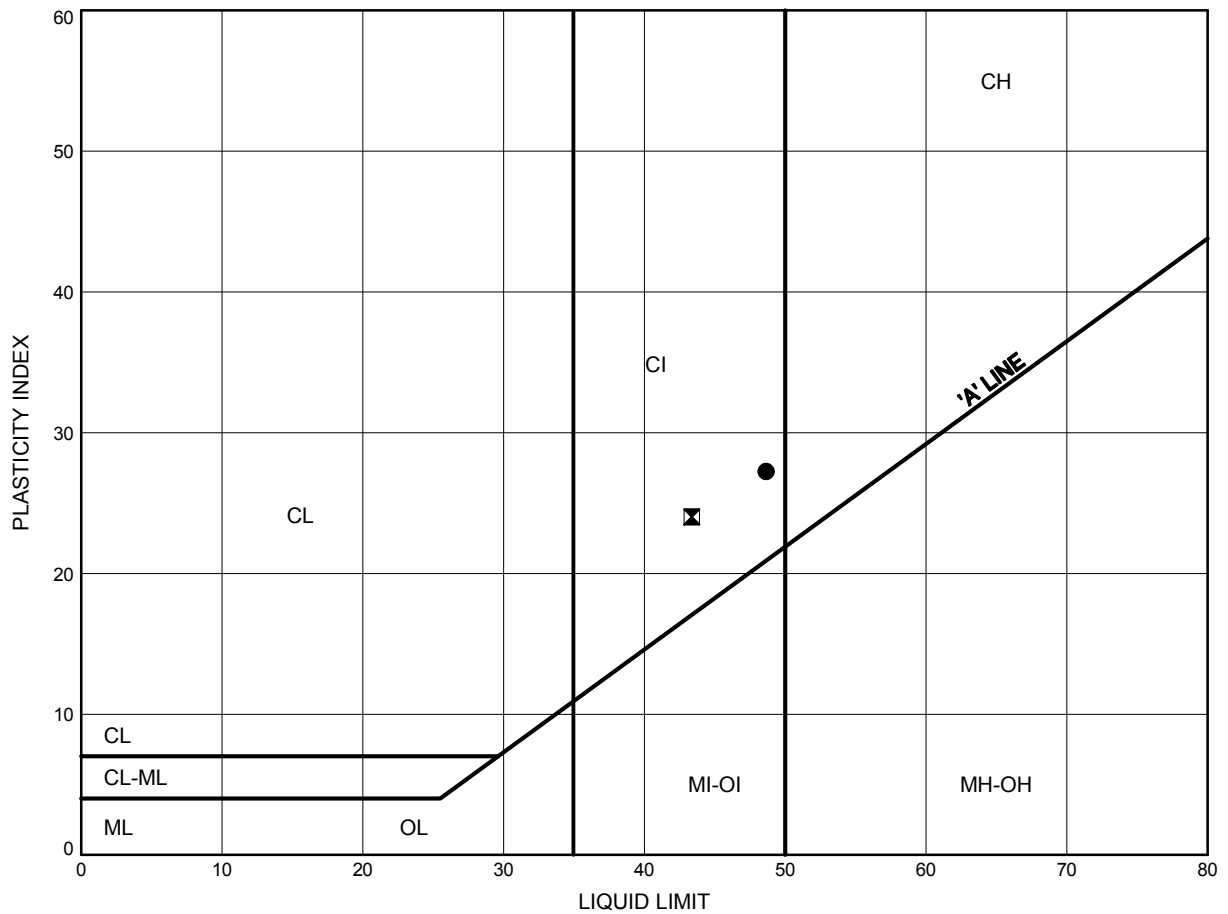


Prep'd AN
 Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE H5

SILTY CLAY



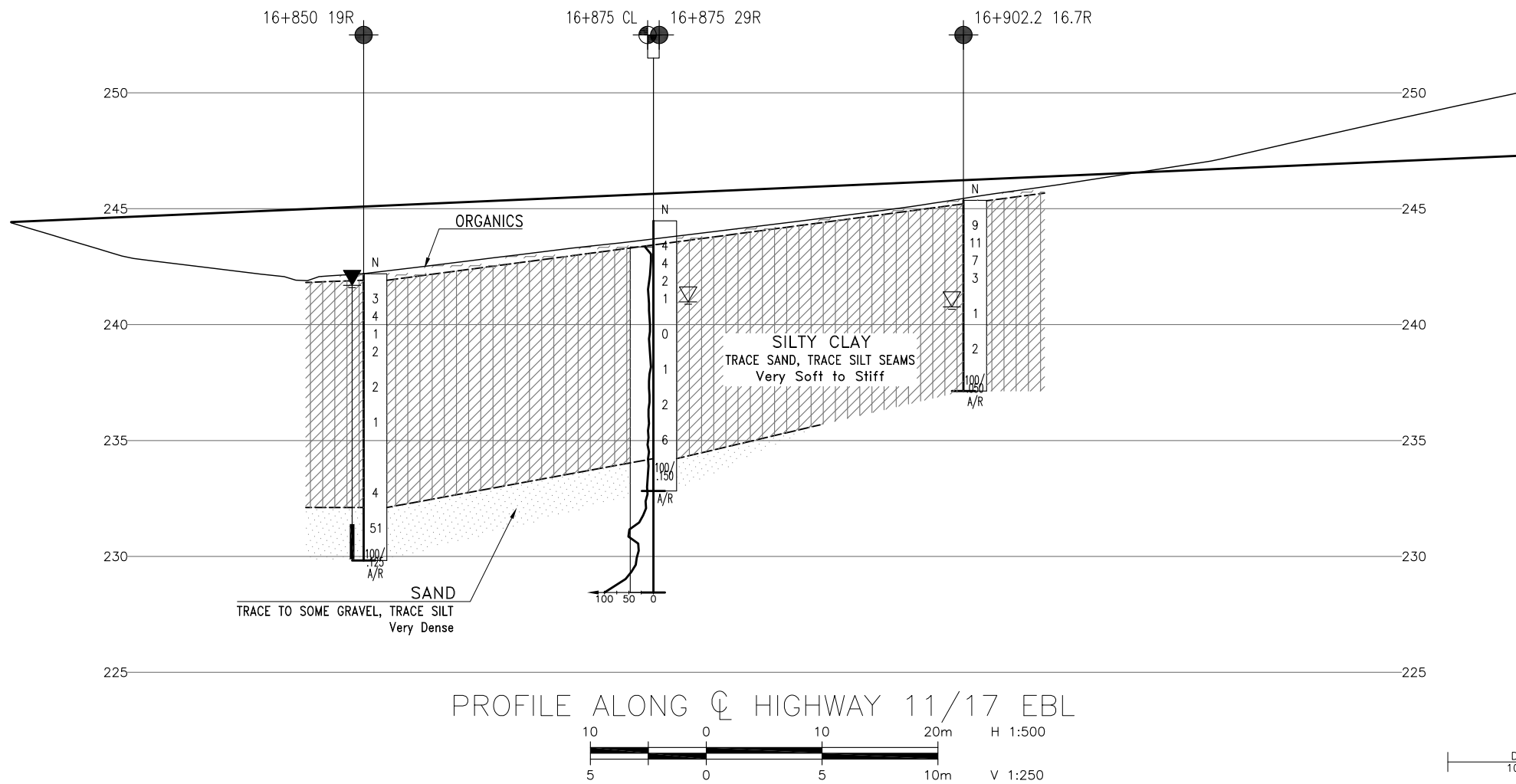
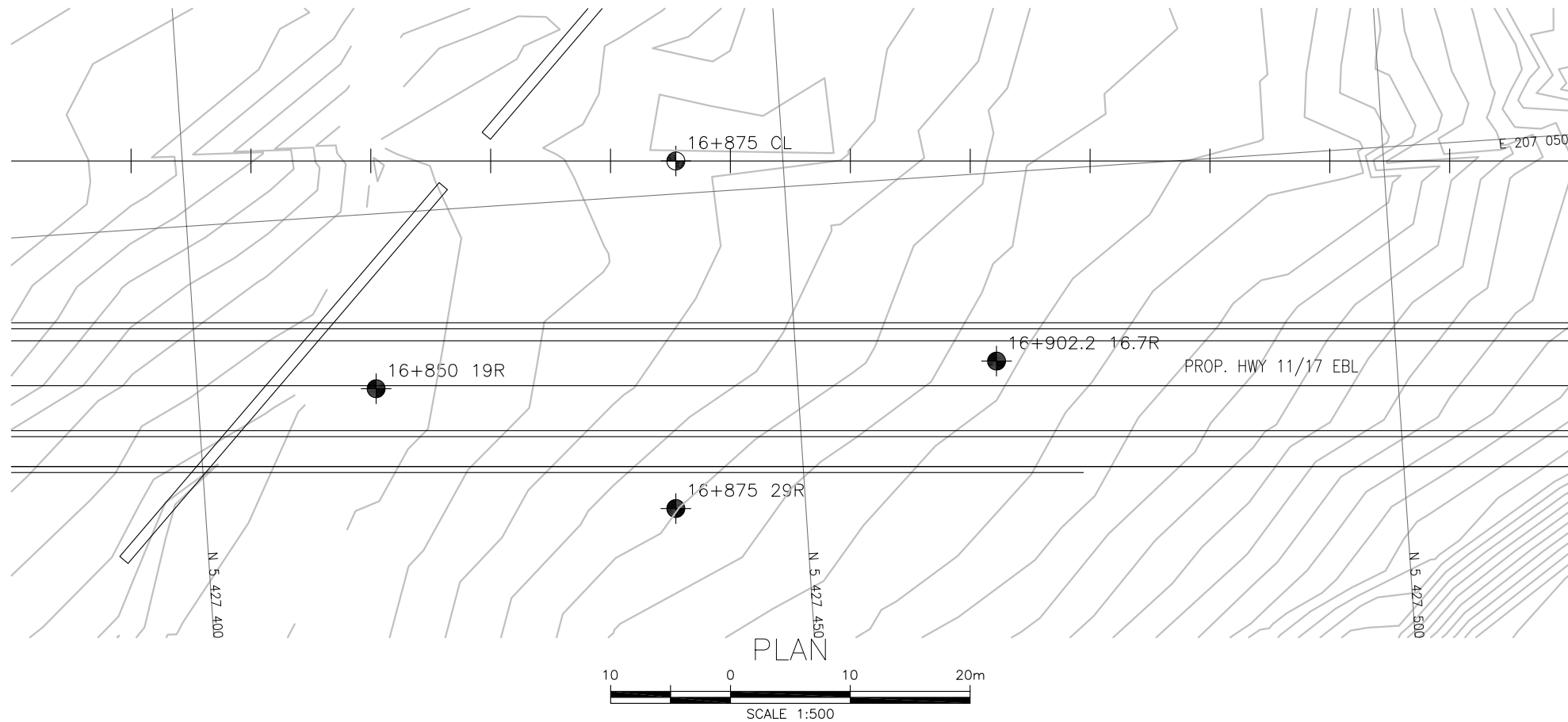
LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	16+910 19L	1.83	243.11
⊠	16+910 19L	6.40	238.54

Date February 2014
 WP# 647-89-00



Prep'd AN
 Chkd. MEF

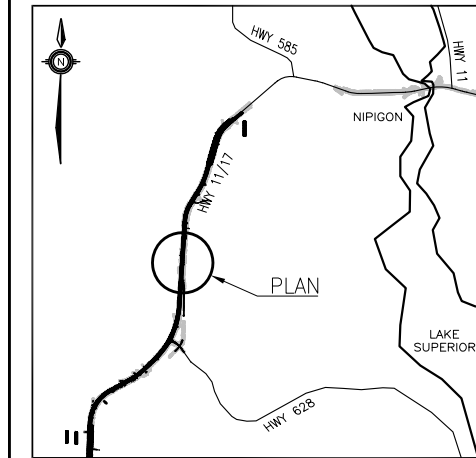


METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN








CONT No 2014-6026
GWP No 647-89-00

HWY 11/17 FOUR LANING
EASTBOUND LANES
(STA. 16+830 TO 16+940)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

	Borehole
	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60° Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

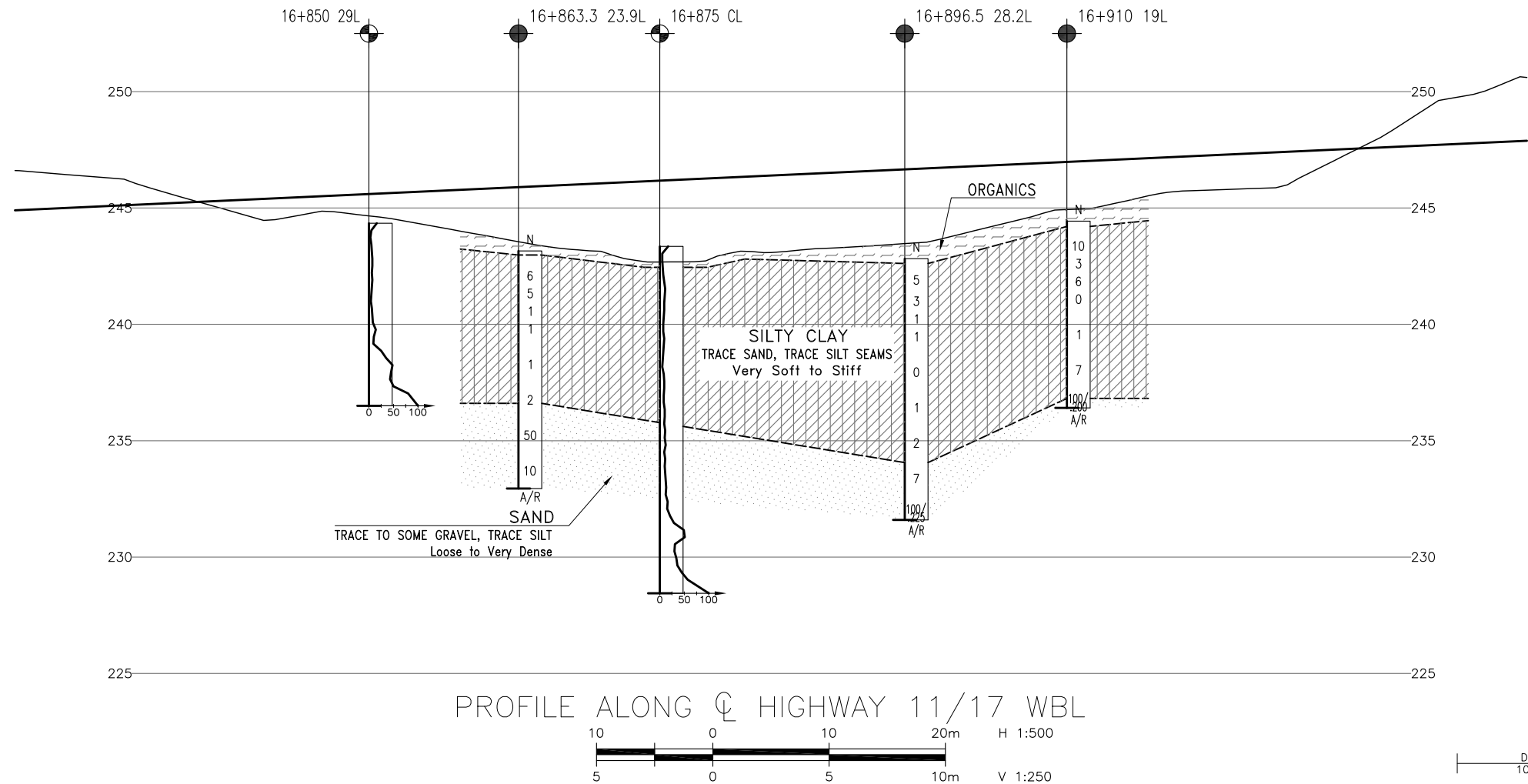
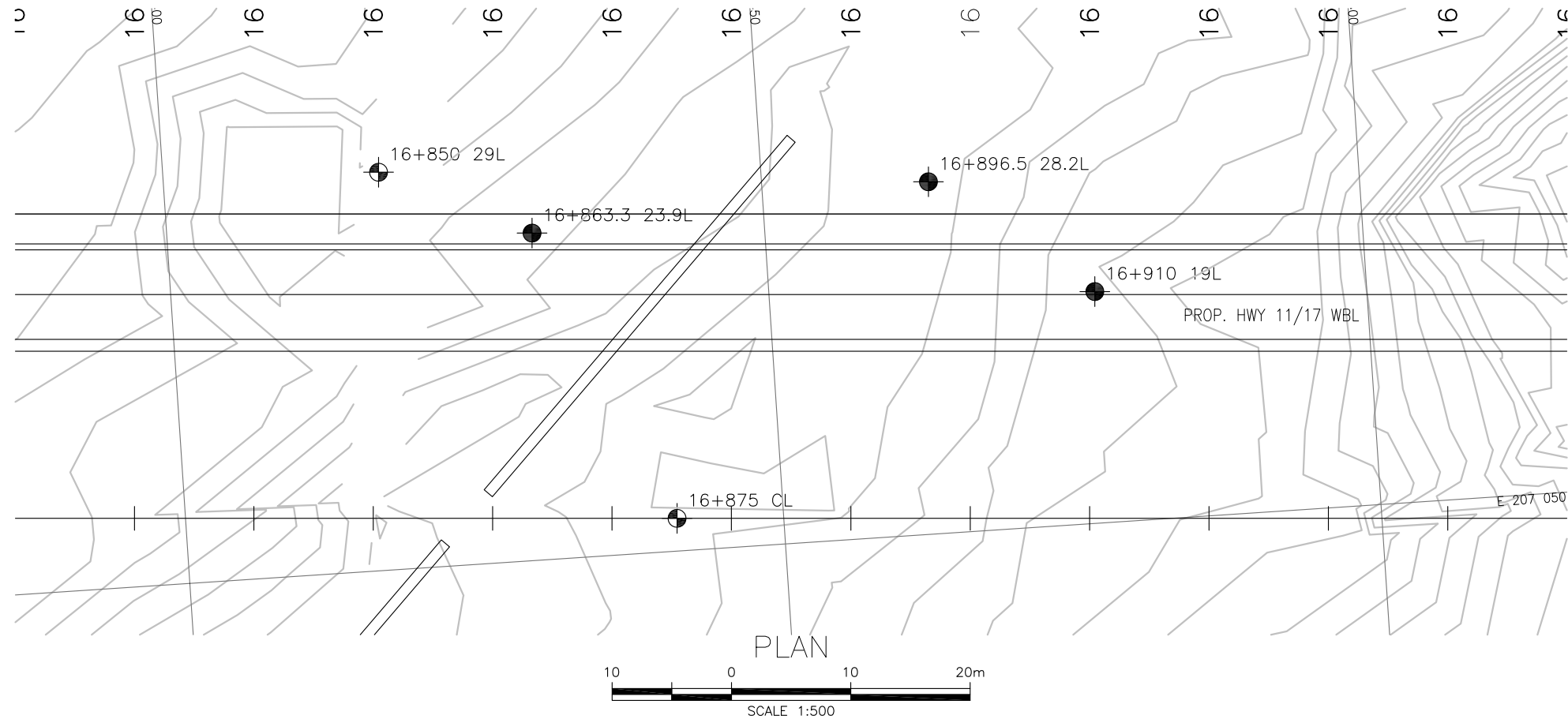
NO	ELEVATION	NORTHING	EASTING
16+850 19R	242.2	5 427 414.9	207 064.6
16+850 29L	244.8	5 427 418.1	207 016.7
16+863.3 23.9L	243.7	5 427 430.5	207 022.6
16+875 29R	244.5	5 427 439.2	207 076.2
16+875 CL	243.4	5 427 441.1	207 047.3
16+896.5 28.2L	243.3	5 427 464.0	207 020.5
16+902.2 16.7R	245.4	5 427 466.7	207 065.7
16+910 19L	244.9	5 427 477.3	207 030.6

-NOTES-

- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 52A-182

[illegible]

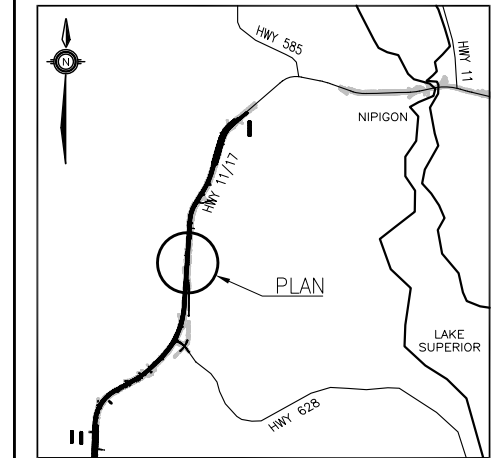


METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No 2014-6026
GWP No 647-89-00

HWY 11/17 FOUR LANING
WESTBOUND LANES
(STA. 16+830 TO 16+940)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

	Borehole
	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
16+850 19R	242.2	5 427 414.9	207 064.6
16+850 29L	244.8	5 427 418.1	207 016.7
16+863.3 23.9L	243.7	5 427 430.5	207 022.6
16+875 29R	244.5	5 427 439.2	207 076.2
16+875 CL	243.4	5 427 441.1	207 047.3
16+896.5 28.2L	243.3	5 427 464.0	207 020.5
16+902.2 16.7R	245.4	5 427 466.7	207 065.7
16+910 19L	244.9	5 427 477.3	207 030.6

-NOTES-

- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCREs No. 52A-182

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	SBP	CHK JPL	CODE LOAD DATE OCT. 2014
DRAWN	MFA	CHK SBP	SITE STRUCT DWG 13

DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

Appendix I

Highway 11/17 EBL and WBL

Sta. 18+450 to 18+500

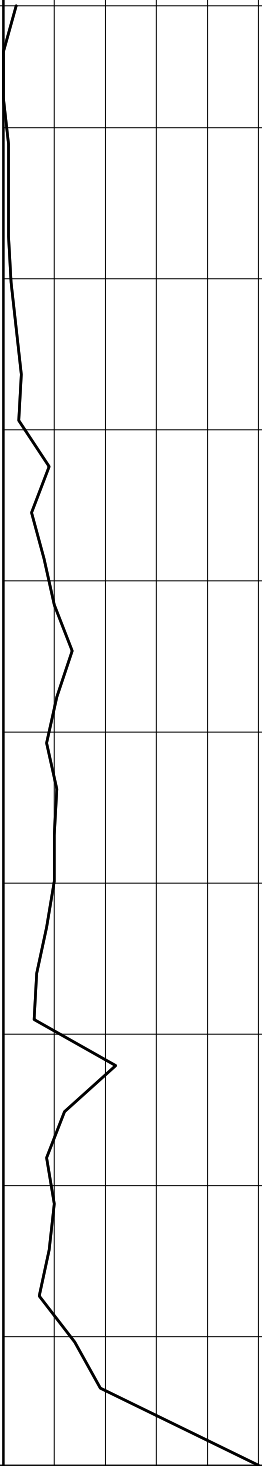
Record of Borehole Sheets
Laboratory Test Results
Borehole Location and Soil Strata Drawings

RECORD OF BOREHOLE No 18+463.5 14R

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 428 994.0 E 207 272.2 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
 DATUM Geodetic DATE 2013.01.29 - 2013.01.29 CHECKED BY JPL

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						
267.7								○ UNCONFINED + FIELD VANE						
0.0	Start DCPT from surface							● QUICK TRIAXIAL × LAB VANE						
								20 40 60 80 100	20 40 60					
														
								267						
								266						
								265						
								264						
								263						
								262						
								261						
								260						
								259						
258.1	END OF DCPT AT 9.7m. BOREHOLE BACKFILLED WITH													
9.7														

Continued Next Page

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

RECORD OF BOREHOLE No 18+463.5 14R

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 428 994.0 E 207 272.2 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.01.29 - 2013.01.29 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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					WATER CONTENT (%)				
							20	40	60	80	100	W _p	W	W _L			
	Continued From Previous Page BENTONITE HOLEPLUG TO SURFACE.																

RECORD OF BOREHOLE No 18+464.4 12.4R

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 428 995.6 E 207 271.3 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.01.29 - 2013.01.29 CHECKED BY JPL

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 (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									WATER CONTENT (%)			
								○ UNCONFINED	+ FIELD VANE	● QUICK TRIAXIAL	× LAB VANE									
								20	40	60	80						100	20	40	60
267.6																				
0.0																				
	PEAT, amorphous Very Soft to Soft Black Wet																			
			1	SS	2										282					
			2	SS	1										338					
			3	SS	3										444					
264.7																				
3.0	SAND, some silt, trace gravel, occasional peat pockets Loose Brown Moist probable cobbles		4	SS	5											Low recovery				
263.2																				
4.4	Clayey SILT, trace sand Firm Grey Wet		5	SS	8															
	Soft		6	SS	2											0 8 67 25				
	some clay, occasional cobbles Stiff		7	SS	14															
259.0																				
8.7	SAND, trace to some silt, trace gravel Loose Grey Wet																			
			8	SS	9											15 71 14 (SI+CL)				

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 18+464.4 12.4R 2 OF 2 METRIC

WP# 647-89-00 LOCATION N 5 428 995.6 E 207 271.3 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.01.29 - 2013.01.29 CHECKED BY JPL

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									
	Continued From Previous Page							20	40	60	80	100					
257.2																	
10.5	END OF BOREHOLE AT 10.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 0.6m, THEN CUTTINGS TO SURFACE.																

RECORD OF BOREHOLE No 18+475 19L

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 429 021.3 E 207 250.1 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.01.30 - 2013.01.30 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							
266.6	PEAT , amorphous Very Soft to Soft Black Wet						20	40	60	80	100	PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	GR SA SI CL
0.0							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	WATER CONTENT (%)							
							20	40	60	80	100	20	40	60	
263.5	Clayey SILT , trace sand, with sand seams Firm to Stiff Grey Moist Firm		1	SS	0		266							315	0 2 78 20
														308	
														362	
3.1			2	SS	2		265								
			3	SS	1		264								
			4	SS	5		263								
								11.2 +							
			5	SS	5		262					14			
								7.5 +							
			6	SS	9		260								
								12.0 +							
258.7	SAND , trace gravel Loose to Compact Grey Wet		7	SS	15		259								
7.9															
257.4	END OF BOREHOLE AT 9.2m UPON REFUSAL. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		8	SS	100/		258								
9.2						.075									

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

METRIC

[illegible]

METRIC[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 18+475 29L

2 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 429 026.5 E 207 241.6 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.01.29 - 2013.01.29 CHECKED BY JPL

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	WATER CONTENT (%)					
	Continued From Previous Page							20 40 60 80 100						
255.4							256	20 40 60 80 100						
11.1	END OF DCPT AT 11.1m ON PROBABLE BEDROCK OR BOULDER. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.							20 40 60 80 100						

RECORD OF BOREHOLE No 18+475 CL

1 OF 2

METRIC

WP# 647-89-00 LOCATION N 5 429 011.4 E 207 266.3 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.01.29 - 2013.01.29 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE WATER CONTENT (%) 20 40 60 PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT W _p W 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					
267.0										
0.0	Frozen up to 0.2m						267			
0.2	Start DCPT from 0.2m						266			
							265			
							264			
							263			
							262			
							261			
							260			
							259			
							258			

Continued Next Page

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

RECORD OF BOREHOLE No 18+475 CL

2 OF 2

METRIC

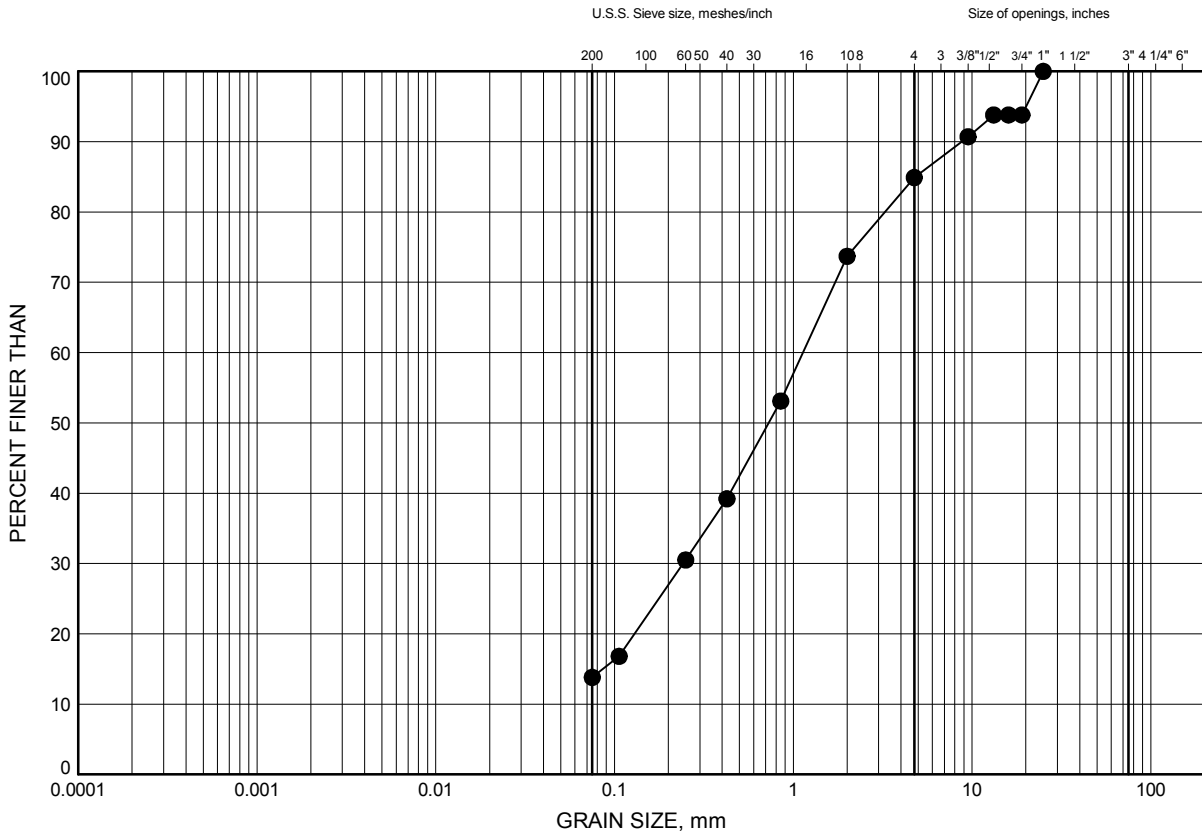
WP# 647-89-00 LOCATION N 5 429 011.4 E 207 266.3 ORIGINATED BY SLL
HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY AN
DATUM Geodetic DATE 2013.01.29 - 2013.01.29 CHECKED BY JPL

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								
	Continued From Previous Page						257						
							256						
							255						
254.1 12.9	END OF DCPT AT 12.9m ON PROBABLE BEDROCK OR BOULDER. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.												

GRAIN SIZE DISTRIBUTION

FIGURE 11

SAND



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	18+464.4 12.4R	9.45	258.20

Date February 2014
 WP# 647-89-00

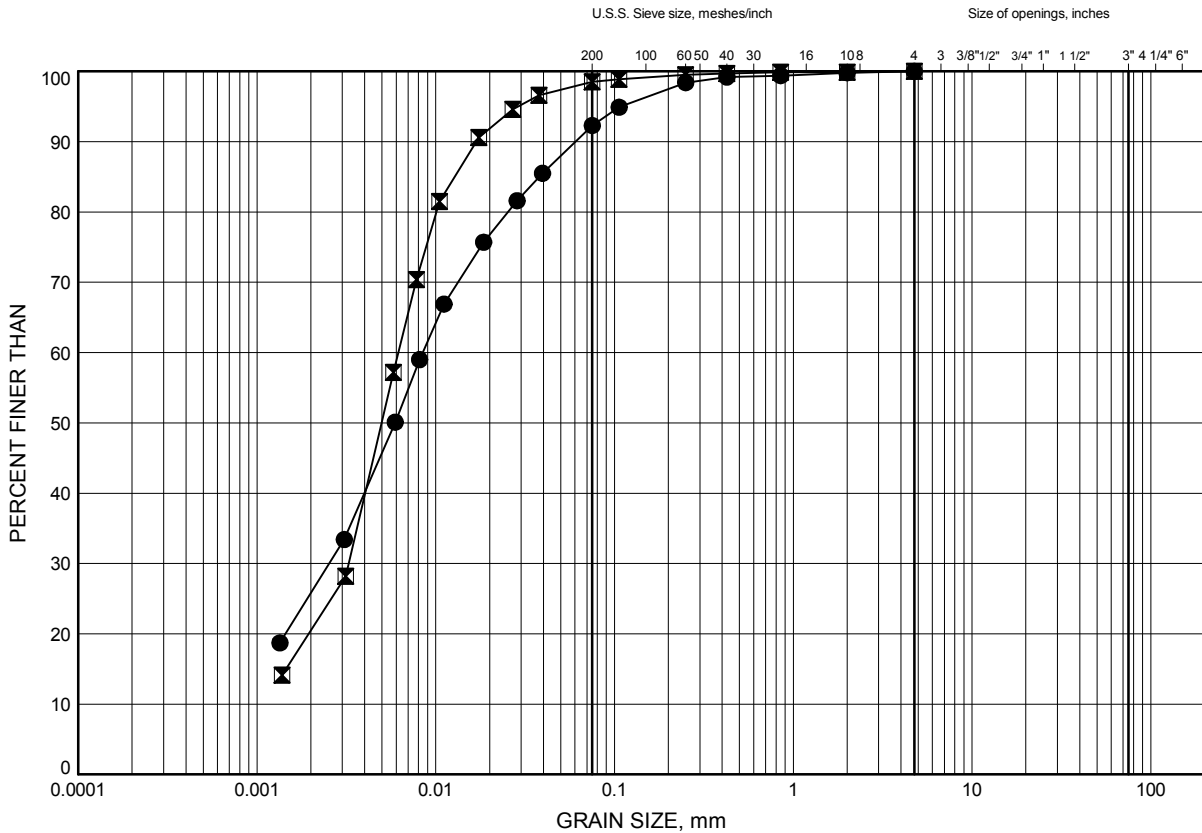


Prep'd AN
 Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE 12

CLAYEY SILT to SILT



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	18+464.4 12.4R	6.40	261.24
⊠	18+475 19L	4.88	261.76

Date February 2014
 WP# 647-89-00

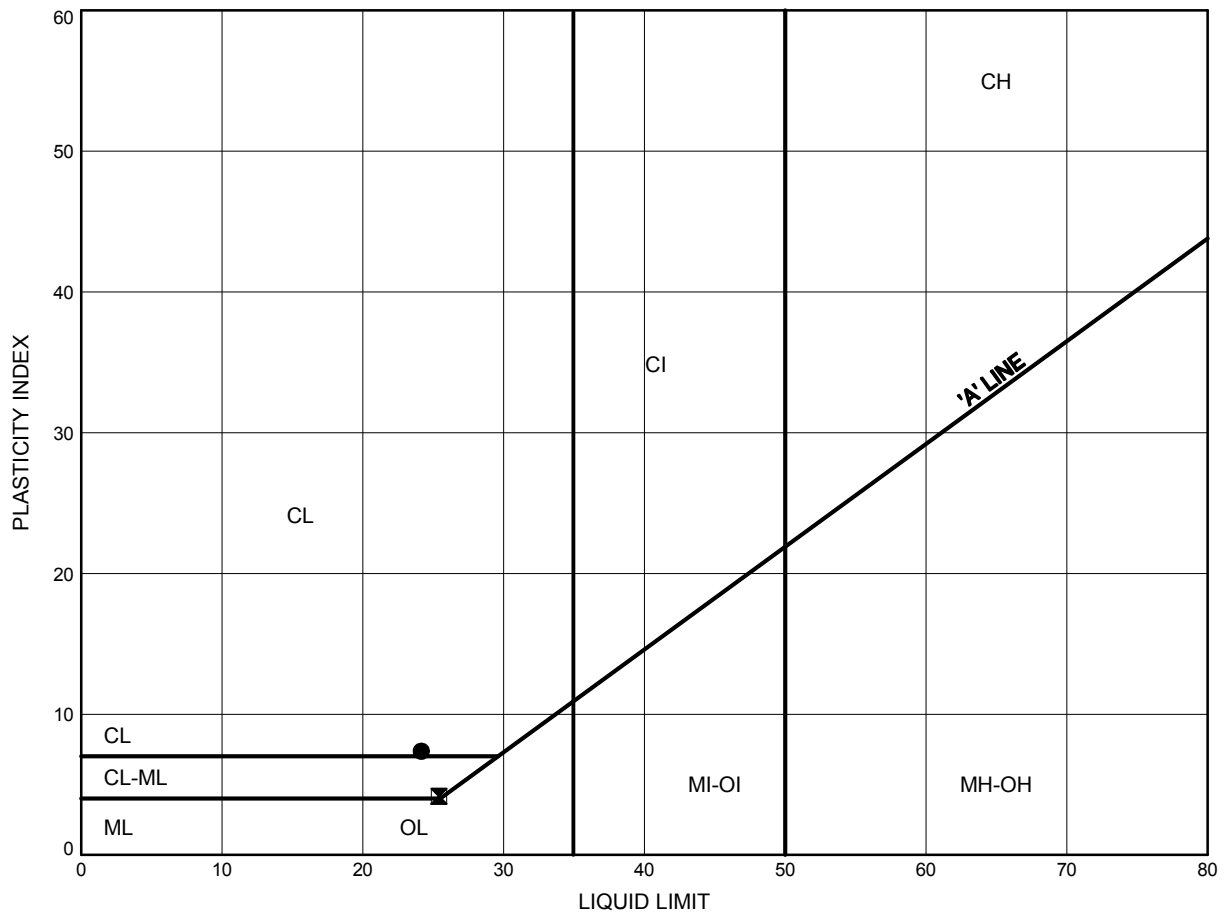


Prep'd AN
 Chkd. MEF

ATTERBERG LIMITS TEST RESULTS

FIGURE 13

CLAYEY SILT to SILT



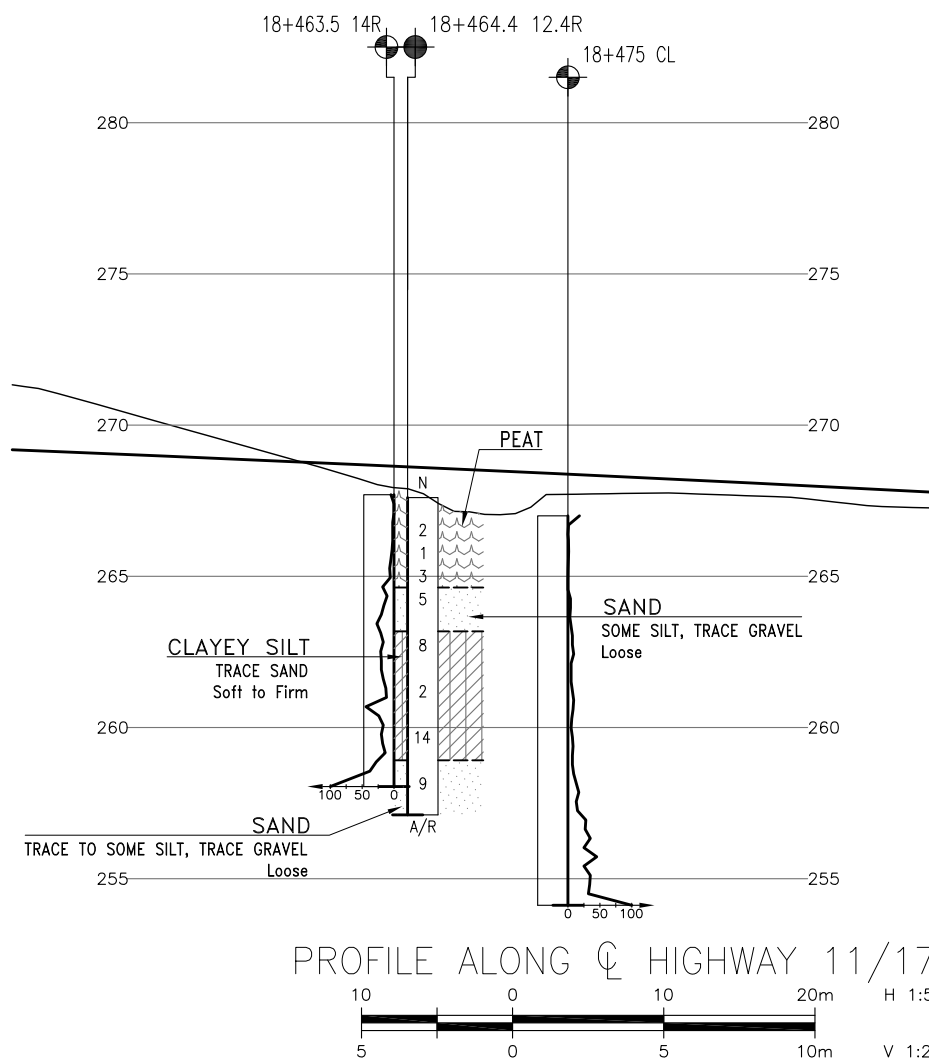
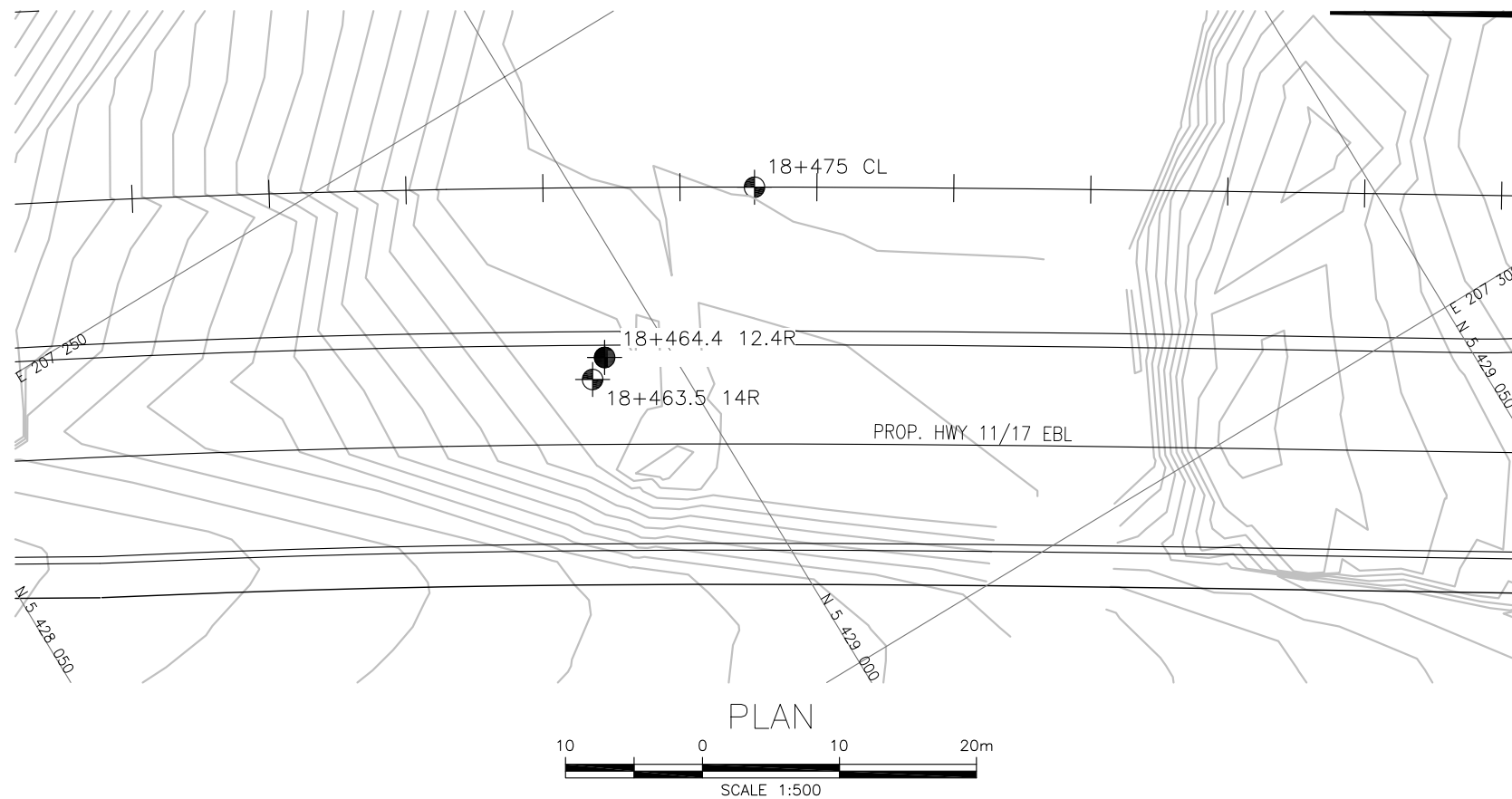
LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	18+464.4 12.4R	6.40	261.24
⊠	18+475 19L	4.88	261.76

Date February 2014
WP# 647-89-00



Prep'd AN
Chkd. MEF

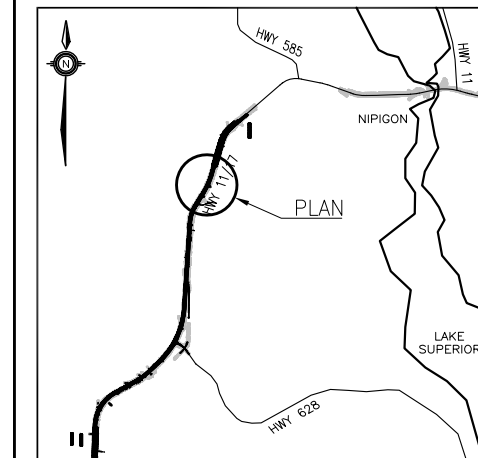


METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN








CONT No 2014-6026
GWP No 647-89-00

HWY 11/17 FOUR LANING
EASTBOUND LANES
(STA. 18+450 TO 18+500)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

	Borehole
	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60° Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
18+463.5 14R	267.7	5 428 994.0	207 272.
18+464.4 12.4R	267.6	5 428 995.6	207 271.
18+475 19L	266.6	5 429 021.3	207 250.
18+475 29L	266.5	5 429 026.5	207 241.
18+475 CL	267.0	5 429 011.4	207 266.

-NOTES-

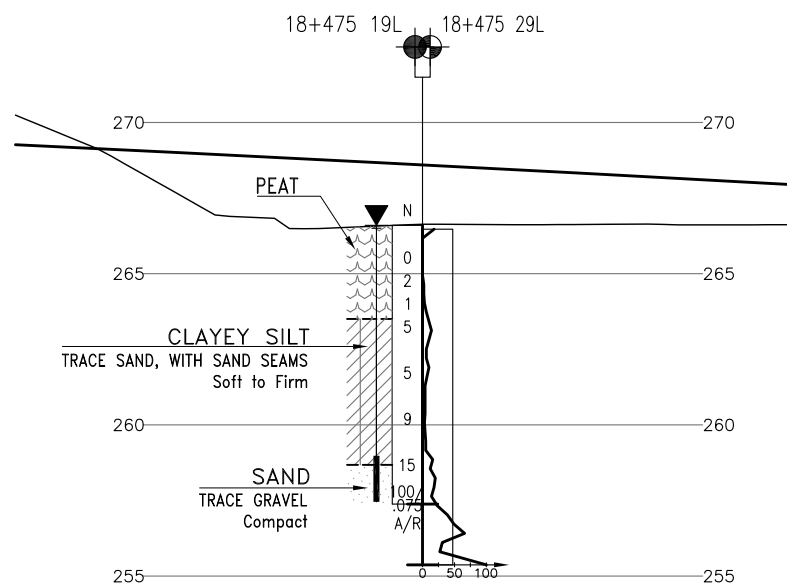
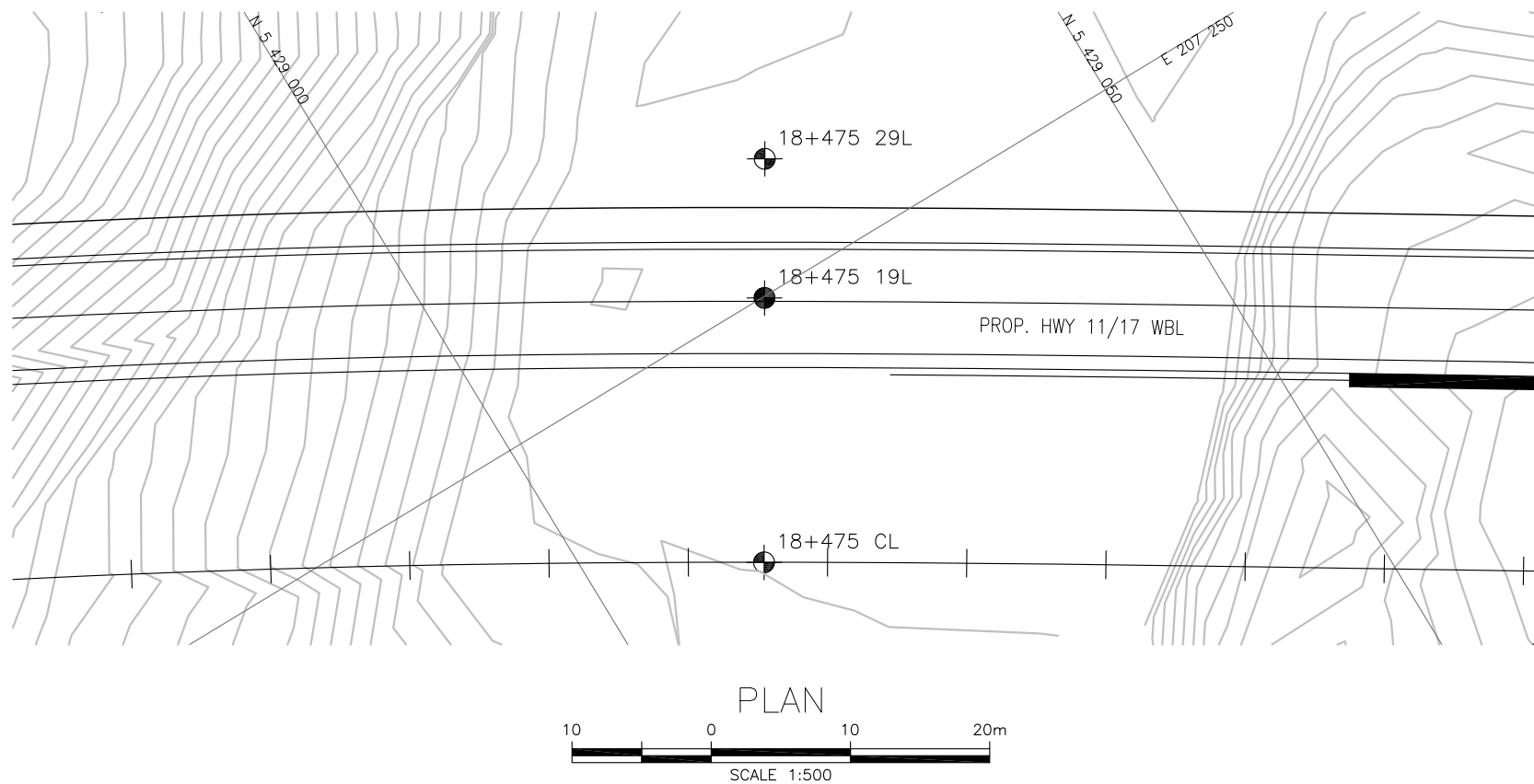
- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 52A-182

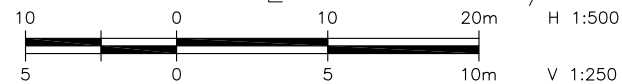
[illegible]

4

FILENAME: H:\Drafting\19\1351\237\ted1237-Plan&Profiles(LowFill).dwg
PLOT DATE: 10/1/2014 4:14 PM



PROFILE ALONG C HIGHWAY 11/17 WBL



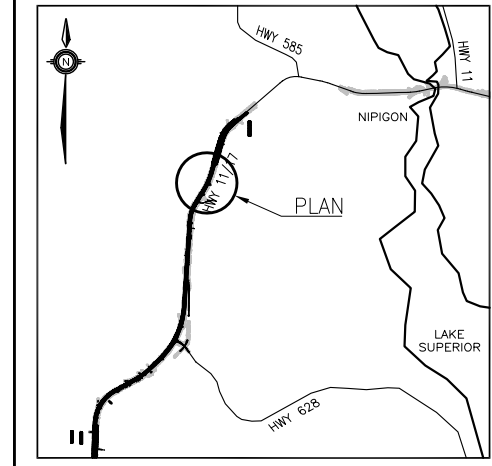
DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN








CONT No 2014-6026
GWP No 647-89-00

HWY 11/17 FOUR LANING
WESTBOUND LANES
(STA. 18+450 TO 18+500)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

	Borehole
	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60° Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

[illegible]

-NOTES-

- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 52A-182

[illegible]

Appendix J

Highway 11/17 EBL and WBL

Sta. 19+850 to 19+900

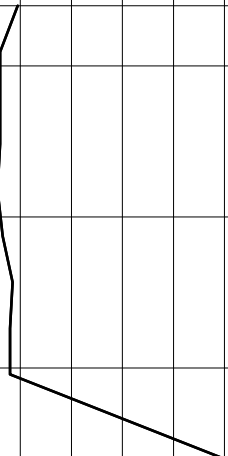
Record of Borehole Sheets
Laboratory Test Results
Borehole Location and Soil Strata Drawings

RECORD OF BOREHOLE No 19+874.3 8.3L

1 OF 1

METRIC

WP# 647-89-00 LOCATION N 5 430 286.4 E 207 814.4 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Dynamic Cone Penetration Test COMPILED BY SBP
 DATUM Geodetic DATE 2013.01.30 - 2013.01.30 CHECKED BY JPL

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							
275.3								20 40 60 80 100							
0.0	Start DCPT at surface														
272.3	END OF DCPT AT 3.0m ON PROBABLE BEDROCK OR BOULDER.														
3.0															

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 19+875 19L

1 OF 1

METRIC

WP# 647-89-00 LOCATION N 5 430 290.5 E 207 804.5 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.01.30 - 2013.01.30 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL LIQUID LIMIT MOISTURE CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					WATER CONTENT (%)				GR	SA	SI	CL
276.5								20	40	60	80	100								
0.0	ORGANICS: (150mm)																			
0.2	SAND, trace silt, trace gravel Compact Brown Moist Wet Loose						276													
		1	SS	14																
		2	SS	10																
		3	SS	8																
		4	SS	8																
							273													
							272													
			5	SS	7															
270.9							271													
5.6	END OF BOREHOLE AT 5.6m UPON AUGER REFUSAL ON PROBABLE BEDROCK OR BOULDERS. STAND PIPE NOT INSTALLED DUE TO WATER BEARING MATERIAL INSIDE HOLLOW STEM AUGERS. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 0.7m, THEN CUTTINGS TO SURFACE.																			

+³, ×³: Numbers refer to
Sensitivity

20
15
10





(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 19+875 19R

1 OF 1

METRIC

WP# 647-89-00 LOCATION N 5 430 280.0 E 207 841.0 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.01.30 - 2013.01.30 CHECKED BY JPL

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				WATER CONTENT (%)				GR	SA	SI	CL
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE											
275.2																			
0.0	ORGANICS (150mm)																		
0.2	SAND , trace silt, trace gravel Compact Brown Moist to Wet		1	SS	22														
			2	SS	13														
273.0																			
2.2	SILT , trace clay, trace sand Very Dense Grey		3	SS	52														
272.2																			
3.0	SAND , trace silt, trace gravel to gravelly, occasional cobbles Very Dense Grey Moist		4	SS	100/ 0.125														
270.5			5	SS	100/ 0.100														
4.7	END OF BOREHOLE AT 4.7m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE OPEN TO 1.9m AND WATER LEVEL AT 1.1m UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 0.8m, THEN CUTTINGS TO SURFACE.																		

RECORD OF BOREHOLE No 19+875 29R

1 OF 1

METRIC

WP# _____ LOCATION N 5 430 277.2 E 207 850.6 ORIGINATED BY _____
 HWY _____ BOREHOLE TYPE _____ COMPILED BY _____
 DATUM Geodetic DATE 2013.01.30 - 2013.01.30 CHECKED BY _____

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			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	W P	W	W L	WATER CONTENT (%)		
275.5 0.0	Start DCPT at surface						20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100							
274														
273.4 2.2	END OF DCPT AT 3.0m ON PROBABLE BEDROCK OR BOULDER.													

RECORD OF BOREHOLE No 19+885 19R

1 OF 1

METRIC

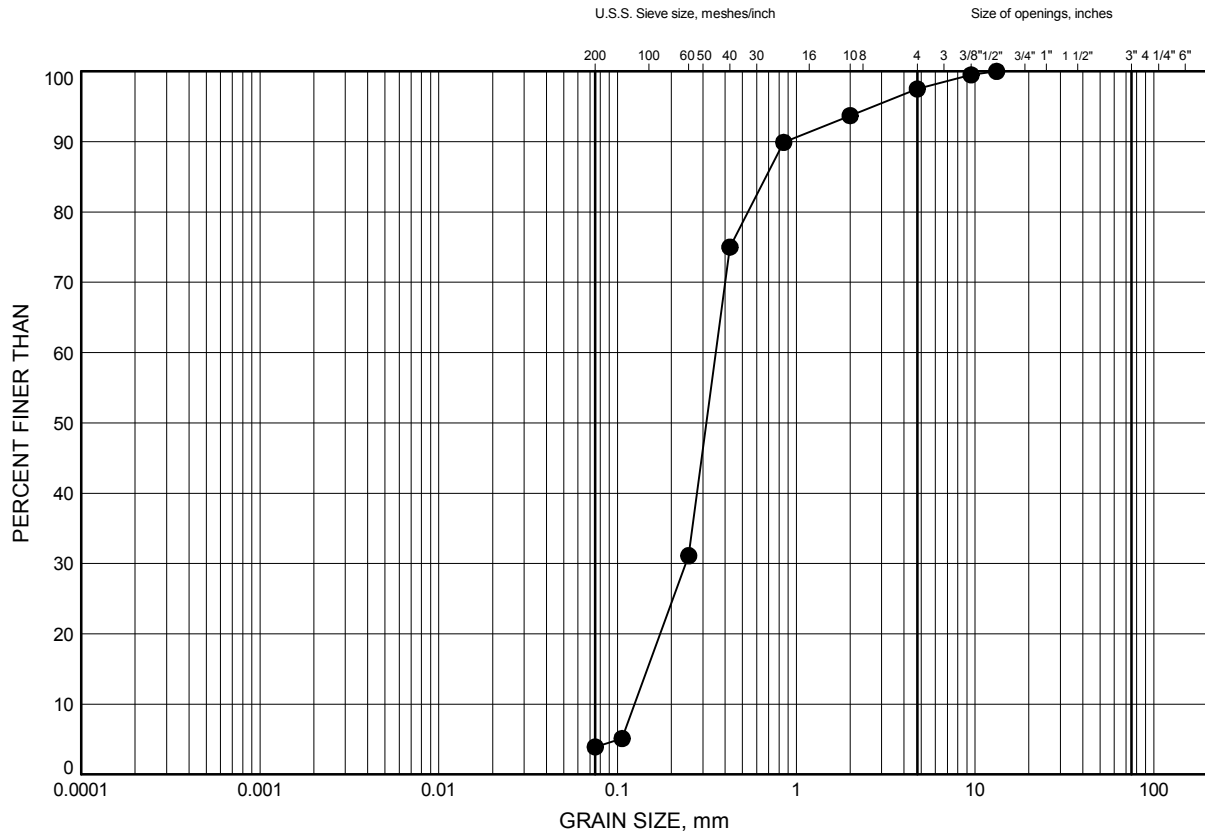
WP# 647-89-00 LOCATION N 5 430 289.2 E 207 843.6 ORIGINATED BY SLL
 HWY 11/17 BOREHOLE TYPE Hollow Stem Augers COMPILED BY SBP
 DATUM Geodetic DATE 2013.01.30 - 2013.01.30 CHECKED BY JPL

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					WATER CONTENT (%)						
						20	40	60	80	100	20	40	60				
275.0						275											
0.0	ORGANICS: (160mm)																
0.2	SAND, trace silt, trace gravel Compact to Dense Brown Moist to Wet		1	GS		274											
						273											
271.9	END OF BOREHOLE AT 3.0m.																
3.0																	

GRAIN SIZE DISTRIBUTION

FIGURE J1

SAND



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	19+875 19L	1.07	275.39

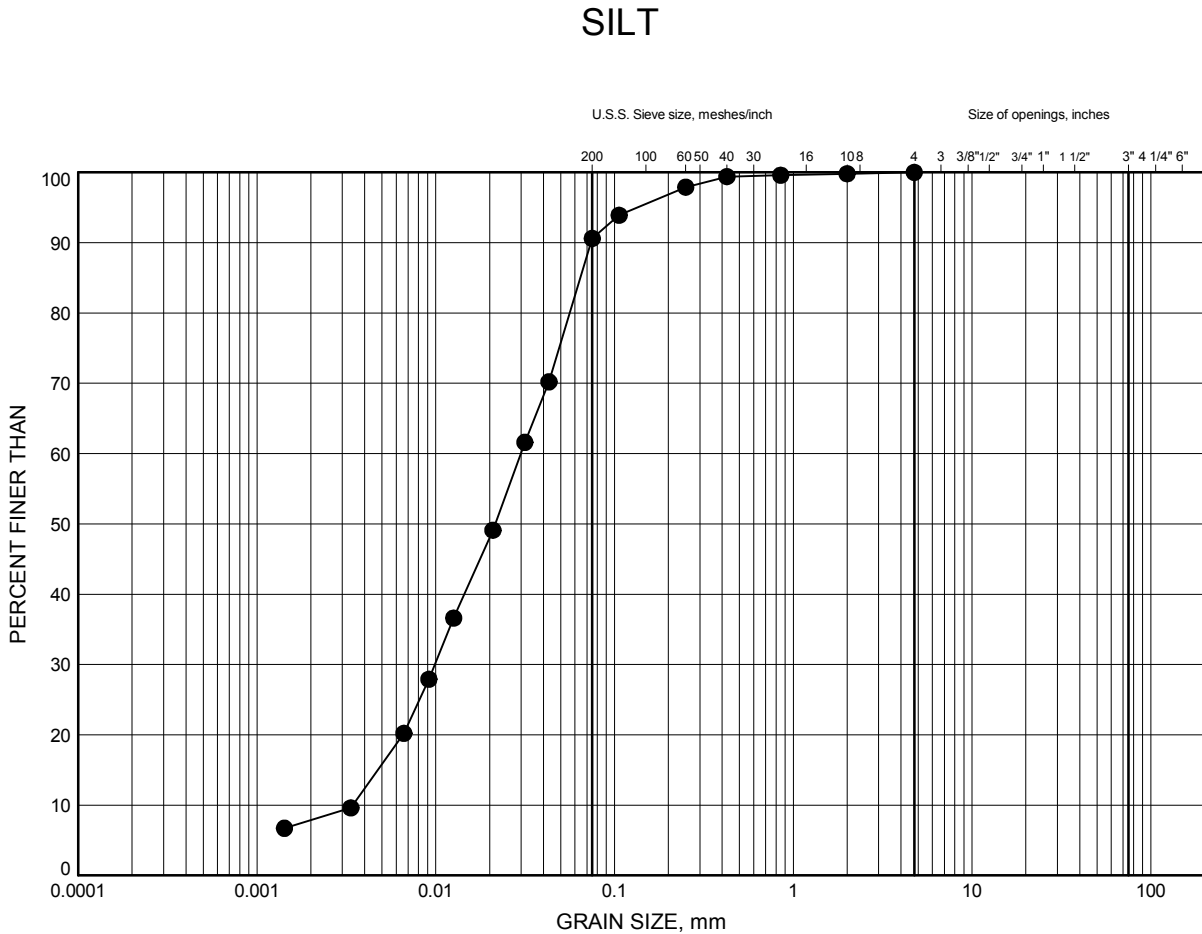
Date February 2014
WP# 647-89-00



Prep'd AN
Chkd. MEF

GRAIN SIZE DISTRIBUTION

FIGURE J2



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	19+875 19R	2.59	272.61

Date February 2014
 WP# 647-89-00



Prep'd AN
 Chkd. MEF

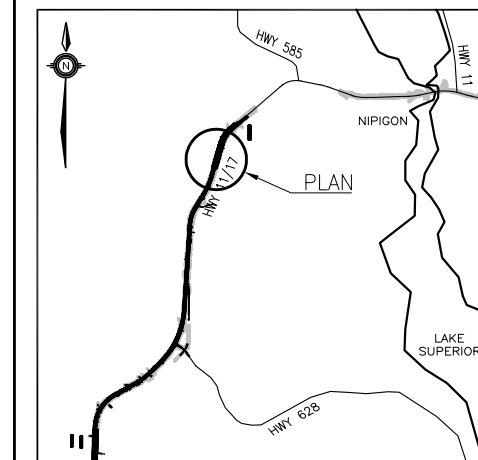
METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No 2014-6026
GWP No 647-89-00






HWY 11/17 FOUR LANING
EASTBOUND LANES
(STA. 19+850 TO 19+900)
BOREHOLE LOCATIONS AND SOIL STRATA

SHEET



KEYPLAN

LEGEND

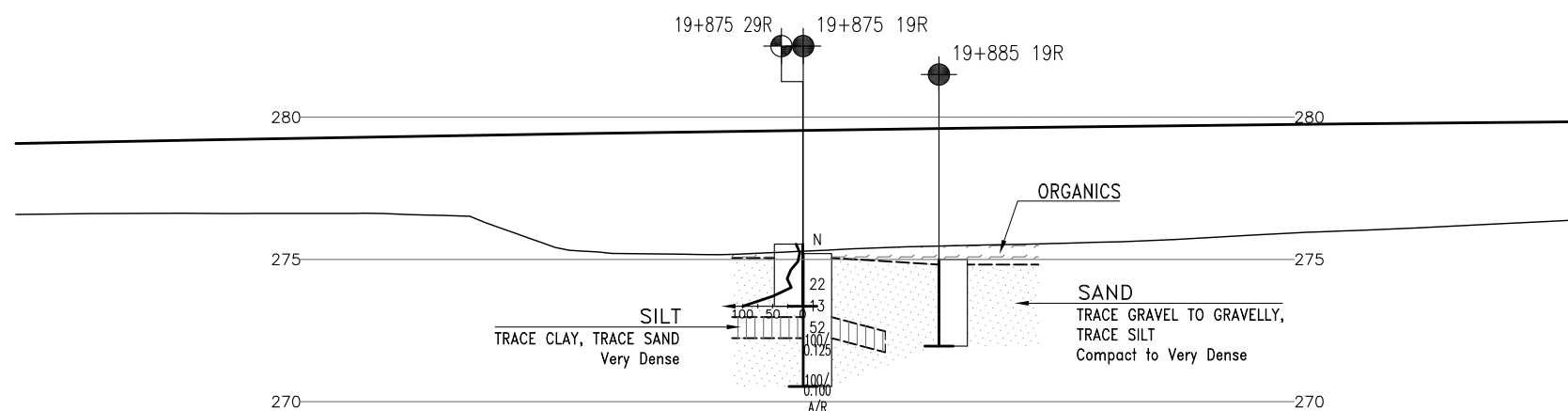
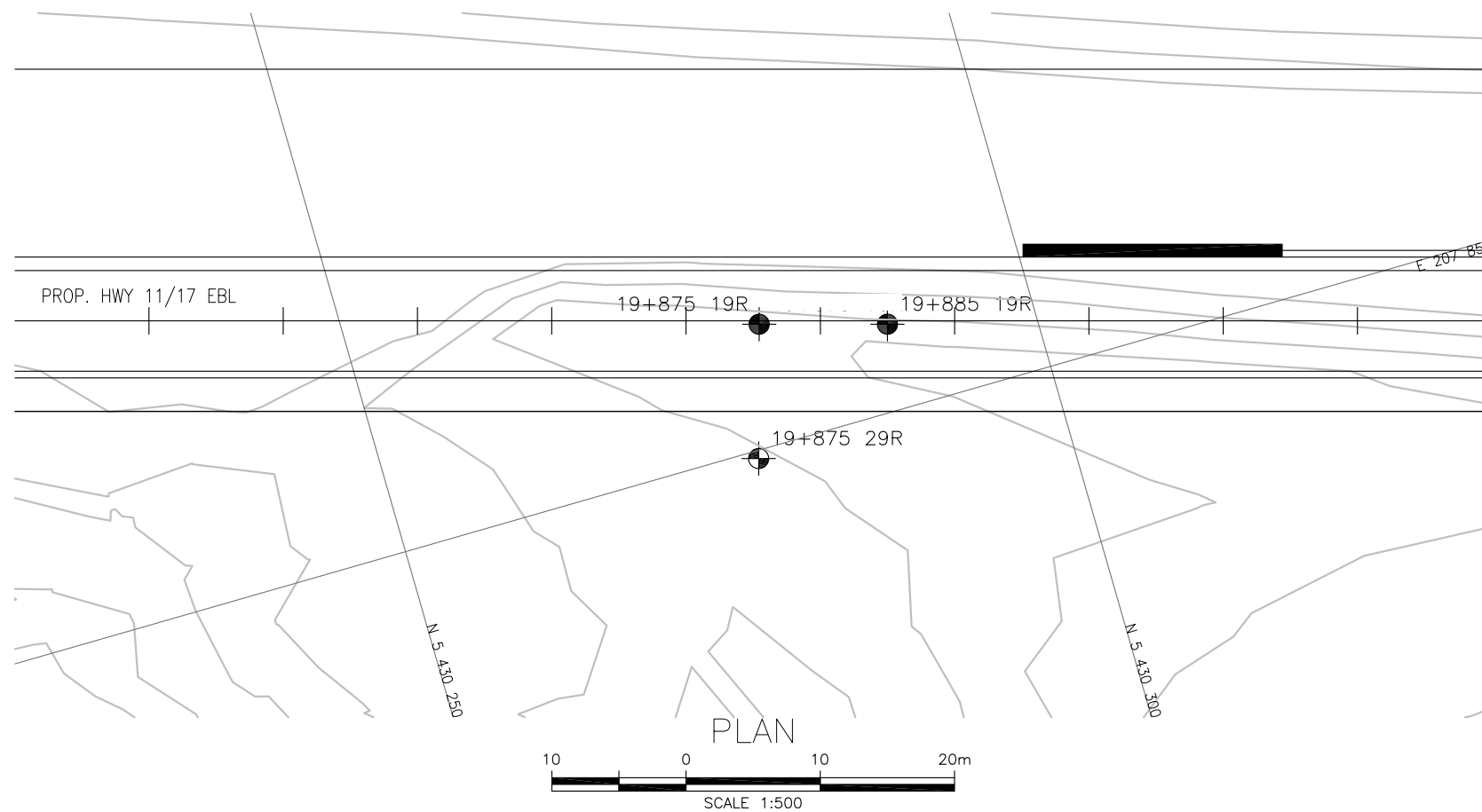
	Borehole
	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60° Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

[illegible]

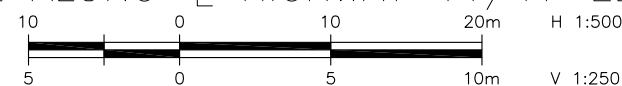
-NOTES-

- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 52A-182

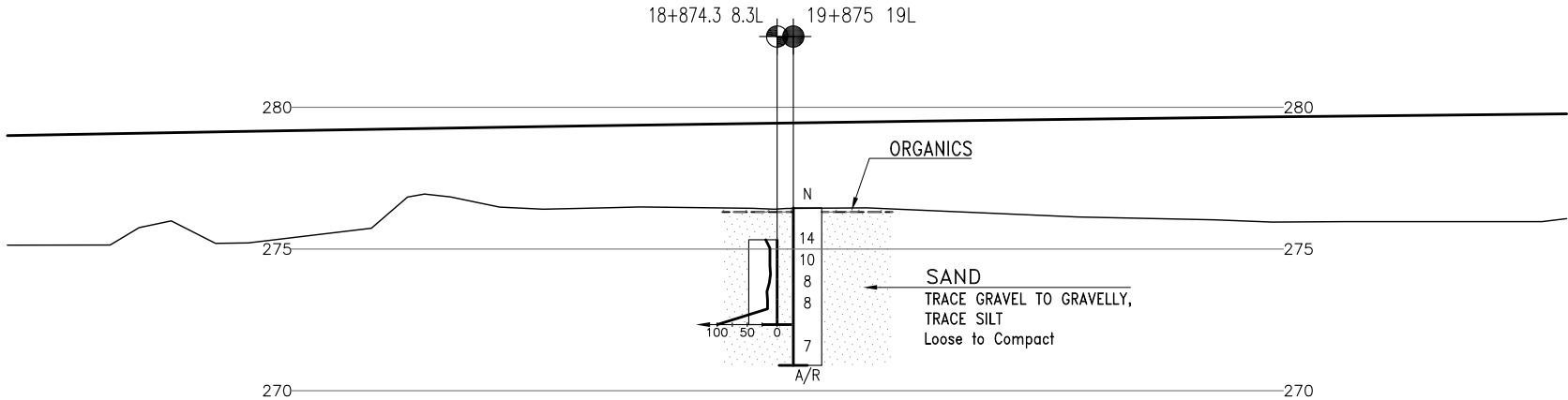
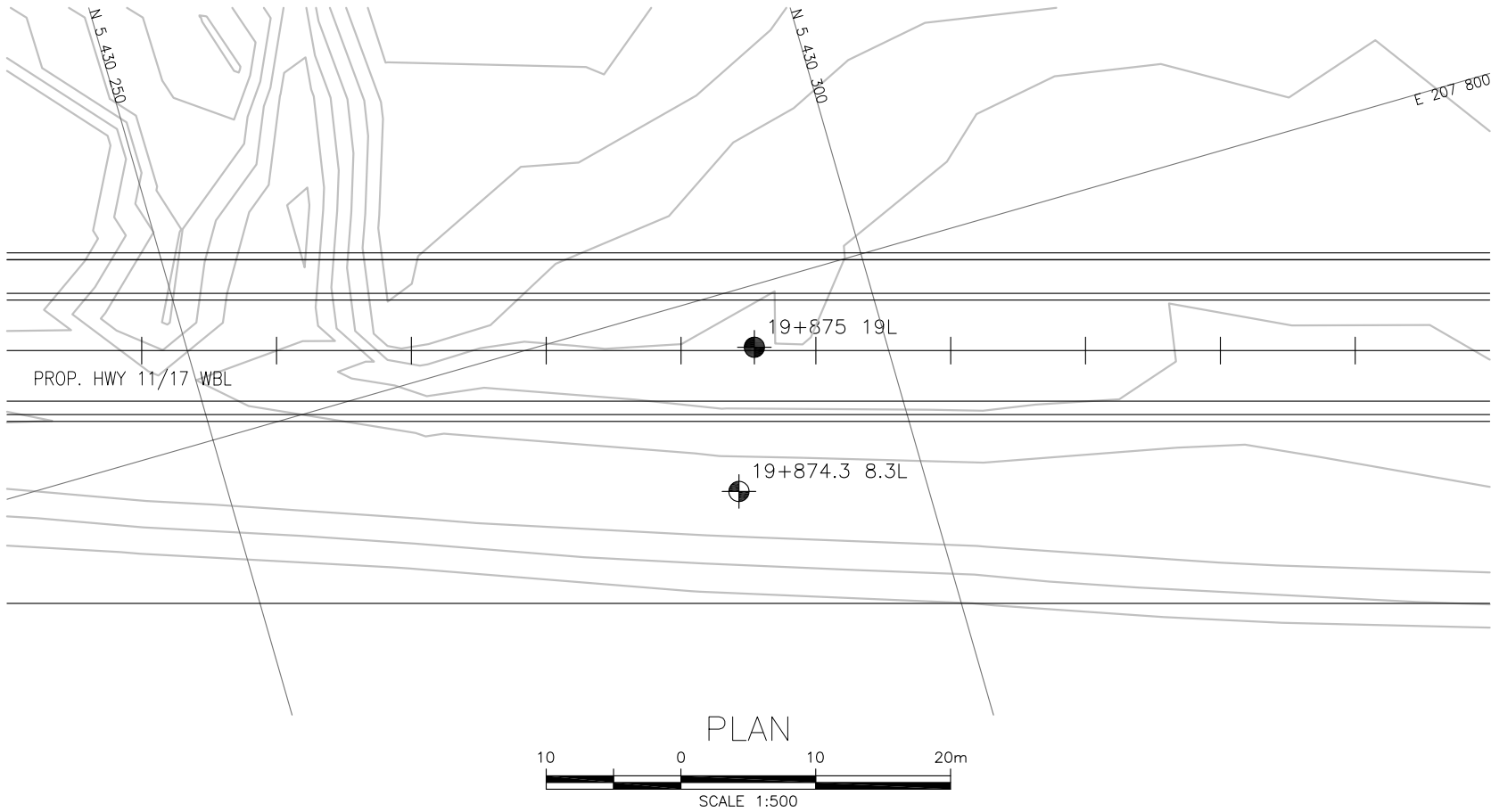


PROFILE ALONG C HIGHWAY 11/17 EBL

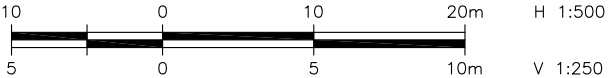


DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

[illegible]



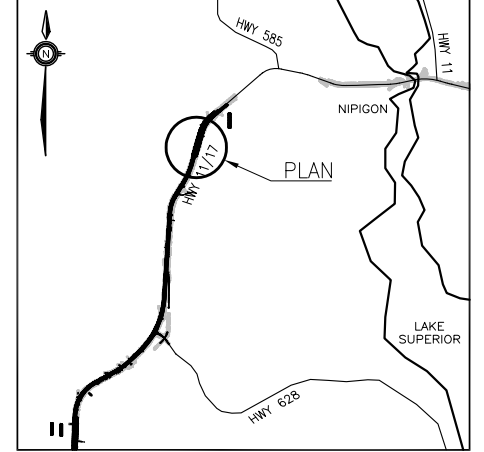
PROFILE ALONG C HIGHWAY 11/17 WBL



METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No 2014-6026
GWP No 647-89-00
HWY 11/17 FOUR LANING
WESTBOUND LANES
(STA. 19+850 TO 19+900)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

	Borehole
	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
19+874.3 8.3L	275.3	5 430 286.4	207 814.4
19+875 19L	276.5	5 430 290.5	207 804.5
19+875 19R	275.2	5 430 280.0	207 841.0
19+875 29R	275.5	5 430 277.2	207 850.6
19+885 19R	275.0	5 430 289.2	207 843.6

-NOTES-

- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 52A-182

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	SBP	CHK JPL	CODE
DRAWN	MFA	CHK SBP	SITE
			STRUCT
			DWG 17
			DATE OCT. 2014

DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING