

**FOUNDATION INVESTIGATION AND DESIGN REPORT
SWAMP CROSSINGS AND HIGH FILL EMBANKMENTS
HIGHWAY 69 FOUR-LANING
FROM THE SOUTH JUNCTION OF HIGHWAY 529 NORTHERLY 15 KM
G.W.P. 5076-06-00
NORTH SECTION - NAISCOOT LAKE TO NORTH PROJECT LIMIT
VOLUME 3 of 4**

Geocres Number: 41H-99

Report to

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Appendix K

**Highway 69 NBL & SBL
Sta. 10+330 to 10+585 Township of Wallbridge**

**Boreholes 28-01 to 28-17, 29-01 to 29-15, 30-01 to 30-09R, C200-1
DCPTs D28-01R to D28-08L, D29-01R to D29-06L, D30-01R to D30-04L**

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

RECORD OF BOREHOLE No BH28-01

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+330 C/L, NBL ORIGINATED BY SLL
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.10.28 - 2008.10.28 CHECKED BY RPR





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			20	40	60	80	100		
199.4	Ground Surface												
0.0	ASPHALT (150mm)												
0.2	SAND, some gravel		1	AS									
198.9	Brown					199							
0.5	Moist (FILL)												
END OF BOREHOLE AT 0.5m UPON AUGER REFUSAL ON PROBABLE ROCK FILL. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO 0.2m, THEN ASPHALT TO SURFACE.													

RECORD OF BOREHOLE No BH28-02L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+337.5 O/S 6.4L, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.10.29 - 2008.10.29 CHECKED BY RPR

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 (%)				
199.4	Ground Surface							20 40 60 80 100						
0.0	ASPHALT (50mm)							20 40 60 80 100						
	SAND, some gravel													
198.7	Brown						199							
0.7	Moist (FILL)													
	END OF BOREHOLE AT 0.7m UPON AUGER REFUSAL ON PROBABLE ROCK FILL. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO 0.2m, THEN ASPHALT TO SURFACE.													

ONTMT4S 6121.GPJ 12/11/12

RECORD OF BOREHOLE No BH28-03

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+350 C/L, NBL ORIGINATED BY SLL
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.10.28 - 2008.10.28 CHECKED BY RPR


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		
198.9	Ground Surface															
0.0	ASPHALT (150mm)															
0.2	SAND, some gravel, occasional rock fill fragments Brown Moist (FILL)		1	AS												
197.7																
1.2	END OF BOREHOLE AT 1.2m UPON AUGER REFUSAL ON PROBABLE ROCK FILL. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO 0.2m, THEN ASPHALT TO THE SURFACE.															

RECORD OF BOREHOLE No BH28-04R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+362.5 O/S 6.4R, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY LG
 DATUM Geodetic DATE 2009.02.03 - 2009.02.03 CHECKED BY RPR

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									
196.9	Ground Surface																
0.0	ORGANICS: (300mm)																
196.6																	
0.3	BEDROCK AT 0.3m																

ONTMT4S 6121.GPJ 12/11/12

RECORD OF BOREHOLE No BH28-05

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+375 C/L, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.10.28 - 2009.10.28 CHECKED BY RPR

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 x LAB VANE				WATER CONTENT (%) w _p w w _L				
198.2	Ground Surface							20	40	60	80	100				
0.0	ASPHALT (150mm)							20	40	60	80	100				
0.2	SAND, some gravel, occasional rock fill fragments Brown Moist (FILL)		1	AS			198									
197.1																
1.1	END OF BOREHOLE AT 1.1m UPON AUGER REFUSAL ON PROBABLE ROCK FILL. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO 0.2m, THEN ASPHALT TO THE SURFACE.															

RECORD OF BOREHOLE No BH28-06L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+387.5 O/S 6.6L, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.10.28 - 2008.10.28 CHECKED BY RPR

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 x LAB VANE							WATER CONTENT (%) w _p w w _L
198.3	Ground Surface														
0.0	ASPHALT (50mm)		1	AS			198								
	SAND, some gravel, trace silt, occasional rock fill fragments Very Dense Brown Moist (FILL)		1	SS	117/ .275										
197.1															
1.2	END OF BOREHOLE AT 1.2m UPON AUGER REFUSAL ON PROBABLE ROCK FILL. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO 0.2m, THEN ASPHALT TO THE SURFACE.														


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

RECORD OF BOREHOLE No BH28-07

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+400 C/L, NBL ORIGINATED BY SLL
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.10.28 - 2008.10.28 CHECKED BY RPR

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						
197.4	Ground Surface							20 40 60 80 100						
0.0 0.0	ASPHALT (50mm)		1	AS			197							
	SAND, some gravel, occasional rock fill fragments Brown Moist (FILL)													
196.5 0.9	END OF BOREHOLE AT 0.9m ON PROBABLE ROCK FILL. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO 0.2m, THEN ASPHALT TO SURFACE.													

RECORD OF BOREHOLE No BH28-08R

1 OF 2

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+412.5 O/S 6.6R, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.10.06 - 2008.10.06 CHECKED BY RPR

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	PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L		
195.1	Ground Surface												
0.0	Silty CLAY , some sand to sandy, occasional topsoil, occasional peaty organics Very Soft Brown		1	SS	2		195						
			2	SS	1		194						0 20 50 30
			3	SS	1		193						
192.9													
2.2	SAND and SILT , trace clay, occasional peaty organics Very Loose Grey Moist Layer of clay (600mm) wet		4	SS	4		192						0 64 28 8
			5	SS	1		191						
190.8													
4.3	Silty CLAY , some sand to sandy, trace gravel Very Soft Grey		6	SS	2		190						
			7	SS	1		189						1 21 58 20
187.5							188						
7.6	END OF BOREHOLE AT 7.6m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 5.2m UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Oct 29/08 0.1 195.0 Jan 14/09 0.5 194.6 Feb 19/09 0.9 194.2 Apr 21/09 Ground Surface Jun 04/09 Ground Surface Aug 17/09 Ground Surface												

Continued Next Page

+³, X³; Numbers refer to
Sensitivity 20
15 10 5 (%) STRAIN AT FAILURE

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No BH28-09

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+425 C/L, NBL ORIGINATED BY SLL
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.10.28 - 2008.10.28 CHECKED BY RPR

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							
196.2	Ground Surface														
0.0	ASPHALT (50mm)		1	AS			196								
	SAND and GRAVEL, trace silt, trace clay, occasional rock fill fragments Compact Brown Moist (FILL)		1	SS	17		195							35 56 9 (SI+CL)	
194.8															
1.4	END OF BOREHOLE AT 1.4m UPON AUGER REFUSAL ON PROBABLE ROCK FILL. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO 0.2m, THEN ASPHALT TO THE SURFACE.														

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

RECORD OF BOREHOLE No BH28-10L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+437.5 O/S 7.1L, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.10.28 - 2008.10.28 CHECKED BY RPR

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		20	40	60	80	100		
197.8	Ground Surface												
0.0	ASPHALT (50mm)		1	AS									
	SAND, some gravel, occasional rock fill fragments Dense Brown Moist (FILL)		1	SS	34	197							
196.4													
1.4	END OF BOREHOLE AT 1.4m UPON AUGER REFUSAL ON PROBABLE ROCK FILL. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO 0.2m, THEN ASPHALT TO THE SURFACE.												

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH28-11

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+450 C/L, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.10.06 - 2008.10.06 CHECKED BY RPR

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	PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT		
195.8	Ground Surface												
0.0	PEAT, fibrous, mixed with topsoil, some sand, occasional organics Soft Brown		1	SS	3								
195.1													
0.7	Silty CLAY, some sand, occasional peaty organics Very Soft Grey		2	SS	1		195						
			3	SS	0		194						
			4	SS	0		193						
192.4			5	SS	7								
192.4	SAND and SILT, some gravel Loose Grey Wet												0 16 53 31
3.5	END OF BOREHOLE (SAMPLER BOUNCING) AT 3.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH GROUT AND AUGER CUTTINGS TO SURFACE. DCPT CONDUCTED AT 2.0m EAST OF BOREHOLE. END OF DCPT AT 3.5m UPON REFUSAL.												

+³ × 3³ Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH28-12R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+462.5 O/S 7.0R, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.10.06 - 2008.10.06 CHECKED BY RPR

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				
195.2	Ground Surface							20 40 60 80 100		20 40 60		
8.8	PEAT: (25mm)						195					
	Silty CLAY, some sand, occasional topsoil, occasional peaty organics Very Soft to Soft Brown		1	SS	4							
			2	SS	2		194					
			3	SS	2							0 15 67 18
193.0							193					
2.2	SAND and SILT, trace to some clay, occasional peaty organics Very Loose to Compact Grey Moist		4	SS	10							0 40 50 10
			5	SS	2		192					
191.2	Bedrock fragments		6	SS	50/ .150							
4.0	END OF BOREHOLE AT 4.0m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 2.9m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH GROUT AND AUGER CUTTINGS TO SURFACE.											

RECORD OF BOREHOLE No BH28-13

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+475 C/L, NBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.10.06 - 2008.10.06 CHECKED BY RPR


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 (%)
								20 40 60 80 100						
195.4	Ground Surface													
195.4	PEAT, fibrous (25mm)		1	SS	4									
	Silty CLAY, some sand to sandy, occasional topsoil and peaty organics Very Soft to Stiff Grey		2	SS	3									
			3	SS	1									
			4	SS	9									
192.4														
3.0	SAND and SILT, some clay, occasional peaty organics Loose Grey Wet		5	SS	8									
191.7														
3.7	END OF BOREHOLE AT 3.7m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 3.0m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.													

RECORD OF BOREHOLE No BH28-14L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+487.5 O/S 6.3L, NBL ORIGINATED BY SLL
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.10.28 - 2008.10.28 CHECKED BY RPR

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 (%)				
197.5	Ground Surface							20	40	60	80	100					
0.0	ASPHALT (50mm)		1	AS			197										
	SAND, some gravel, occasional rock fill fragments Very Dense Brown Moist (FILL)																
196.5			1	SS	100												
1.0	END OF BOREHOLE AT 1.0m UPON AUGER REFUSAL ON PROBABLE ROCK FILL. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO 0.2m, THEN ASPHALT TO THE SURFACE.																

RECORD OF BOREHOLE No BH28-15

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+500 C/L, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.10.06 - 2008.10.06 CHECKED BY RPR

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						
195.7	Ground Surface							<div>20406080100</div> <div>○ UNCONFINED + FIELD VANE</div> <div>● QUICK TRIAXIAL × LAB VANE</div>						
194.8	<div>ORGANICS: (25mm)</div> <div>SAND and SILT, some clay, occasional peaty organics, rock fill fragments Very Loose to Loose Brown to Grey Moist</div>		1	SS	3		195							
			2	SS	5									0 42 46 12
194.2														
1.5	END OF BOREHOLE AT 1.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO THE SURFACE.													

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

RECORD OF BOREHOLE No BH28-16R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+510 O/S 6.3R, NBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.10.06 - 2008.10.06 CHECKED BY RPR

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 (%) 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			
197.2	Ground Surface														
0.0	ORGANICS: (75mm)		1	SS	8	197									
0.1															
	SAND and SILT, some clay, occasional rock fill fragments Loose Brown Moist														
			2	SS	8	196									
195.8															0 44 45 11
1.4	END OF BOREHOLE AT 1.4m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.														

RECORD OF BOREHOLE No BH28-17

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+515 C/L, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.10.06 - 2008.10.06 CHECKED BY RPR

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	20 40 60 80 100	20 40 60 80 100	20 40 60 80 100	20 40 60 80 100		
196.3	Ground Surface													
196.0	ORGANICS: (50mm)													
	SAND and SILT, occasional rock fill fragments Loose Brown Moist		1	SS	6		196							
195.2			2	SS	8/									
1.1	END OF BOREHOLE (SAMPLER BOUNCING) AT 1.1m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.													

METRIC

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			20 40 60 80 100					
200.0	Ground Surface						SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100						GR SA SI CL

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	20 40 60 80 100	W P W W L	20 40 60		
200.0	Ground Surface						○ UNCONFINED + FIELD VANE						
0.0	BEDROCK AT SURFACE						● QUICK TRIAXIAL × LAB VANE						

RECORD OF BOREHOLE No D28-02L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+362.5 O/S 6.4L, NBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
DATUM Geodetic DATE 2008.10.29 - 2008.10.29 CHECKED BY RPR

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 (%)
198.8	Ground Surface							20	40	60	80	100					
0.0	Auger to 1.0m.																
197.8							198										
1.0	AUGER REFUSAL AT 1.0m ON PROBABLE ROCK FILL.																

METRIC

[illegible]

RECORD OF BOREHOLE No D28-04L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+412.5 O/S 6.6L, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.10.28 - 2008.10.28 CHECKED BY RPR

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				
197.9	Ground Surface																
0.0	ASPHALT (50mm)		1	AS													
197.0	SAND, some gravel, occasional rock fill fragments Brown Moist (FILL)																
0.9	Auger to 0.9m AUGER REFUSAL AT 0.9m ON PROBABLE ROCK FILL.																

RECORD OF BOREHOLE No D28-05R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+437.5 O/S 7.1R, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.10.06 - 2008.10.06 CHECKED BY RPR

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 (%)						
195.1	Ground Surface							20	40	60	80	100	20	40	60		
0.0	DCPT from surface						195										
							194										
							193										
							192										
191.5																	
3.6	END OF DCPT AT 3.6m UPON REFUSAL ON PROBABLE BEDROCK.																

RECORD OF BOREHOLE No D28-06L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+462.5 O/S 7.0L, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.10.28 - 2008.10.28 CHECKED BY RPR

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 (%)					
197.6	Ground Surface													
0.0	ASPHALT (50mm)		1	AS										
	SAND, some gravel, occasional rock fill fragments Brown Moist (FILL)													
196.1	Auger to 1.5m. DCPT from 1.5m.													
1.5														
191.4	END OF DCPT AT 6.2m UPON REFUSAL ON PROBABLE BEDROCK.													
6.2														

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

METRIC

[illegible]

RECORD OF BOREHOLE No D28-08L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+510 O/S 6.3L, NBL ORIGINATED BY SLL
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
DATUM Geodetic DATE 2008.10.28 - 2008.10.28 CHECKED BY RPR

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		
197.4	Ground Surface															
0.0	ASPHALT (50mm)		1	AS												
196.5	SAND, some gravel, occasional rock fill fragments Brown Moist (FILL)					197										
0.9	Auger to 0.9m AUGER REFUSAL AT 0.9m ON PROBABLE ROCK FILL.															

RECORD OF BOREHOLE No BH29-02L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+367.5 O/S 6.3L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY AN
 DATUM Geodetic DATE 2008.09.25 - 2008.09.25 CHECKED BY RPR

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	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
201.8	Ground Surface												
88	ORGANICS: (25mm)												
	BEDROCK AT 0.025m												

METRIC[illegible]

ONTMT4S 6121.GPJ 12/11/12

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No BH29-04R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+387.5 O/S 6.3R, SBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.25 - 2008.09.25 CHECKED BY RPR

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									
197.3	Ground Surface							20	40	60	80	100					
0.0	ORGANICS , trace sand		1	SS	2												
196.9	Dark Brown																
0.4	(400mm)						197										
	END OF BOREHOLE AT 0.4m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED UPON COMPLETION.																

RECORD OF BOREHOLE No BH29-05

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+400 C/L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.25 - 2008.09.25 CHECKED BY RPR

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				
195.0	Ground Surface							20 40 60 80 100				
0.0	PEAT, fibrous Dark Brown (50mm)		1	SS	2		195					
	SAND and SILT, trace clay, with peaty organics Very Loose Brown to Grey Moist		2	SS	3		194					
	Compact Wet		3	SS	12		193					0 52 40 8
192.6	Silty CLAY, some sand Very Soft Grey		4	SS	2		192					0 11 67 22
2.4			1	TW	PH							
191.3	Gravelly SAND, occasional cobbles Grey Wet		5	SS								
3.8	END OF BOREHOLE AT 3.8m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter schedule 40 PVC pipe with 1.52m slotted screen.											
	WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Oct 29/08 1.2 193.8 Jan 15/09 0.2 194.8 Feb 19/09 Frozen at Surface Apr 21/09 0.4 194.6 Jun 04/09 0.4 194.6 Aug 17/09 0.6 194.4 Aug 25/09 0.6 194.4 Oct 27/09 0.6 194.4 Nov 20/09 0.9 194.1											

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

RECORD OF BOREHOLE No BH29-06L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+412.5 O/S 9.5L, SBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.25 - 2008.09.25 CHECKED BY RPR

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								
194.4	Ground Surface															
8.8	PEAT, fibrous (25mm)		1	SS	1		194									
	Silty CLAY, mixed with peaty organics, sandy, trace gravel Very Soft Brown to Grey		2	SS	2		193									
	Trace sand Firm Grey		3	SS	6		192									
191.8																
2.6	Silty SAND, some gravel, some clay Grey Wet		4	SS	50/											
191.1																
3.3	END OF BOREHOLE (SAMPLER BOUNCING) AT 3.3m ON PROBABLE BEDROCK. WATER LEVEL AT 2.5m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH GROUT AND HOLEPLUG TO SURFACE.				.000											

+ 3, X 3 : Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH29-07

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+425 C/L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.25 - 2008.09.25 CHECKED BY RPR

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							WATER CONTENT (%) w _p w w _L				
194.6	Ground Surface							20	40	60	80	100							
194.0	PEAT, fibrous (25mm)		1	SS	1		194												
	Silty SAND, mixed with peaty organics Very Loose Dark Brown to Grey Moist		2	SS	4														
	Layer of grey silty clay (300mm) at 1.2m		3	SS	50													0 11 69 20	
193.0																			
1.6	END OF BOREHOLE (SAMPLER BOUNCING) AT 1.6m ON PROBABLE BEDROCK. WATER LEVEL AT 1.5m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS AND HOLEPLUG TO SURFACE.				150														

+³ X³: Numbers refer to Sensitivity 20 15 10 5 0 (%) STRAIN AT FAILURE

METRIC

SOIL PROFILE					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES	GROUND WATER CONDITIONS	ELEVATION SCALE
196.7	Ground Surface				
0.0	BEDROCK AT SURFACE.				

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No BH29-09

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+450 C/L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.25 - 2008.09.25 CHECKED BY RPR

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									
196.5	Ground Surface																
0.0	Silly SAND , trace organics Very Loose Dark Brown		1	SS	2												
196.0	Wet																
0.5	END OF BOREHOLE AT 0.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.																

RECORD OF BOREHOLE No BH29-10L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+462.5 O/S 6.4L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.25 - 2008.09.25 CHECKED BY RPR

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 x LAB VANE							PLASTIC LIMIT w _p NATURAL MOISTURE CONTENT w LIQUID LIMIT w _L WATER CONTENT (%)
196.7	Ground Surface														
0.0	ORGANICS: (75mm)														
0.1	Silty SAND with organics, occasional cobbles		1	SS	2										
	Very Loose														
195.9	Brown														
0.8	Wet		2	SS	50		196								
	END OF BOREHOLE (SAMPLER BOUNCING) AT 0.8m ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.														

RECORD OF BOREHOLE No BH29-11

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+475 C/L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.24 - 2008.09.24 CHECKED BY RPR

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									
195.4	Ground Surface							20	40	60	80	100					
0.0	SAND and SILT, some clay Very Loose Brown to Grey Moist		1	SS	1		195										
194.4			2	SS	52/ 150												
1.0	END OF BOREHOLE AT 1.0m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.																

RECORD OF BOREHOLE No BH29-12

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+480 C/L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.24 - 2008.09.24 CHECKED BY RPR

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						
195.2	Ground Surface							20 40 60 80 100		20 40 60				
0.0	Silty SAND , with peaty organics, occasional decayed wood Very Loose Grey Wet		1	SS	2		195				○			
			2	SS	0		194					○		
			3	SS	1						○			
193.0							193							
2.2	Silty CLAY , some sand Very Soft Grey		4	SS	0					┌─┐	○			0 13 59 28
192.2														
3.0	SILT , some sand		5	SS	51/						○			
192.0	Grey													
3.2	Moist				150									
END OF BOREHOLE AT 3.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH GROUT 0.2m, THEN HOLEPLUG TO SURFACE. DCPT CONDUCTED AT 0.9m EAST OF BOREHOLE. END OF DCPT AT 3.2m UPON REFUSAL.														




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

RECORD OF BOREHOLE No BH29-13R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+402.5 O/S 7.0R, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
 DATUM Geodetic DATE 2010.11.16 - 2010.11.16 CHECKED BY MRA

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										
194.6	Ground Surface							20	40	60	80	100						
0.0	PEAT, fibrous Black		1	SS	5		194											
194.0																		
0.6	Silty CLAY, with sand seams Firm to Stiff Brown to Grey		2	SS	4													
	Organic layer at 1.1m		3	SS	7													
			4	SS	29													
192.3							193										0 19 51 30	
2.3	END OF BOREHOLE AT 2.3m ON PROBABLE BEDROCK. BOREHOLE OPEN TO 1.8m AND WATER LEVEL AT 0.4m UPON COMPLETION. BOREHOLE BACKFILLED WITH HOLEPLUG TO SURFACE.																	

RECORD OF BOREHOLE No BH29-14R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+487.5 O/S 7.0R, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
 DATUM Geodetic DATE 2010.11.15 - 2010.11.15 CHECKED BY MRA

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
195.2	Ground Surface													
0.0	PEAT, fibrous: (175mm)													
0.2	Silty CLAY, some sand, trace organics		1	SS	5		195							
194.6	Firm Brown													
0.6	Sandy SILT, some clay Loose Brown to Grey Moist to Wet		2	SS	9									
			3	SS	4		194							
			4	SS	5									
	With silty clay layers		5	SS	10		193							
			6	SS	5		192							
191.5	END OF BOREHOLE AT 3.7m DUE TO CAVE. BOREHOLE OPEN TO 2.5m AND WATER LEVEL AT 1.6m UPON COMPLETION. BOREHOLE BACKFILLED WITH HOLEPLUG TO SURFACE.													
3.7														

+ 3. X 3. Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH29-15

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+495 C/L, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
 DATUM Geodetic DATE 2010.11.15 - 2010.11.15 CHECKED BY MRA

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		
195.2	Ground Surface							20 40 60 80 100							
0.0	PEAT, fibrous		1	SS	3										
194.5															
0.7	Silty CLAY, occasional peaty organics, with sand seams Soft to Stiff Grey Wet		2	SS	5										0 30 47 23
			3	SS	3										
			4	SS	11										
			5	SS	12										0 10 35 55
			6	SS	4										
191.6															
3.6	SAND, some silt														
191.3	Loose														
3.9	Grey		7	SS	3										
190.9	Wet														
4.3	Silty CLAY Soft Grey														
END OF BOREHOLE AT 4.3m DUE TO CAVE. BOREHOLE OPEN TO 3.1m AND WATER LEVEL AT SURFACE UPON COMPLETION. BOREHOLE BACKFILLED WITH HOLEPLUG TO SURFACE.															

+ ³, × ³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

METRIC

[illegible]

METRIC

[illegible]

RECORD OF BOREHOLE No D29-03R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+412.5 O/S 9.5R, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.09.25 - 2008.09.25 CHECKED BY RPR

SOIL PROFILE		SAMPLES				GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40					
194.6	Ground Surface													
0.0	DCPT from surface,													
191.4														
3.2	END OF DCPT AT 3.2m UPON REFUSAL ON PROBABLE BEDROCK.													

RECORD OF BOREHOLE No D29-04L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+437.5 O/S 7.6L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.09.25 - 2008.09.25 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT 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		
195.3	Ground Surface							20 40 60 80 100						
0.0	DCPT from surface							20 40 60 80 100						
193.9														
1.4	END OF DCPT AT 1.4m UPON REFUSAL ON PROBABLE BEDROCK													

+³ ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No D29-05R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+462.5 O/S 6.4R, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.09.25 - 2008.09.25 CHECKED BY RPR

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						
195.9	Ground Surface													
0.0	DCPT from surface.													
195.2	END OF DCPT AT 0.7m UPON REFUSAL ON PROBABLE BEDROCK.													
0.7														

RECORD OF BOREHOLE No D29-06L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+487.5 O/S 7.0L, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2010.11.15 - 2010.11.15 CHECKED BY MRA

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 (%)	W _p	W		
195.0	Ground Surface						20 40 60 80 100	20 40 60					
0.0	DCPT from surface.						20 40 60 80 100	20 40 60					
192.5	END OF DCPT AT 2.5m UPON REFUSAL ON PROBABLE BEDROCK.						20 40 60 80 100	20 40 60					

+³, X³: Numbers refer to
Sensitivity

20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH30-01

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+510 C/L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.24 - 2008.09.24 CHECKED BY RPR

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							
								20 40 60 80 100							
195.3	Ground Surface														
0.0	Silly SAND , with peaty organics, occasional roots and rootlets Very Loose to Loose Dark Brown Moist		1	SS	2		195								
			2	SS	5		194								
			3	SS	2										
193.1															
2.2	Silly CLAY Soft to Stiff Grey		4	SS	9		193								
			5	SS	2		192								
			1	TW	PH		191								
							190								
189.5															
5.8	SAND and SILT , some gravel, trace clay Compact Grey Wet		6	SS	10	189									
188.1															
7.2	END OF BOREHOLE AT 7.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 1.3m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH GROUT TO 0.2m, THEN HOLEPLUG TO SURFACE. DCPT CONDUCTED NEAR THE BOREHOLE. END OF DCPT AT 7.2m UPON REFUSAL.														

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

RECORD OF BOREHOLE No BH30-02

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+520 C/L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008 09 24 - 2008 09 24 CHECKED BY RPR

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	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L		
195.1	Ground Surface												
193.7	PEAT, fibrous: (75mm)		1	SS	2		195						
	Silty SAND, with peaty organics Very Loose Brown Moist		2	SS	2		194						
193.7	Silty CLAY, with peaty organics, some sand Very Soft to Soft Brown to Grey		3	SS	1		193						
1.4	Trace sand Grey		4	SS	3		192						
			5	SS	3		191						
			6	SS	0		190						
			7	SS	2		189						
			8	SS	5		188						
187.5	SAND and SILT, trace gravel Very Dense Grey Wet		9	SS	50/ .000		187						
7.6	END OF BOREHOLE (SAMPLER BOUNCING) AT 8.4m ON PROBABLE BEDROCK. WATER LEVEL AT 1.9m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH GROUT TO 0.2m, THEN HOLEPLUG TO SURFACE.												
186.7													
8.4													

ONTWT4S 6121.GPJ 12/11/12

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

RECORD OF BOREHOLE No BH30-03L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+532.5 O/S 6.3L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.23 - 2008.09.23 CHECKED BY RPR

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 <div>γ</div> kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					
195.2	Ground Surface							20 40 60 80 100					
0.0	PEAT, fibrous, some sand Very Soft Dark Brown Wet		1	SS	2	<div>▽</div>	195						
194.1			2	SS	1		194						
1.1	Silty CLAY, sandy Very Soft Grey		3	SS	2		193						
192.9			4	SS	10		192						
2.3	SAND and SILT, trace clay Very Loose to Loose Grey Moist		5	SS	4								
191.0	Layer of gravel (200mm)		6	SS	527								
4.2	END OF BOREHOLE AT 4.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 1.1m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG, GROUT AND AUGER CUTTINGS TO SURFACE.				.050								

+³, ×³: Numbers refer to
Sensitivity

20
15
10





(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH30-04

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+545 C/L, SBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.23 - 2008.09.23 CHECKED BY RPR

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						
195.0	Ground Surface													
0.0	PEAT: (500mm)		1	SS	0		195							
194.5														
0.5	Silty SAND, trace to some gravel, trace clay, occasional peaty organics Very Loose Grey Wet		2	SS	1		194							
			3	SS	3		193							
192.7														
2.3	SAND and SILT, trace clay Very Loose to Compact Grey Wet		4	SS	8		192							
			5	SS	23		191							
190.4	Gravelly		6	SS	54/									
4.6	END OF BOREHOLE AT 4.6m (SAMPLER BOUNCING) ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.				.075									

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

RECORD OF BOREHOLE No BH30-05R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+557 O/S 6.3R, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.23 - 2008.09.23 CHECKED BY RPR

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					
195.0	Ground Surface							20 40 60 80 100					
0.8	PEAT, fibrous (25mm)		1	SS	1		195	○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					
	Silty SAND, some clay, occasional peaty organics Very Loose Grey Wet		2	SS	2		194						
193.6													
1.4	Silty CLAY, sandy Very Soft Grey		3	SS	2		193					0 26 50 24	
192.8													
2.2	SAND and SILT, trace clay, trace gravel Compact Grey Wet		4	SS	10		192					1 44 48 7	
			5	SS	17		191						
190.7	Cobbles		6	SS	60/								
4.3	END OF BOREHOLE AT 4.3m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 0.5m UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter schedule 40 PVC pipe with 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Oct 29/08 Ground Surface Jan 14/09 Frozen at Surface Feb 19/09 Frozen at Surface Apr 21/09 0.3* 195.3 Jun 04/09 0.1* 195.1 Aug 17/09 Ground Surface Aug 25/09 Ground Surface Oct 27/09 Ground Surface Nov 20/09 Ground Surface *(Artesian Condition)				150								

RECORD OF BOREHOLE No BH30-06

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+570 C/L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.23 - 2008.09.23 CHECKED BY RPR

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 (%)		
								○ UNCONFINED	+ FIELD VANE	● QUICK TRIAXIAL			× LAB VANE	w _p	w
195.5	Ground Surface														
0.0	PEAT , fibrous (75mm)														
0.1	Silly SAND , trace clay, occasional roots and peaty organics		1	SS	5										
	Loose Brown Moist		2	SS	6							0 77 19 4			
			3	SS	2										
193.3	Silly CLAY , trace sand														
2.2	Soft Grey		4	SS	3							0 12 61 27			
192.5	SAND and SILT , some gravel														
3.0	Compact Grey		5	SS	15										
192.1	Wet														
3.4	END OF BOREHOLE AT 3.4m ON PROBABLE BEDROCK. WATER LEVEL AT 1.7m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.														

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

RECORD OF BOREHOLE No BH30-07L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+580 O/S 6.3L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.23 - 2008.09.23 CHECKED BY RPR

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									
197.3	Ground Surface							20	40	60	80	100					
0.0	Silty SAND , trace organics Compact Dark Brown Damp		1	SS	11		197										
196.7																	
0.6	END OF BOREHOLE (SAMPLER BOUNCING) AT 0.6m ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.																

+³ . X³ : Numbers refer to
Sensitivity 20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH30-08

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+585 C/L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008 09 23 - 2008 09 23 CHECKED BY RPR

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			
198.0	Ground Surface															
0.0	ORGANICS: (300mm)		1	SS	54/											
197.7																
0.3	END OF BOREHOLE AT 0.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.				0.15											

RECORD OF BOREHOLE No BH30-09R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+507.5 O/S 7.0R, SBL ORIGINATED BY SLL
HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
DATUM Geodetic DATE 2010.11.15 - 2010.11.15 CHECKED BY MRA

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				
195.3	Ground Surface											
0.0	PEAT		1	SS	5							
194.7												
0.6	Silty SAND, some clay, occasional peaty organics Very Loose Dark Brown Moist to Wet		2	SS	3							
			3	SS	2							
193.5												
1.8	PEAT, fibrous		4	SS	4							
192.9												
2.4	Silty CLAY Very Stiff to Soft Grey Wet		5	SS	15							
			6	SS	6							
	with sand layers		7	SS	3							
			8	SS	3							
			9	SS	-							
190.0												
5.3	END OF BOREHOLE AT 5.3m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE OPEN TO 4.9m AND WATER LEVEL AT SURFACE UPON COMPLETION. BOREHOLE BACKFILLED WITH HOLEPLUG TO SURFACE.											

+ 3, X 3: Numbers refer to
Sensitivity

20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No D30-01R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+532.5 S/O/S 6.3R, SBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
DATUM Geodetic DATE 2008.09.23 - 2008.09.23 CHECKED BY RPR

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						
195.2	Ground Surface							20 40 60 80 100						
0.0	DCPT from surface							20 40 60 80 100						
							195							
							194							
							193							
							192							
							191							
							190							
							189							
188.8	END OF DCPT AT 6.4m UPON REFUSAL ON PROBABLE BEDROCK													
6.4														

RECORD OF BOREHOLE No D30-02L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+557 O/S 6.3L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.09.23 - 2008.09.23 CHECKED BY RPR

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				
195.0	Ground Surface						195					
0.0	DCPT from surface,											
							194					
							193					
							192					
							191					
							190					
							189					
							188					
187.1												
7.9	END OF DCPT AT 7.9m UPON REFUSAL ON PROBABLE BEDROCK.											



ONTMT4S 6121.GPJ 12/12/12

RECORD OF BOREHOLE No D30-03R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 10+580 O/S 6.3R, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.09.23 - 2008.09.23 CHECKED BY RPR

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									
197.4	Ground Surface							20	40	60	80	100					
0.0	ORGANICS , some sand Brown		1	SS	7												
196.9	Auger to 0.5m						197										
0.5	AUGER REFUSAL AT 0.5m ON PROBABLE BEDROCK																

METRIC

[illegible]

RECORD OF BOREHOLE No C200-1

1 OF 1

METRIC

WP# 5134-12-11 LOCATION N 5 060 548.7 E 231 342.5 ORIGINATED BY ES/GM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2012.06.14 - 2012.06.14 CHECKED BY LRB

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		
197.7	Ground Surface													
196.6	ASPHALT: (40mm) SAND, some gravel Brown Dry (FILL)		1	GS										
1.1	ROCK FILL		1	RUN										
193.4			2	RUN										
4.3	PEAT Dark Brown Wet		1	SS	2									
193.0	Silty CLAY, trace sand, occasional wood fibres Soft Wet Grey		2	SS	3									
191.9	Silty SAND, trace gravel Loose Grey/Brown Wet		3	SS	8									
191.1			4	SS	50/									
6.6	END OF BOREHOLE AT 6.6m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 5.8m, CUTTINGS TO 0.1m, THEN ASPALT TO SURFACE.				0.075									

+³ ×³: Numbers refer to
Sensitivity

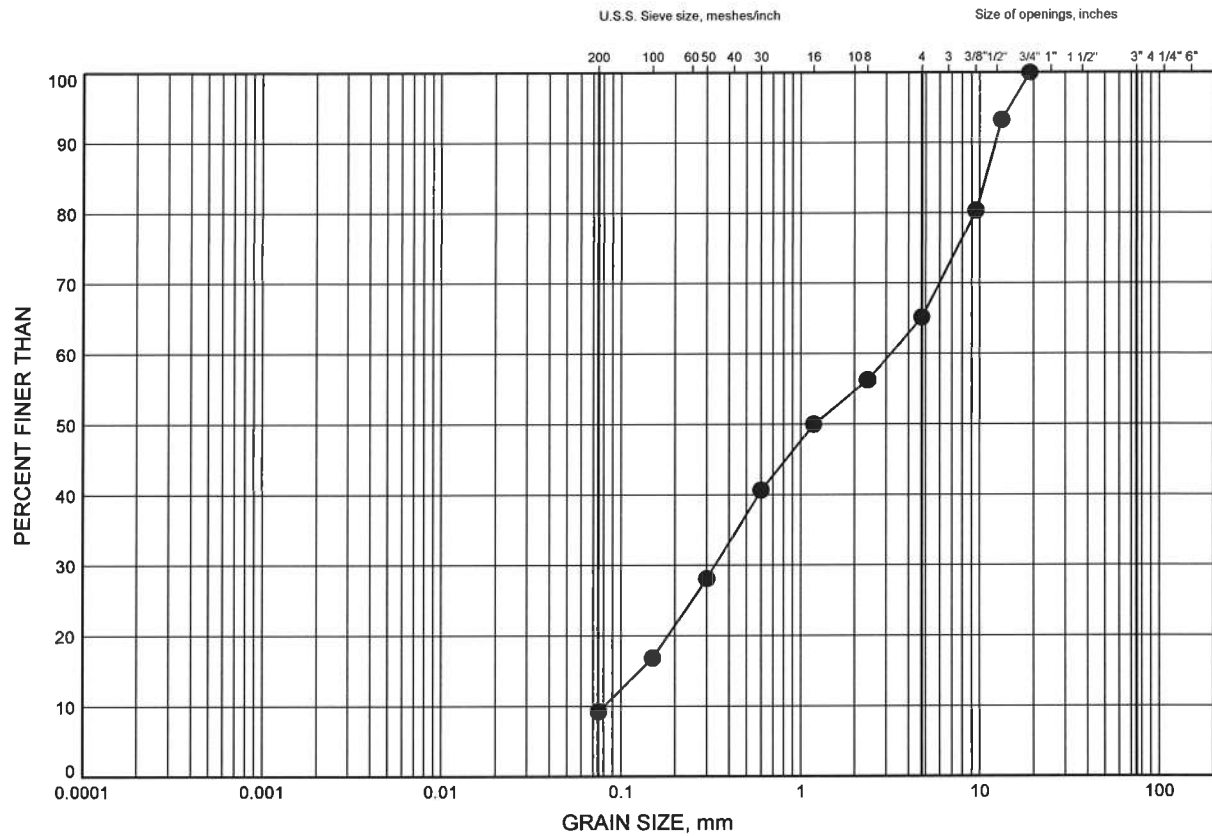
20
15
10

(%) STRAIN AT FAILURE

Hwy 69 Four-Laning North of Hwy 529
GRAIN SIZE DISTRIBUTION

FIGURE K1

SAND and GRAVEL FILL



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH28-09	1.07	195.13

GRAIN SIZE DISTRIBUTION - THURBER 6121.GPJ 12/14/12

Date December 2012
 GWP# 5294-08-00

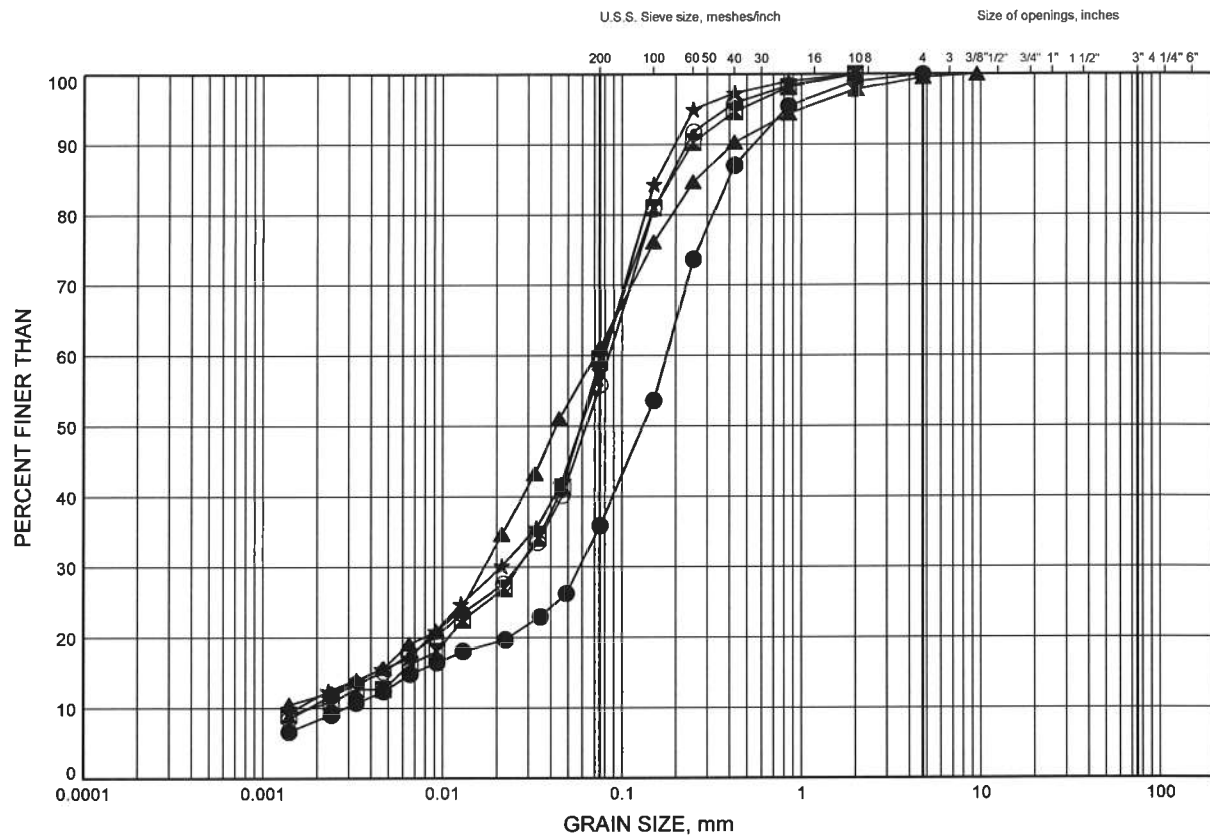


Prep'd MFA
 Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE K2

SAND and SILT



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH28-08R	2.59	192.51
⊠	BH28-12R	2.59	192.61
▲	BH28-13	3.35	192.05
★	BH28-15	1.07	194.63
⊙	BH28-16R	1.07	196.13

Date December 2012
GWP# 5294-08-00

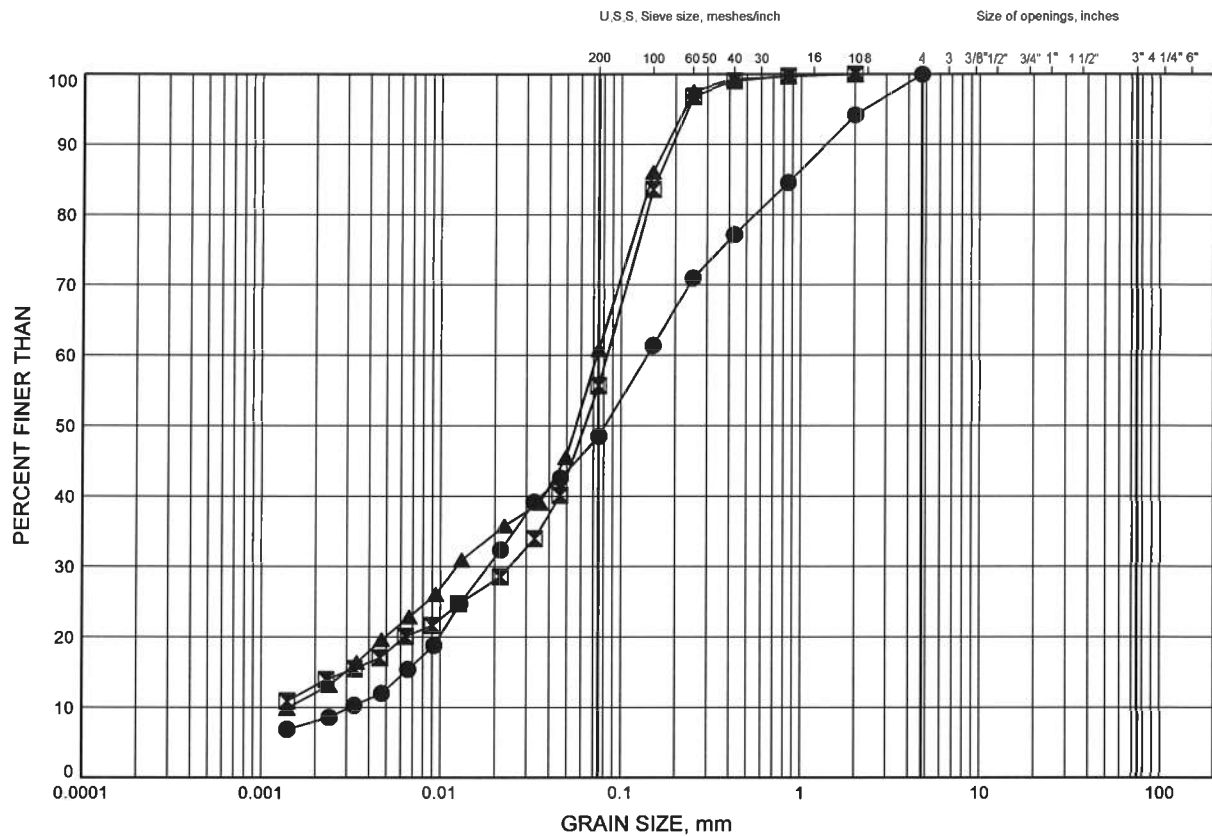


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE K3

SAND and 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)
●	BH29-05	1.83	193.17
⊠	BH29-11	0.76	194.64
▲	BH29-14R	1.52	193.68

Date December 2012

GWP# 5294-08-00



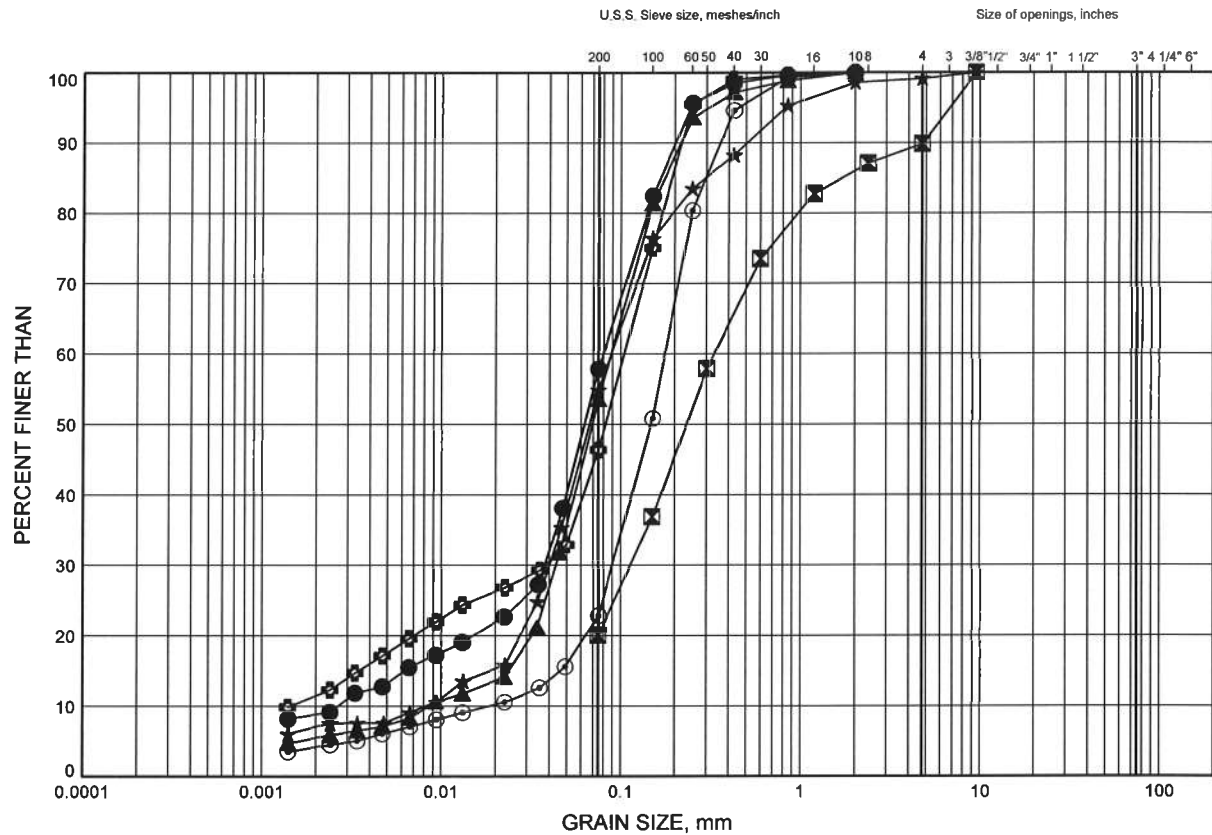
Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE K4

SAND and 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)
●	BH30-03L	3.35	191.85
⊠	BH30-04	1.83	193.17
▲	BH30-04	3.35	191.65
★	BH30-05R	3.35	191.65
⊙	BH30-06	1.07	194.43
⊕	BH30-09R	0.91	194.39

Date December 2012
GWP# 5294-08-00

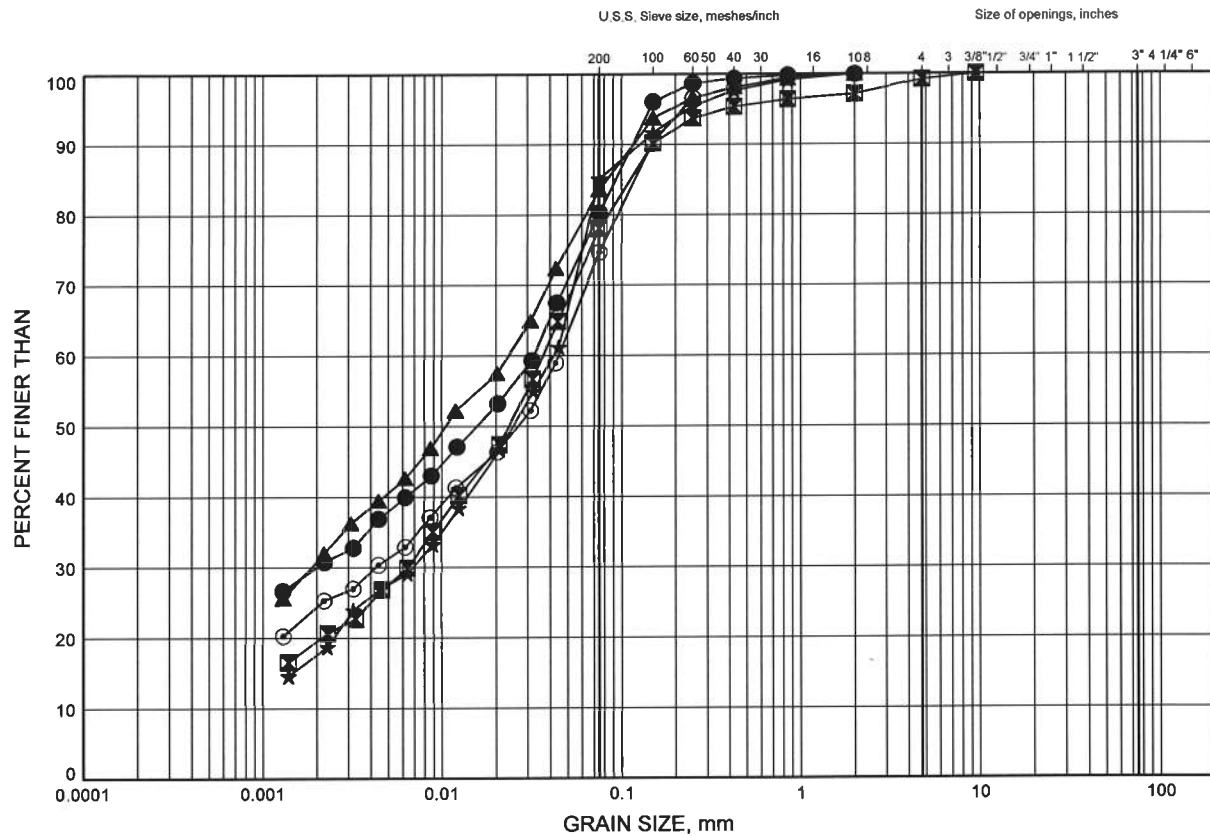


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE K5

Silty CLAY



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH28-08R	1.07	194.03
⊠	BH28-08R	6.40	188.70
▲	BH28-11	3.20	192.60
★	BH28-12R	1.83	193.37
⊙	BH28-13	1.83	193.57

Date December 2012
GWP# 5294-08-00

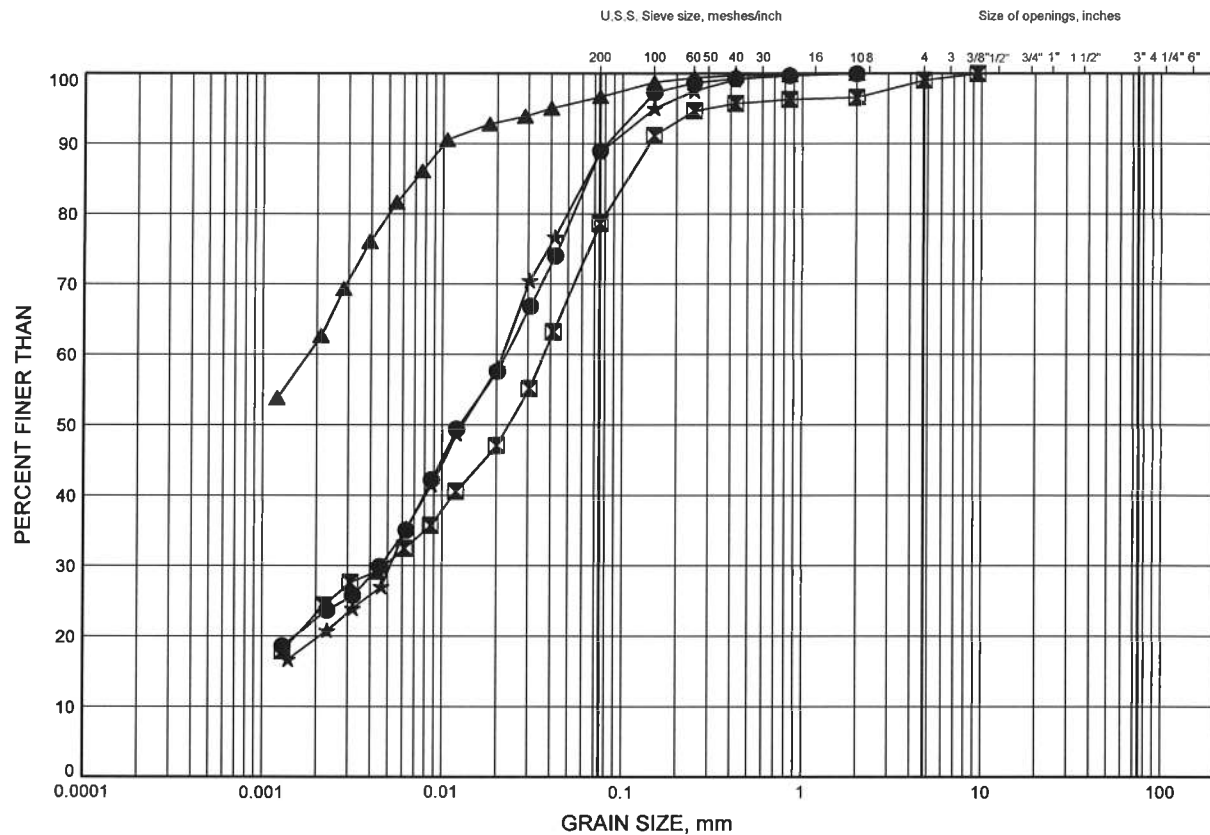


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE K6

Silty CLAY



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH29-05	2.59	192.41
☒	BH29-06L	1.07	193.33
▲	BH29-06L	1.98	192.42
★	BH29-07	1.30	193.30

Date December 2012

GWP# 5294-08-00

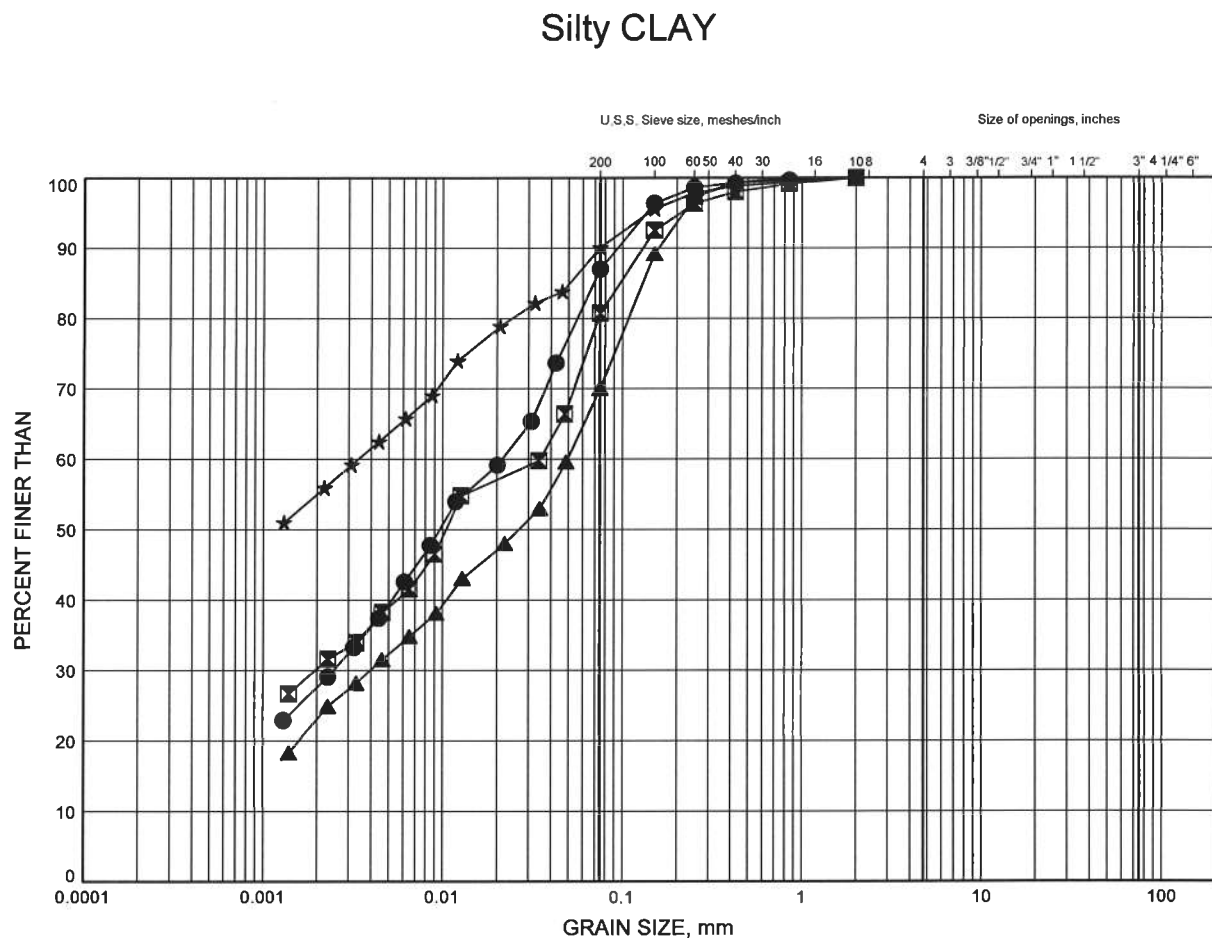


Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE K7



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH29-12	2.59	192.61
⊠	BH29-13R	1.52	193.08
▲	BH29-15	0.91	194.29
★	BH29-15	2.74	192.46

Date December 2012
GWP# 5294-08-00

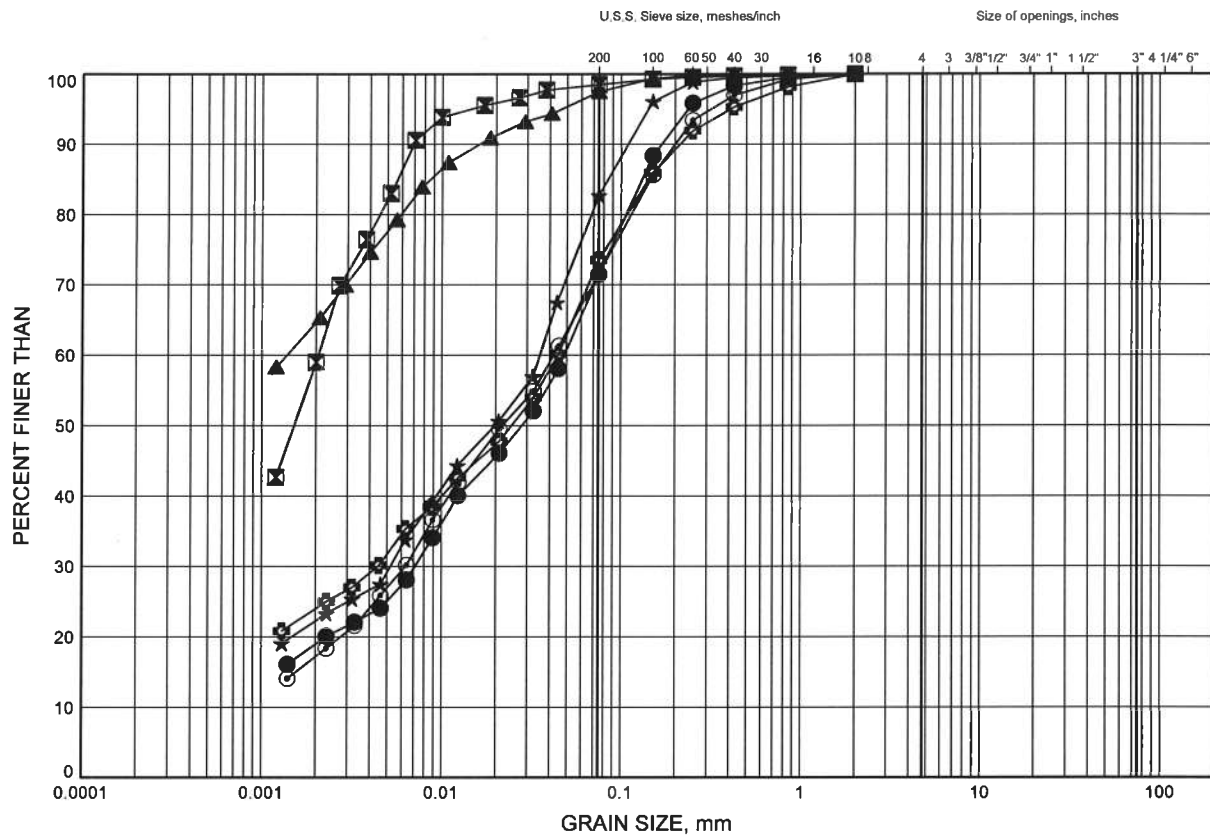


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE K8

Silty CLAY



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH30-01	2.59	192.71
■	BH30-01	4.11	191.19
▲	BH30-02	3.35	191.75
★	BH30-02	6.25	188.85
⊙	BH30-03L	1.22	193.98
⊕	BH30-05R	1.83	193.17

GRAIN SIZE DISTRIBUTION - THURBER 6121.GPJ 12/14/12

Date December 2012

GWP# 5294-08-00

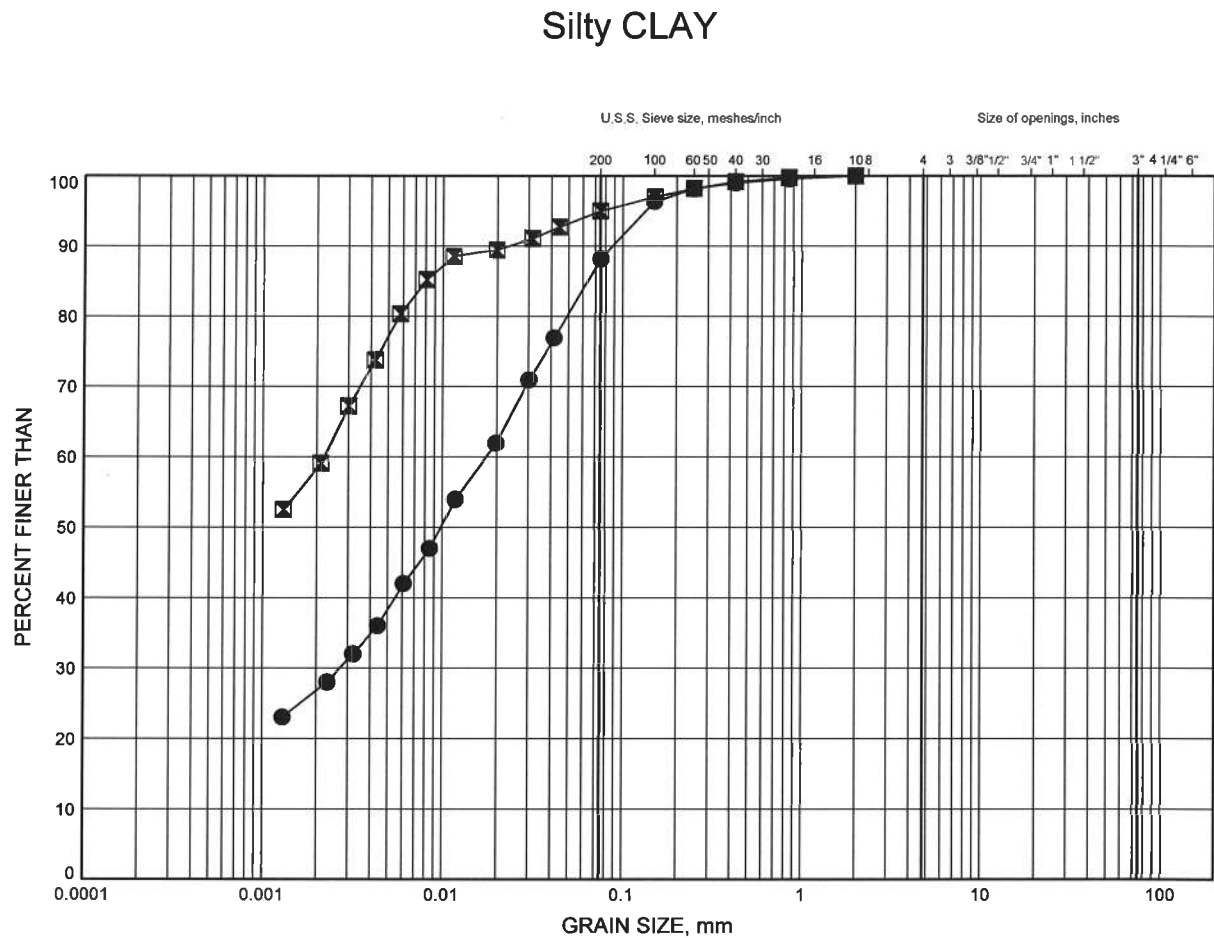


Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE K9



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH30-06	2.59	192.91
■	BH30-09R	3.96	191.34

Date December 2012
GWP# 5294-08-00

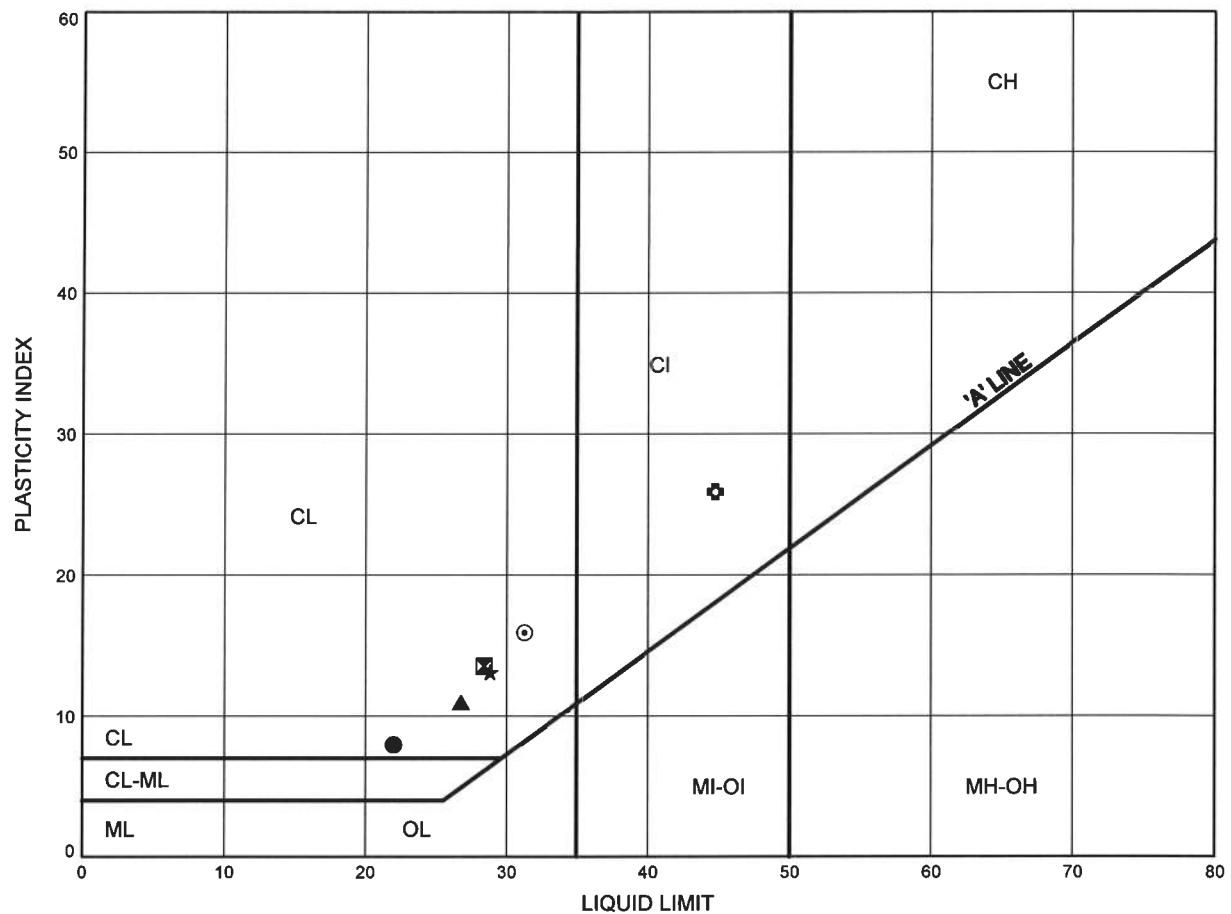


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
ATTERBERG LIMITS TEST RESULTS

FIGURE K10

Silty CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH28-08R	6.40	188.70
⊠	BH28-11	3.20	192.60
▲	BH29-05	2.59	192.41
★	BH29-12	2.59	192.61
⊙	BH29-13R	1.52	193.08
⊕	BH29-15	2.74	192.46

Date December 2012
 GWP# 5294-08-00

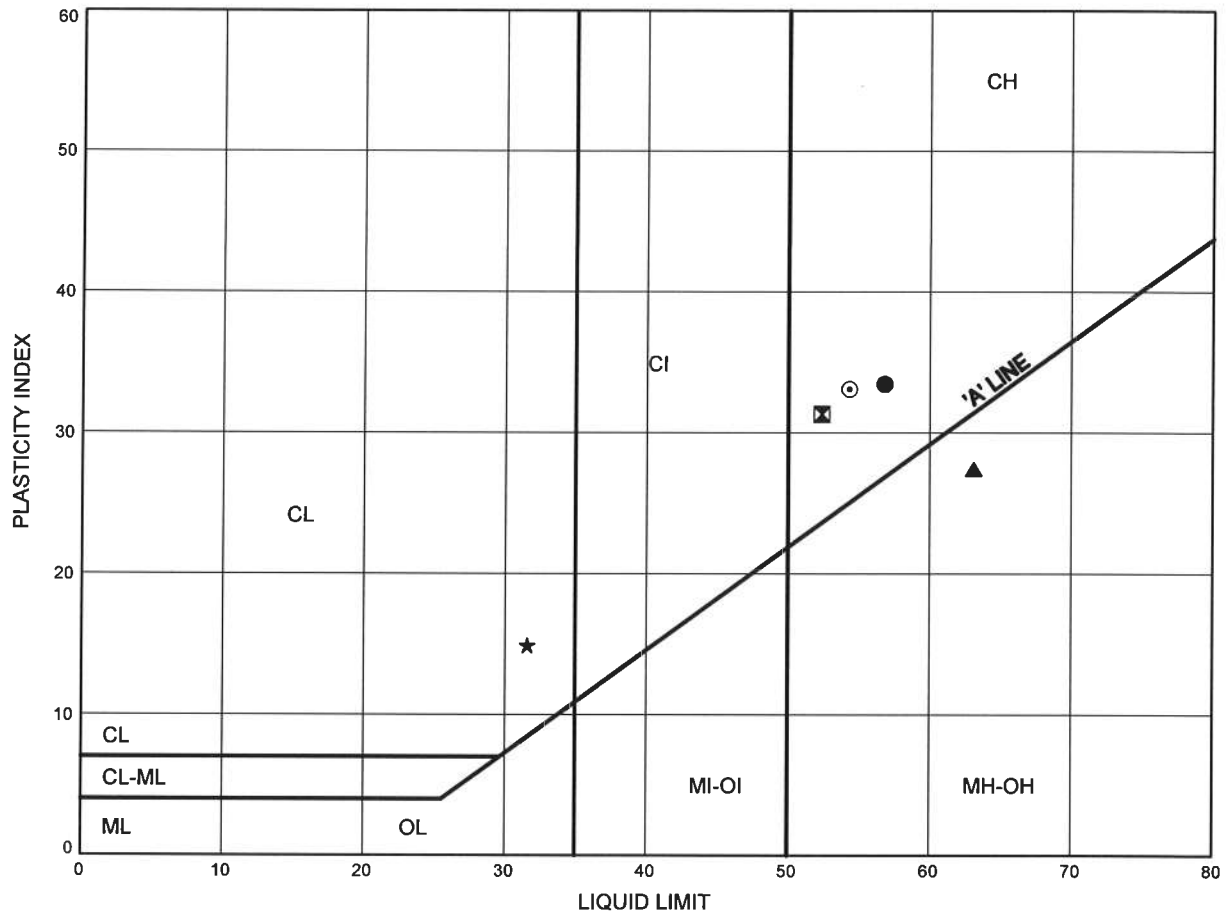


Prep'd MFA
 Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
ATTERBERG LIMITS TEST RESULTS

FIGURE K11

Silty CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH30-01	4.11	191.19
⊠	BH30-02	3.35	191.75
▲	BH30-03L	1.22	193.98
★	BH30-06	2.59	192.91
⊙	BH30-09R	3.96	191.34

Date December 2012

GWP# 5294-08-00



Prep'd MFA

Chkd. MRA



Consolidation Test Report

CLIENT: **MMM GROUP LIMITED**

FILE NUMBER: 19-5161-21

PROJECT: Hwy 69 Four-Laning North of Hwy 529

REPORT DATE: 15-Jun-10

TEST DATES: January 15, 2009 - January 22, 2009

SAMPLE: BH30-01 (12' 6" - 14' 6")
Clay, Silty, trace Sand, Brown, (CH), 59% Clay, 39% Silt, 2% Sand

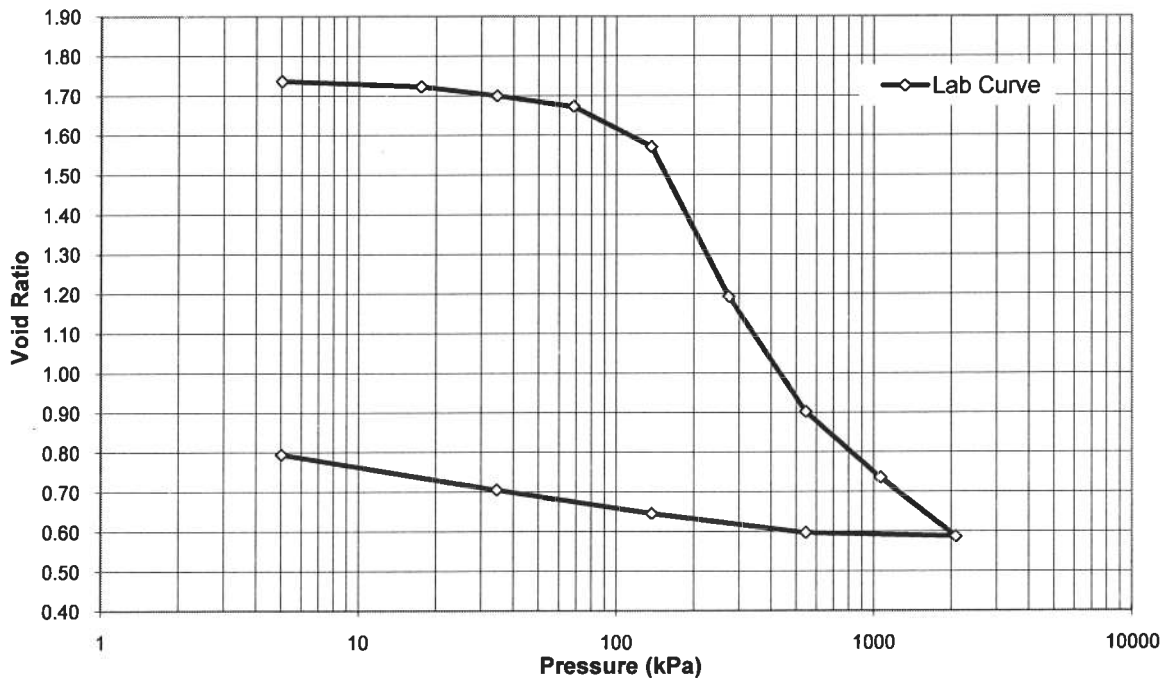
PROCEDURE: Test carried out in accordance with Standard Test Method for One-Dimensional Consolidation Properties of Soils, ASTM D 2435-04, method B

	<u>Start of Test</u>	<u>End of Test</u>
Wet Dens. (kg/m ³)	1643.1	2077.8
Dry Dens. (kg/m ³)	1015.5	1548.7
Moisture Cont. (%)	61.8	34.2
Void Ratio	1.738	0.795
Saturation (%)	98.9	

Note: A Specific Gravity of 2.78 was assumed for the void ratio and saturation calculations.

Void Ratio vs. Pressure

Project #: 19-5161-21
Client: MMM GROUP LIMITED
Project Name: Hwy 69 Four-Laning North of Hwy 529
Sample: BH30-01 (12' 6" - 14' 6")
Oedometer Consolidation Test





Consolidation Test Report

Hwy 69 Four-Laning North of Hwy 529
19-5161-21

BH30-01 (12' 6" - 14' 6")

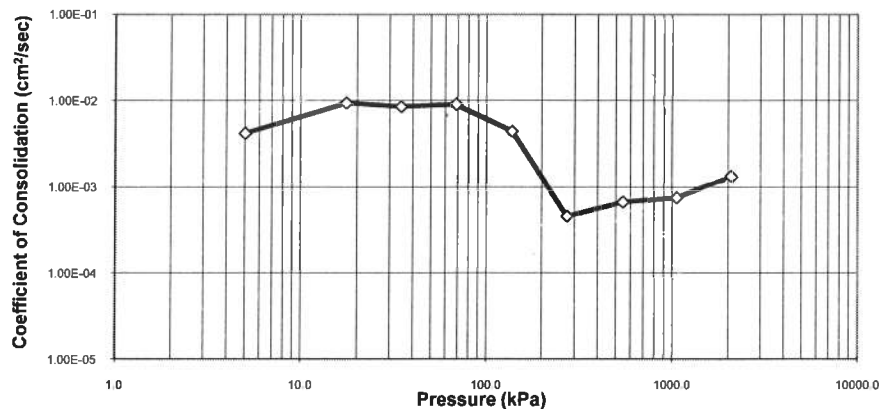
TRIMMING: The Specimen was manually trimmed to the size of consolidation ring, then mounted in a fixed ring consolidometer.

LOADING: A seating load of 5 kPa was applied and the consolidometer was flooded with distilled water. Sample was monitored to ensure no swelling effect occurred before the start of the test. Subsequent loads were applied after 100% primary consolidation was reached.

CALCULATIONS: Coefficients of Consolidation were calculated by the square root time method.

Pressure (kPa)	Corr. H. (mm)	Avg. H. (mm)	d ₉₀ (mm)	t ₉₀ (min)	c _v (cm ² /s)	Void Ratio	m _v (m ² /kN)	k (cm/s)
0.00	20.000					1.738		
5.02	19.995	19.998	0.071	3.36	4.21E-03	1.737	4.98E-05	2.05E-08
17.56	19.898	19.947	0.135	1.48	9.49E-03	1.724	3.87E-04	3.60E-07
34.53	19.725	19.812	0.095	1.62	8.56E-03	1.700	5.12E-04	4.30E-07
68.48	19.529	19.627	0.140	1.48	9.18E-03	1.673	2.93E-04	2.64E-07
136.85	18.788	19.159	0.264	2.89	4.48E-03	1.572	5.55E-04	2.44E-07
273.20	16.017	17.403	1.850	23.31	4.59E-04	1.192	1.08E-03	4.87E-08
545.45	13.895	14.956	1.512	11.84	6.68E-04	0.902	4.87E-04	3.19E-08
1057.67	12.684	13.290	0.760	8.22	7.59E-04	0.736	1.70E-04	1.27E-08
2080.10	11.596	12.140	0.608	3.90	1.34E-03	0.587	8.39E-05	1.10E-08
545.45	11.666	11.631				0.597		
136.85	12.025	11.846				0.646		
34.53	12.459	12.242				0.705		
5.02	13.111	12.785				0.795		

Coefficient of Consolidation vs. Pressure



Notes: C_v and k calculated using t₉₀ values



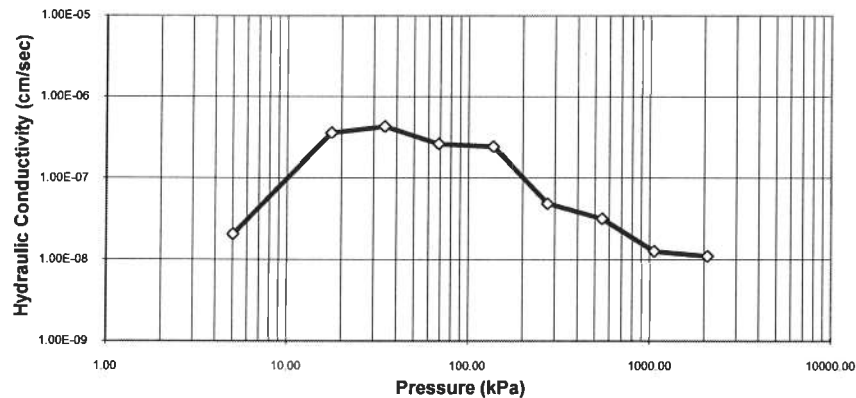
Consolidation Test Report

Hwy 69 Four-Laning North of Hwy 529
19-5161-21

BH30-01 (12' 6" - 14' 6")

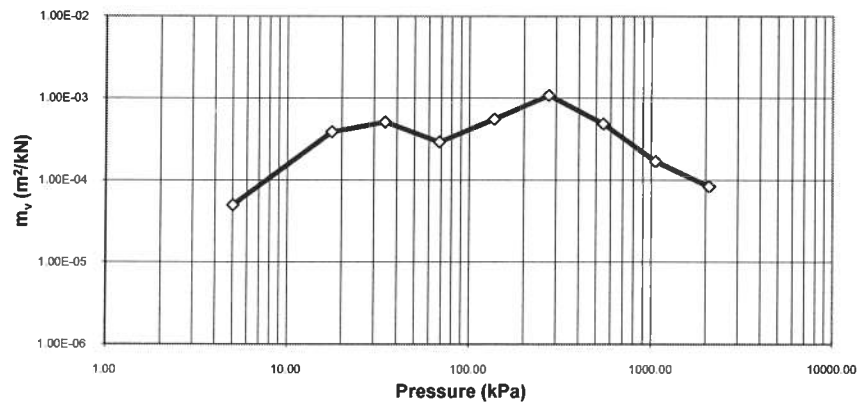
Hydraulic Conductivity vs. Pressure

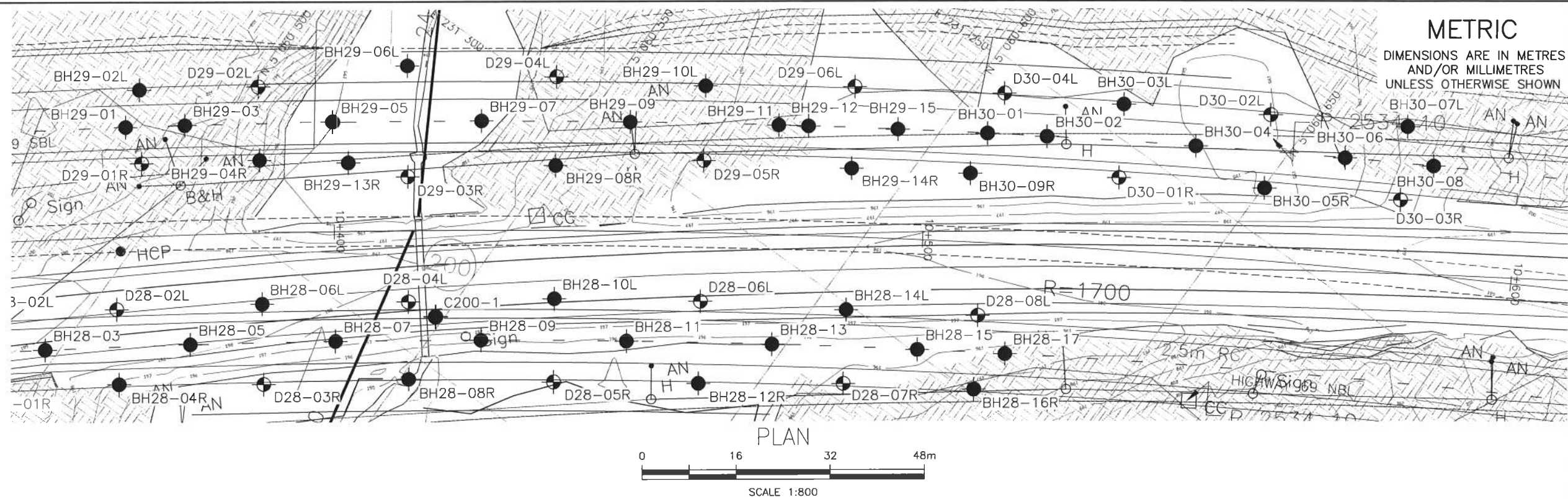
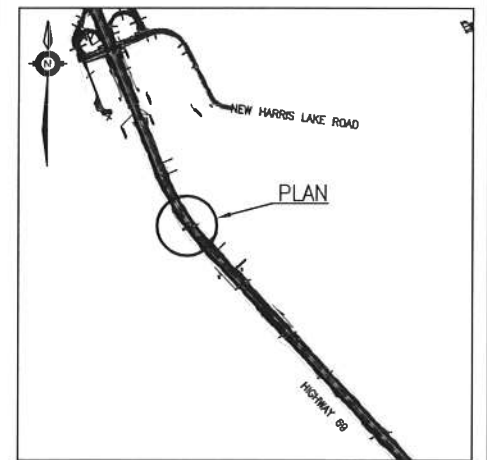
Project #: 19-5161-21
Client: MMM GROUP LIMITED
Project Name: Hwy 69 Four-Laning North of Hwy 529
Sample: BH30-01 (12' 6" - 14' 6")
Oedometer Consolidation Test



m_v vs. Pressure

Project #: 19-5161-21
Client: MMM GROUP LIMITED
Project Name: Hwy 69 Four-Laning North of Hwy 529
Sample: BH30-01 (12' 6" - 14' 6")
Oedometer Consolidation Test



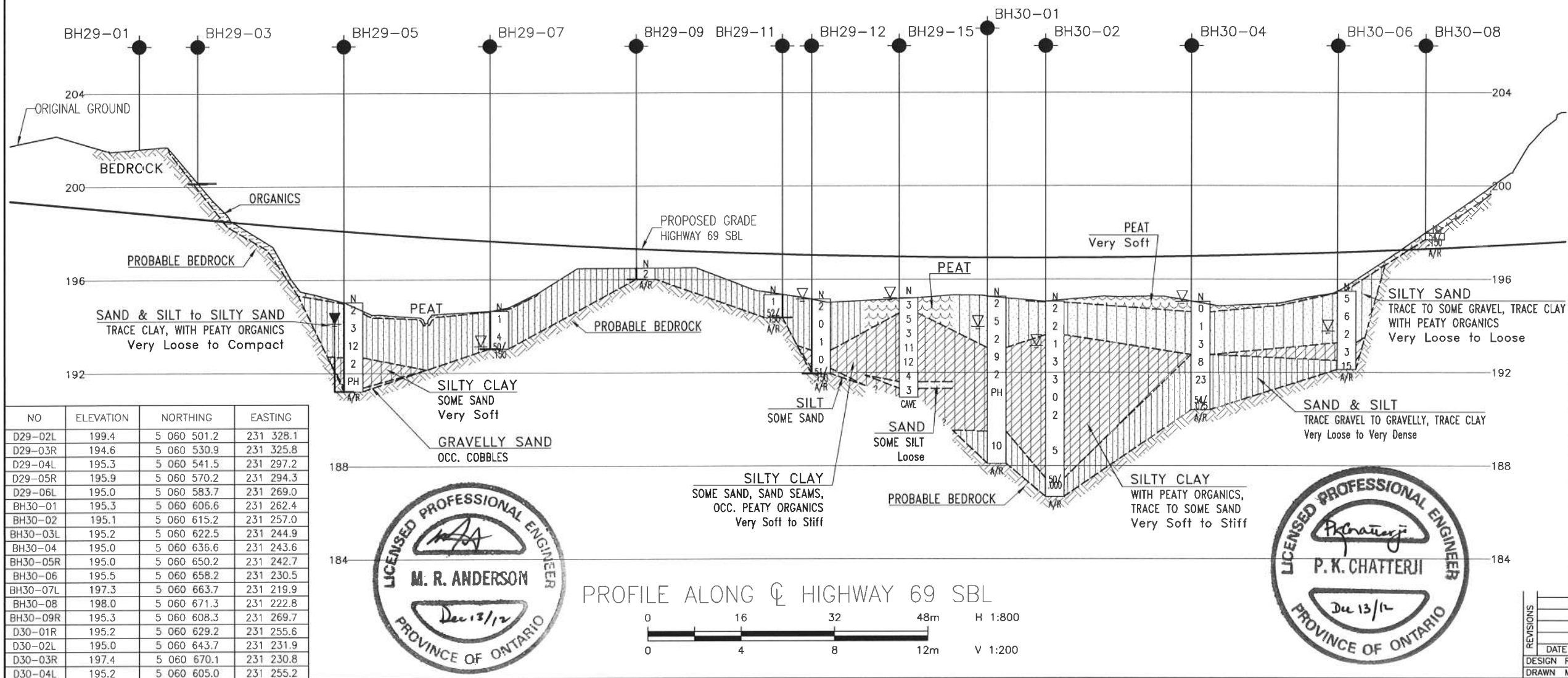
CONT No
GWP No 5294-08-00HIGHWAY 69 FOUR-LANING
WALLBRIDGE HWY 69 SBL-CL
(STA 10+330 - 10+585)
BOREHOLE LOCATIONS AND SOIL STRATA**MMM GROUP****THURBER ENGINEERING LTD.****KEYPLAN****LEGEND**

●	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
BH29-01	201.6	5 060 486.9	231 346.9
BH29-02L	201.8	5 060 485.0	231 340.4
BH29-03	200.2	5 060 494.9	231 340.7
BH29-04R	197.3	5 060 508.8	231 338.2
BH29-05	195.0	5 060 515.1	231 325.6
BH29-06L	194.4	5 060 519.7	231 310.4
BH29-07	194.6	5 060 535.6	231 310.7
BH29-08R	196.7	5 060 550.2	231 309.6
BH29-09	196.5	5 060 556.2	231 296.1
BH29-10L	196.7	5 060 563.0	231 283.7
BH29-11	195.4	5 060 577.1	231 281.9
BH29-12	195.2	5 060 581.3	231 279.1
BH29-13R	194.6	5 060 521.3	231 329.7
BH29-14R	195.2	5 060 591.4	231 280.7
BH29-15	195.2	5 060 593.9	231 270.7
D29-01R	200.5	5 060 492.7	231 350.3

-NOTES-

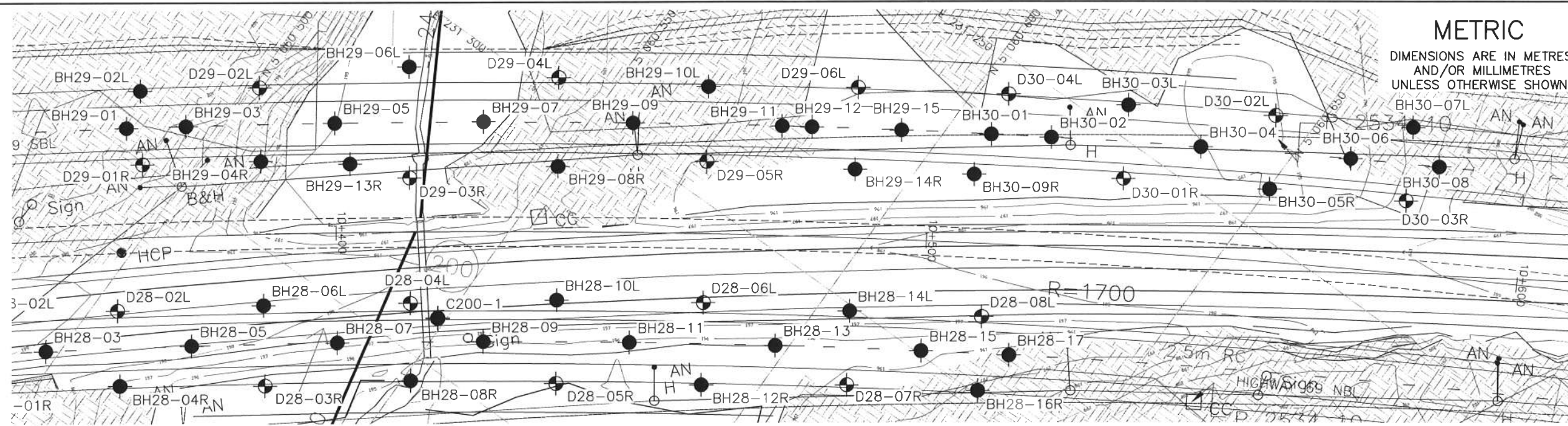
- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 41H-99

NO	ELEVATION	NORTHING	EASTING
D29-02L	199.4	5 060 501.2	231 328.1
D29-03R	194.6	5 060 530.9	231 325.8
D29-04L	195.3	5 060 541.5	231 297.2
D29-05R	195.9	5 060 570.2	231 294.3
D29-06L	195.0	5 060 583.7	231 269.0
BH30-01	195.3	5 060 606.6	231 262.4
BH30-02	195.1	5 060 615.2	231 257.0
BH30-03L	195.2	5 060 622.5	231 244.9
BH30-04	195.0	5 060 636.6	231 243.6
BH30-05R	195.0	5 060 650.2	231 242.7
BH30-06	195.5	5 060 658.2	231 230.5
BH30-07L	197.3	5 060 663.7	231 219.9
BH30-08	198.0	5 060 671.3	231 222.8
BH30-09R	195.3	5 060 608.3	231 269.7
D30-01R	195.2	5 060 629.2	231 255.6
D30-02L	195.0	5 060 643.7	231 231.9
D30-03R	197.4	5 060 670.1	231 230.8
D30-04L	195.2	5 060 605.0	231 255.2



REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG



PLAN



SCALE 1:800

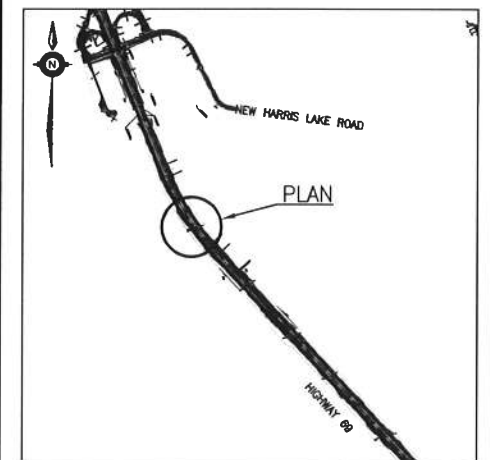
METRIC

DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWNCONT No
GWP No 5294-08-00HIGHWAY 69 FOUR-LANING
WALLBRIDGE HWY 69 SBL-RT TOE
(STA 10+330 - 10+585)
BOREHOLE LOCATIONS AND SOIL STRATA

SHEET

MMM GROUP

THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

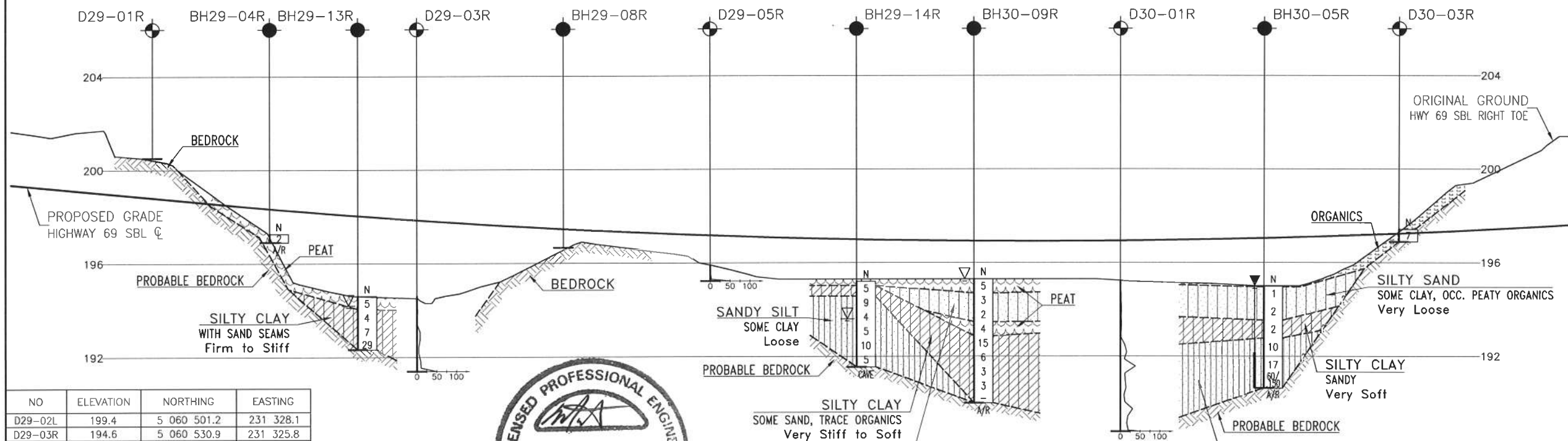
●	Borehole
○	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
▽	Water Level
↑	Head Artesian Water
↓	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
BH29-01	201.6	5 060 486.9	231 346.9
BH29-02L	201.8	5 060 485.0	231 340.4
BH29-03	200.2	5 060 494.9	231 340.7
BH29-04R	197.3	5 060 508.8	231 338.2
BH29-05	195.0	5 060 515.1	231 325.6
BH29-06L	194.4	5 060 519.7	231 310.4
BH29-07	194.6	5 060 535.6	231 310.7
BH29-08R	196.7	5 060 550.2	231 309.6
BH29-09	196.5	5 060 556.2	231 296.1
BH29-10L	196.7	5 060 563.0	231 283.7
BH29-11	195.4	5 060 577.1	231 281.9
BH29-12	195.2	5 060 581.3	231 279.1
BH29-13R	194.6	5 060 521.3	231 329.7
BH29-14R	195.2	5 060 591.4	231 280.7
BH29-15	195.2	5 060 593.9	231 270.7
D29-01R	200.5	5 060 492.7	231 350.3

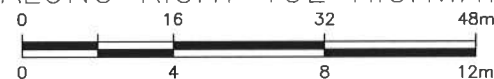
-NOTES-

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- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 41H-99



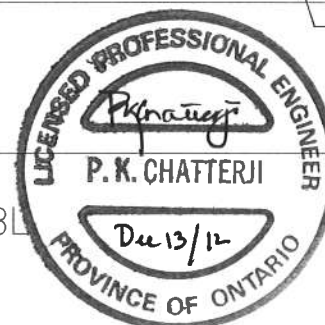
PROFILE ALONG RIGHT TOE HIGHWAY 69 SBL



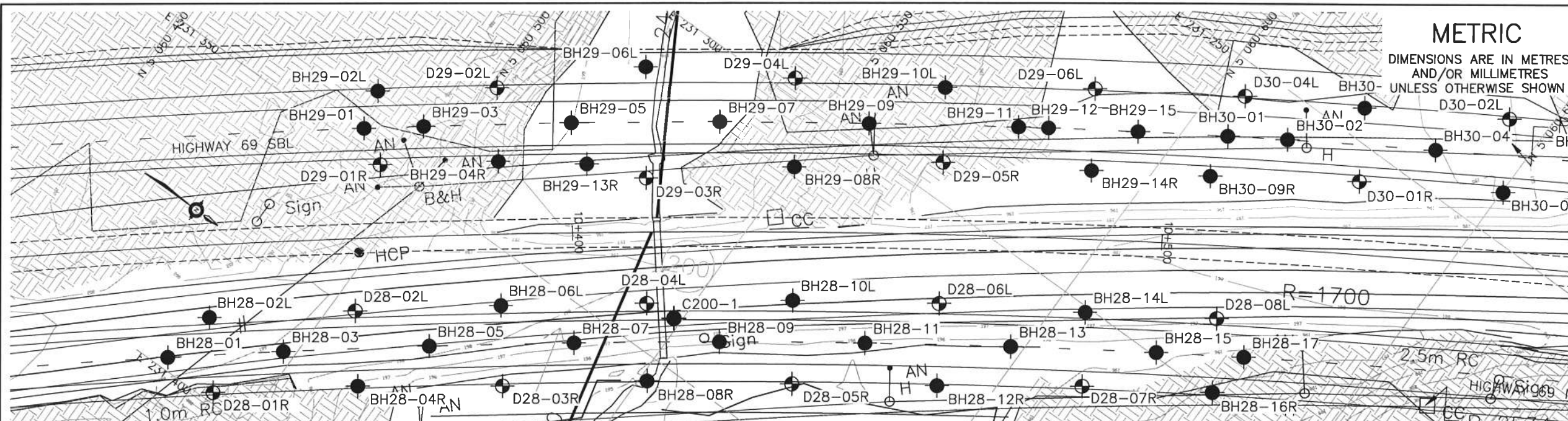
H 1:800

V 1:200

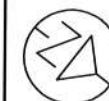
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D29-02L	199.4	5 060 501.2	231 328.1
D29-03R	194.6	5 060 530.9	231 325.8
D29-04L	195.3	5 060 541.5	231 297.2
D29-05R	195.9	5 060 570.2	231 294.3
D29-06L	195.0	5 060 583.7	231 269.0
BH30-01	195.3	5 060 606.6	231 262.4
BH30-02	195.1	5 060 615.2	231 257.0
BH30-03L	195.2	5 060 622.5	231 244.9
BH30-04	195.0	5 060 636.6	231 243.6
BH30-05R	195.0	5 060 650.2	231 242.7
BH30-06	195.5	5 060 658.2	231 230.5
BH30-07L	197.3	5 060 663.7	231 219.9
BH30-08	198.0	5 060 671.3	231 222.8
BH30-09R	195.3	5 060 608.3	231 269.7
D30-01R	195.2	5 060 629.2	231 255.6
D30-02L	195.0	5 060 643.7	231 231.9
D30-03R	197.4	5 060 670.1	231 230.8
D30-04L	195.2	5 060 605.0	231 255.2



REVISIONS	DATE	BY	DESCRIPTION
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DRAWN	MFA	CHK PKC	SITE
LOAD	DATE	DEC. 2012	DWG



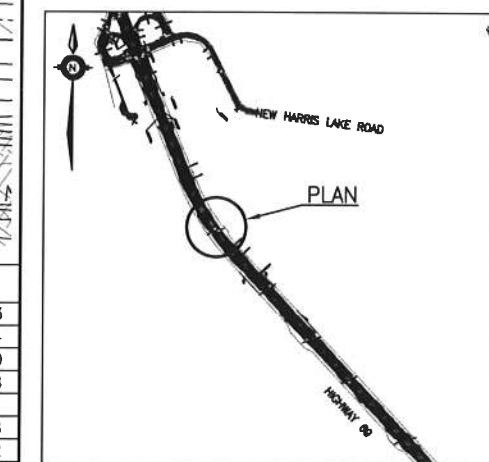
METRIC

DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWNCONT No
GWP No 5294-08-00HIGHWAY 69 FOUR-LANING
WALLBRIDGE HWY 69 NBL-LT TOE
(STA 10+330 - 10+585)
BOREHOLE LOCATIONS AND SOIL STRATA

SHEET

MMM GROUP

THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

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

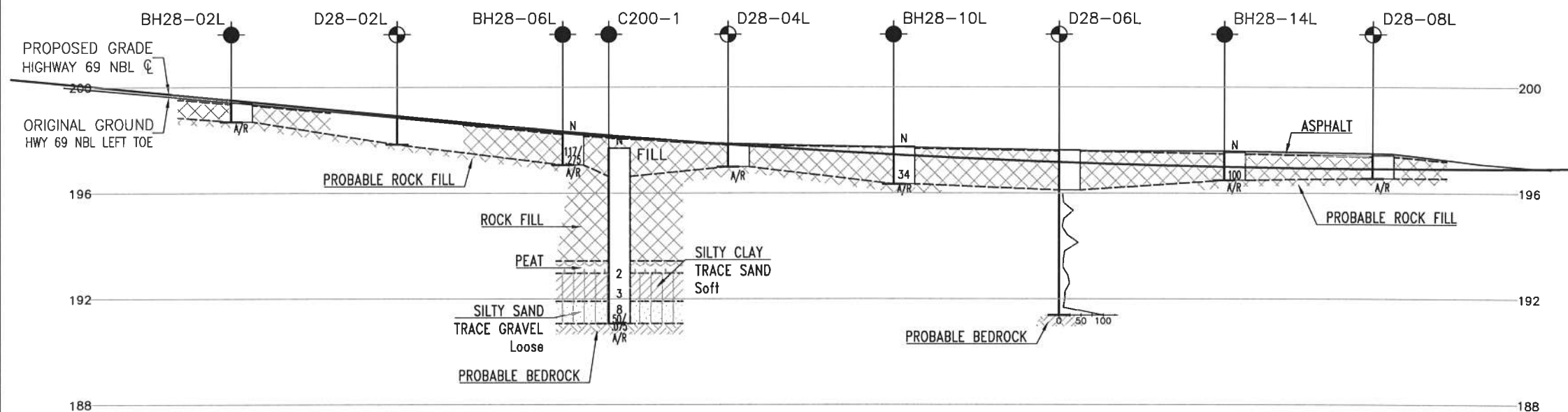
NO	ELEVATION	NORTHING	EASTING
BH28-01	199.4	5 060 482.6	231 398.0
BH28-02L	199.4	5 060 484.4	231 388.4
BH28-03	198.9	5 060 498.1	231 385.7
BH28-04R	196.9	5 060 511.7	231 383.2
BH28-05	198.2	5 060 517.6	231 370.6
BH28-06L	198.3	5 060 523.5	231 357.8
BH28-07	197.4	5 060 537.4	231 355.7
BH28-08R	195.1	5 060 551.3	231 353.8
BH28-09	196.2	5 060 557.4	231 341.2
BH28-10L	197.8	5 060 563.4	231 328.2
BH28-11	195.8	5 060 577.6	231 326.9
BH28-12R	195.2	5 060 591.7	231 325.7
BH28-13	195.4	5 060 598.0	231 313.0
BH28-14L	197.5	5 060 604.8	231 300.9
BH28-15	195.7	5 060 618.6	231 299.3
BH28-16R	197.2	5 060 630.3	231 299.3

NOTES

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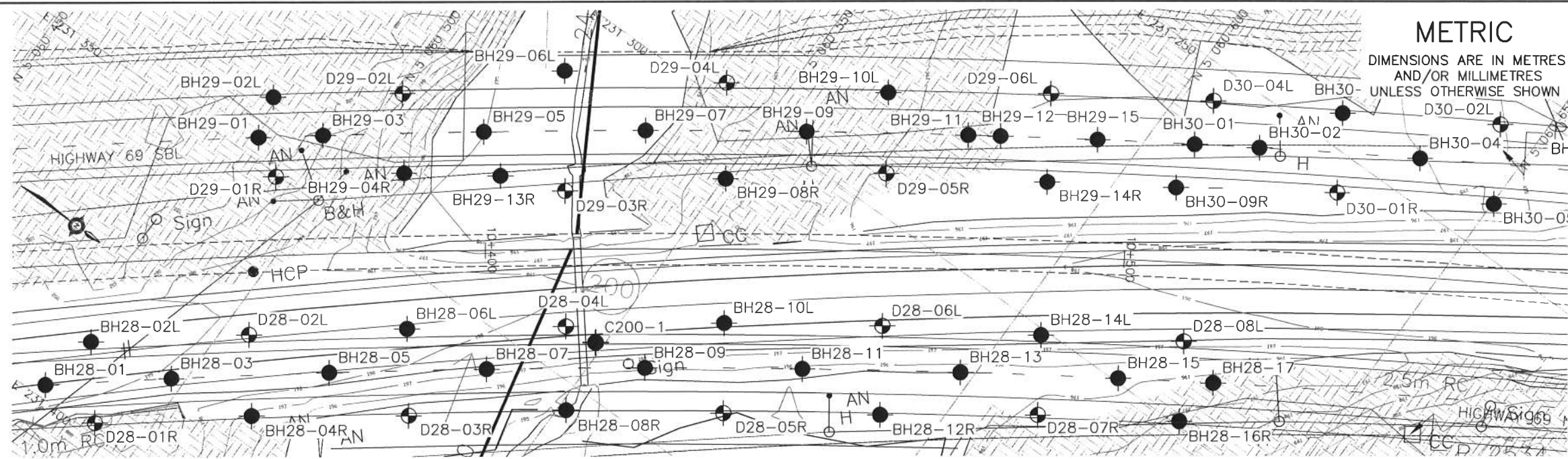
GEOCRETS No. 41H-99

REVISIONS	DATE	BY	DESCRIPTION
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			STRUCT
			DWG
			DATE DEC. 2012

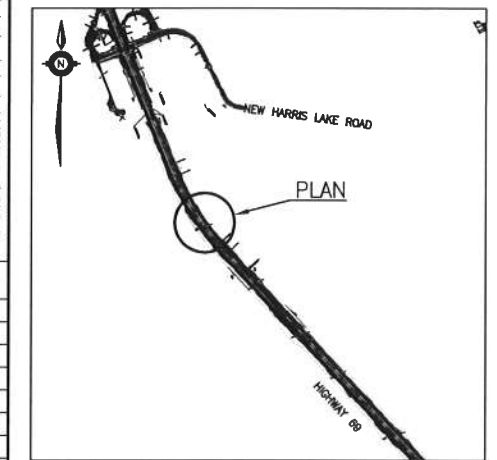


PROFILE ALONG LEFT TOE HIGHWAY 69 NBL

H 1:800
V 1:200



NO	ELEVATION	NORTHING	EASTING
BH28-17	196.3	5 060 631.1	231 291.3
D28-01R	200.0	5 060 492.4	231 398.4
D28-02L	198.8	5 060 503.9	231 373.0
D28-03R	195.3	5 060 531.7	231 368.8
D28-04L	197.9	5 060 543.5	231 343.1
D28-05R	195.1	5 060 571.6	231 339.8
D28-06L	197.6	5 060 583.8	231 314.2
D28-07R	196.2	5 060 611.8	231 311.4
D28-08L	197.4	5 060 623.5	231 288.7



KEYPLAN

LEGEND

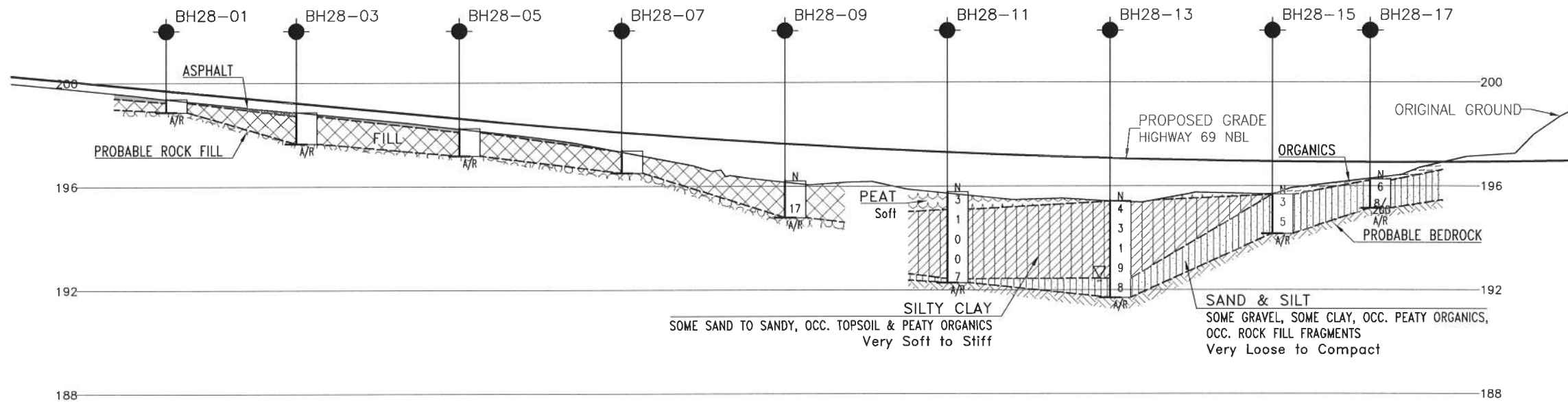
	Borehole
	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60° Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
BH28-01	199.4	5 060 482.6	231 398.0
BH28-02L	199.4	5 060 484.4	231 388.4
BH28-03	198.9	5 060 498.1	231 385.7
BH28-04R	196.9	5 060 511.7	231 383.2
BH28-05	198.2	5 060 517.6	231 370.6
BH28-06L	198.3	5 060 523.5	231 357.8
BH28-07	197.4	5 060 537.4	231 355.7
BH28-08R	195.1	5 060 551.3	231 353.8
BH28-09	196.2	5 060 557.4	231 341.2
BH28-10L	197.8	5 060 563.4	231 328.2
BH28-11	195.8	5 060 577.6	231 326.9
BH28-12R	195.2	5 060 591.7	231 325.7
BH28-13	195.4	5 060 598.0	231 313.0
BH28-14L	197.5	5 060 604.8	231 300.9
BH28-15	195.7	5 060 618.6	231 299.3
BH28-16R	197.2	5 060 630.3	231 299.3

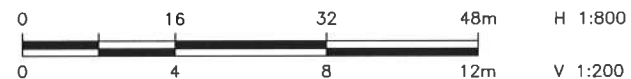
-NOTES-

- 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.

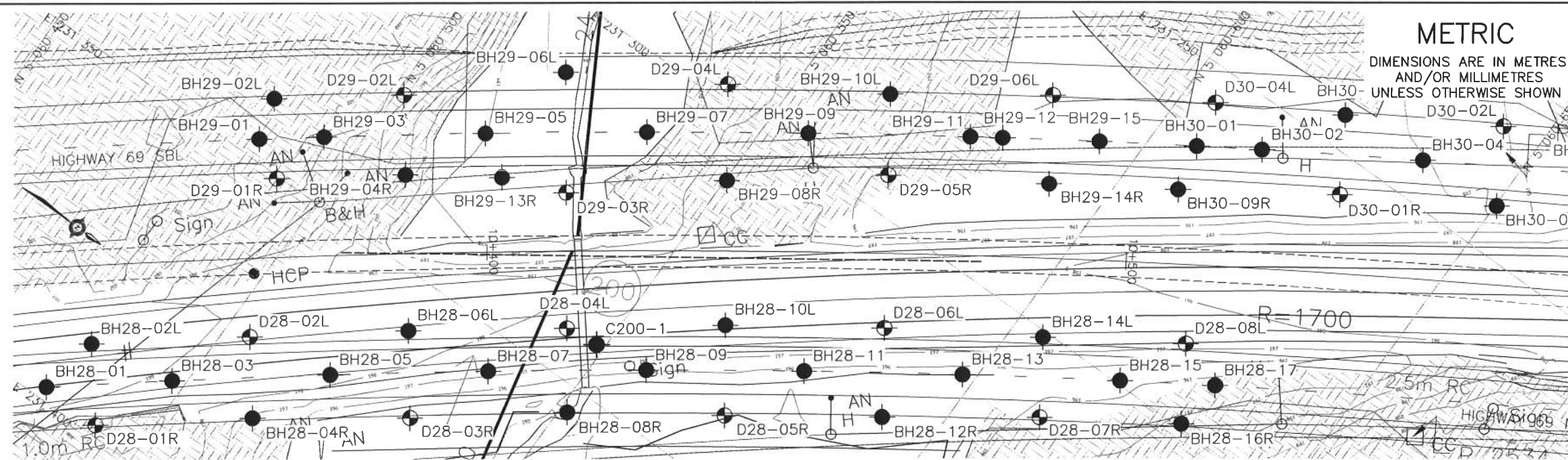
GEOCRES No. 41H-99



PROFILE ALONG CL HIGHWAY 69 NBL

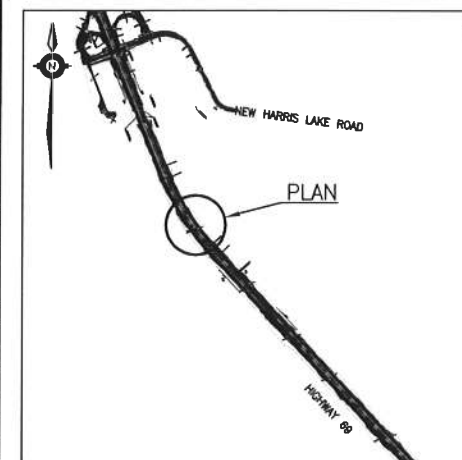


REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



PLAN
0 16 32 48m
SCALE 1:800

NO	ELEVATION	NORTHING	EASTING
BH28-17	196.3	5 060 631.1	231 291.3
D28-01R	200.0	5 060 492.4	231 398.4
D28-02L	198.8	5 060 503.9	231 373.0
D28-03R	195.3	5 060 531.7	231 368.8
D28-04L	197.9	5 060 543.5	231 343.1
D28-05R	195.1	5 060 571.6	231 339.8
D28-06L	197.6	5 060 583.8	231 314.2
D28-07R	196.2	5 060 611.8	231 311.4
D28-08L	197.4	5 060 623.5	231 288.7



KEYPLAN
LEGEND

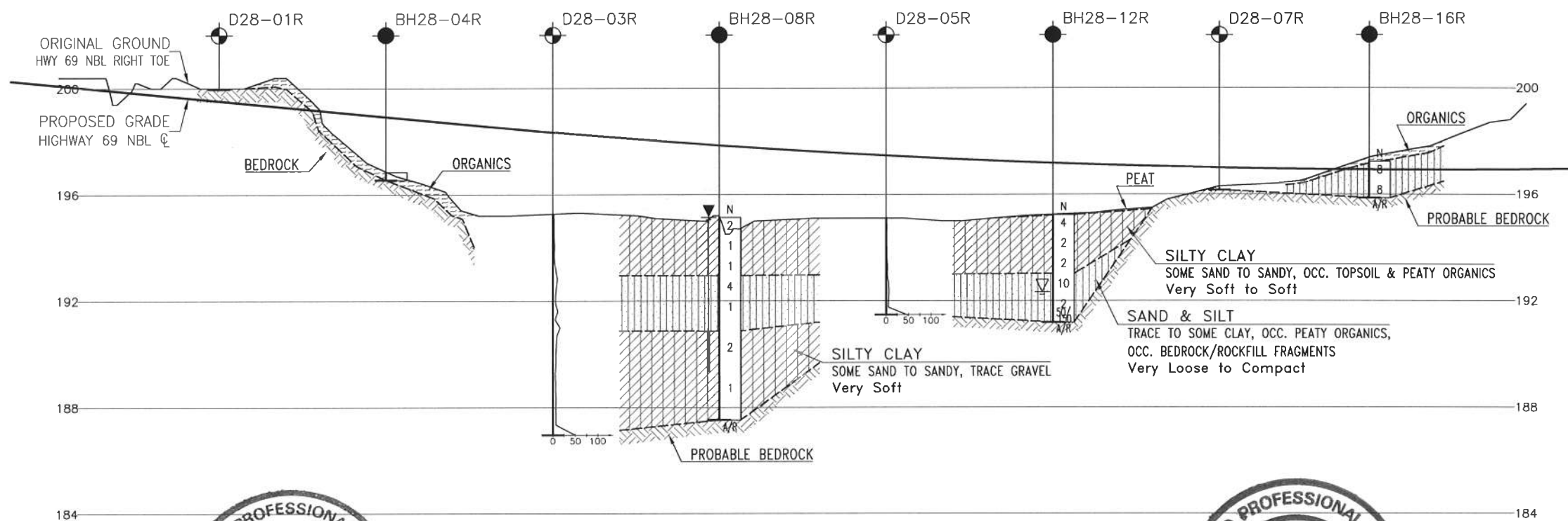
●	Borehole
○	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
▽	Water Level
▽	Head Artesian Water
▽	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
BH28-01	199.4	5 060 482.6	231 398.0
BH28-02L	199.4	5 060 484.4	231 388.4
BH28-03	198.9	5 060 498.1	231 385.7
BH28-04R	196.9	5 060 511.7	231 383.2
BH28-05	198.2	5 060 517.6	231 370.6
BH28-06L	198.3	5 060 523.5	231 357.8
BH28-07	197.4	5 060 537.4	231 355.7
BH28-08R	195.1	5 060 551.3	231 353.8
BH28-09	196.2	5 060 557.4	231 341.2
BH28-10L	197.8	5 060 563.4	231 328.2
BH28-11	195.8	5 060 577.6	231 326.9
BH28-12R	195.2	5 060 591.7	231 325.7
BH28-13	195.4	5 060 598.0	231 313.0
BH28-14L	197.5	5 060 604.8	231 300.9
BH28-15	195.7	5 060 618.6	231 299.3
BH28-16R	197.2	5 060 630.3	231 299.3

-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. 41H-99



PROFILE ALONG RIGHT TOE HIGHWAY 69 NBL

0 16 32 48m H 1:800
0 4 8 12m V 1:200



REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012

Appendix L

**Highway 69 NBL
Sta. 12+050 to 12+100 Township of Wallbridge**

**Boreholes 31-01 to 31-06L
DCPT D31-01R**

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

RECORD OF BOREHOLE No BH31-01

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 12+055 C/L, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.16 - 2008.09.16 CHECKED BY RPR

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 (%)				
195.7	Ground Surface							20 40 60 80 100		20 40 60				
0.0	SAND and SILT , trace gravel Very Loose Brown Moist		1	SS	4			20 40 60 80 100		20 40 60				
195.1														
0.6	END OF BOREHOLE (SAMPLER BOUNCING) AT 0.6m ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.													

RECORD OF BOREHOLE No BH31-02L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 12+062.5 O/S 8.1L, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.16 - 2008.09.16 CHECKED BY RPR

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 x LAB VANE							PLASTIC LIMIT w _P NATURAL MOISTURE CONTENT w LIQUID LIMIT w _L			
195.4	Ground Surface		1	SS	2	195												
0.0 0.1	ORGANICS: (100mm) SAND and SILT , some clay Very Loose to Loose Brown to Grey Moist																	
194.1			2	SS	9													
1.3	END OF BOREHOLE (SAMPLE BOUNCING) AT 1.3m ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS AND HOLEPLUG TO SURFACE.																	

RECORD OF BOREHOLE No BH31-03

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 12+075 C/L, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.16 - 2008.09.16 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)							
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)						
195.4	Ground Surface							20	40	60	80	100	w _p	w	w _L	GR	SA	SI	CL		
0.0	SAND and SILT , some clay to clayey, occasional rootlets Very Loose to Compact Grey		1	SS	4		195							o							
	Decayed wood fragments		2	SS	14		194							o				0	38	44	18
	Layer of clayey silt		3	SS	4		193							o							
			4	SS	3		192							o				0	48	37	15
			5	SS	6																
191.0			6	SS	51/.020																
4.4	END OF BOREHOLE AT 4.4m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. WATER LEVEL AT 2.4m UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter schedule 40 PVC pipe with 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Sep 24/08 3.3 192.1 Oct 29/08 0.4 195.0 Jan 14/09 Frozen at Surface Feb 19/09 Frozen at Surface Apr 21/09 Ground Surface Jun 04/09 0.2 195.2 Aug 17/09 0.3 195.1 Aug 25/09 0.3 195.1 Oct 27/09 0.3 195.1 Nov 20/09 0.5 194.9																				

RECORD OF BOREHOLE No BH31-04R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 12+087.5 O/S 9.1R, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.16 - 2008.09.16 CHECKED BY RPR

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						
195.2	Ground Surface							20 40 60 80 100						
195.2	ORGANICS: (75mm)							20 40 60 80 100						
	SAND and SILT, some clay Very Loose to Loose Brown to Grey Moist		1	SS	2		195							
			2	SS	6		194							
			3	SS	5									
192.7			4	SS	50/		193							
2.5	END OF BOREHOLE AT 2.5m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. WATER LEVEL AT 2.5m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.				.000									

RECORD OF BOREHOLE No BH31-05

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wellbridge Twp., Station 12+100 C/L, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.16 - 2008.09.16 CHECKED BY RPR

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 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE			WATER CONTENT (%) w _p w w _L					
195.6	Ground Surface							20	40	60	80	100				
195.6	ORGANICS: (25mm)															
	SAND and SILT , trace clay Loose Brown to Grey Moist		1	SS	6		195									
			2	SS	9											
			3	SS	10		194									
193.5																
2.1	END OF BOREHOLE (SAMPLER BOUNCING) AT 2.1m ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS AND HOLEPLUG TO SURFACE.															

RECORD OF BOREHOLE No BH31-06L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 12+087.5 O/S 9.1L, NBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.16 - 2008.09.16 CHECKED BY RPR

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 (%)						
195.7	Ground Surface							20 40 60 80 100							
0.0	ORGANICS: (100mm)		1	SS	50/			20 40 60 80 100							
0.2	SAND and SILT, occasional peat Brown Moist				.000										
	END OF BOREHOLE (SAMPLER BOUNCING) AT 0.2m ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.														

ONTMT4S 6121.GPJ 12/11/12

RECORD OF BOREHOLE No D31-01R

1 OF 1

METRIC

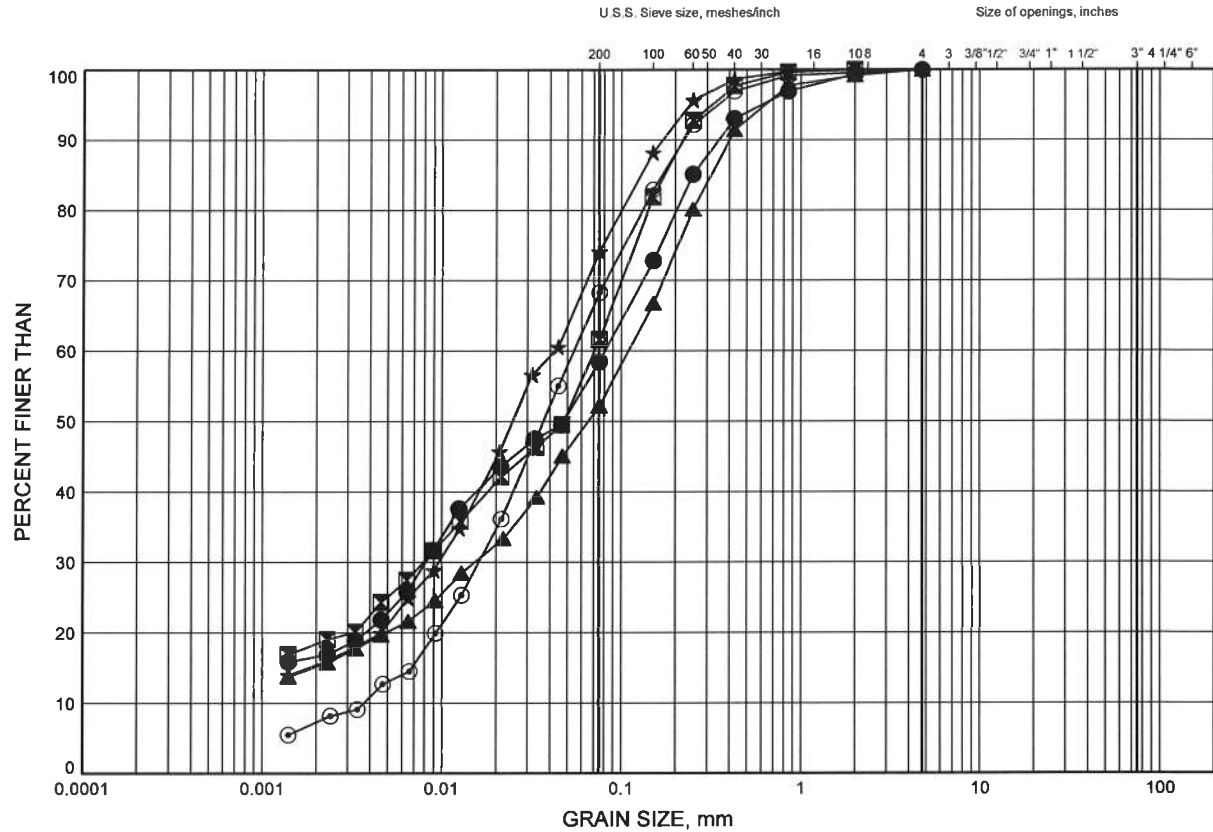
GWP# 5294-08-00 LOCATION Wallbridge Twp., Station 12+062.5 O/S 8.1R, NBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
DATUM Geodetic DATE 2008.09.16 - 2008.09.16 CHECKED BY RPR

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 (%)				
195.9	Ground Surface							20 40 60 80 100						
0.0								○ UNCONFINED + FIELD VANE						
195.6								● QUICK TRIAXIAL × LAB VANE						
0.3	BEDROCK AT 0.3m.							20 40 60 80 100						

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE L1

SAND and SILT



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH31-02L	1.04	194.36
■	BH31-03	1.07	194.33
▲	BH31-03	2.59	192.81
★	BH31-04R	1.83	193.37
⊙	BH31-05	1.79	193.81

GRAIN SIZE DISTRIBUTION - THURBER 6121 GPJ 12/13/12

Date December 2012
GWP# 5294-08-00

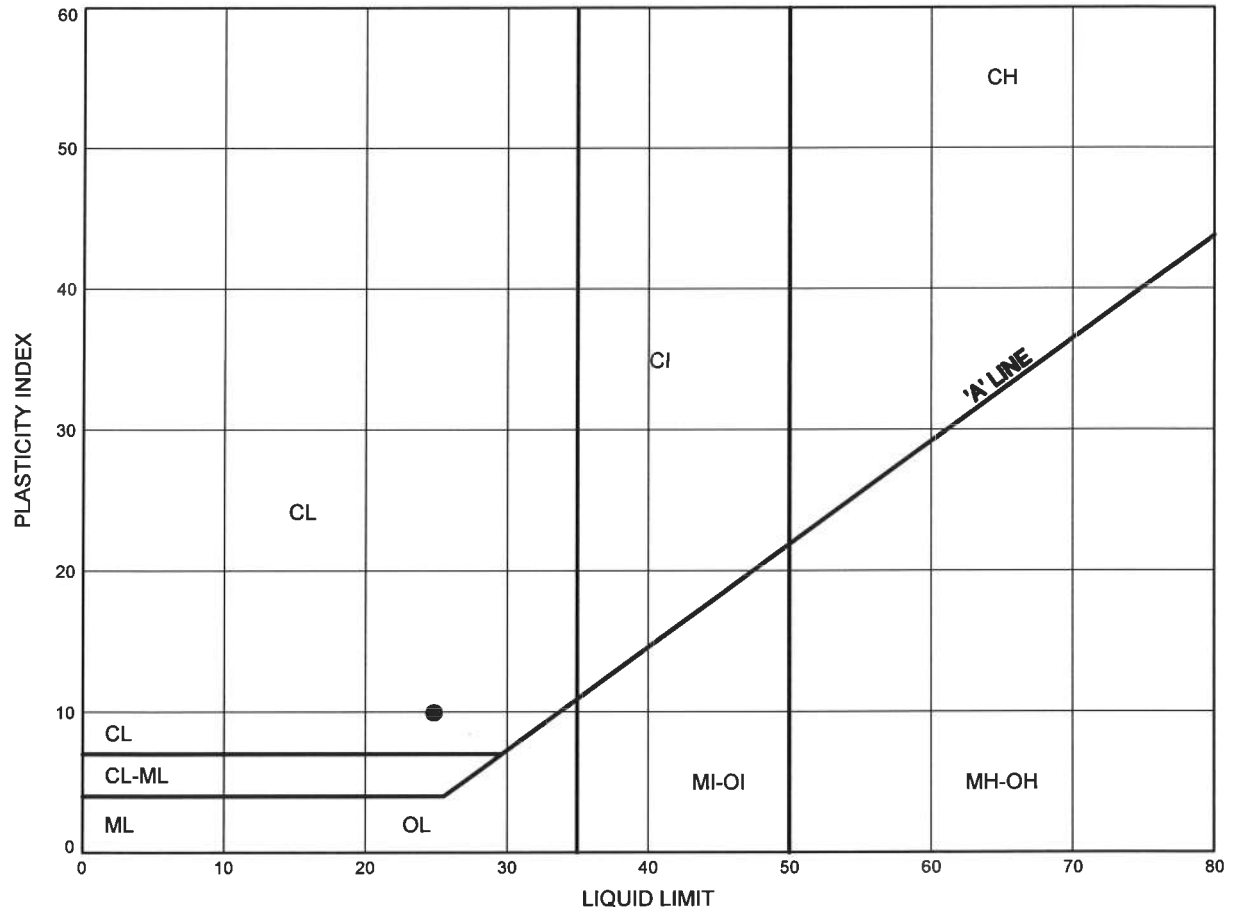


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
ATTERBERG LIMITS TEST RESULTS

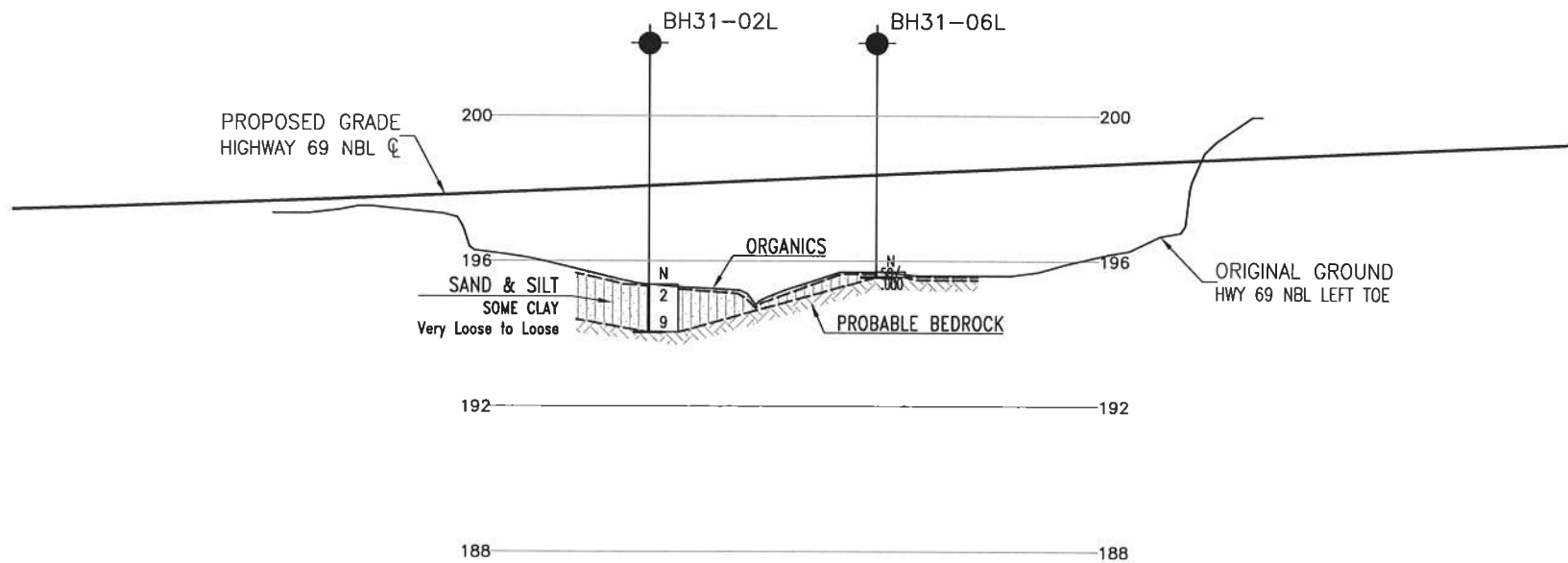
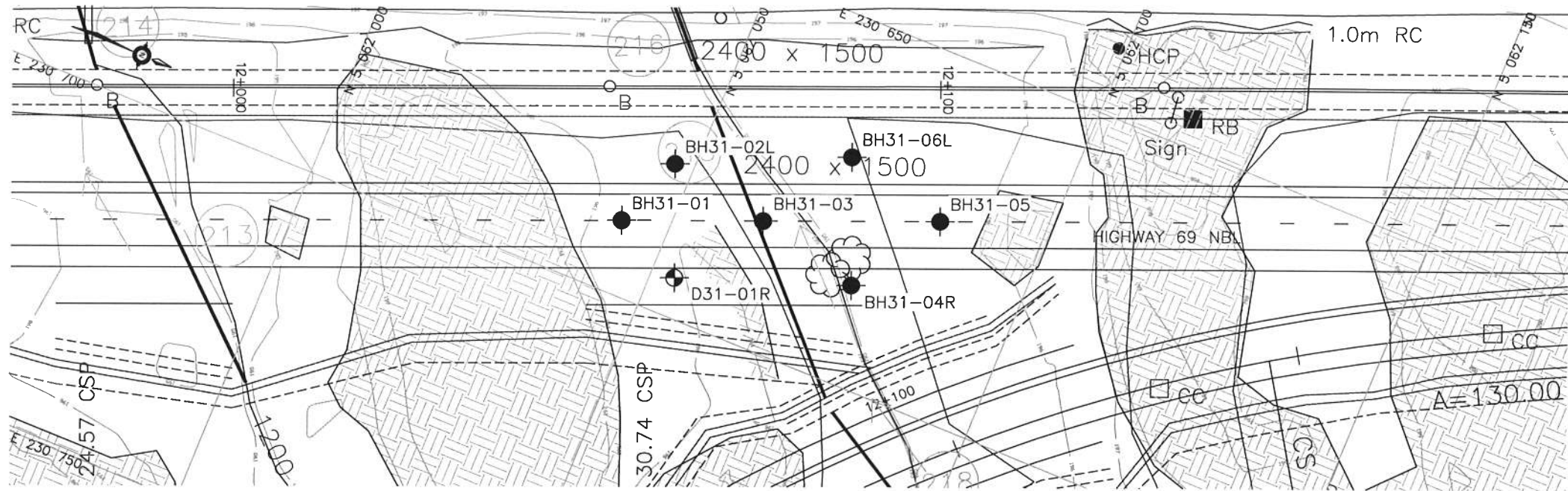
FIGURE L2

SAND and SILT (Clayey Zone)



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH31-03	1.07	194.33

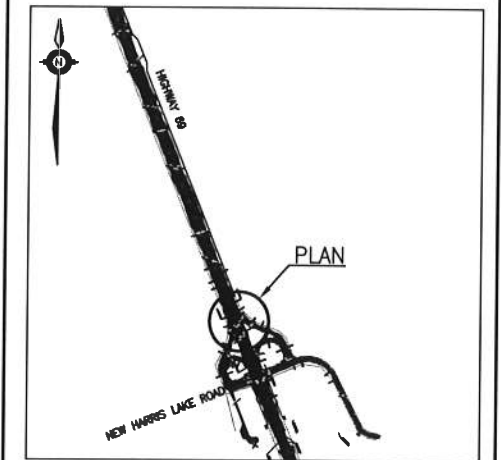


PROFILE ALONG LEFT TOE HIGHWAY 69 NBL



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

CONT No
GWP No 5294-08-00
HIGHWAY 69 FOUR-LANING
WALLBRIDGE HWY 69 NBL-LT TOE
(STA 12+050 - 12+100)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN
LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH31-01	195.7	5 062 043.4	230 689.8
BH31-02L	195.4	5 062 047.3	230 679.4
BH31-03	195.4	5 062 061.9	230 682.3
BH31-04R	195.2	5 062 076.9	230 686.0
BH31-05	195.6	5 062 085.1	230 672.9
BH31-06L	195.7	5 062 070.1	230 669.2
D31-01R	195.9	5 062 053.3	230 694.5

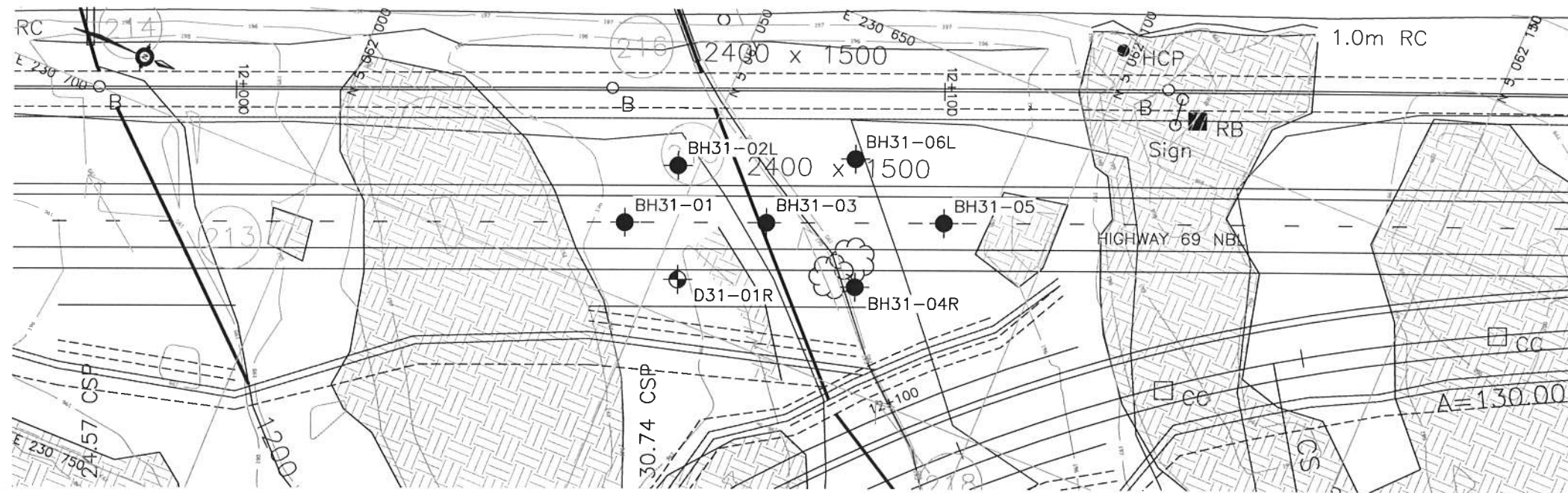
-NOTES-

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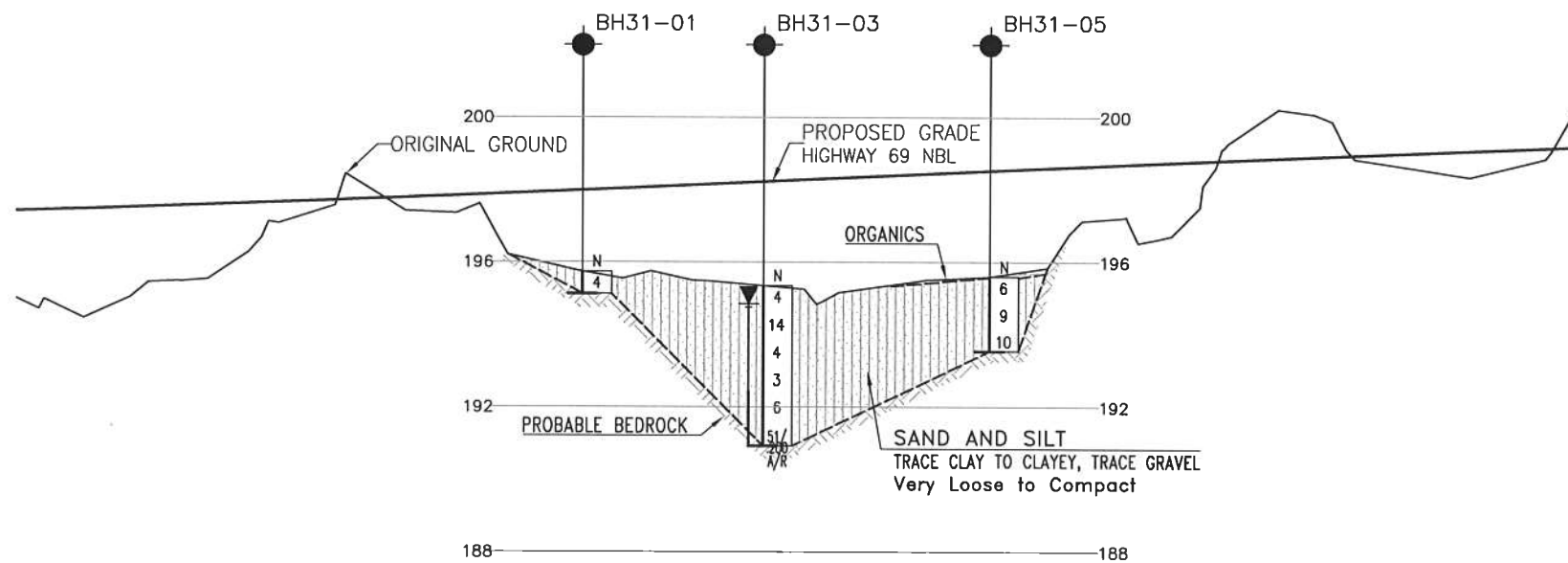
GEOCRES No. 41H-99

DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG CODE
DRAWN	MFA	CHK PKC SITE
LOAD		DATE DEC. 2012
STRUCT		DWG





PLAN
0 16 32 48m
SCALE 1:800



PROFILE ALONG C HIGHWAY 69 NBL

0 16 32 48m H 1:800
0 4 8 12m V 1:200

METRIC

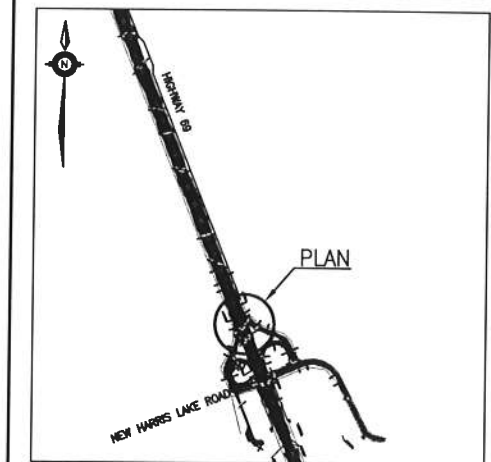
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
GWP No 5294-08-00

HIGHWAY 69 FOUR-LANING
WALLBRIDGE HWY 69 NBL-C
(STA 12+050 - 12+100)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



KEYPLAN
LEGEND

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

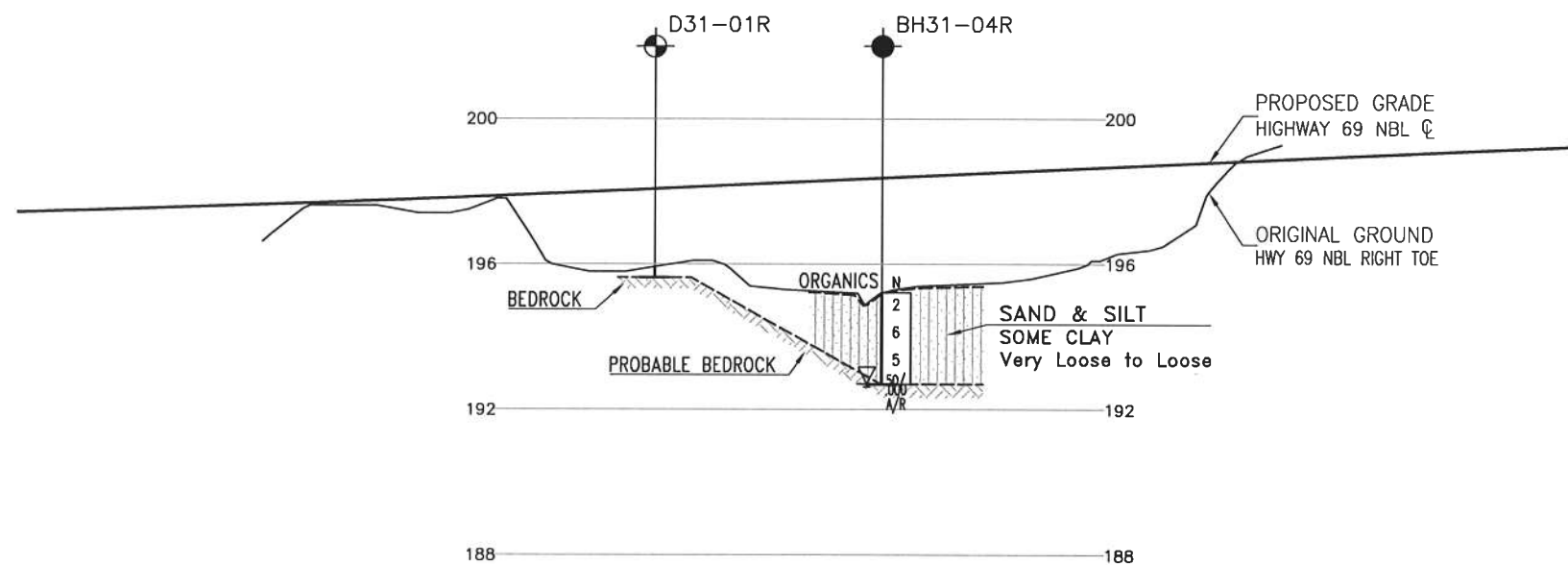
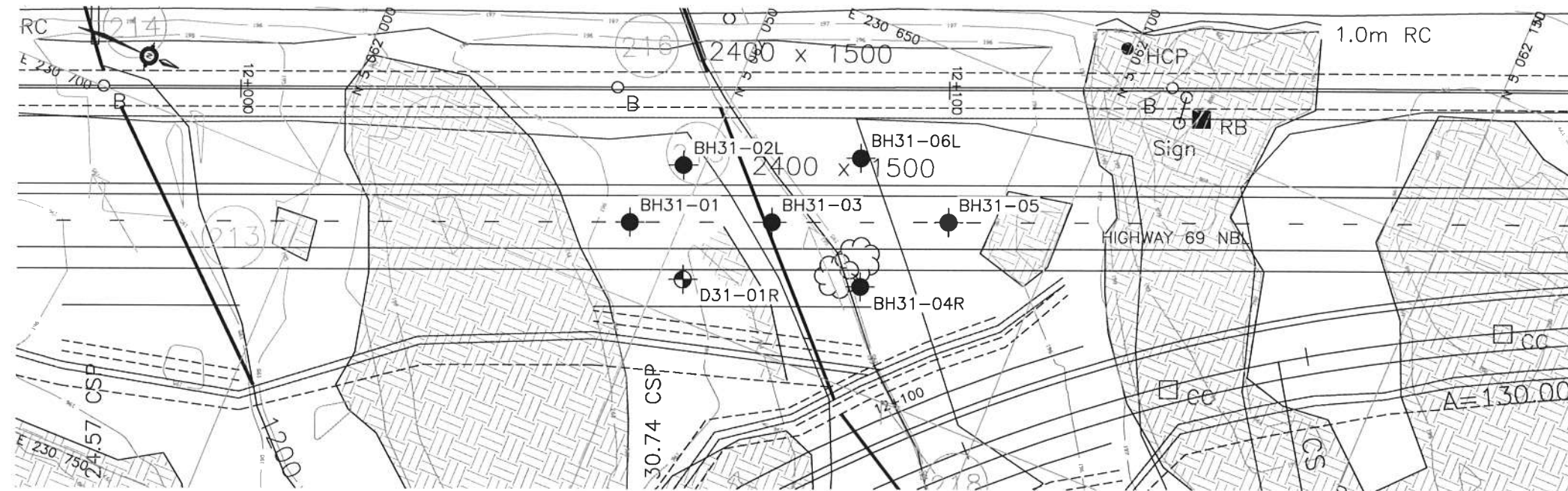
NO	ELEVATION	NORTHING	EASTING
BH31-01	195.7	5 062 043.4	230 689.8
BH31-02L	195.4	5 062 047.3	230 679.4
BH31-03	195.4	5 062 061.9	230 682.3
BH31-04R	195.2	5 062 076.9	230 686.0
BH31-05	195.6	5 062 085.1	230 672.9
BH31-06L	195.7	5 062 070.1	230 669.2
D31-01R	195.9	5 062 053.3	230 694.5

-NOTES-

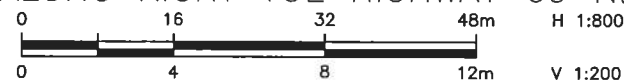
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GEOCRES No. 41H-99

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKG	SITE
DATE	DEC. 2012	DATE	DEC. 2012
STRUCT	DWG		



PROFILE ALONG RIGHT TOE HIGHWAY 69 NBL

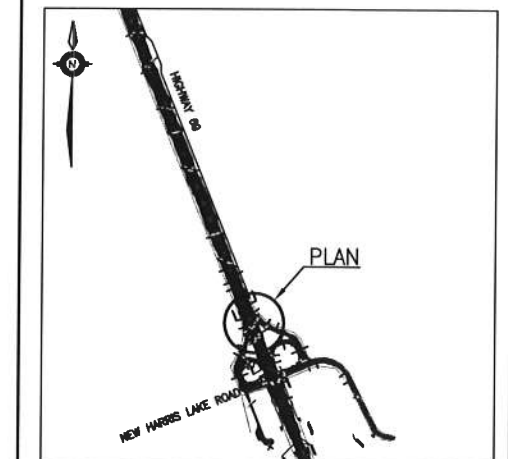


METRIC

DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWNCONT No
GWP No 5294-08-00HIGHWAY 69 FOUR-LANING
WALLBRIDGE HWY 69 NBL-RT TOE
(STA 12+050 - 12+100)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



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
BH31-01	195.7	5 062 043.4	230 689.8
BH31-02L	195.4	5 062 047.3	230 679.4
BH31-03	195.4	5 062 061.9	230 682.3
BH31-04R	195.2	5 062 076.9	230 686.0
BH31-05	195.6	5 062 085.1	230 672.9
BH31-06L	195.7	5 062 070.1	230 669.2
D31-01R	195.9	5 062 053.3	230 694.5

-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. 41H-99

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



Appendix M

**Harris Lake Road
Sta. 9+800 to 9+930**

**Boreholes 32-01L to 32-13
DCPTs D32-01R to D32-06L**

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

RECORD OF BOREHOLE No BH32-01L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+790 O/S 14.8L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY AN
 DATUM Geodetic DATE 2008.10.02 - 2008.10.02 CHECKED BY RPR

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 X 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						
194.1	Ground Surface										
8.8	ORGANICS: (50mm)										
	BEDROCK AT 0.05m.										

RECORD OF BOREHOLE No BH32-02

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+800 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.10.02 - 2008.10.02 CHECKED BY RPR

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								
193.1	Ground Surface							20 40 60 80 100								
0.0	SAND , trace silt, trace clay Very Loose to Compact Brown Damp Occasional peaty organics		1	SS	4		193									
			2	SS	11		192									
			3	SS	7		191									
			4	SS	19/											
190.5					175											
2.6	END OF BOREHOLE (SAMPLER BOUNCING) AT 2.6m ON PROBABLE BEDROCK. WATER LEVEL AT 1.1m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.															

RECORD OF BOREHOLE No BH32-03R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+812.5 O/S 15.0R ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.10.02 - 2008.10.02 CHECKED BY RPR

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	20 40 60	w _P w w _L	WATER CONTENT (%)	kN/m ³		
192.5	Ground Surface													
0.0	PEAT, fibrous (100mm)													
0.1	SAND, trace silt, trace clay, occasional peaty organics Very Loose to Compact Brown Moist		1	SS	4		192							
			2	SS	14									
			3	SS	9		191							
	Some gravel Wet		4	SS	8		190							
			5	SS	6		189							
			6	SS	8		188							
							187							
185.9			7	SS	53/		186							
6.6	END OF BOREHOLE AT 6.6m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. WATER LEVEL AT 5.3m UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Oct 29/08 0.8 191.7 Jan 14/09 0.8 191.7 Feb 19/09 Frozen at Surface Apr 21/09 0.2 192.3 Jun 05/09 0.7 191.8 Aug 20/09 0.8 191.7 Aug 25/09 0.8 191.7 Oct 27/09 0.9 191.6 Nov 20/09 1.2 191.3				.075									

+ 3 . × 3 : Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH32-04

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+825 C/L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.10.01 - 2008.10.01 CHECKED BY RPR

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	○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE									
193.1	Ground Surface						193											
0.0	PEAT, fibrous (50mm)		1	SS	3	▽	193											
	SAND, some silt, trace clay, trace gravel Very Loose to Compact Brown Damp						192											
			2	SS	12		192											
							191											
			3	SS	13		191											
	Wet						190											
			4	SS	9		190											
							189											
	Auger grinding		5	SS	11		189											
188.5																		
4.6	END OF BOREHOLE AT 4.6m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 1.5m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG, AUGER CUTTINGS AND GROUT TO SURFACE.		6	SS	50/.000													

+³ . x³ : Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

METRIC

[illegible]

RECORD OF BOREHOLE No BH32-06

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+850 C/L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.10.01 - 2008.10.01 CHECKED BY RPR

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						
193.0	Ground Surface							20 40 60 80 100						
193.0	PEAT, fibrous (25mm)		1	SS	2	▽	193							0 7 54 39
	SAND, trace silt Very Loose to Compact Brown Damp		2	SS	13		192							
191.6	Silty CLAY, trace sand to sandy Stiff Brown to Grey		3	SS	13		191							
			4	SS	6		190							
190.9	Sandy SILT, some clay Very Loose to Loose Grey Moist		5	SS	3									
189.0														
4.0	END OF BOREHOLE AT 4.0m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. WATER LEVEL AT 1.26m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.													

RECORD OF BOREHOLE No BH32-07R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+862.5 O/S 17.1R ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.10.01 - 2008.10.01 CHECKED BY RPR

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
192.4	Ground Surface																
0.0	SAND , trace to some silt, trace clay, trace gravel Very Loose to Loose Brown Wet		1	SS	2		192										
			2	SS	5												
			3	SS	1												
	Occasional peaty organics						191										
	</																

RECORD OF BOREHOLE No BH32-08

1 OF 2

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+875 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.30 - 2008.09.30 CHECKED BY RPR

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 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE				WATER CONTENT (%) w _P w w _L				GR	SA	SI	CL
192.9	Ground Surface							20	40	60	80	100							
0.0	SAND , trace silt, trace clay, trace organics Very Loose to Loose Brown Damp		1	SS	3									○					
			2	SS	7									○					
	Moist to Wet		3	SS	6									○					
190.7																			
2.2	Sandy SILT , some clay Very Loose to Loose Brown to Grey Moist		4	SS	6									○					
			5	SS	3									○					
188.9																			
4.0	SAND , some silt, some gravel Compact to Very Loose Grey Wet		6	SS	16									○					
			7	SS	3									○					
			8	SS	2									○					
			9	SS	26									○					
183.1			10	SS	50/														
9.8	END OF BOREHOLE AT 9.8m UPON				.000														

Continued Next Page

+³ × 3³ Numbers refer to 20
Sensitivity 15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH32-08

2 OF 2

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+875 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.30 - 2008.09.30 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE LIMIT LIQUID 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
	Continued From Previous Page							20 40 60 80 100		W _P W W _L							
	AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 0.9m IN OPEN BOREHOLE UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Oct 29/08 1.3 191.6 Jan 14/09 Frozen at Surface Feb 19/09 Frozen at Surface Apr 21/09 0.8 192.1 Jun 05/09 0.7 192.2 Aug 20/09 1.2 191.7 Aug 25/09 1.1 191.8 Oct 27/09 1.1 191.8 Nov 20/09 1.4 191.5																

RECORD OF BOREHOLE No BH32-09L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+887.5 Q/S 18.3L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.10.01 - 2008.10.01 CHECKED BY RPR

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	PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT		
192.6	Ground Surface												
191.4	PEAT, fibrous (25mm) SAND, some silt, trace organics Very Loose to Compact Brown Moist		1	SS	3		192						
191.4			2	SS	14								
190.3	Silty CLAY, some sand to sandy Firm Brown to grey		3	SS	7		191						0 21 57 22
189.6	SAND and SILT, some clay Loose Grey Wet		4	SS	4		190						0 42 47 11
3.0	END OF BOREHOLE AT 3.0m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. WATER LEVEL AT 0.7m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.												

RECORD OF BOREHOLE No BH32-10

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+900 C/L ORIGINATED BY LG
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.01.29 - 2009.01.29 CHECKED BY RPR

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 (%)				
192.8	Pond Surface							20 40 60 80 100		20 40 60				
0.0	ICE and WATER							20 40 60 80 100		20 40 60				
191.6							192							
1.2	Silty CLAY, trace sand, occasional organics Very Soft to Soft Grey		1	SS	2		191							
190.2			2	SS	5		190							
2.6	SAND and SILT, trace clay Very Loose to Loose Grey Wet		3	SS	2		189						0 52 41 7	
189.0			4	SS	2		189							
3.8	SAND, trace to some silt, trace clay Loose to Compact Grey Wet		5	SS	18		188						8 80 12 (SI+CL)	
187.5														
5.3	END OF BOREHOLE AT 5.3m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.													

+ 3, X 3; Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH32-11R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+912.5 O/S 19.1R ORIGINATED BY LG
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

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 (%)				
192.8	Pond Surface													
0.0	ICE and WATER													
191.6														
1.2	SAND and SILT, some clay, occasional roots Loose Grey		1	SS	4									
			2	SS	4									
			3	SS	51/ 200									
189.4	END OF BOREHOLE AT 3.4m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.													
3.4														

RECORD OF BOREHOLE No BH32-12

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+925 C/L ORIGINATED BY LG
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.29 - 2009.01.29 CHECKED BY RPR

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						
192.8	Pond Surface													
0.0	ICE and WATER													
191.1														
1.7	SAND and SILT, some clay, occasional organics Very Loose to Loose Grey Wet		1	SS	3									
			2	SS	4									
			3	SS	4									
188.2														
4.6	SAND, trace silt Very Loose Brown Wet		4	SS	2									
186.6			5	SS	50/									
6.2	END OF BOREHOLE AT 6.2m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.				.075									

+ ³ × ³ : Numbers refer to
Sensitivity

20
15
10
5
0
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH32-13

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+930 C/L ORIGINATED BY LG
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.29 - 2009.01.29 CHECKED BY RPR

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 (%)				
192.8	Pond Surface							20 40 60 80 100		w _p	w	w _L		GR SA SI CL
0.0	ICE and WATER							20 40 60 80 100						
192.0							192							
0.8	SAND, some silt, trace clay, occasional peaty organics Very Loose Brown Wet		1	SS	2									
			2	SS	2		191							
190.5														
2.3	Sandy SILT Very Loose Brown Wet		3	SS	2		190							
189.7														
3.1	SAND, trace silt, trace gravel Compact to Loose Brown Wet		4	SS	24		189							
	Occasional cobbles													
			5	SS	4		188							0 98 2 (SI+CL)
			6	SS	11		187							
186.1														
6.7	END OF BOREHOLE AT 6.7m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.													

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

RECORD OF BOREHOLE No D32-01R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+790 O/S 14.8R ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
DATUM Geodetic DATE 2008.10.02 - 2008.10.02 CHECKED BY RPR

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 (%)							
192.5	Ground Surface								20 40 60 80 100							GR SA SI CL
0.0	DCPT from surface								20 40 60 80 100							

RECORD OF BOREHOLE No D32-02L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+812.5 O/S 15.0L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.10.02 - 2008.10.02 CHECKED BY RPR

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			20	40	60	80	100		
194.0	Ground Surface													
0.0	DCPT from surface.						194							
193.7														
0.3	END OF DCPT AT 0.3m UPON REFUSAL ON PROBABLE BEDROCK.													

ONTMT4S 6121.GPJ 12/12/12

RECORD OF BOREHOLE No D32-03R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+837.5 O/S 15.9R ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.10.01 - 2008.10.01 CHECKED BY RPR

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			W _P W W _L	WATER CONTENT (%)						
192.4 0.0	Ground Surface DCPT from surface.															

ONTMT4S 6121.GPJ 12/12/12

RECORD OF BOREHOLE No D32-04L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+862.5 O/S 17.1L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.10.01 - 2008.10.01 CHECKED BY RPR

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				
193.6	Ground Surface							20 40 60 80 100						
0.0	DCPT from surface.							20 40 60 80 100						
							193							
							192							
191.8														
1.8	END OF DCPT AT 1.8m UPON REFUSAL ON PROBABLE BEDROCK.													

1 OF 1

METRIC

[illegible]

RECORD OF BOREHOLE No D32-06L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 9+912.5 O/S 19.1L ORIGINATED BY LG
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
DATUM Geodetic DATE 2009.01.29 - 2009.01.29 CHECKED BY RPR

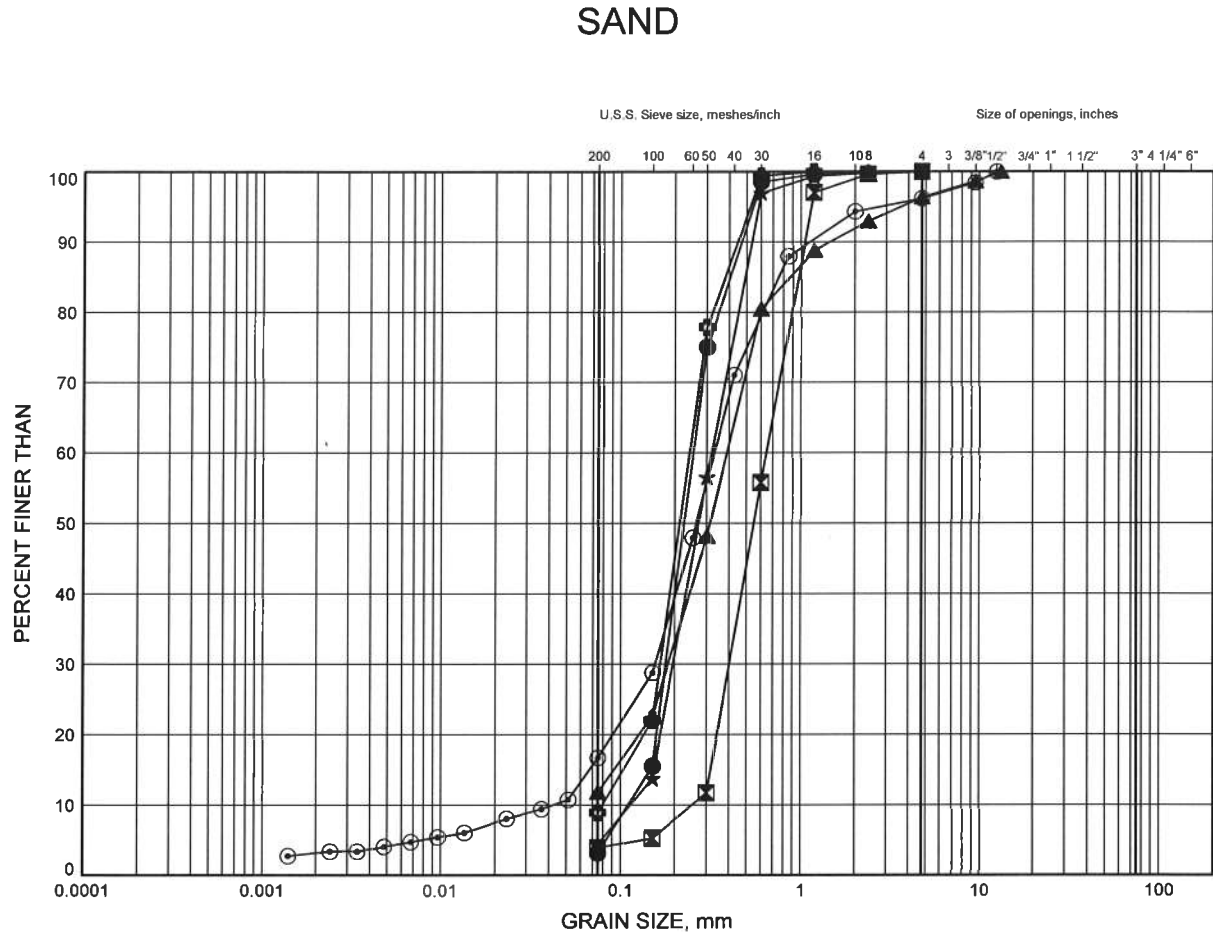
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
192.8	Pond Surface										
0.0	ICE and WATER										
191.4											
1.4	DCPT from 1.4m.										
188.6											
4.2	END OF DCPT AT 4.2m UPON REFUSAL ON PROBABLE BEDROCK.										

+³, ×³: Numbers refer to
Sensitivity

20
15 10 5
(%) STRAIN AT FAILURE

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE M1



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH32-02	1.83	191.27
■	BH32-03R	4.88	187.62
▲	BH32-04	3.35	189.75
★	BH32-07R	1.07	191.33
⊙	BH32-07R	2.59	189.81
⊕	BH32-08	1.83	191.07

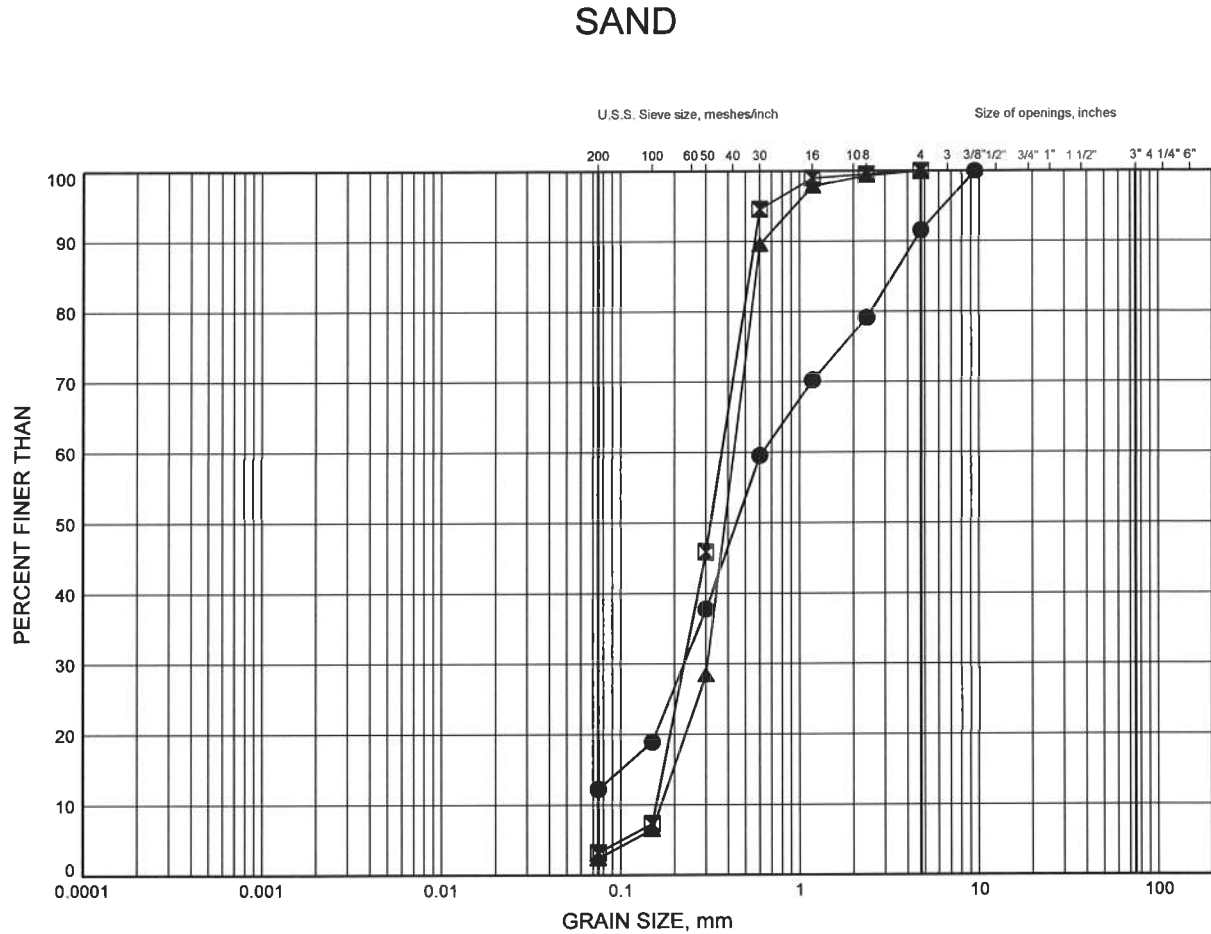
Date December 2012
GWP# 5294-08-00



Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE M2



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

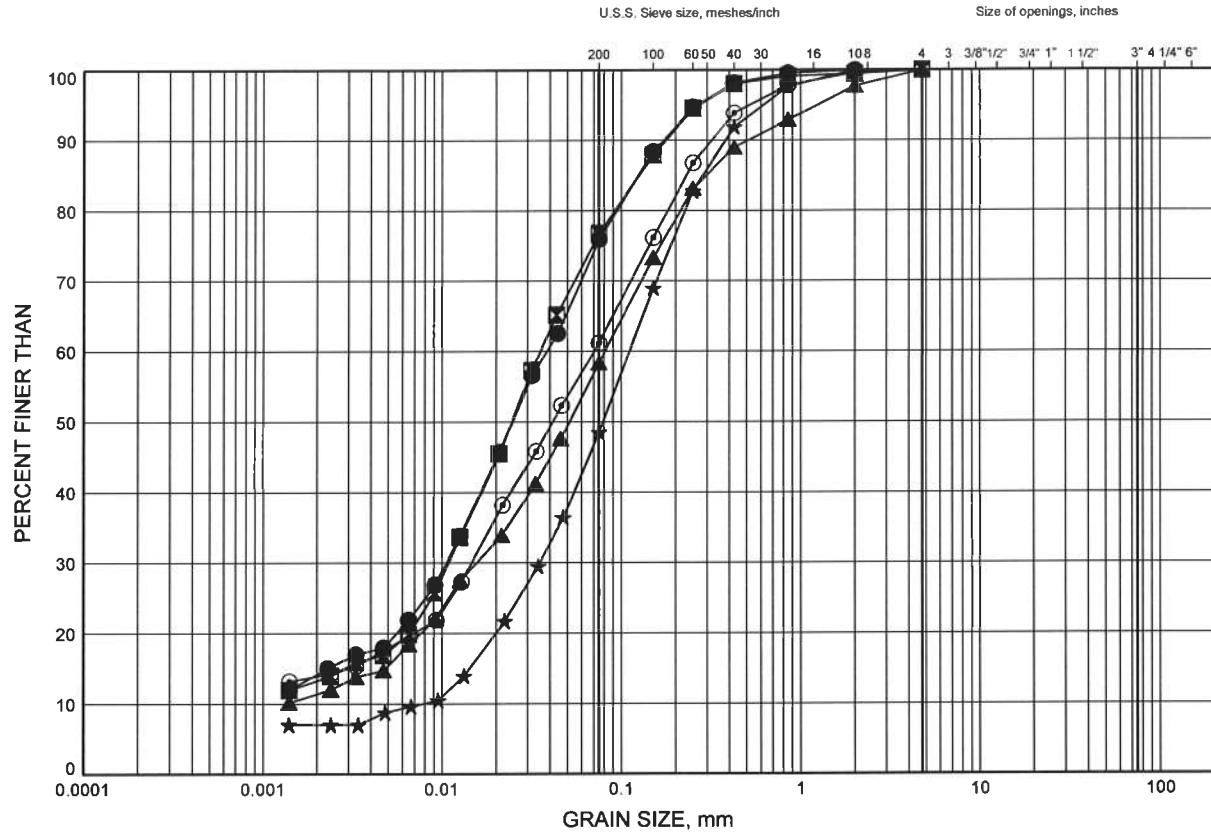
LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH32-10	4.88	187.92
⊠	BH32-12	4.88	187.92
▲	BH32-13	4.88	187.92

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE M3

Sandy SILT to SAND and SILT



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH32-06	3.35	189.65
■	BH32-08	3.35	189.55
▲	BH32-09L	2.59	190.01
★	BH32-10	3.35	189.45
⊙	BH32-11R	2.59	190.21

GRAIN SIZE DISTRIBUTION - THURBER 6121.GPJ 12/13/12

Date December 2012
GWP# 5294-08-00

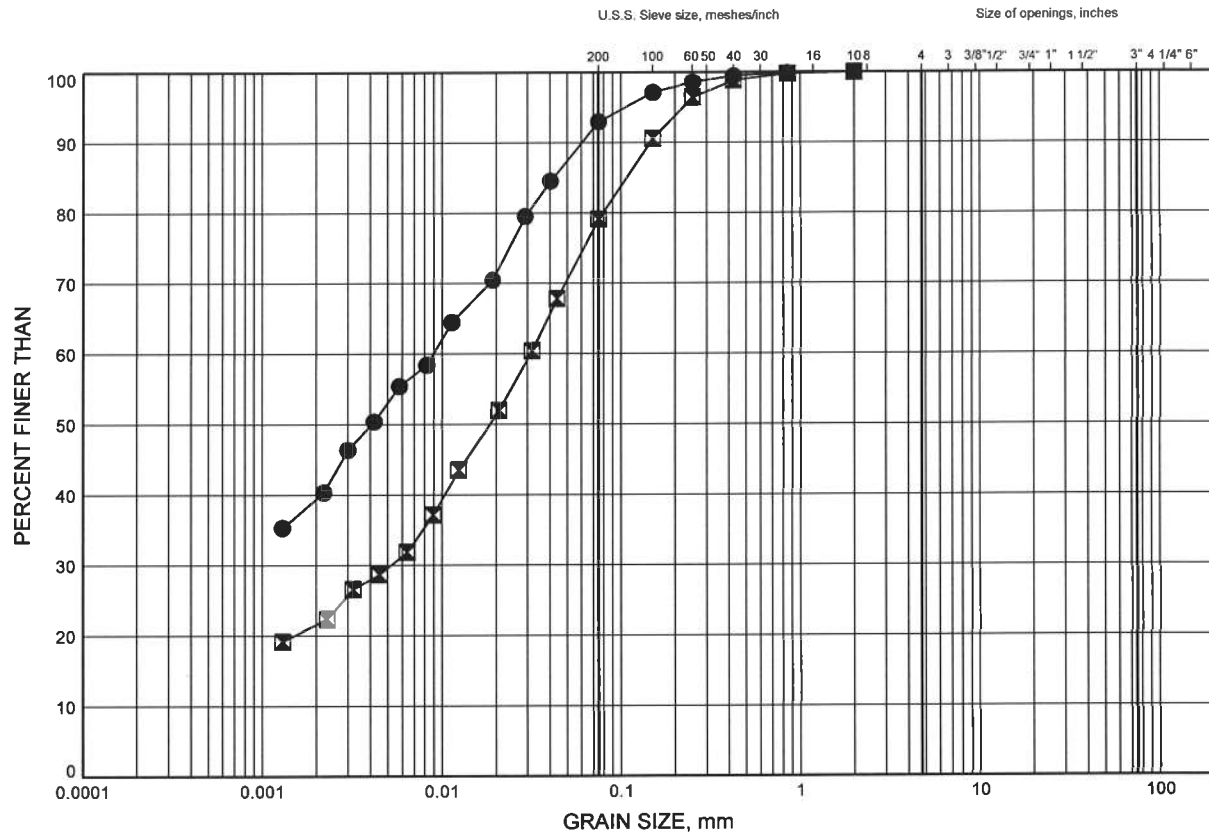


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
GRAIN SIZE DISTRIBUTION

FIGURE M4

Silty CLAY



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

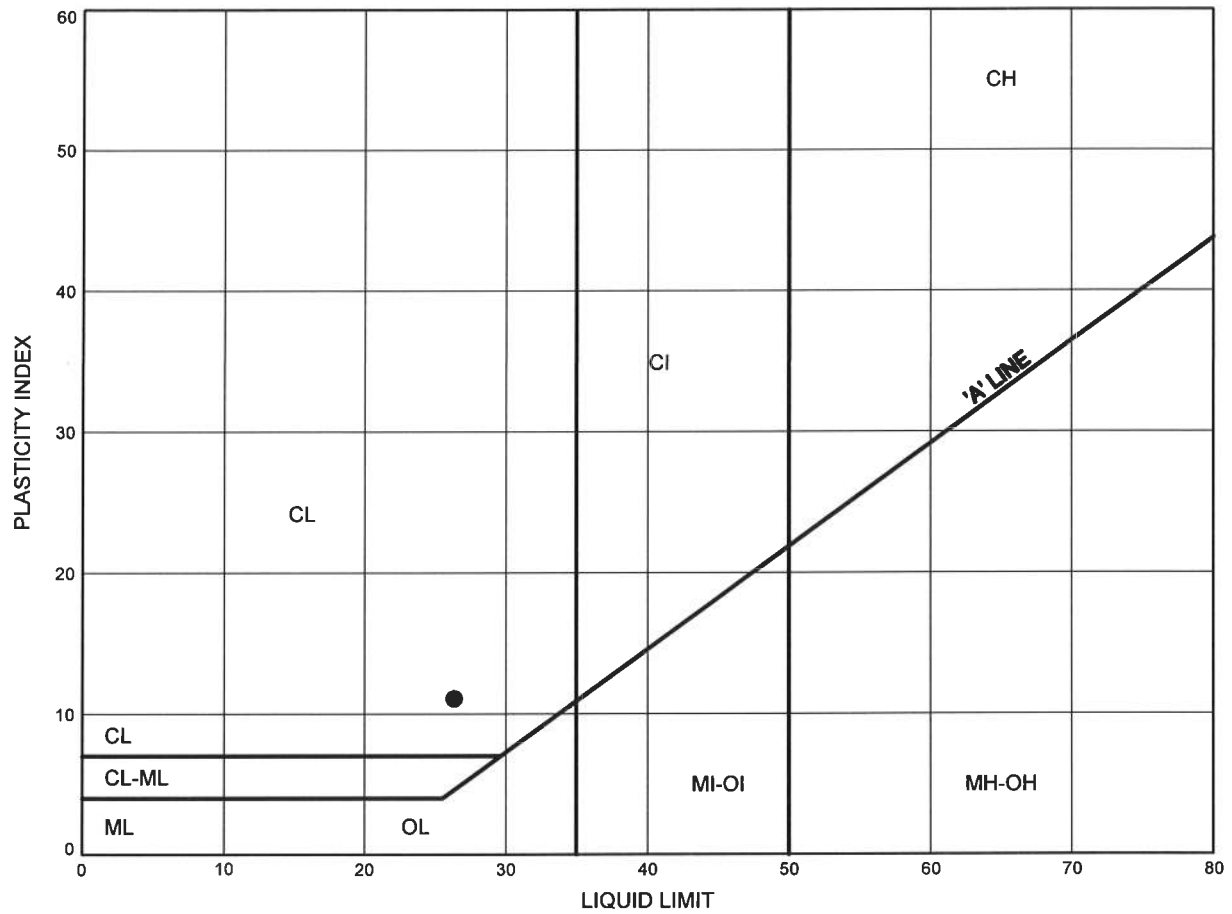
LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH32-06	1.83	191.17
■	BH32-09L	1.83	190.77

Hwy 69 Four-Laning North of Hwy 529
ATTERBERG LIMITS TEST RESULTS

FIGURE M5

Silty CLAY



LEGEND

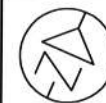
SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH32-09L	1.83	190.77

Date December 2012
 GWP# 5294-08-00



Prep'd MFA
 Chkd. MRA

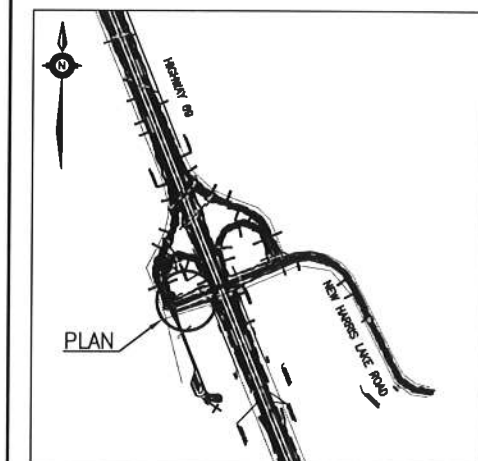
CONT No
GWP No 5294-08-00
HIGHWAY 69 FOUR-LANING
NEW HARRIS LAKE ROAD-LEFT TOE
(STA 9+800 - 9+930)
BOREHOLE LOCATIONS AND SOIL STRATA



SHEET

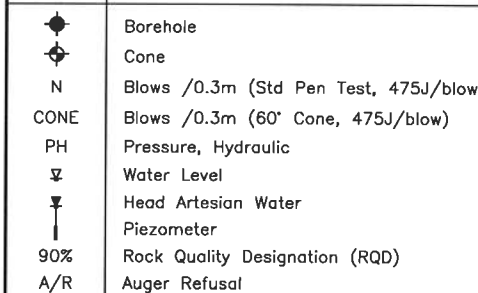


THURBER ENGINEERING LTD



KEYPLAN

LEGEND

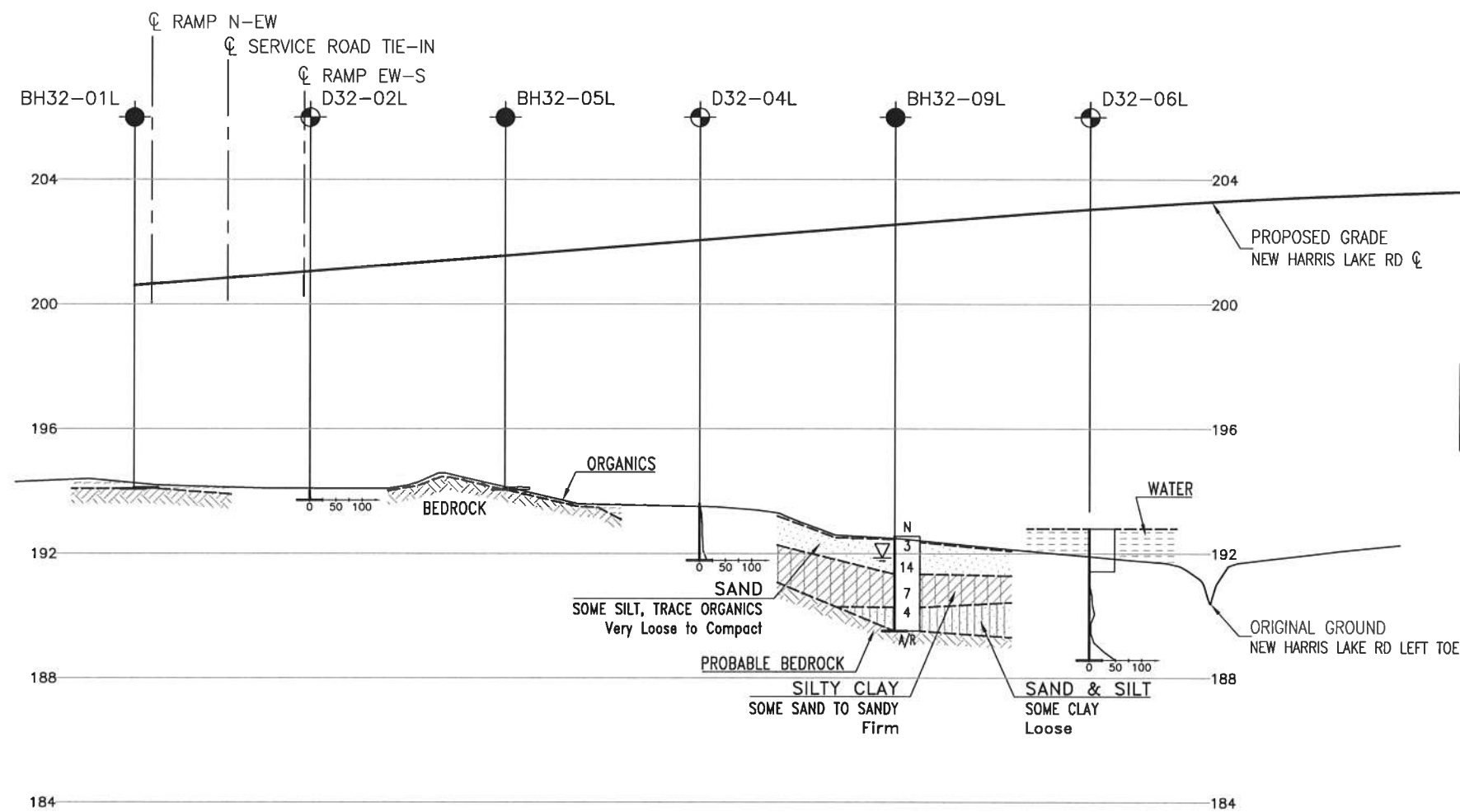


NO	ELEVATION	NORTHING	EASTING	NO	ELEVATION	NORTHING	EASTING
D32-04L	193.6	5 061 671.9	230 671.3	BH32-01L	194.1	5 061 642.6	230 604.9
D32-05R	192.8	5 061 648.5	230 707.7	BH32-02	193.1	5 061 632.7	230 619.8
D32-06L	192.8	5 061 692.5	230 716.9	BH32-03R	192.5	5 061 623.4	230 637.0
				BH32-04	193.1	5 061 642.0	230 642.9
				BH32-05L	194.1	5 061 661.4	230 648.6
				BH32-06	193.0	5 061 651.4	230 666.6
				BH32-07R	192.4	5 061 640.2	230 684.1
				BH32-08	192.9	5 061 660.7	230 689.3
				BH32-09L	192.6	5 061 682.4	230 694.0
				BH32-10	192.8	5 061 670.1	230 712.5
				BH32-11R	192.8	5 061 657.1	230 731.2
				BH32-12	192.8	5 061 679.5	230 735.7
				BH32-13	192.8	5 061 681.3	230 740.3
				D32-01R	192.5	5 061 615.2	230 616.0
				D32-02L	194.0	5 061 651.2	230 625.7
				D32-03R	192.4	5 061 632.0	230 660.5

-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.

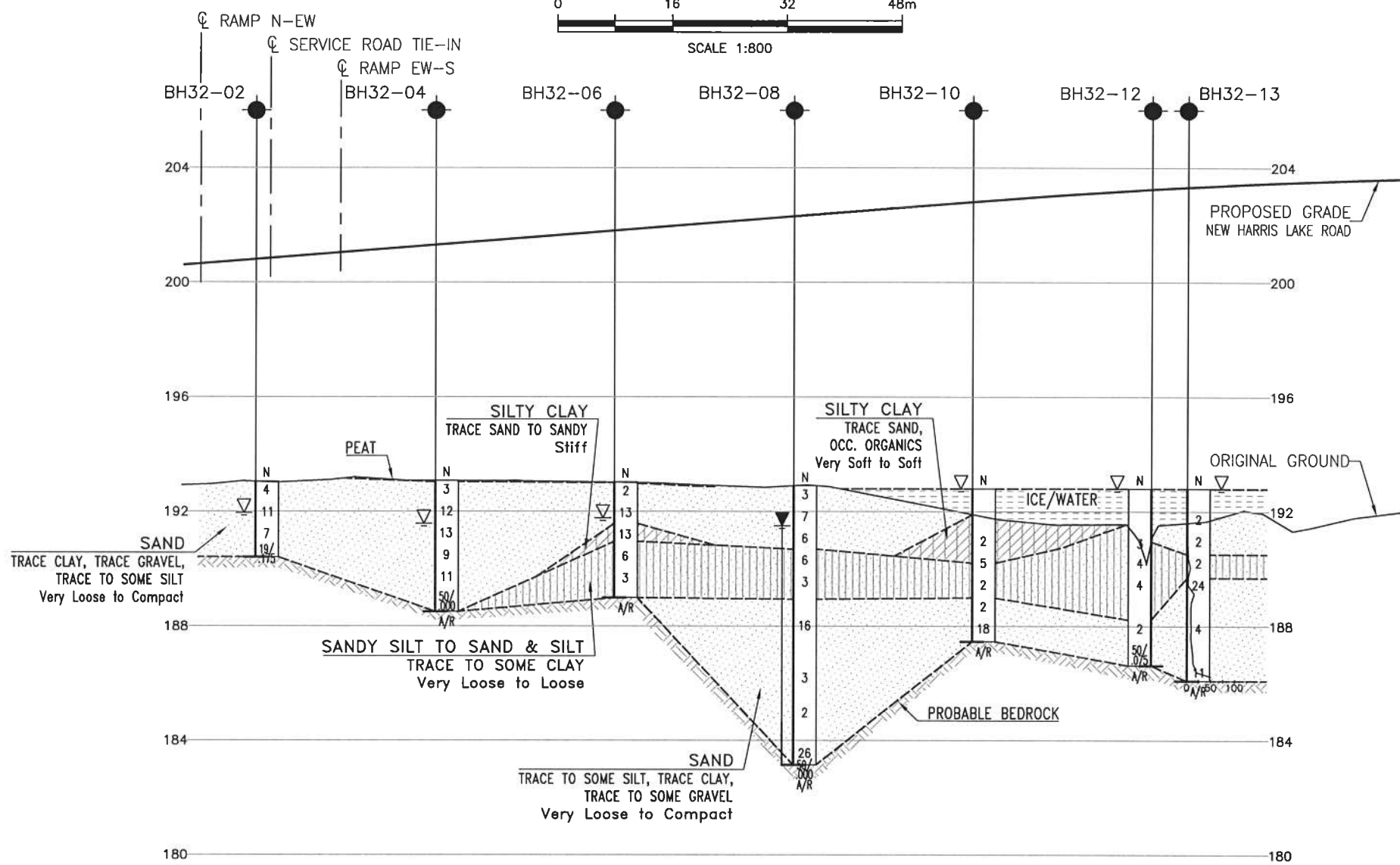
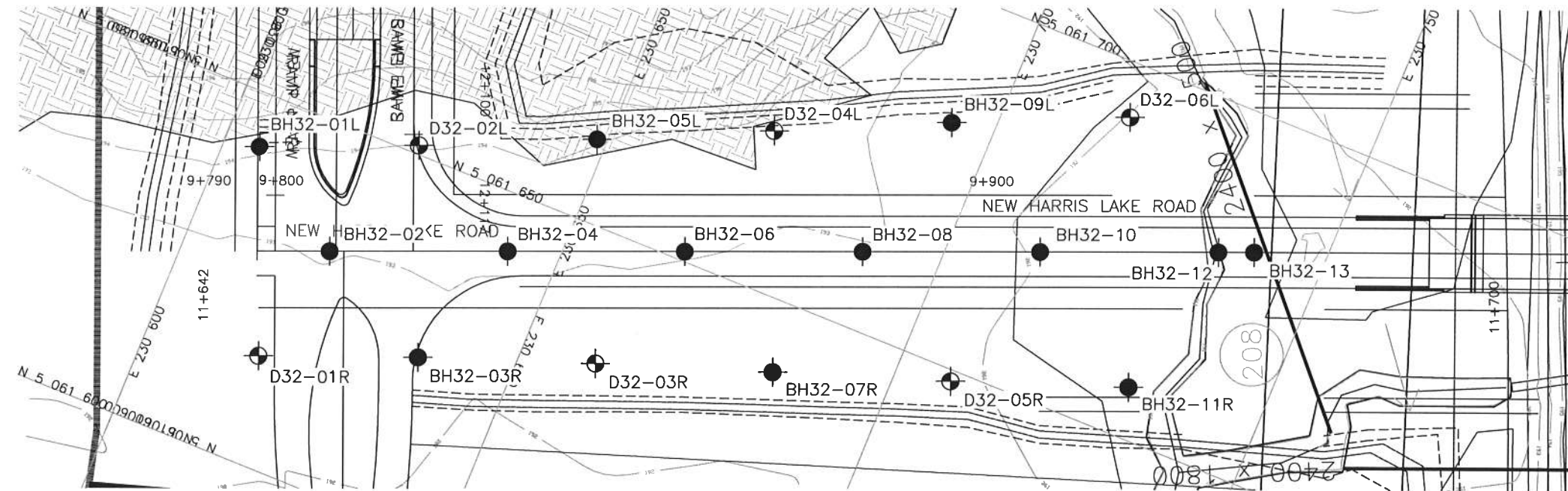
GEOCRES No. 41H-99



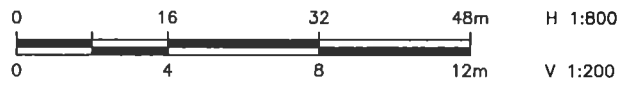
PROFILE ALONG LEFT TOE NEW HARRIS LAKE ROAD



REVISIONS										
	DATE	BY	DESCRIPTION							
	DESIGN	RPR	CHK	AEG	CODE	LOAD	DATE DEC. 201			
	DRAWN	MFA	CHK	PKC	SITE	ISTRUCT	DWG			



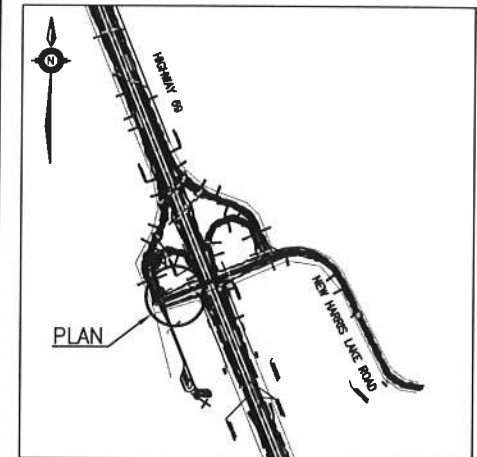
PROFILE ALONG CL NEW HARRIS LAKE ROAD



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



CONT No
GWP No 5294-08-00
HIGHWAY 69 FOUR-LANING
NEW HARRIS LAKE ROAD-CL
(STA 9+800 - 9+930)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

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

NO	ELEVATION	NORTHING	EASTING	NO	ELEVATION	NORTHING	EASTING
D32-04L	193.6	5 061 671.9	230 671.3	BH32-01L	194.1	5 061 642.6	230 604.9
D32-05R	192.8	5 061 648.5	230 707.7	BH32-02	193.1	5 061 632.7	230 619.8
D32-06L	192.8	5 061 692.5	230 716.9	BH32-03R	192.5	5 061 623.4	230 637.0
				BH32-04	193.1	5 061 642.0	230 642.9
				BH32-05L	194.1	5 061 661.4	230 648.6
				BH32-06	193.0	5 061 651.4	230 666.1
				BH32-07R	192.4	5 061 640.2	230 684.1
				BH32-08	192.9	5 061 660.7	230 689.3
				BH32-09L	192.6	5 061 682.4	230 694.0
				BH32-10	192.8	5 061 670.1	230 712.5
				BH32-11R	192.8	5 061 657.1	230 731.2
				BH32-12	192.8	5 061 679.5	230 735.7
				BH32-13	192.8	5 061 681.3	230 740.3
				D32-01R	192.5	5 061 615.2	230 616.0
				D32-02L	194.0	5 061 651.2	230 625.7
				D32-03R	192.4	5 061 632.0	230 660.5

NOTES

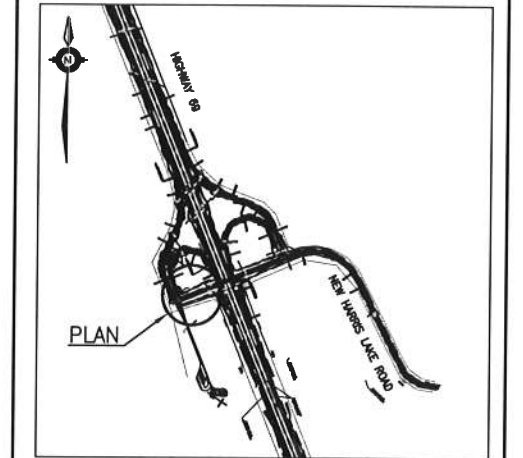
- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 41H-99

DESIGN	RPR	CHK	AEG	CODE	LOAD	DATE	DEC. 2012
DRAWN	MFA	CHK	PKC	SITE	STRUCT	DWG	








THURBER ENGINEERING LTD.



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 |

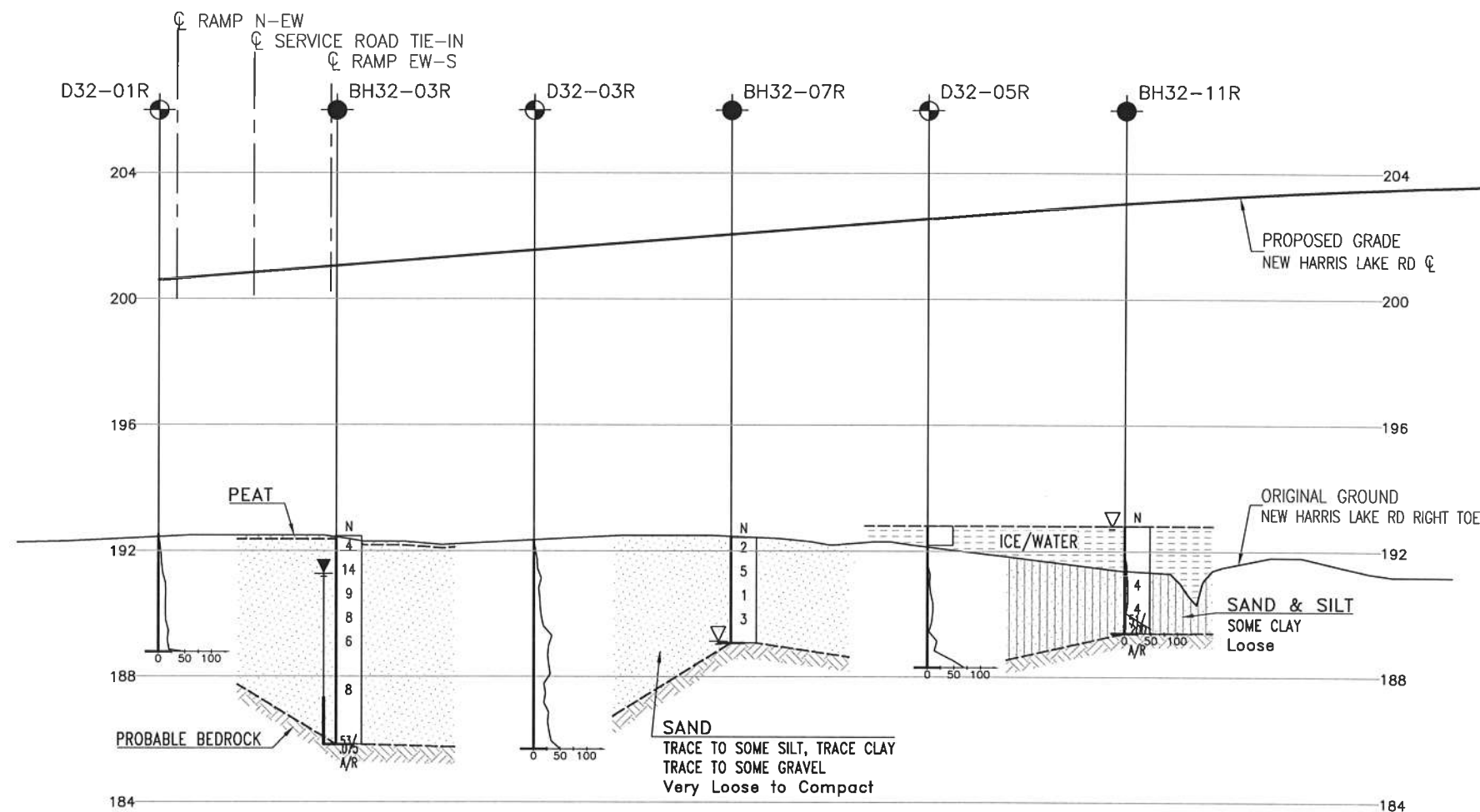
NO	ELEVATION	NORTHING	EASTING	NO	ELEVATION	NORTHING	EASTING
D32-04L	193.6	5 061 671.9	230 671.3	BH32-01L	194.1	5 061 642.6	230 604.9
D32-05R	192.8	5 061 648.5	230 707.7	BH32-02	193.1	5 061 632.7	230 619.8
D32-06L	192.8	5 061 692.5	230 716.9	BH32-03R	192.5	5 061 623.4	230 637.0
				BH32-04	193.1	5 061 642.0	230 642.9
				BH32-05L	194.1	5 061 661.4	230 648.6
				BH32-06	193.0	5 061 651.4	230 666.1
				BH32-07R	192.4	5 061 640.2	230 684.1
				BH32-08	192.9	5 061 660.7	230 689.3
				BH32-09L	192.6	5 061 682.4	230 694.0
				BH32-10	192.8	5 061 670.1	230 712.5
				BH32-11R	192.8	5 061 657.1	230 731.2
				BH32-12	192.8	5 061 679.5	230 735.7
				BH32-13	192.8	5 061 681.3	230 740.3
				D32-01R	192.5	5 061 615.2	230 616.0
				D32-02L	194.0	5 061 651.2	230 625.7
				D32-03R	192.4	5 061 632.0	230 660.5

-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. 41H-99

PROFILE ALONG RIGHT TOE NEW HARRIS LAKE ROAD

[illegible]

Appendix N

**Harris Lake Road
Sta. 10+085 to 10+280**

**Boreholes 33-01 to 33-18
DCPTs D33-02R to D33-08L**

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

RECORD OF BOREHOLE No BH33-01

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+085 C/L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.27 - 2008.09.27 CHECKED BY RPR


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 ● QUICK TRIAXIAL x LAB VANE										w _p w w _L		
191.9	Ground Surface							20	40	60	80	100								
0.0	SAND , some silt, trace clay, occasional roots, rootlets and peaty organics Very Loose to Loose Brown Wet		1	SS	1									○						
			2	SS	5		191							○			0 75 20 5			
190.3			3	SS	52/															
1.6	END OF BOREHOLE AT 1.6m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.				075															

RECORD OF BOREHOLE No BH33-01R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+087.5 O/S 18.6R ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.27 - 2008.09.27 CHECKED BY RPR

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						WATER CONTENT (%) w _p w w _L					GR	SA	SI
193.3	Ground Surface																				
0.0	SAND and SILT , some clay Very Loose Brown Moist		1	SS	2		193											0	43	41	16
192.4			2	SS	52/																
0.9	END OF BOREHOLE AT 0.9m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.				125																

RECORD OF BOREHOLE No BH33-02L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+087.5 O/S 18.6L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.26 - 2008.09.26 CHECKED BY RPR

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 (%)
192.3	Ground Surface																	
0.0	SAND, some silt, trace clay, occasional roots, rootlets and peaty organics Very Loose Dark Brown Moist Compact Grey		1	SS	1		192										2 83 15 (SI+CL)	
			2	SS	14			191										
			3	SS	10													
			4	SS	15			190										
189.3																		
3.0	GRAVEL, some sand		5	SS	61/													
189.0	Grey																	
3.3	Wet				125													
	END OF BOREHOLE AT 3.3m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. WATER LEVEL AT 1.2m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH GROUT TO 0.3m THEN HOLEPLUG AND AUGER CUTTINGS TO SURFACE.																	

+ 3 . X 3 : Numbers refer to
Sensitivity

20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH33-03

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+100 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY AN
 DATUM Geodetic DATE 2008.09.27 - 2008.09.27 CHECKED BY RPR

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		
193.2	Ground Surface												
0.0	ORGANICS: (50mm)												
	BEDROCK AT 0.05m.												

RECORD OF BOREHOLE No BH33-04L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+112.5 O/S 17.4L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.26 - 2008.09.26 CHECKED BY RPR

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 (%)					
191.8	Ground Surface							20 40 60 80 100		W _P W W _L					
0.0	SAND, with peaty organics, some silt Very Loose Brown Damp occasional cobbles		1	SS	1	191									
			2	SS	52/										
							.200								
190.4															
1.4	GRAVEL, some sand, occasional cobbles Grey Damp		3	SS	60/										
190.1															
1.7	END OF BOREHOLE AT 1.7m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.				.050										

+³ . x³ : Numbers refer to
Sensitivity

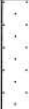
20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH33-05

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+125 C/L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.27 - 2008.09.27 CHECKED BY RPR

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 (%)
192.9	Ground Surface							20	40	60	80	100			
0.0	SAND , some silt, some gravel, occasional peaty organics Loose Brown Moist		1	SS	6									○	
192.1			2	SS	51/.025									○	
0.8	END OF BOREHOLE AT 0.8m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.														

1 OF 1

METRIC

[illegible]

RECORD OF BOREHOLE No BH33-07

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+150 C/L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY AN
DATUM Geodetic DATE 2008.09.27 - 2008.09.27 CHECKED BY RPR

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 (%)				
192.4	Ground Surface							20 40 60 80 100						
0.0	PEAT, fibrous, some sand Loose		1	SS	1			○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE						
191.9	Dark Brown							20 40 60 80 100						
0.5	Wet (500mm)													
	END OF BOREHOLE (SAMPLER BOUNCING) AT 0.5m ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.													

1 OF 1

METRIC

[illegible]

RECORD OF BOREHOLE No BH33-09

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+175 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.27 - 2008.09.27 CHECKED BY RPR

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 (%)
192.0	Ground Surface							20	40	60	80	100					
0.0	SAND , some silt, occasional peaty organics Very Loose Dark Brown		1	SS	2		192										
191.4	Wet																
0.6	END OF BOREHOLE AT 0.58m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 0.3m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.																

RECORD OF BOREHOLE No BH33-10L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+187.5 O/S 16.0L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.26 - 2008.09.26 CHECKED BY RPR

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 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE		WATER CONTENT (%) w _p w w _L				GR	SA	SI	CL				
192.3	Ground Surface							20	40	60	80	100									
0.0	SAND and SILT , trace clay, occasional peaty organics Very Loose Grey Wet		1	SS	1	▽	192											0	63	33	4
191.2			2	SS	10/ 225															0	48
1.1	END OF BOREHOLE AT 1.1m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 0.5m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.																				

+ 3, X 3: Numbers refer to
Sensitivity

20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH33-11

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+200 C/L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008 09 27 - 2008 09 27 CHECKED BY RPR

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						
191.9	Ground Surface							20 40 60 80 100						
0.8	PEAT, fibrous (25mm)							20 40 60 80 100						
191.4	SAND, some silt, some clay Very Loose Grey Moist to Wet		1	SS	1									
0.5	Silty CLAY, some sand Soft Grey		2	SS	4		191							0 14 63 23
			3	SS	4		190							
189.7														
2.2	SAND, some silt, some gravel, trace clay Loose Grey Wet		4	SS	6		189							
188.8			5	SS	1/									
3.1	END OF BOREHOLE (SAMPLER BOUNCING) AT 3.1m ON PROBABLE BEDROCK. WATER LEVEL AT 0.9m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.				.025									

METRIC

[illegible]

RECORD OF BOREHOLE No BH33-13

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+225 C/L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.27 - 2008.09.27 CHECKED BY RPR

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						
192.5	Ground Surface							20 40 60 80 100						
0.0	PEAT, fibrous (50mm)							20 40 60 80 100						
191.8	SAND, some silt, trace to some clay, occasional peaty organics Loose Grey Moist		1	SS	5		192							
0.7	Silty CLAY, trace to some sand Very Soft Brown		2	SS	2									0 10 64 26
191.1	SAND and SILT, some clay, trace gravel, occasional cobbles Very Loose Grey		3	SS	2		191							
190.5	Moist to Wet													
2.0	END OF BOREHOLE AT 2.0m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.													

RECORD OF BOREHOLE No BH33-14L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+237.5 O/S 14.0L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.27 - 2008.09.27 CHECKED BY RPR

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		
192.1	Ground Surface													
192.1	PEAT, fibrous (25mm)													
	Sandy SILT, some clay		1	SS	2		192							
	Very Loose to Loose													
	Brown													
	Moist													
			2	SS	8		191							
			3	SS	0		190							0 27 62 11
	Grey													
			4	SS	0		189							
	Wet													
			5	SS	2		188							0 19 70 11
187.5	END OF BOREHOLE AT 4.6m ON PROBABLE BEDROCK. WATER LEVEL AT 0.65m UPON COMPLETION OF DRILLING. DCPT CONDUCTED 2.0m NORTH OF BOREHOLE LOCATION. END OF DCPT AT 4.7m UPON REFUSAL.													
4.6														
	Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.													
	WATER LEVEL READINGS:													
	DATE DEPTH (m) ELEV. (m)													
	Oct 29/08 0.2 191.9													
	Jan 16/09 Frozen at Surface													
	Feb 19/09 Frozen at Surface													
	Apr 21/09 0.2* 192.3													
	Jun 04/09 0.1* 192.2													
	Aug 20/09 0.4 191.7													
	Aug 25/09 0.3 191.8													
	Oct 27/09 0.4 191.7													
	Nov 20/09 0.6 191.5													
	* (Artesian Condition)													

+³, x³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH33-15

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+250 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.27 - 2008.09.27 CHECKED BY RPR

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		
193.2	Ground Surface													
0.0	SAND, some silt, with peaty organics Very Loose Dark Brown Moist		1	SS	1		193							
192.5														
0.7	Silty CLAY, trace to some sand Stiff to Firm Brown to Grey		2	SS	10		192							0 6 67 27
			3	SS	5									0 12 63 25
191.0							191							
2.2	SAND and SILT, some clay Very Loose Grey Wet		4	SS	1									0 33 55 12
							190							
189.4			5	SS	0									
3.8	END OF BOREHOLE AT 3.8m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 2.8m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE. DCPT CONDUCTED AT 0.9m WEST OF BOREHOLE. END OF DCPT AT 3.8m UPON REFUSAL ON PROBABLE BEDROCK.													

+³, X³: Numbers refer to
Sensitivity

20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH33-16R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+262.5 O/S 12.6R ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.28 - 2008.09.28 CHECKED BY RPR

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									
194.5	Ground Surface							20	40	60	80	100					
194.0	PEAT, fibrous (25mm)																
	SAND and SILT, trace clay Very Loose to Compact Brown Damp Decayed wood fragments		1	SS	2		194										
			2	SS	6												0 51 43 6
			3	SS	16		193										
192.4																	
2.1	END OF BOREHOLE AT 2.1m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.																

+³, x³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH33-17

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+275 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.28 - 2008.09.28 CHECKED BY RPR

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		
193.5	Ground Surface													
0.0 0.1	PEAT, fibrous (75mm)													
192.8	SAND, some silt Loose Brown to Grey Moist		1	SS	5		193							
0.7	Silty CLAY, some sand to sandy Stiff to Soft Brown to Grey Moist		2	SS	14		192							0 23 58 19
191.3			3	SS	4									0 11 66 23
2.2 191.1	SAND and SILT, trace clay Loose Brown Moist		4	SS	54/ .150									
2.4	END OF BOREHOLE (SAMPLER BOUNCING) AT 2.4m ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.													

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH33-18

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+280 C/L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.28 - 2008.09.28 CHECKED BY RPR

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 (%)				
193.3	Ground Surface							20 40 60 80 100		w _p	w	w _L		
0.0 0.1	PEAT, fibrous (75mm)		1	SS	3		193							
	Sandy SILT, some clay Very Loose to Compact Brown Moist		2	SS	13		192							0 24 61 15
191.9	Silty CLAY, some sand Soft Brown		3	SS	4		191							0 11 64 25
190.6														
188.7 2.8	SAND and SILT Loose Brown Moist													
END OF BOREHOLE AT 2.8m ON PROBABLE BEDROCK. WATER LEVEL AT 2.7m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE. DCPT CONDUCTED AT 0.9m WEST OF BOREHOLE. END OF DCPT AT 2.8m UPON REFUSAL ON PROBABLE BEDROCK.														

RECORD OF BOREHOLE No D33-02R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+112.5 O/S 17.4R ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.09.27 - 2008.09.27 CHECKED BY RPR

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 (%)						
193.2	Ground Surface														
0.0	DCPT from surface							193							
192.0															
1.2	END OF DCPT AT 1.2m UPON REFUSAL ON PROBABLE BEDROCK.														

METRIC

[illegible]

RECORD OF BOREHOLE No D33-04L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+162.5 O/S 16.6L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.09.26 - 2008.09.26 CHECKED BY RPR

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 (%)					
192.3 0.0	Ground Surface DCPT from surface.							20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	20 40 60					
189.5 2.8	END OF DCPT AT 2.8m UPON REFUSAL ON PROBABLE BEDROCK.													

RECORD OF BOREHOLE No D33-05R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION New Harris Lake Rd., Station 10+187.5 O/S 16.0R ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.09.27 - 2008.09.27 CHECKED BY RPR

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 (%)				
193.7	Ground Surface							20 40 60 80 100	○ UNCONFINED + FIELD VANE	w _P w w _L				
0.0	DCPT from surface.							● QUICK TRIAXIAL × LAB VANE						
193.2														
0.5	END OF DCPT AT 0.5m UPON REFUSAL ON PROBABLE BEDROCK.													

ONTMT4S 6121 GPJ 12/12/12

+³ x³ : Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

METRIC

[illegible]

METRIC[illegible]

ONTMT4S 6121.GPJ 12/12/12

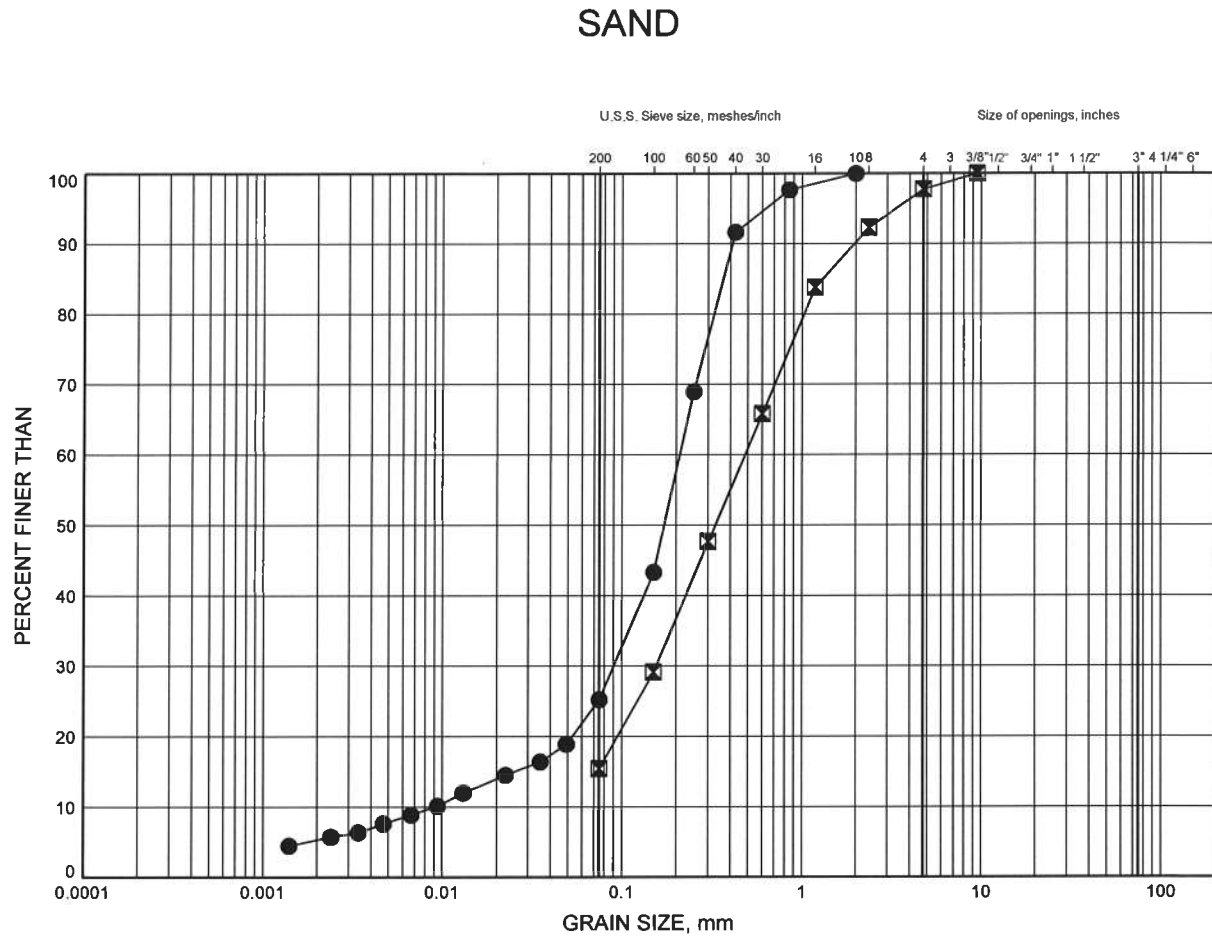
+ 3, × 3: Numbers refer to Sensitivity

METRIC

[illegible]

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE N1



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH33-01	1.07	190.83
■	BH33-02L	1.83	190.47

GRAIN SIZE DISTRIBUTION - THURBER 6121.GPJ 12/13/12

Date December 2012
GWP# 5294-08-00

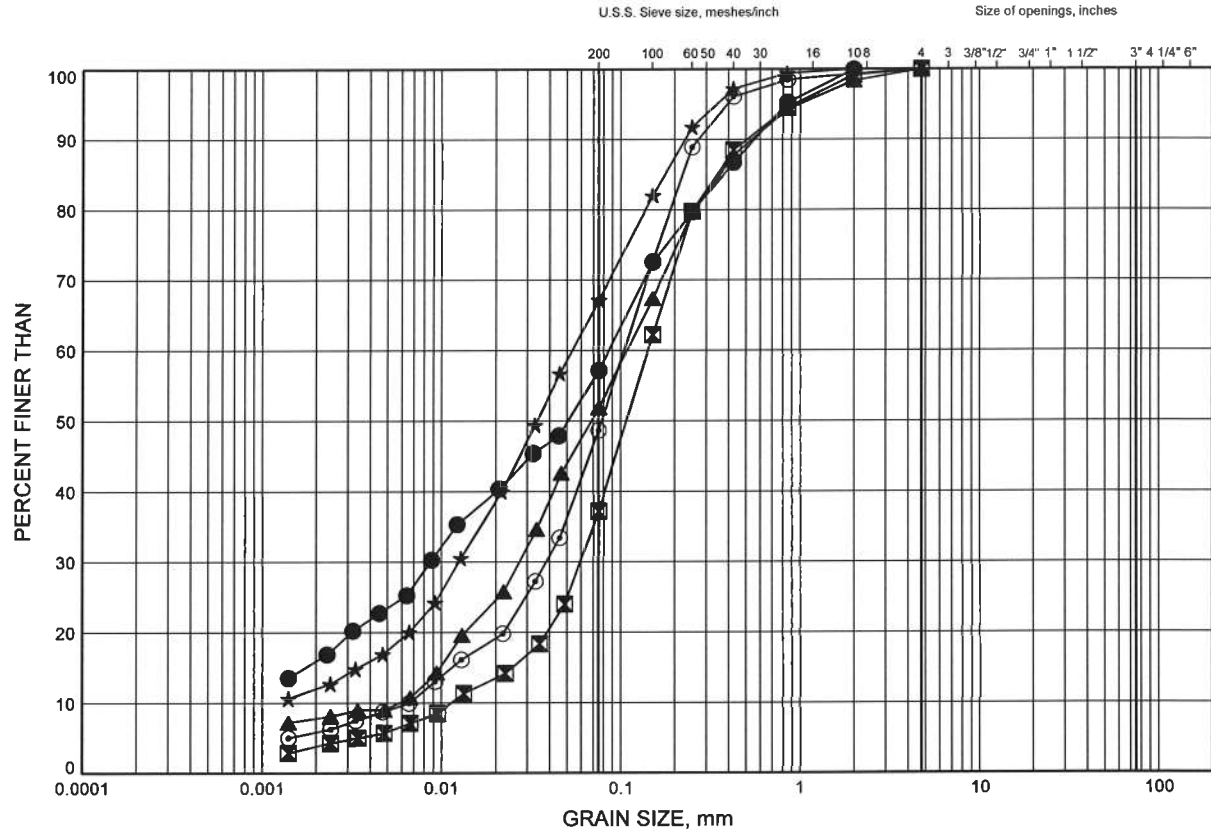


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE N2

SAND and SILT



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH33-01R	0.30	193.00
⊠	BH33-10L	0.30	192.00
▲	BH33-10L	0.95	191.35
★	BH33-15	2.59	190.61
⊙	BH33-16R	1.07	193.43

GRAIN SIZE DISTRIBUTION - THURBER 6121.GPJ 12/13/12

Date December 2012
GWP# 5294-08-00

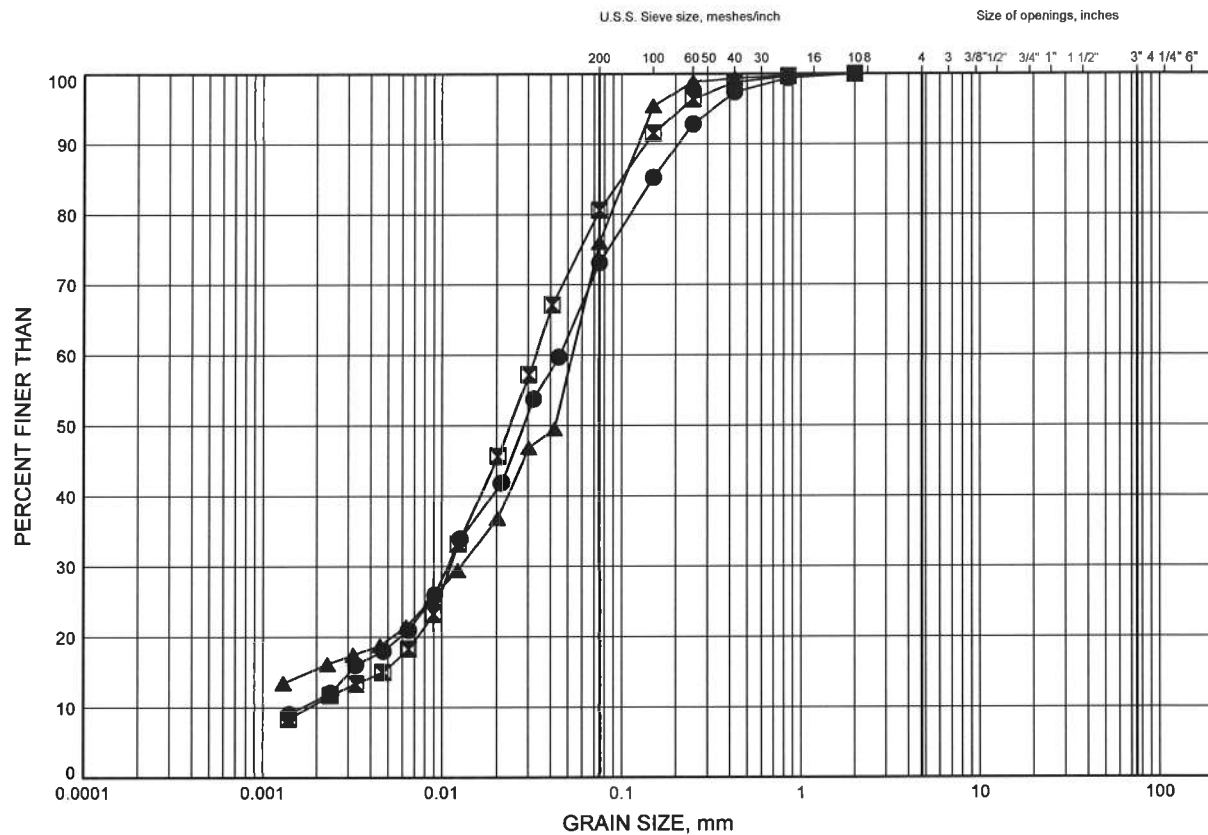


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE N3

Sandy SILT



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH33-14L	1.83	190.27
■	BH33-14L	3.35	188.75
▲	BH33-18	1.07	192.23

GRAIN SIZE DISTRIBUTION - THURBER 6121 GPJ 12/13/12

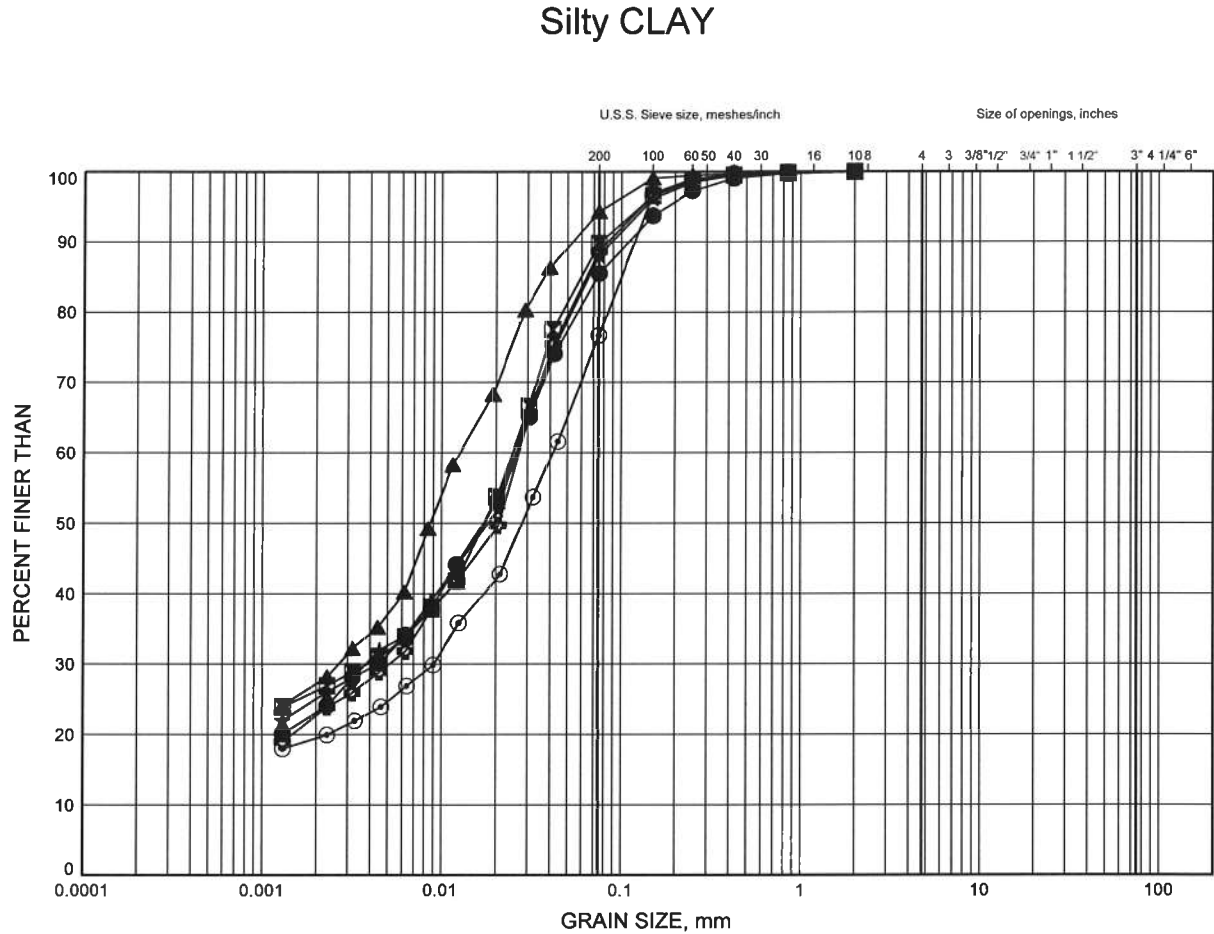
Date December 2012
GWP# 5294-08-00



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Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE N4



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH33-11	1.07	190.83
■	BH33-13	1.07	191.43
▲	BH33-15	1.07	192.13
★	BH33-15	1.83	191.37
⊙	BH33-17	1.07	192.43
⊕	BH33-17	1.83	191.67

Date December 2012

GWP# 5294-08-00



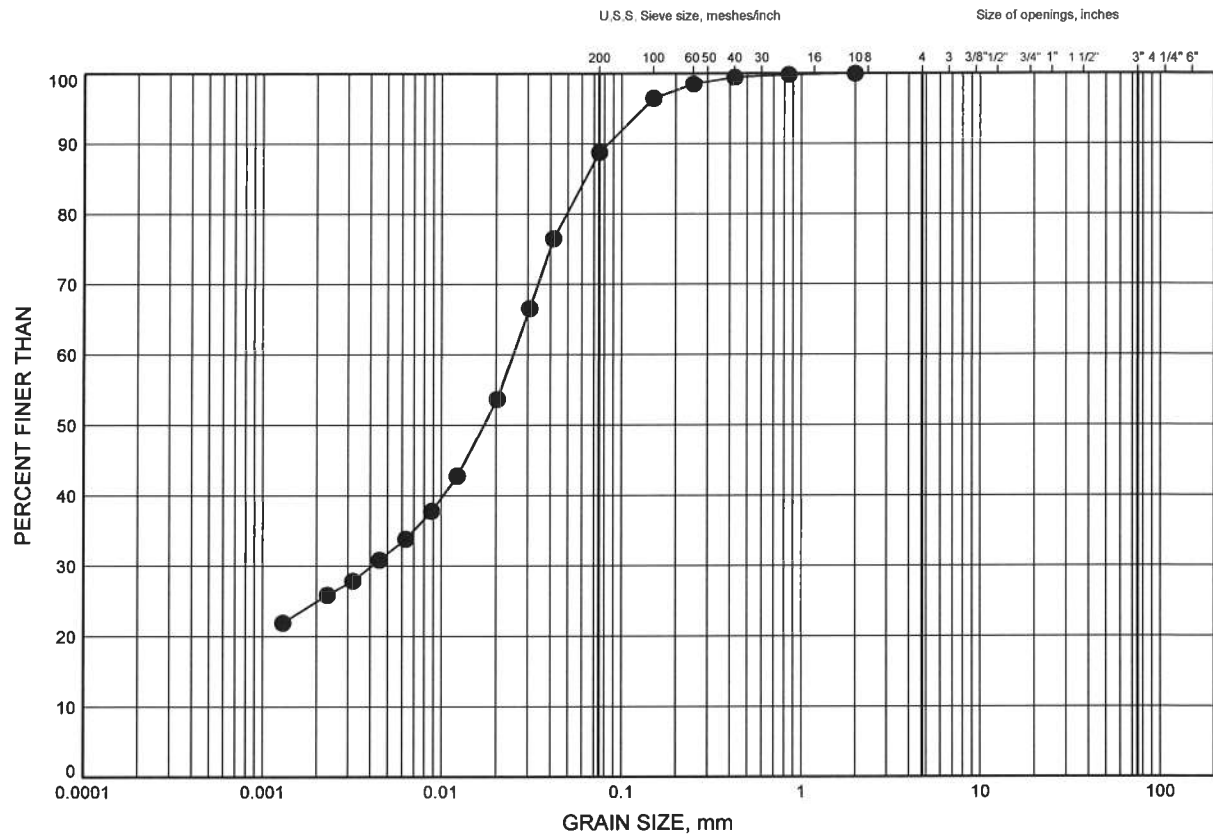
Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE N5

Silty CLAY



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH33-18	1.83	191.47

GRAIN SIZE DISTRIBUTION - THURBER 6121 GPJ 12/13/12

Date December 2012
GWP# 5294-08-00

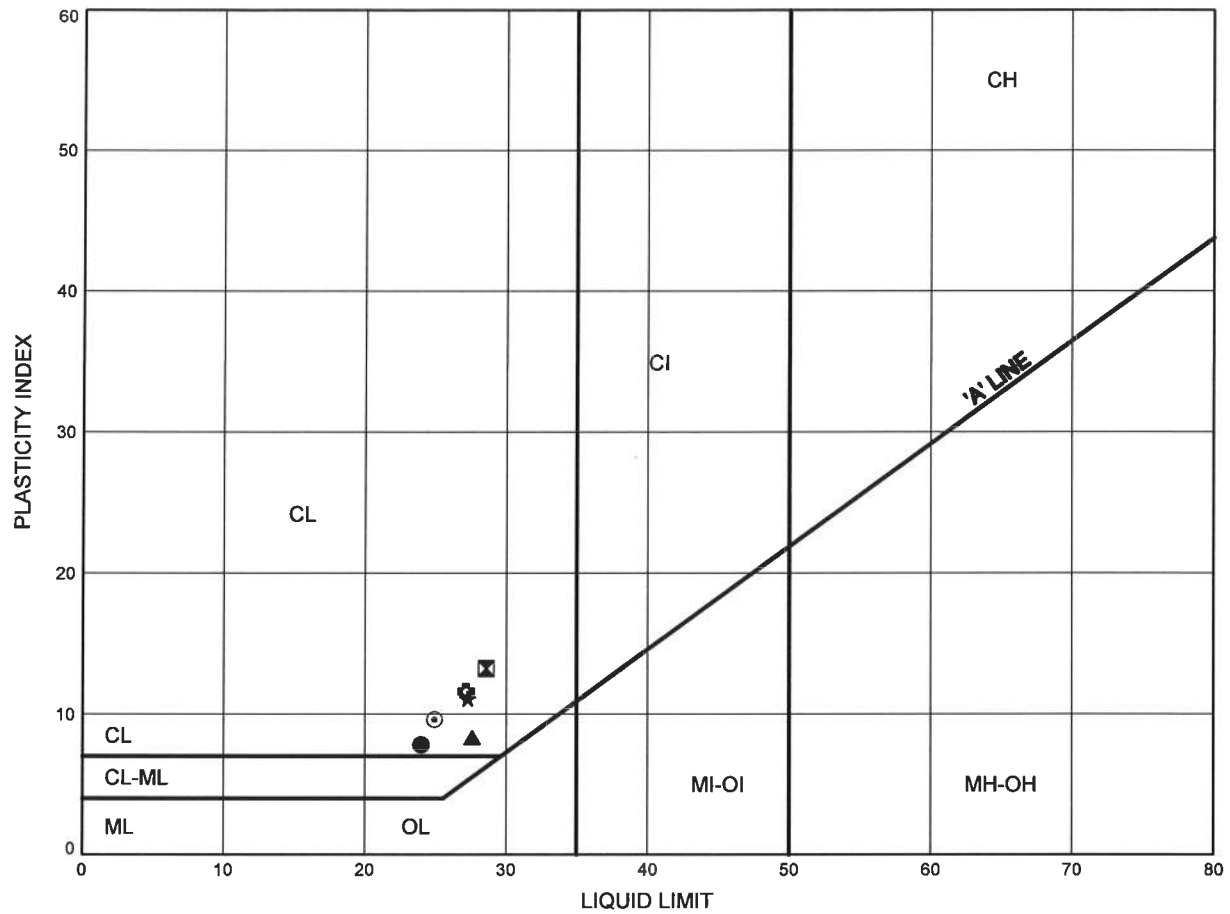


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Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
ATTERBERG LIMITS TEST RESULTS

FIGURE N6

Silty CLAY



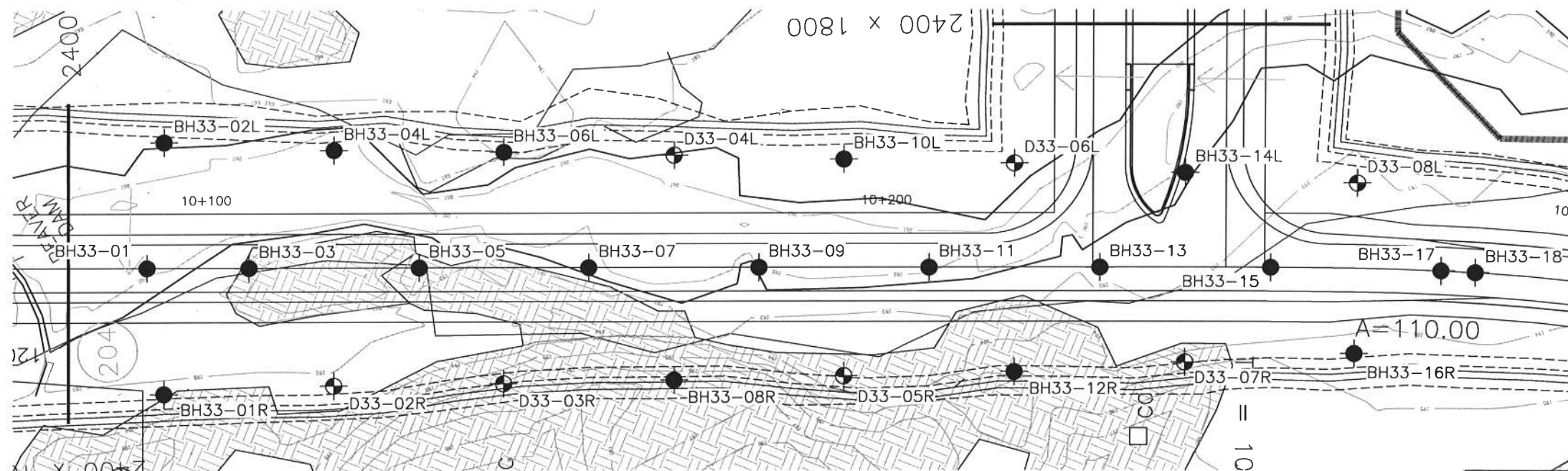
LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH33-11	1.07	190.83
⊠	BH33-13	1.07	191.43
▲	BH33-15	1.07	192.13
★	BH33-17	1.83	191.37
⊙	BH33-18	1.83	191.67
⊕	BH33-19	1.83	191.47

Date December 2012
 GWP# 5294-08-00



Prep'd MFA
 Chkd. MRA



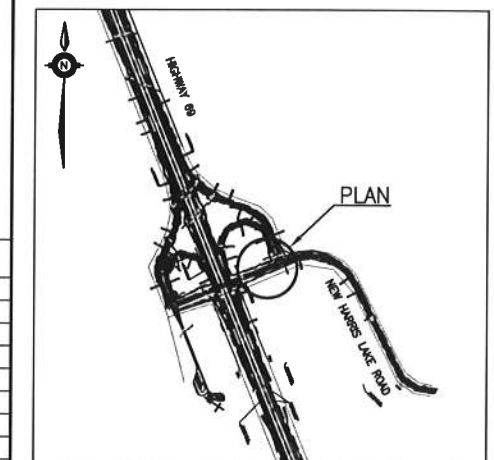
NO	ELEVATION	NORTHING	EASTING
BH33-16R	194.5	5 061 794.0	231 053.2
BH33-17	193.5	5 061 810.2	231 060.3
BH33-18	193.3	5 061 811.8	231 065.1
D33-02R	193.2	5 061 733.6	230 916.0
D33-03R	196.2	5 061 743.2	230 939.1
D33-04L	192.3	5 061 783.8	230 949.6
D33-05R	193.7	5 061 763.0	230 985.0
D33-06L	192.8	5 061 801.4	230 996.5
D33-07R	194.6	5 061 783.5	231 030.6
D33-08L	193.2	5 061 817.5	231 044.1

CONT No
GWP No 5294-08-00

HIGHWAY 69 FOUR-LANING
NEW HARRIS LAKE ROAD-CL
(STA 10+085 - 10+280)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

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

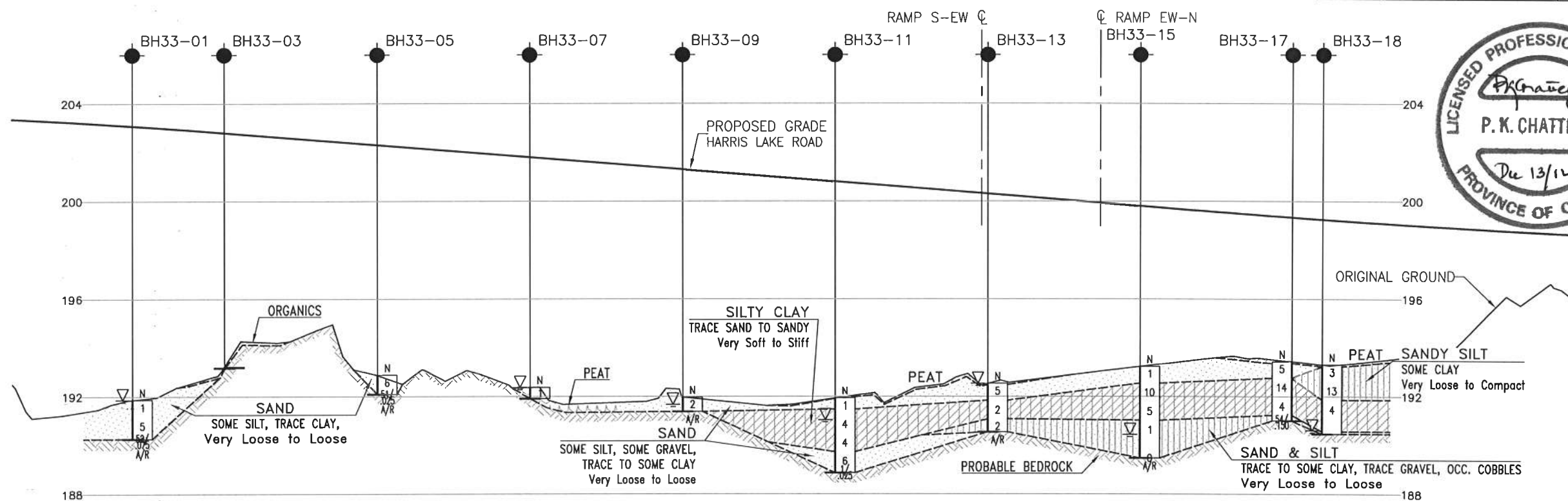
NO	ELEVATION	NORTHING	EASTING
BH33-01	191.9	5 061 739.4	230 884.0
BH33-01R	193.3	5 061 723.1	230 893.3
BH33-02L	192.3	5 061 757.6	230 879.4
BH33-03	193.2	5 061 745.0	230 897.9
BH33-04L	191.8	5 061 765.8	230 903.0
BH33-05	192.9	5 061 754.4	230 921.1
BH33-06L	192.9	5 061 774.9	230 926.3
BH33-07	192.4	5 061 763.7	230 944.3
BH33-08R	196.3	5 061 753.0	230 962.1
BH33-09	192.0	5 061 773.1	230 967.5
BH33-10L	192.3	5 061 792.6	230 973.0
BH33-11	191.9	5 061 782.5	230 990.6
BH33-12R	194.9	5 061 772.9	231 008.0
BH33-13	192.5	5 061 791.8	231 013.8
BH33-14L	192.1	5 061 809.5	231 020.2
BH33-15	193.2	5 061 801.2	231 037.0

NOTES

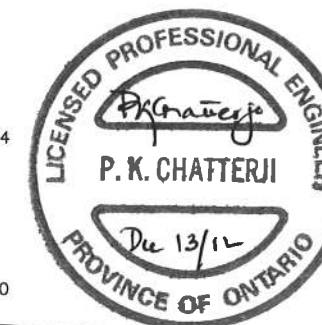
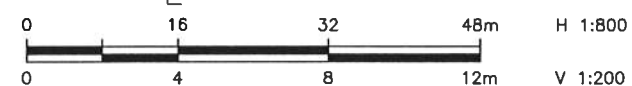
- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

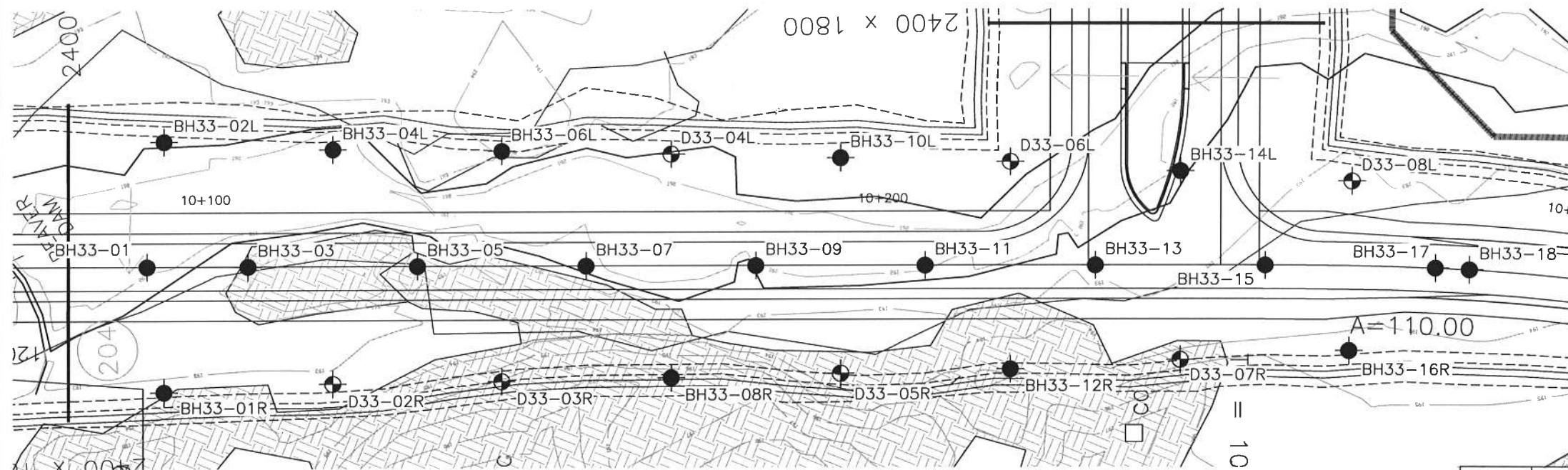
GEOCREs No. 41H-99

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



PROFILE ALONG CL NEW HARRIS LAKE ROAD



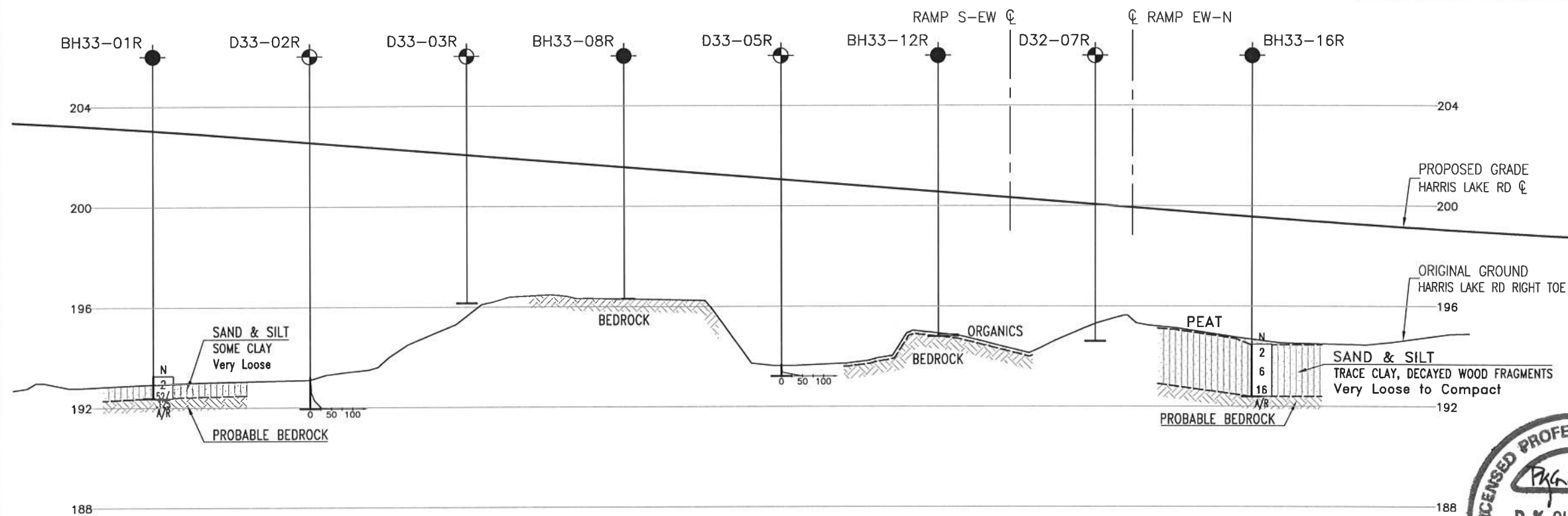


PLAN



SCALE 1:800

NO	ELEVATION	NORTHING	EASTING
BH33-16R	194.5	5 061 794.0	231 053.2
BH33-17	193.5	5 061 810.2	231 060.3
BH33-18	193.3	5 061 811.8	231 065.1
D33-02R	193.2	5 061 733.6	230 916.0
D33-03R	196.2	5 061 743.2	230 939.1
D33-04L	192.3	5 061 783.8	230 949.6
D33-05R	193.7	5 061 763.0	230 985.0
D33-06L	192.8	5 061 801.4	230 996.5
D33-07R	194.6	5 061 783.5	231 030.6
D33-08L	193.2	5 061 817.5	231 044.1



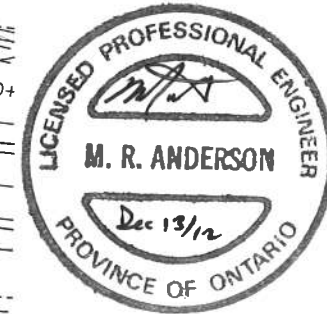
PROFILE ALONG RIGHT TOE NEW HARRIS LAKE ROAD



H 1:800

V 1:200

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

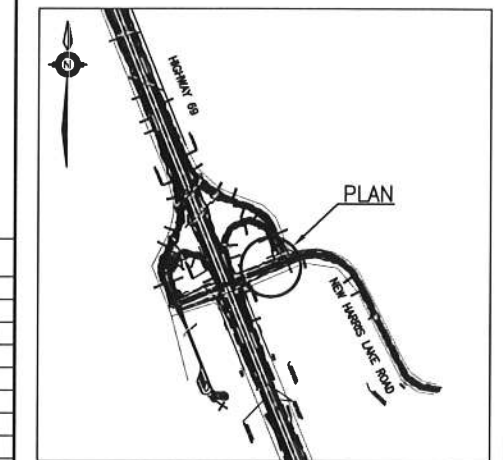


CONT No
GWP No 5294-08-00

HIGHWAY 69 FOUR-LANING
NEW HARRIS LAKE ROAD-RIGHT TOE
(STA 10+085 - 10+280)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH33-01	191.9	5 061 739.4	230 884.0
BH33-01R	193.3	5 061 723.1	230 893.3
BH33-02L	192.3	5 061 757.6	230 879.4
BH33-03	193.2	5 061 745.0	230 897.9
BH33-04L	191.8	5 061 765.8	230 903.0
BH33-05	192.9	5 061 754.4	230 921.1
BH33-06L	192.9	5 061 774.9	230 926.3
BH33-07	192.4	5 061 763.7	230 944.3
BH33-08R	196.3	5 061 753.0	230 962.1
BH33-09	192.0	5 061 773.1	230 967.5
BH33-10L	192.3	5 061 792.6	230 973.0
BH33-11	191.9	5 061 782.5	230 990.6
BH33-12R	194.9	5 061 772.9	231 008.0
BH33-13	192.5	5 061 791.8	231 013.8
BH33-14L	192.1	5 061 809.5	231 020.2
BH33-15	193.2	5 061 801.2	231 037.0

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. 41H-99



DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG
DRAWN	MFA	CHK PKC
LOAD	DATE	DEC. 2012
STRUCT	DWG	

Appendix O

**Rest Area Road
Sta. 10+000 to 10+150**

**Boreholes 34-01 to 34-13
DCPTs D34-01R to D34-06L**

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

RECORD OF BOREHOLE No BH34-01

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Service Rd. Tie-in, Station 10+000 C/L ORIGINATED BY LG
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

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	PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	
193.0	Ground Surface						193					
0.0	SAND, trace silt, trace clay, occasional organics Very Loose Brown Moist		1	SS	1		192					
	Fine to medium grained Compact Wet		2	SS	10		191					
190.2			3	SS	13							1 90 9 (SI+CL)
2.8	END OF BOREHOLE (SAMPLER BOUNCING) AT 2.8m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 1.5m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE DCPT CONDUCTED NEAR THE BOREHOLE AND TERMINATED AT 2.9m UPON REFUSAL ON PROBABLE BEDROCK.											

RECORD OF BOREHOLE No BH34-02L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Service Rd. Tie-in, Station 10+012.5 O/S 15.3L ORIGINATED BY LG
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

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									
192.8	Pond Surface																
0.0	ICE																
0.2	SAND, fine to medium grained, trace silt, trace clay, occasional organics Compact Brown Moist		1	SS	13												
			2	SS	12												
			3	SS	5												
190.3	Medium to coarse grained Wet		4	SS	53/												
2.5	END OF BOREHOLE (SAMPLER BOUNCING) AT 2.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.				175												

+³, X³: Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH34-03

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Service Rd. Tie-in, Station 10+025 C/L ORIGINATED BY LG
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

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									
192.2	Ground Surface							20	40	60	80	100					
0.0	SAND, trace gravel, trace silt, trace clay, occasional organics Compact Reddish Brown Moist 																

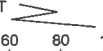

+³, X³: Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH34-04R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Service Rd. Tie-in, Station 10+037.5 O/S 15.6R ORIGINATED BY LG
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

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		
192.0	Ground Surface						192										
0.0	SAND , some silt, trace gravel, trace clay Very Loose to Loose Brown Wet		1	SS	1												
	Fine to medium grained		2	SS	7		191										1 86 13 (SI+CL)
	Dense		3	SS	34		190										
189.9	END OF BOREHOLE (SAMPLER BOUNCING) AT 2.1m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.																
2.1																	

RECORD OF BOREHOLE No BH34-05

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Service Rd. Tie-in, Station 10+050 C/L ORIGINATED BY LG
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR


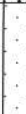
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE							WATER CONTENT (%) w _p w w _L				
192.3	Pond Surface							20	40	60	80	100							
0.0	ICE and WATER						192												
191.7																			
0.6	SAND, trace gravel, trace silt, trace clay, occasional roots, occasional wood pieces																		
	Compact		2	SS	19														
	Brown																		
190.8	Wet						191												
1.5	END OF BOREHOLE (SAMPLER BOUNCING) AT 1.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.																		

RECORD OF BOREHOLE No BH34-06L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Service Rd. Tie-in, Station 10+062.5 O/S 15.1L ORIGINATED BY LG
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

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						
191.0	Ground Surface							20 40 60 80 100						
0.0	PEAT, fibrous, some sand, some silt Black Wet		1	AS			191							
190.4														
0.6	SAND, some silt, trace gravel, trace clay, medium to coarse grained Compact Brown Wet		1	SS	19		190							
	Dense		2	SS	33		189							4 77 19 (SI+CL)
	Grey													
			3	SS	13									
187.8							188							
3.2	END OF BOREHOLE (SAMPLER BOUNCING) AT 3.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.													

RECORD OF BOREHOLE No BH34-07

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Service Rd. Tie-in, Station 10+063 C/L ORIGINATED BY LG
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

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 80 100	W _P W W _L				
192.3	Pond Surface													
0.0	ICE and WATER													
191.4														
0.9	PEAT, fibrous, some roots Black		1	AS										
190.9	Wet													
1.4	(500mm)													
	END OF BOREHOLE (SAMPLER BOUNCING) AT 1.4m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.													

RECORD OF BOREHOLE No BH34-08R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Service Rd. Tie-in, Station 10+112.5 O/S 14.9R
 HWY 69 BOREHOLE TYPE Hollow Stem Augers
 DATUM Geodetic DATE 2009.01.30 - 2009.01.30
 ORIGINATED BY LG
 COMPILED BY AN
 CHECKED BY RPR



SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT <div><div></div><div>20406080100</div></div> <div>SHEAR STRENGTH kPa</div> <div>○ UNCONFINED + FIELD VANE</div> <div>● QUICK TRIAXIAL × LAB VANE</div> <div>20406080100</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								
191.3	Pond Surface												
0.0	ICE and WATER												
189.8													
1.5	END OF BOREHOLE (SAMPLER BOUNCING) AT 1.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK.												

METRIC

[illegible]

1 OF 1

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						
191.3	Ground Surface						○ UNCONFINED ● QUICK TRIAXIAL	+ FIELD VANE × LAB VANE	20 40 60 80 100 20 40 60 80 100	20 40 60			GR SA SI C	

ONTMT4S 6121.GPJ 12/11/12

+³, ×³: Numbers refer to Sensitivity

METRIC

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		W _p W W _L				
192.3	Ground Surface						○ UNCONFINED + FIELD VANE	20 40 60 80 100			20 40 60			GR SA SI CL
0.0	BEDROCK AT SURFACE						● QUICK TRIAXIAL X LAB VANE							

RECORD OF BOREHOLE No BH34-12R



1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Service Rd. Tie-in, Station 10+137.5 O/S 12.4R ORIGINATED BY LG
 HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY AN
 DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

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									
192.8	Ground Surface						20	40	60	80	100	W _p	W	W _L		GR SA SI CL	
0.0	BEDROCK AT SURFACE																

METRIC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20 40 60 80 100	W _p W W _L	WATER CONTENT (%)	20 40 60		
192.2	Ground Surface												
							SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100						

ONTMT4S 6121.GPJ 12/11/12

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No D34-01R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Service Rd. Tie-in, Station 10+012.5 O/S 15.3R ORIGINATED BY LG
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT 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 (%)							
192.5	Ground Surface								20 40 60 80 100							
0.0	DCPT from surface. ICE to 0.6m.								20 40 60 80 100							
									</							

+³, X³: Numbers refer to Sensitivity 20 15 10 5 0 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No D34-02L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Service Rd. Tie-in, Station 10+037.5 O/S 15.6L ORIGINATED BY LG
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
DATUM Geodetic DATE 2009.01.31 - 2009.01.31 CHECKED BY RPR

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 (%)									
191.7	Ground Surface						○ UNCONFINED + FIELD VANE										
0.0	DCPT from surface						● QUICK TRIAXIAL × LAB VANE										

+³, ×³: Numbers refer to
Sensitivity

20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No D34-03R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Service Rd. Tie-in, Station 10+062.5 O/S 15.1R ORIGINATED BY LG
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2009.01.31 - 2009.01.31 CHECKED BY RPR

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 (%)							
192.0	Ground Surface																
0.0	DCPT from surface. ICE and WATER to 0.6m.																
190.5																	
1.5	END OF DCPT AT 1.5m UPON REFUSAL ON PROBABLE BEDROCK.																

+ 3, X 3 : Numbers refer to
Sensitivity

20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No D34-04L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Service Rd. Tie-in, Station 10+087.5 O/S 13.0L ORIGINATED BY LG
 HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY AN
 DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT 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				
192.2	Ground Surface		1	AS				20 40 60 80 100		20 40 60				
0.0 0.1	BEDROCK AT 0.075m.													

METRIC[illegible]

METRIC

[illegible]

12712

LICENSED PROFESSIONAL ENGINEER

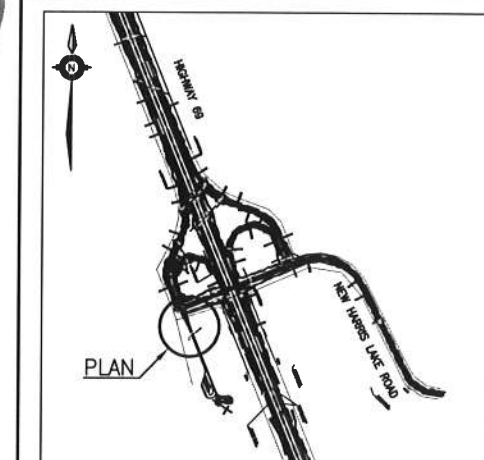
M. R. ANDERSON






Dec 13/12

PROVINCE OF ONTARIO



SHEET

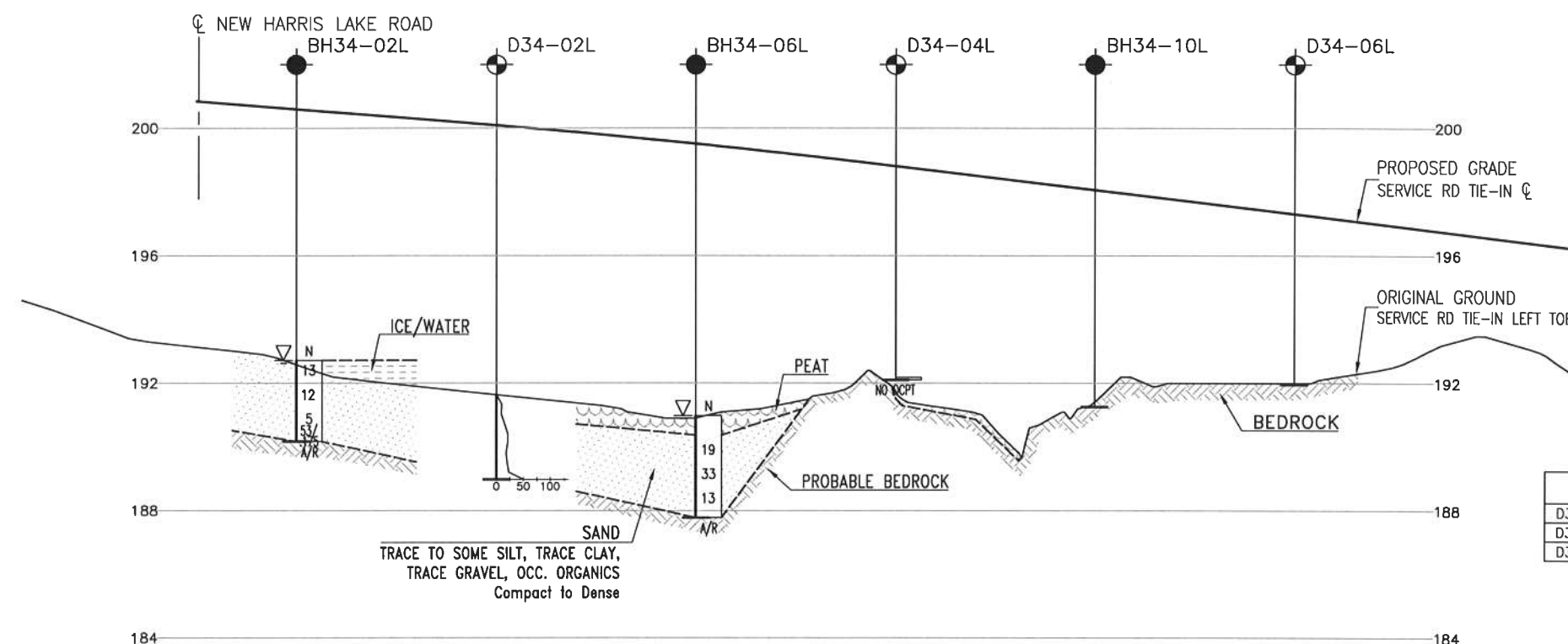


	Borehole
	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60° Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

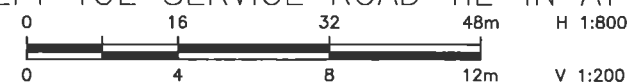
NO	ELEVATION	NORTHING	EASTING
BH34-01	193.0	5 061 633.4	230 621.8
BH34-02L	192.8	5 061 627.5	230 640.3
BH34-03	192.2	5 061 610.2	230 631.6
BH34-04R	192.0	5 061 592.8	230 621.1
BH34-05	192.3	5 061 587.0	230 640.3
BH34-06L	191.0	5 061 581.1	230 659.9
BH34-07	192.3	5 061 575.0	230 645.3
BH34-08R	191.3	5 061 523.5	230 649.9
BH34-09	191.9	5 061 540.7	230 659.9
BH34-10L	191.3	5 061 534.7	230 677.6
BH34-11	192.3	5 061 517.5	230 668.8
BH34-12R	192.8	5 061 501.3	230 661.6
BH34-13	192.2	5 061 494.3	230 677.6
D34-01R	192.5	5 061 616.1	230 612.2
D34-02L	191.7	5 061 604.5	230 650.0
D34-03R	192.0	5 061 569.8	230 631.0

- 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.

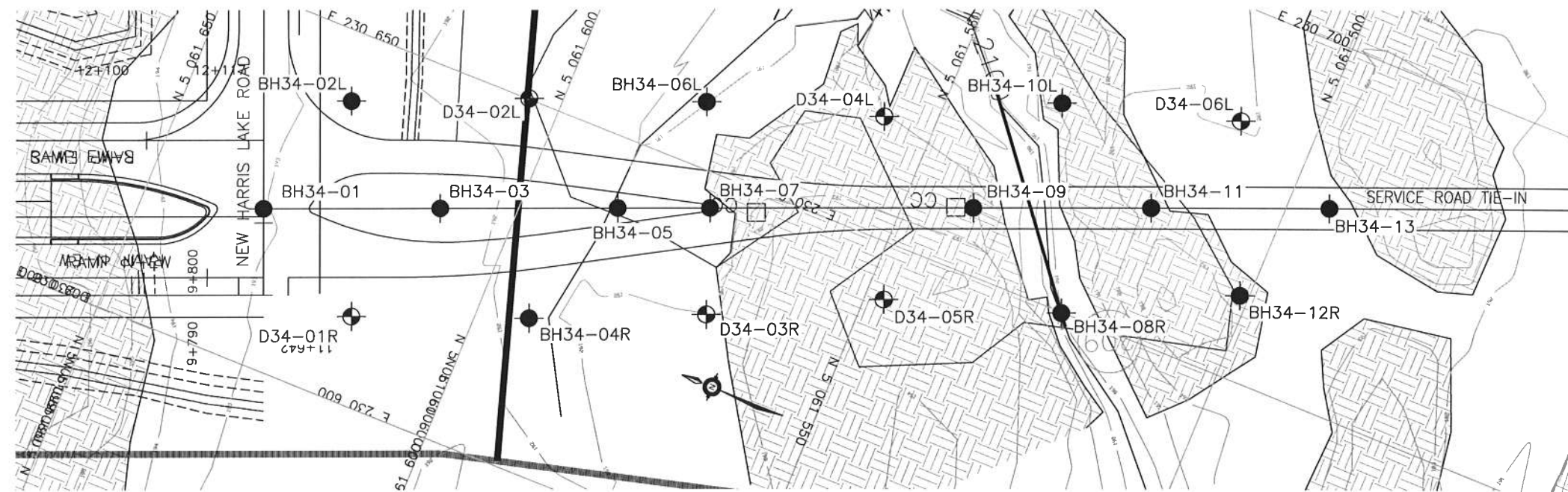
REV	DATE	BY	DESCRIPTION				DATE	DEC. 20
			CHK	AEG	CODE	LOAD		
DESIGN	RPR	CHK	CHK	PKC	SITE	STRUCT	LDWG	
DRAWN	MFA	CHK	CHK	PKC	SITE	STRUCT	LDWG	



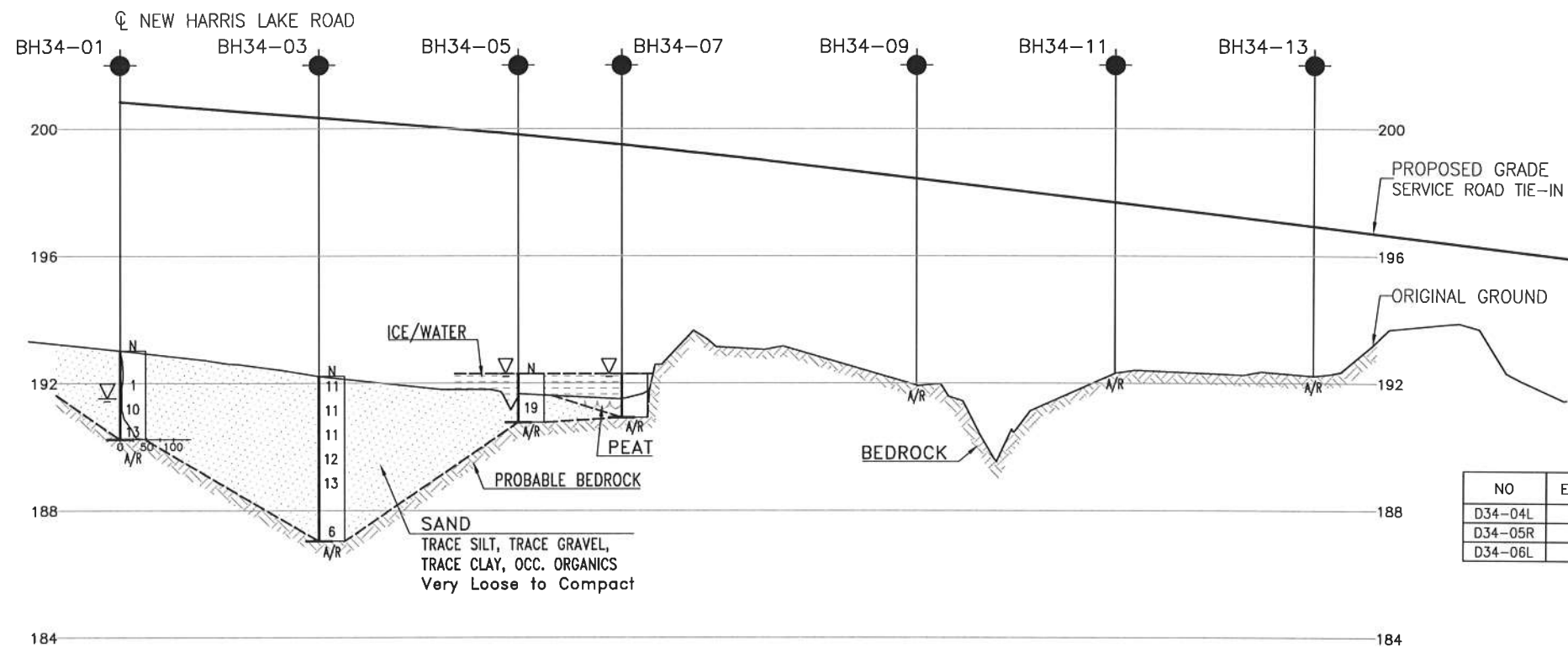
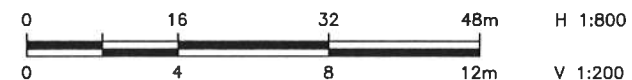
PROFILE ALONG LEFT TOE SERVICE ROAD TIE-IN AT RAMP N-E



NO	ELEVATION	NORTHING	EASTING
D34-04L	192.2	5 061 557.1	230 666.
D34-05R	193.7	5 061 547.4	230 642.
D34-06L	192.0	5 061 510.6	230 684.



PLAN

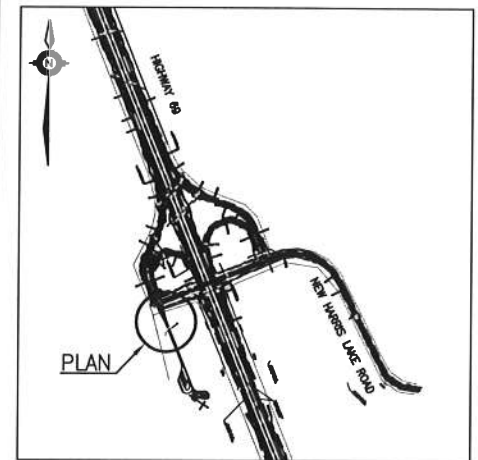
PROFILE ALONG \varnothing SERVICE ROAD TIE-IN AT RAMP N-E

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



CONT No
GWP No 5294-08-00

HIGHWAY 69 FOUR-LANING
SERVICE ROAD TIE-IN- \varnothing
(STA 10+000 - 10+150)
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

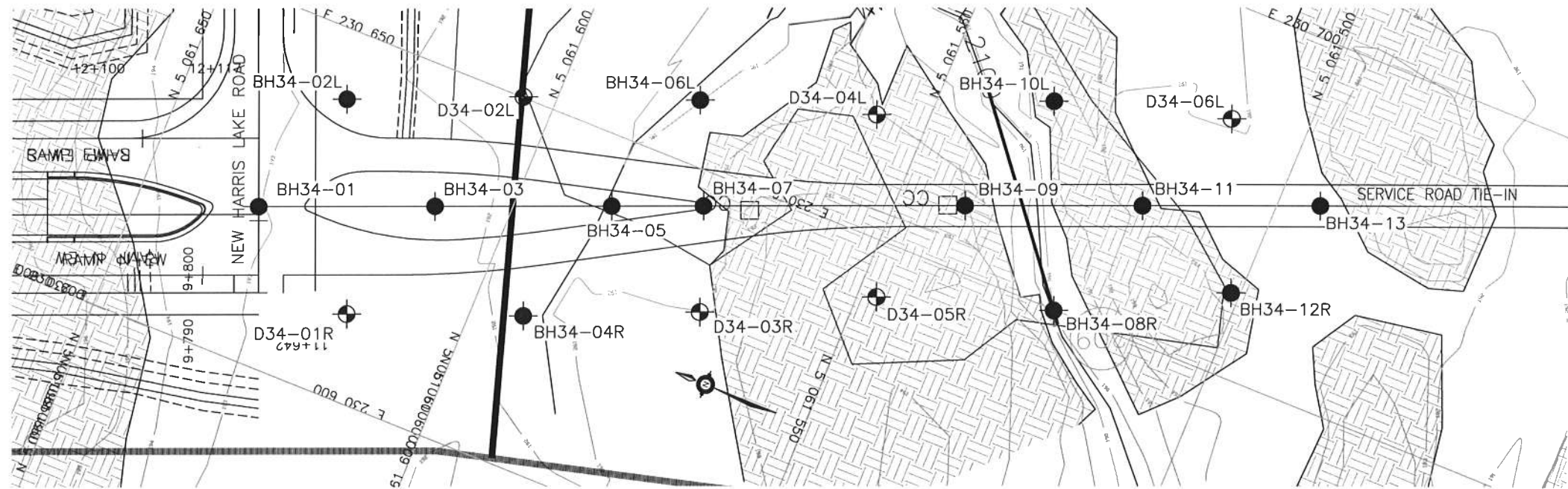
NO	ELEVATION	NORTHING	EASTING
BH34-01	193.0	5 061 633.4	230 621.6
BH34-02L	192.8	5 061 627.5	230 640.5
BH34-03	192.2	5 061 610.2	230 631.0
BH34-04R	192.0	5 061 592.8	230 621.2
BH34-05	192.3	5 061 587.0	230 640.3
BH34-06L	191.0	5 061 581.1	230 659.0
BH34-07	192.3	5 061 575.0	230 645.2
BH34-08R	191.3	5 061 523.5	230 649.9
BH34-09	191.9	5 061 540.7	230 659.1
BH34-10L	191.3	5 061 534.7	230 677.6
BH34-11	192.3	5 061 517.5	230 668.4
BH34-12R	192.8	5 061 501.3	230 661.6
BH34-13	192.2	5 061 494.3	230 677.8
D34-01R	192.5	5 061 616.1	230 612.1
D34-02L	191.7	5 061 604.5	230 650.1
D34-03R	192.0	5 061 569.8	230 631.0

-NOTES-

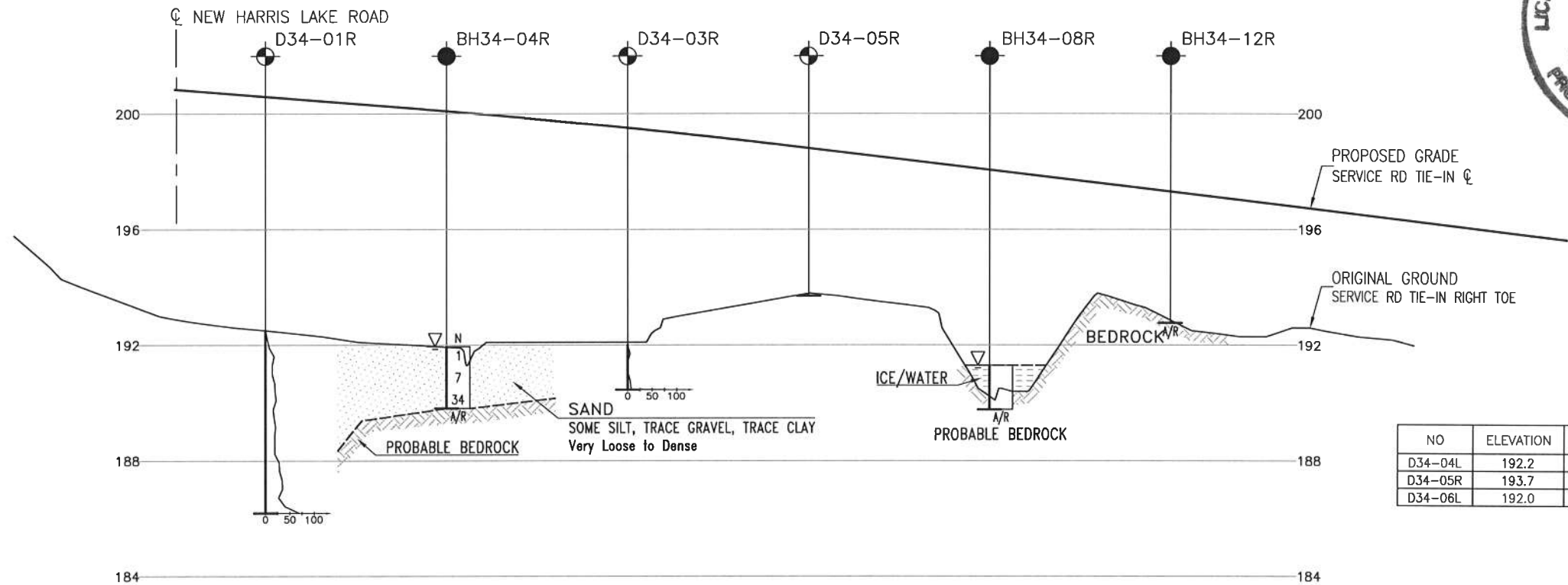
- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 41H-99

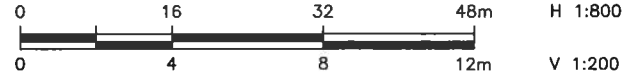
REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



PLAN



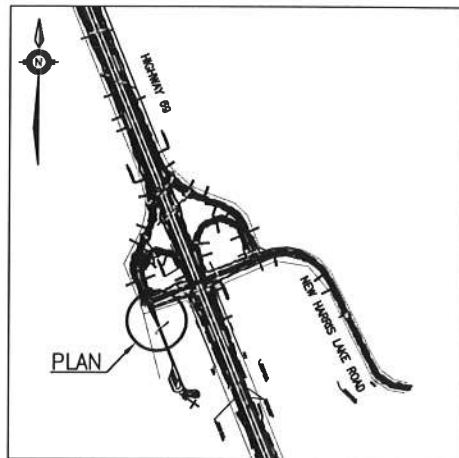
PROFILE ALONG RIGHT TOE SERVICE ROAD TIE-IN AT RAMP N-E



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



CONT No
GWP No 5294-08-00
HIGHWAY 69 FOUR-LANING
SERVICE ROAD TIE-IN-RIGHT TOE
(STA 10+000 - 10+150)
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
BH34-01	193.0	5 061 633.4	230 621.6
BH34-02L	192.8	5 061 627.5	230 640.5
BH34-03	192.2	5 061 610.2	230 631.0
BH34-04R	192.0	5 061 592.8	230 621.2
BH34-05	192.3	5 061 587.0	230 640.3
BH34-06L	191.0	5 061 581.1	230 659.0
BH34-07	192.3	5 061 575.0	230 645.2
BH34-08R	191.3	5 061 523.5	230 649.9
BH34-09	191.9	5 061 540.7	230 659.1
BH34-10L	191.3	5 061 534.7	230 677.6
BH34-11	192.3	5 061 517.5	230 668.4
BH34-12R	192.8	5 061 501.3	230 661.6
BH34-13	192.2	5 061 494.3	230 677.8
D34-01R	192.5	5 061 616.1	230 612.1
D34-02L	191.7	5 061 604.5	230 650.1
D34-03R	192.0	5 061 569.8	230 631.0

- 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. 41H-99

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			STRUCT
			DWG
			DATE DEC. 2012

Appendix P

**Harris Lake Road
Ramp S-EW, Sta. 12+120 to 12+195
Ramp EW-N, Sta. 11+625 to 11+690**

**Boreholes 35-01 to 35-08, 36-01 to 36-08
DCPTs D35-01R to D35-03R, D36-01R to D36-03R**

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

RECORD OF BOREHOLE No BH35-01

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., S-E/W Ramp, Station 12+120 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY AN
 DATUM Geodetic DATE 2008.09.27 - 2008.09.27 CHECKED BY RPR

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						
								20 40 60 80 100						
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE						
								20 40 60 80 100						
197.2	Ground Surface													
0.0	BEDROCK AT SURFACE.													

RECORD OF BOREHOLE No BH35-02

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., S-E/W Ramp, Station 12+125 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY AN
 DATUM Geodetic DATE 2008.09.27 - 2008.09.27 CHECKED BY RPR



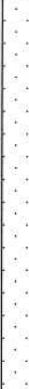
SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH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

RECORD OF BOREHOLE No BH35-03L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., E/W-N Ramp, Station 11+685 O/S 6.7L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.29 - 2008.09.29 CHECKED BY RPR

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 x LAB VANE											
193.2	Ground Surface							20	40	60	80	100							
0.0	SAND and SILT , occasional peaty organics Very Loose to Loose Brown to Grey Damp Layer of Silty Clay (300mm) Moist Auger grinding and refusal on possible boulder. Moved 1.5m and redrilled.		1	SS	5		193												
			2	SS	8		192												
			3	SS	3		191												
190.7							190												
2.5	SAND , trace to some silt, trace clay, occasional cobbles Grey Loose to Compact Wet		4	SS	5		190												
			5	SS	26		189												
188.0																			
5.2	END OF BOREHOLE AT 5.2m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. WATER LEVEL AT 1.1m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH GROUT TO 0.3m THEN HOLEPLUG TO SURFACE.																		

RECORD OF BOREHOLE No BH35-04

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., S-E/W Ramp, Station 12+150 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.26 - 2008.09.26 CHECKED BY RPR

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					WATER CONTENT (%) W _P W W _L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
192.4	Ground Surface							20	40	60	80	100																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													

+ 3, X 3 : Numbers refer to
Sensitivity

20
15
10



(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH35-05R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., S-E/W Ramp, Station 12+162.5 O/S 12.5R ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.26 - 2008.09.26 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT LIMIT			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 x LAB VANE		WATER CONTENT (%) w _p w w _L				
192.6	Ground Surface							20 40 60 80 100						
0.0 0.1	ORGANICS: (75mm) Silty CLAY , sandy, occasional peaty organics Very Soft to Soft Grey		1	SS	2									
			2	SS	0									
191.2														0 24 59 17
1.4	SAND , some clay, some silt, trace gravel Loose Brown to Grey Wet		3	SS	8									
			4	SS	8									
			5	SS	6									2 81 17 (SI+CL)
188.1	Gravelly													
4.5	END OF BOREHOLE AT 4.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. Piezometer installation consists of 19mm diameter schedule 40 PVC pipe with 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Oct 29/08 0.2 192.4 Jan 16/09 Frozen at Surface Feb 19/09 0.2* 192.8 Apr 21/09 Ground Surface Jun 04/09 0.1* 192.7 Aug 20/09 0.3 192.3 Aug 25/09 0.3 192.3 Oct 27/09 0.3 192.3 Nov 20/09 0.5 192.1 * (Artesian Condition)													

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

RECORD OF BOREHOLE No BH35-06

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., S-E/W Ramp, Station 12+175 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.26 - 2008.09.26 CHECKED BY RPR

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							PLASTIC LIMIT w _p NATURAL MOISTURE CONTENT w LIQUID LIMIT w _L			
192.2	Ground Surface							20	40	60	80	100						
189.5	ORGANICS: (25mm)							20	40	60	80	100						
	SAND and SILT, trace to some clay Very Loose Grey Moist Occasional topsoil and peaty organics Wet		1	SS	3	▽	192											
			2	SS	3		191											0 29 56 15
			3	SS	1													0 29 59 12
			4	SS	18		190											
2.7	END OF BOREHOLE AT 2.7m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 1.2m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE. DCPT CONDUCTED AT 0.6m EAST OF BOREHOLE LOCATION. END OF DCPT AT 2.7m UPON REFUSAL ON PROBABLE BEDROCK.																	

RECORD OF BOREHOLE No BH35-07L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., E/W-N Ramp, Station 11+635 O/S 4.5L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
DATUM Geodetic DATE 2009.02.09 - 2009.02.09 CHECKED BY RPR

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								
192.6	Ground Surface							20 40 60 80 100				w _P w w _L			kN/m ³	GR SA SI CL
0.0	Silty CLAY , some sand, trace gravel, occasional roots Stiff Grey		1	SS	14											
192.0							192									
0.6	SAND and SILT , trace gravel, trace clay Loose Grey Wet		2	SS	3											
							191									
			3	SS	10											
			4	SS	11											
189.9							190									
2.7	END OF BOREHOLE AT 2.7m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.															

RECORD OF BOREHOLE No BH35-08

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., S-E/W Ramp, Station 12+190 C/L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.27 - 2008.09.27 CHECKED BY RPR

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								
192.3	Ground Surface							20	40	60	80	100				
0.0	ORGANICS: (50mm) Silty CLAY , sandy, occasional decayed roots and peaty organics Soft Grey		1	SS	3		192									0 27 46 27
			2	SS	4											
190.9							191									
1.4	SAND and SILT , some clay Very Loose Grey Wet		3	SS	2											0 29 60 11
190.0			4	SS	50/ .000											
2.3	END OF BOREHOLE AT 2.3m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. WATER LEVEL AT 1.3m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS AND HOLEPLUG TO THE SURFACE.															

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

METRIC

[illegible]

RECORD OF BOREHOLE No D35-02L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., E/W-N Ramp, Station 11+660 O/S 4.7L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
DATUM Geodetic DATE 2008.09.26 - 2008.09.26 CHECKED BY RPR

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 (%)
192.2	Ground Surface						20	40	60	80	100	20	40	60	
0.0	DCPT from surface						20	40	60	80	100	20	40	60	
190.1															
2.1	END OF DCPT AT 2.1m UPON REFUSAL ON PROBABLE BEDROCK														

ONTMT4S 6121.GPJ 12/12/12

METRIC

[illegible]

RECORD OF BOREHOLE No BH36-01

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., E/W-N Ramp, Station 11+620 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.28 - 2008.09.28 CHECKED BY RPR

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						
193.6	Ground Surface							20 40 60 80 100		20 40 60				
0.0	ORGANICS, some sand and silt, rootlets Dark Brown (200mm)		1	SS	547			20 40 60 80 100		20 40 60		118		GR SA SI CL
0.2	END OF BOREHOLE (SAMPLER BOUNCING) AT 0.2m ON BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.				200									

RECORD OF BOREHOLE No BH36-02

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., E/W-N Ramp, Station 11+625 C/L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.28 - 2008.09.28 CHECKED BY RPR

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							PLASTIC LIMIT w _p NATURAL MOISTURE CONTENT w LIQUID LIMIT w _L			
193.2	Ground Surface							20	40	60	80	100						
193.2	ORGANICS: (25mm)						193											
192.5	Silty SAND Very Loose Brown Moist		1	SS	2													
192.5																		
0.7	Silty CLAY, trace to some sand Firm to Soft Brown		2	SS	8		192											0 4 50 46
			3	SS	4													0 18 62 20
191.0																		
190.8	SAND and SILT Loose Brown Moist						191											
2.3	END OF BOREHOLE AT 2.3m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. WATER LEVEL AT 1.2m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.																	

+³ . X³ : Numbers refer to
Sensitivity

20
15
10


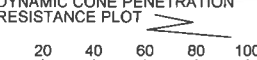

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH36-03L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., S-E/W Ramp, Station 12+185 O/S 5L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.28 - 2008.09.28 CHECKED BY RPR

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					
191.8	Ground Surface												GR SA SI CL
0.8	ORGANICS: (25mm)						○ UNCONFINED + FIELD VANE			wP w wL			
191.1	Silty SAND, some clay Very Loose Brown Moist		1	SS	3		● QUICK TRIAXIAL x LAB VANE			WATER CONTENT (%)			
0.7	Silty CLAY, some sand to sandy Very Soft to Soft Brown		2	SS	5								
	Grey		3	SS	4								
	Layer of silt		4	SS	1								
			5	SS	1								
187.7	END OF BOREHOLE AT 4.1m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. WATER LEVEL AT 0.5m UPON COMPLETION OF DRILLING. BOREHOLE GROUTED TO SURFACE.												
4.1													

RECORD OF BOREHOLE No BH36-04

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., E/W-N Ramp, Station 11+650 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.28 - 2008.09.28 CHECKED BY RPR

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	PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT		
192.3	Ground Surface												
0.8	ORGANICS: (50mm)												
191.5	Silty SAND, occasional peaty organics Very Loose Dark Brown Moist		1	SS	4		192						
0.8	Silty CLAY, trace sand Firm Brown		2	SS	5		191						0 9 53 38
			3	SS	5								
190.0							190						
2.3	SAND and SILT, some clay Very Loose Grey Moist to Wet		4	SS	2								
			5	SS	1		189						0 26 63 11
							188						
187.6			6	SS	52/								
4.7	END OF BOREHOLE AT 4.7m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. WATER LEVEL AT 0.9m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH GROUT, HOLEPLUG AND AUGER CUTTINGS TO SURFACE.				.020								

+ ³, x ³: Numbers refer to
Sensitivity

20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH36-05R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., E/W-N Ramp, Station 11+662.5 O/S 13.8R ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.28 - 2008.09.28 CHECKED BY RPR

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						
191.8	Ground Surface							20 40 60 80 100						
0.0	PEAT, fibrous Dark Brown (700mm)		1	SS	0			○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE						
191.1							191							
0.7	Silly CLAY, some sand Soft Brown to Grey		2	SS	3									
190.4														
1.4	SAND and SILT, some clay Very Loose Grey Moist		3	SS	1		190							0 26 59 15
188.9														
2.9	SAND, some silt Very Dense Grey Wet		4	SS	60/ .150		189							
187.2							188							
4.6	END OF BOREHOLE AT 4.6m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. WATER LEVEL AT 1.4m UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Oct 29/08 0.2 191.6 Jan 16/09 Frozen at Surface Feb 19/09 Frozen at Surface Apr 21/09 0.2 191.6 Jun 04/09 Ground Surface Aug 20/09 0.1 191.7 Aug 25/09 0.0 191.8 Oct 27/09 0.0 191.8 Nov 20/09 0.2 191.6		5	SS	55/ .075									

+³, x³, Numbers refer to
Sensitivity 20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH36-06

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., E/W-N Ramp, Station 11+675 C/L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.09.28 - 2008.09.28 CHECKED BY RPR

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								
192.7	Ground Surface															
0.0	ORGANICS: (100mm)															
0.1	Silty SAND, some clay, occasional peaty organics Very Loose		1	SS	1								○			
192.0	Grey to Dark Brown Moist to Wet															
0.7	Silty CLAY, some sand Very Soft Brown		2	SS	2								○			0 22 63 15
191.3	SAND and SILT, trace clay, trace gravel Very Loose to Compact Brown to Grey Moist to Wet		3	SS	1								○			
1.4			4	SS	19								○			1 47 48 4
189.7			5	SS	53/ .050								○			
3.0	END OF BOREHOLE AT 3.0m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. WATER LEVEL AT 0.8m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.															

RECORD OF BOREHOLE No BH36-07L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., S-E/W Ramp, Station 12+135 O/S 7L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.28 - 2008.09.29 CHECKED BY RPR

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 (%)		
								○ UNCONFINED	+ FIELD VANE	● QUICK TRIAXIAL	× LAB VANE									
193.3	Ground Surface																			
0.0	ORGANICS: (75mm)																			
0.1	SAND and SILT, trace clay, trace gravel, occasional peaty organics Very Loose Brown Damp		1	SS	3															
	Compact Grey Moist to Wet		2	SS	25															
			3	SS	20												2 62 30 6			
191.1			4	SS	50/															
2.2	END OF BOREHOLE AT 2.2m UPON AUGER REFUSAL (SAMPLER BOUNCING) ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.				.000															

RECORD OF BOREHOLE No BH36-08

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., E/W-N Ramp, Station 11+690 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.09.28 - 2008.09.29 CHECKED BY RPR

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 x LAB VANE							PLASTIC LIMIT w _p NATURAL MOISTURE CONTENT w LIQUID LIMIT w _L		
193.8	Ground Surface							20	40	60	80	100					
0.0	ORGANICS: (50mm)																
193.1	Silty SAND, some clay Loose Grey Damp		1	SS	5									○			
0.7	Silty CLAY, trace sand Soft Grey to Brown		2	SS	6		193							○			0 9 64 27
192.4	SAND, some silt, some clay, trace gravel Very Loose to Compact Grey Wet		3	SS	8		192							○			
1.4			4	SS	15		191							○			1 80 19 (SI+CL)
			5	SS	7		190							○			
			6	SS	0		189							○			
			7	SS	45		188							○			
							187										
186.2		Dense															
7.6	END OF BOREHOLE UPON AUGER REFUSAL (SAMPLER BOUNCING) AT 7.6m ON PROBABLE BEDROCK. WATER LEVEL AT 2.1m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH GROUT TO SURFACE. DCPT CONDUCTED NEAR THE BOREHOLE. END OF DCPT AT 7.6m UPON REFUSAL ON PROBABLE BEDROCK.																

+³, x³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No D36-01R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., E/W-N Ramp, Station 11+637.5 O/S 13.5R ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.09.28 - 2008.09.28 CHECKED BY RPR

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	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	
193.1	Ground Surface						193					
0.0	DCPT from surface						192					
							191					
							190					
							189					
							188					
187.6	END OF DCPT AT 5.5m ON PROBABLE BEDROCK.											
5.5												

ONTMT4S 6121.GPJ 12/12/12

RECORD OF BOREHOLE No D36-02L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., S-E/W Ramp, Station 12+160 O/S 4.7L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.09.28 - 2008.09.28 CHECKED BY RPR

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 (%)						
192.8	Ground Surface								20 40 60 80 100						
0.0	DCPT from surface.								20 40 60 80 100					kN/m ³	GR SA SI CL

RECORD OF BOREHOLE No D36-03R

1 OF 1

METRIC

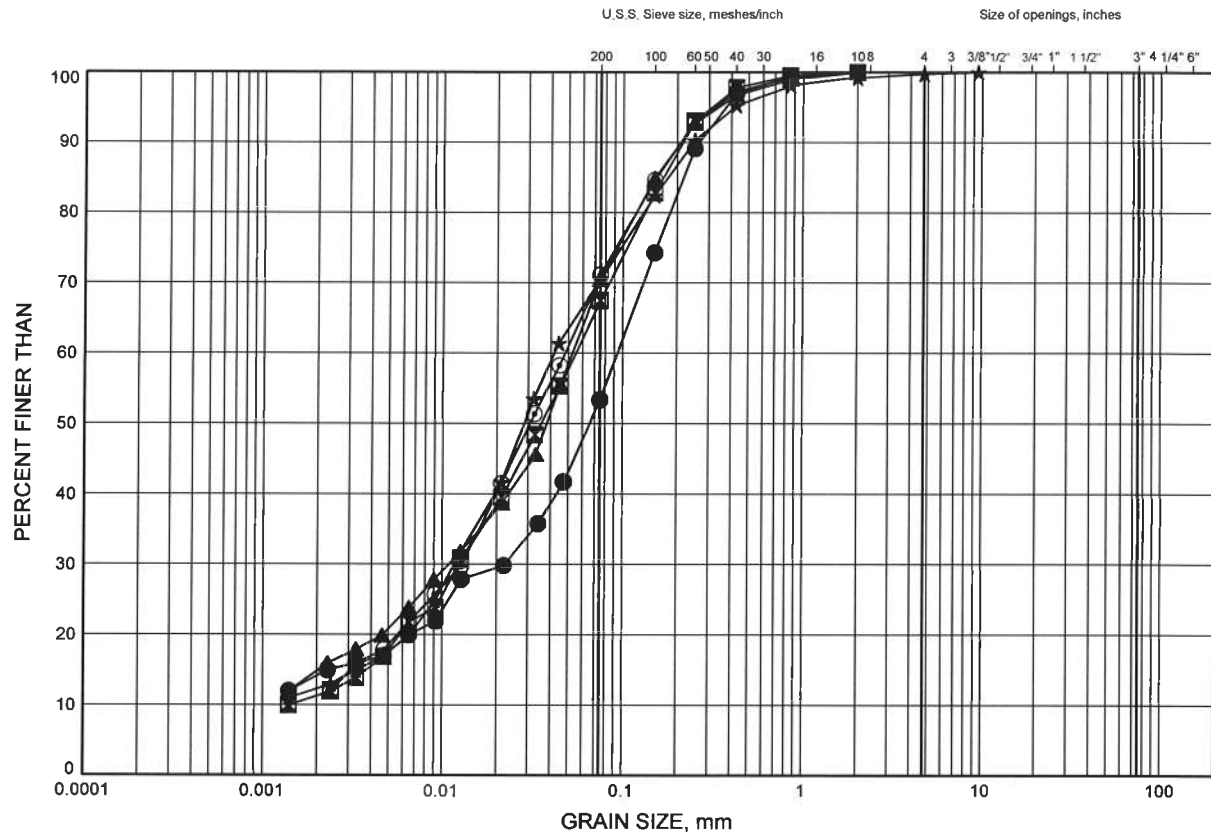
GWP# 5294-08-00 LOCATION Harris Lake Rd., E/W-N Ramp, Station 11+687.5 O/S 10.3R ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.09.28 - 2008.09.28 CHECKED BY RPR

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										
193.4	Ground Surface								○ UNCONFINED	+ FIELD VANE						
0.0	DCPT from surface								● QUICK TRIAXIAL	× LAB VANE						
									20 40 60 80 100	20 40 60						
									193							
									192							
									191							
									190							
									189							
									188							
187.3	END OF DCPT AT 6.1m UPON REFUSAL ON PROBABLE BEDROCK.															
6.1																

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE P1

SAND and 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)
●	BH35-03L	1.83	191.37
⊠	BH35-04	1.83	190.57
▲	BH35-06	1.07	191.13
★	BH35-06	1.83	190.37
⊙	BH35-08	1.83	190.47

Date December 2012
GWP# 5294-08-00

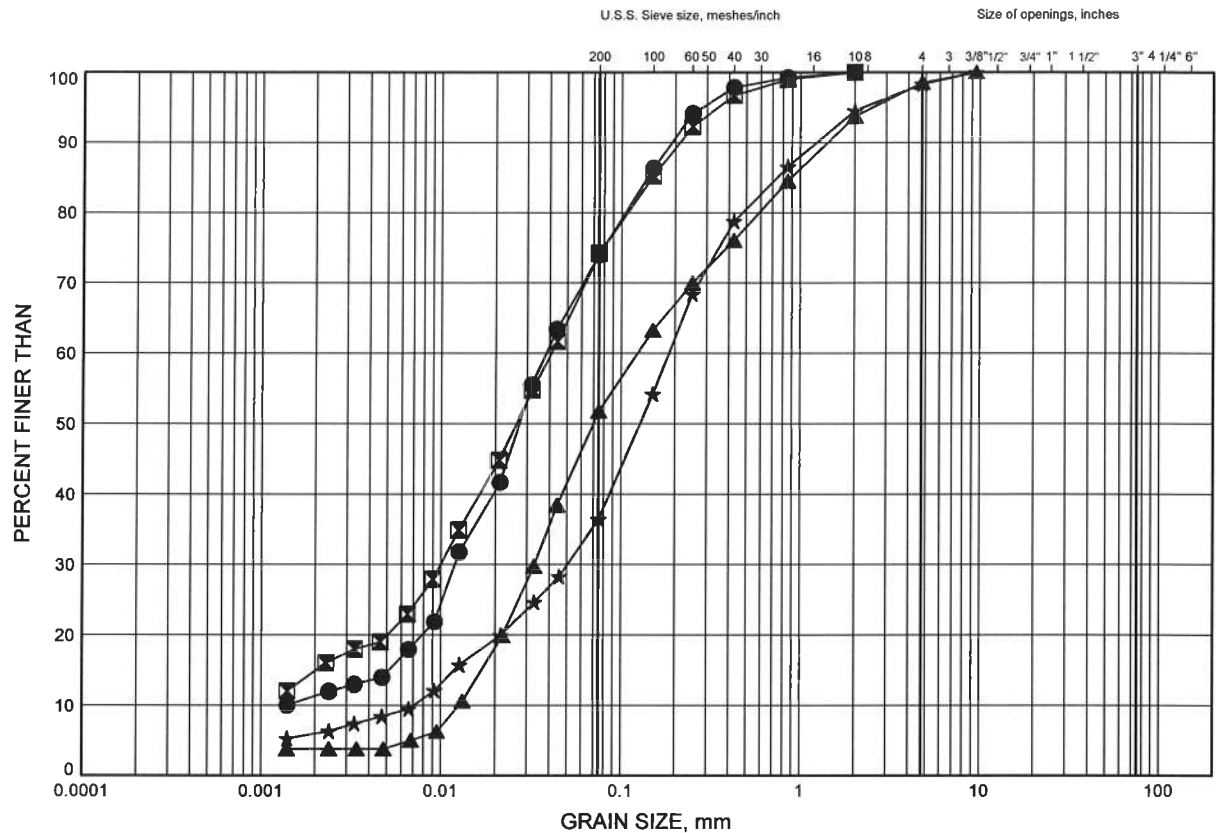


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE P2

SAND and 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)
●	BH36-04	3.35	188.95
⊠	BH36-05R	1.83	189.97
▲	BH36-06	2.59	190.11
★	BH36-07L	1.83	191.47

Date December 2012

GWP# 5294-08-00



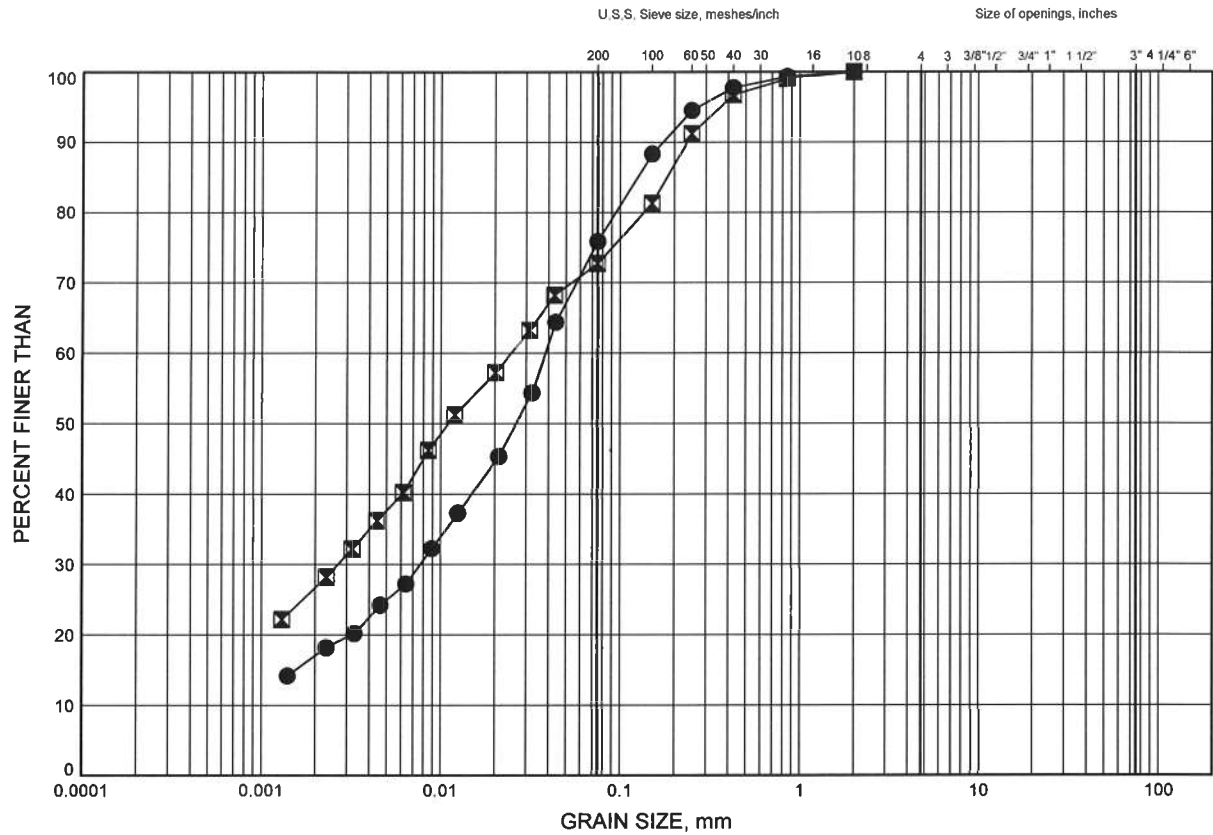
Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE P3

Silty CLAY



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH35-05R	1.22	191.38
■	BH35-08	0.30	192.00

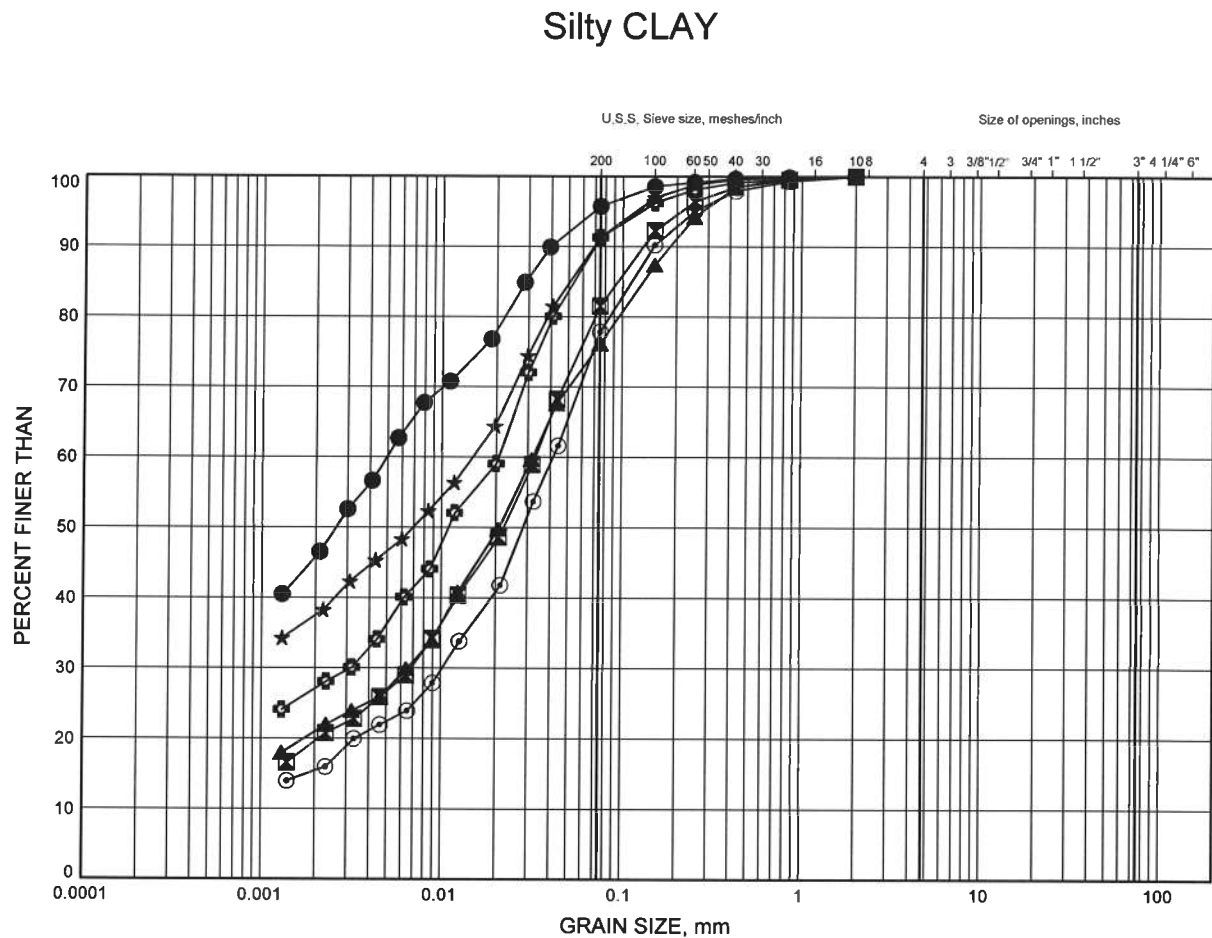
Date December 2012
GWP# 5294-08-00



Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE P4



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH36-02	1.07	192.13
⊠	BH36-02	1.83	191.37
▲	BH36-03L	1.83	189.97
★	BH36-04	1.07	191.23
⊙	BH36-06	1.07	191.63
⊕	BH36-08	1.07	192.73

Date December 2012

GWP# 5294-08-00

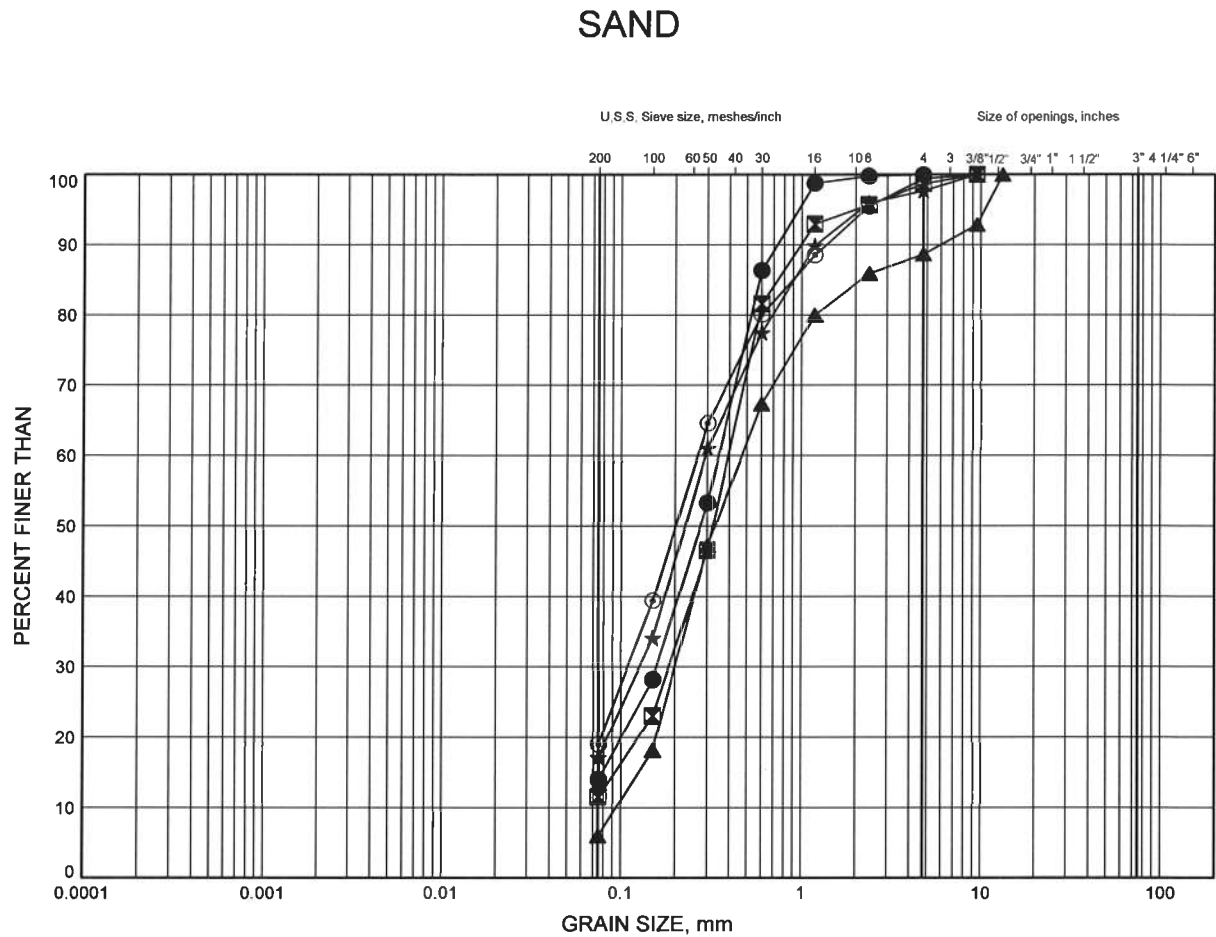


Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE P5



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH35-03L	3.35	189.85
⊠	BH35-03L	4.88	188.32
▲	BH35-04	3.35	189.05
★	BH35-05R	3.35	189.25
⊙	BH36-08	2.59	191.21

Date December 2012
GWP# 5294-08-00

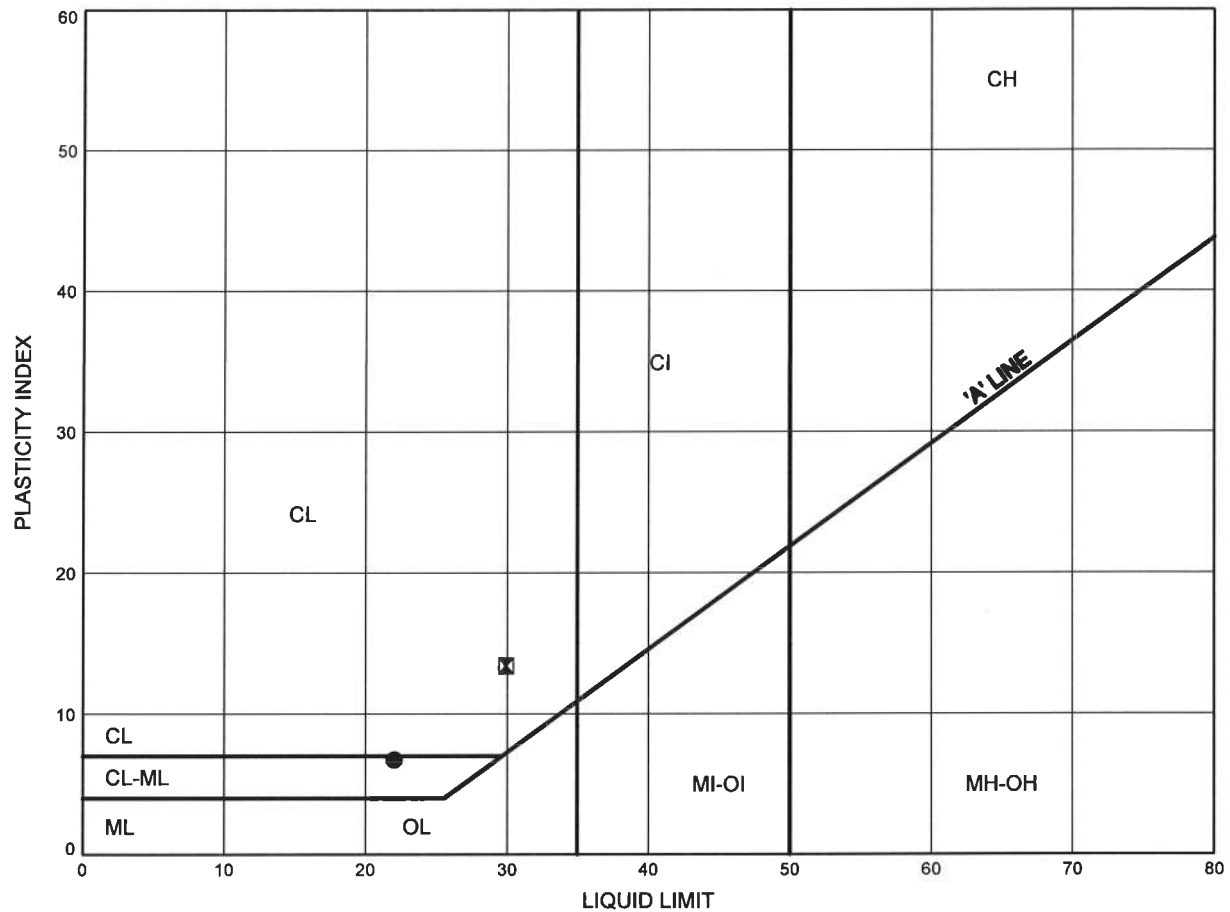


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
ATTERBERG LIMITS TEST RESULTS

FIGURE P6

Silty CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH35-05R	1.07	191.53
⊠	BH35-08	0.30	192.00

Date December 2012
 GWP# 5294-08-00

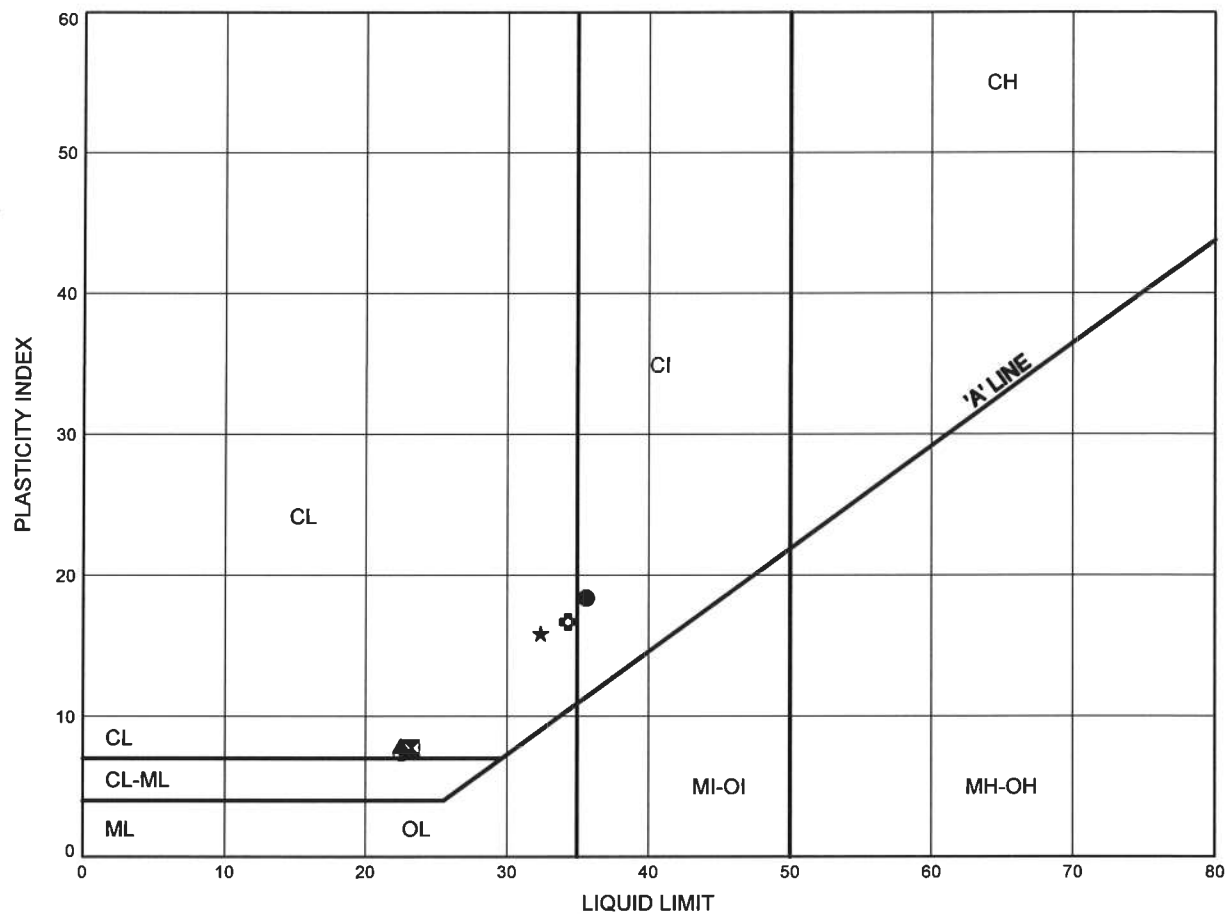


Prep'd MFA
 Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
ATTERBERG LIMITS TEST RESULTS

FIGURE P7

Silty CLAY



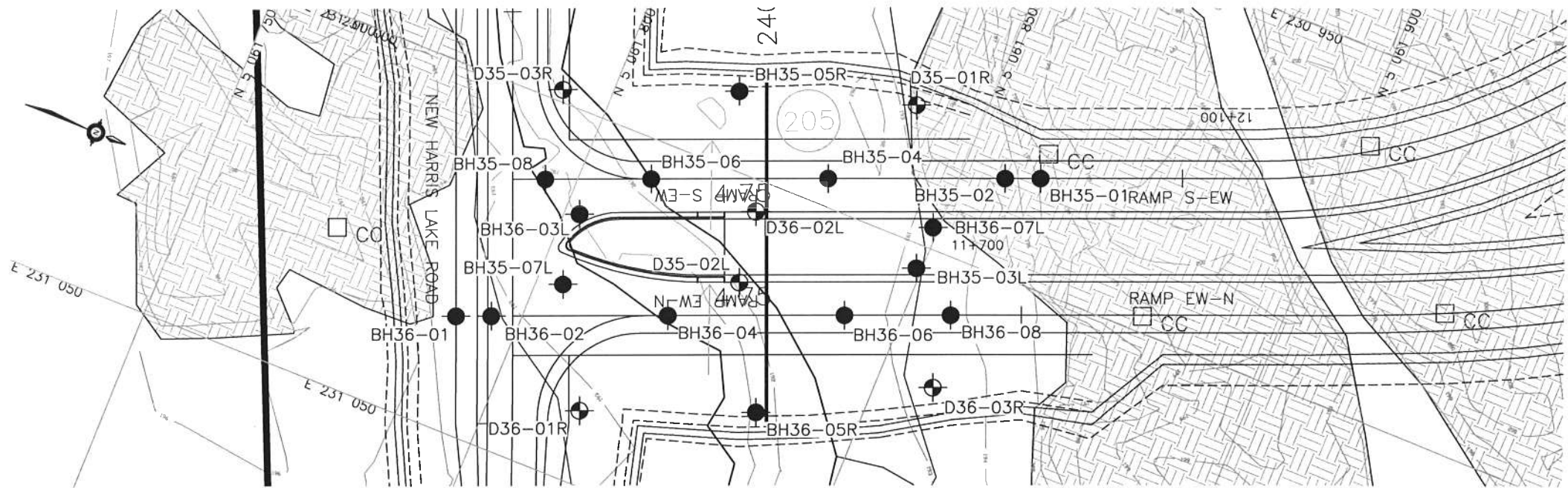
LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH36-02	1.07	192.13
⊠	BH36-02	1.83	191.37
▲	BH36-03L	1.83	189.97
★	BH36-04	1.07	191.23
⊙	BH36-06	1.07	191.63
⊕	BH36-08	1.07	192.73

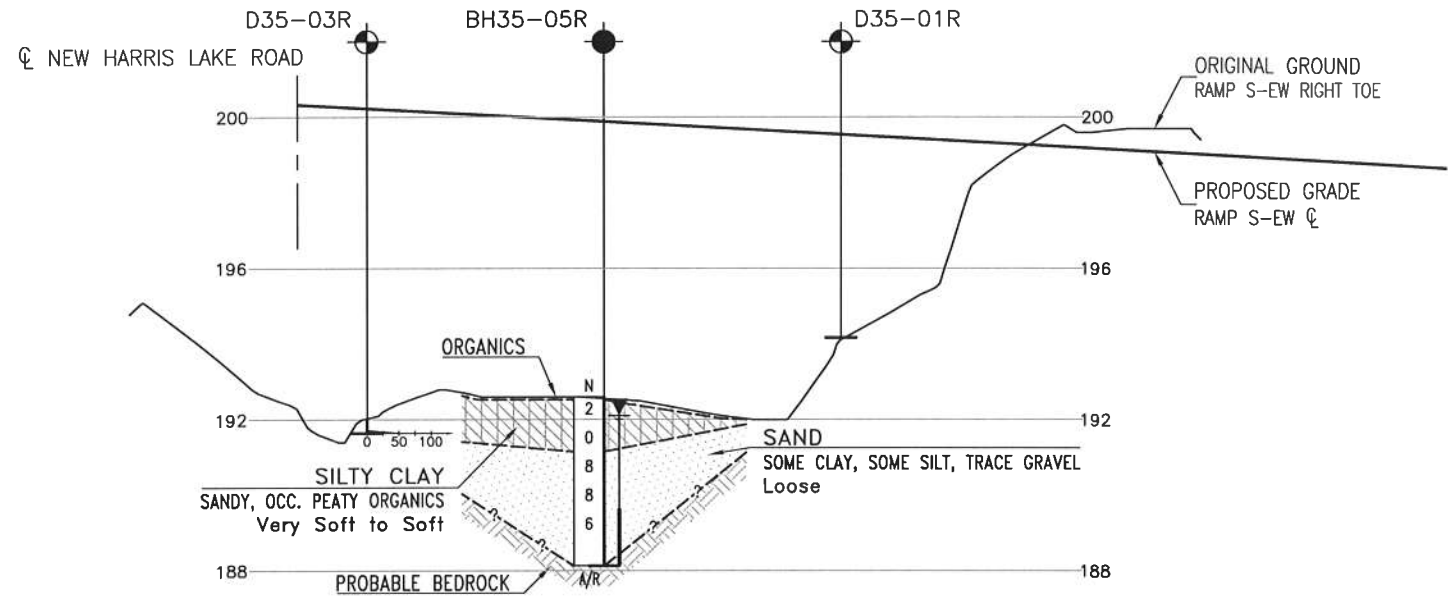
Date December 2012
 GWP# 5294-08-00



Prep'd MFA
 Chkd. MRA



PLAN
0 16 32 48m
SCALE 1:800



PROFILE ALONG RIGHT TOE RAMP S-EW
0 16 32 48m H 1:800
0 4 8 12m V 1:200

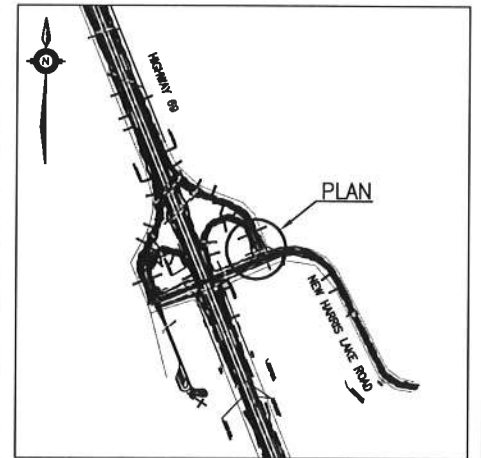
METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
GWP No 5294-08-00

HIGHWAY 69 FOUR-LANING
HARRIS LAKE RD RAMP S-EW-RT TOE
(STA 12+120 - 12+195)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



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

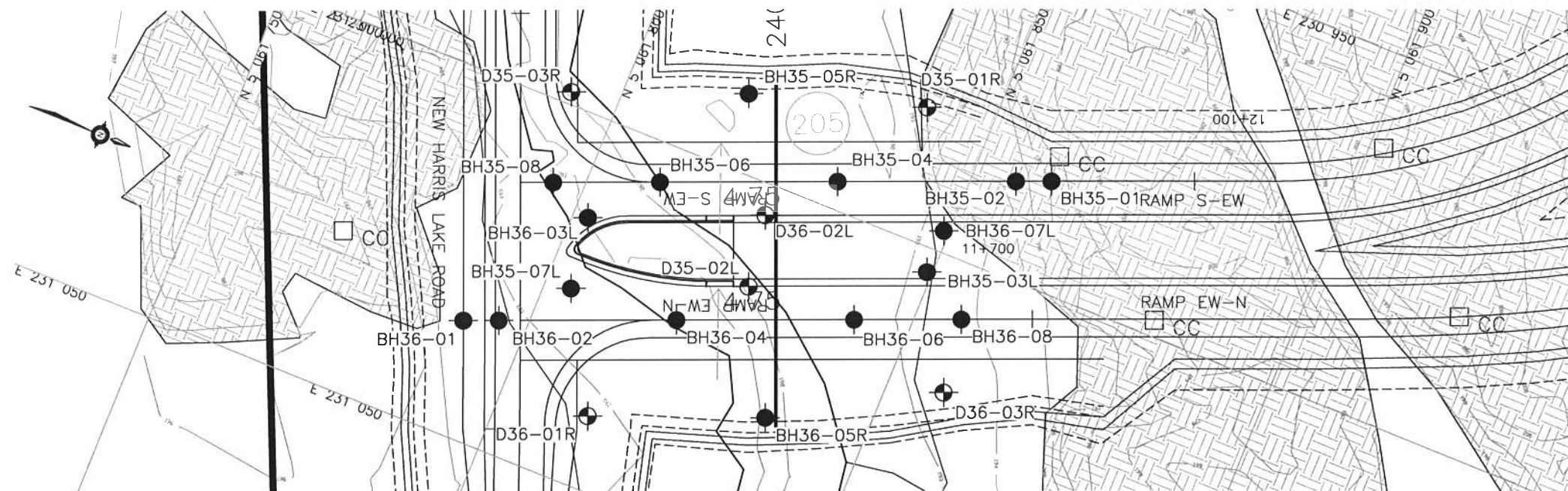
NO	ELEVATION	NORTHING	EASTING
BH35-01	197.2	5 061 860.7	230 984.9
BH35-02	195.4	5 061 856.0	230 986.8
BH35-03L	193.2	5 061 849.2	231 003.3
BH35-04	192.4	5 061 832.8	230 996.1
BH35-05R	192.6	5 061 816.6	230 989.2
BH35-06	192.2	5 061 809.7	231 005.5
BH35-07L	192.6	5 061 803.7	231 024.1
BH35-08	192.3	5 061 795.8	231 011.1
D35-01R	194.2	5 061 840.5	230 981.7
D35-02L	192.2	5 061 826.8	231 014.5
D35-03R	192.0	5 061 793.3	230 998.3

-NOTES-

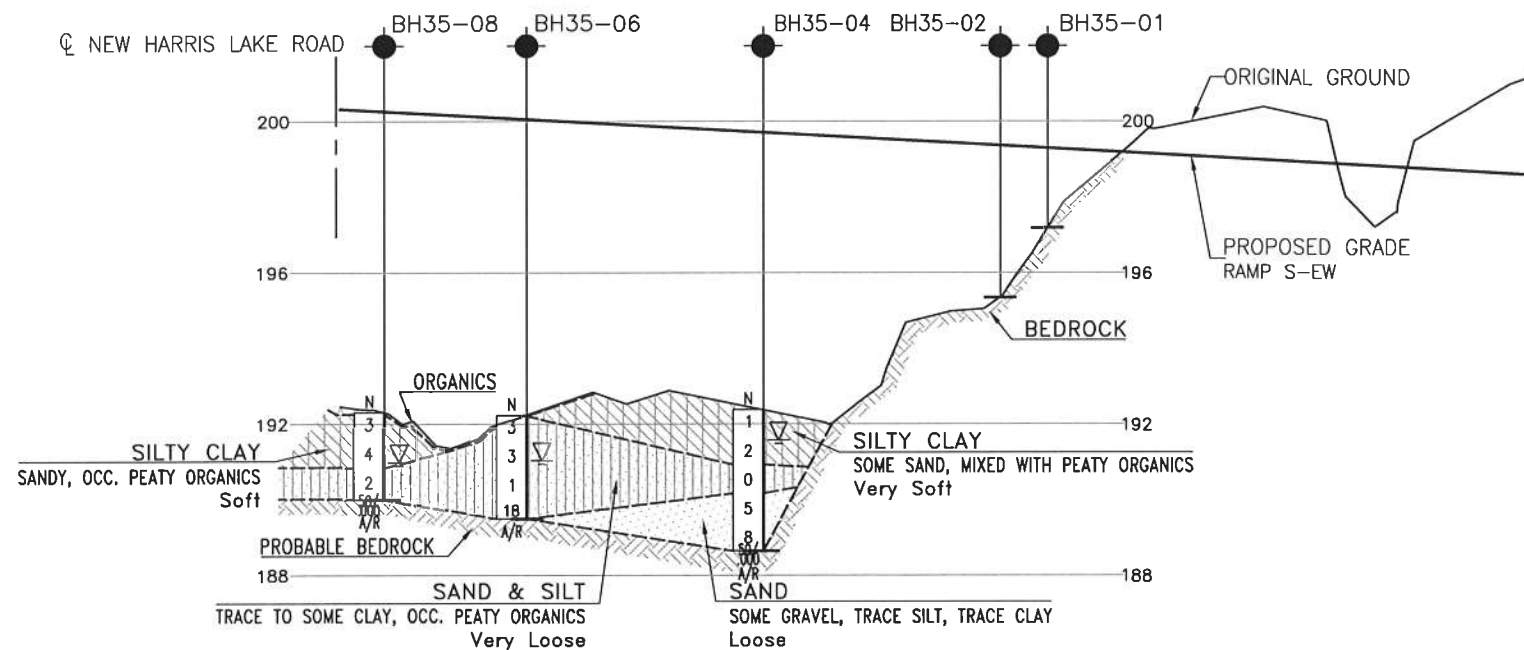
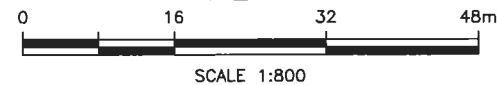
- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 41H-99

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



PLAN



PROFILE ALONG CL RAMP S-EW



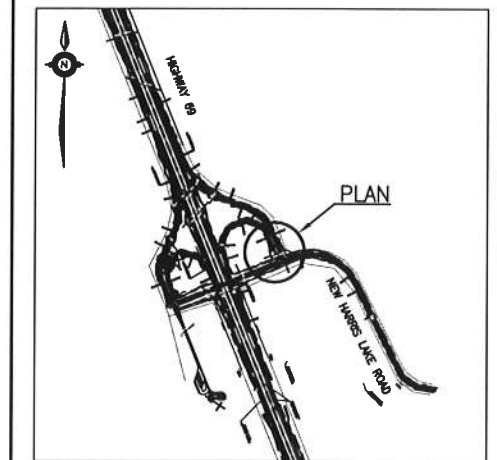
METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
GWP No 5294-08-00

HIGHWAY 69 FOUR-LANING
HARRIS LAKE RD RAMP S-EW
(STA 12+120 - 12+195)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH35-01	197.2	5 061 860.7	230 984.9
BH35-02	195.4	5 061 856.0	230 986.8
BH35-03L	193.2	5 061 849.2	231 003.3
BH35-04	192.4	5 061 832.8	230 996.1
BH35-05R	192.6	5 061 816.6	230 989.2
BH35-06	192.2	5 061 809.7	231 005.5
BH35-07L	192.6	5 061 803.7	231 024.1
BH35-08	192.3	5 061 795.8	231 011.1
D35-01R	194.2	5 061 840.5	230 981.7
D35-02L	192.2	5 061 826.8	231 014.5
D35-03R	192.0	5 061 793.3	230 998.3

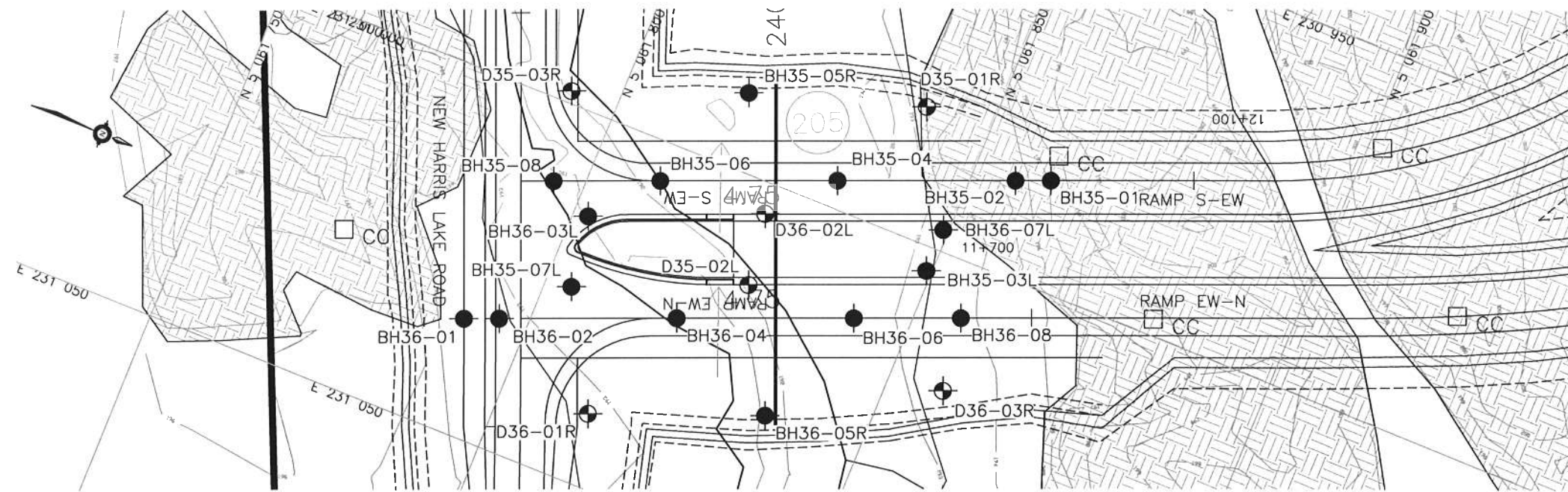
-NOTES-

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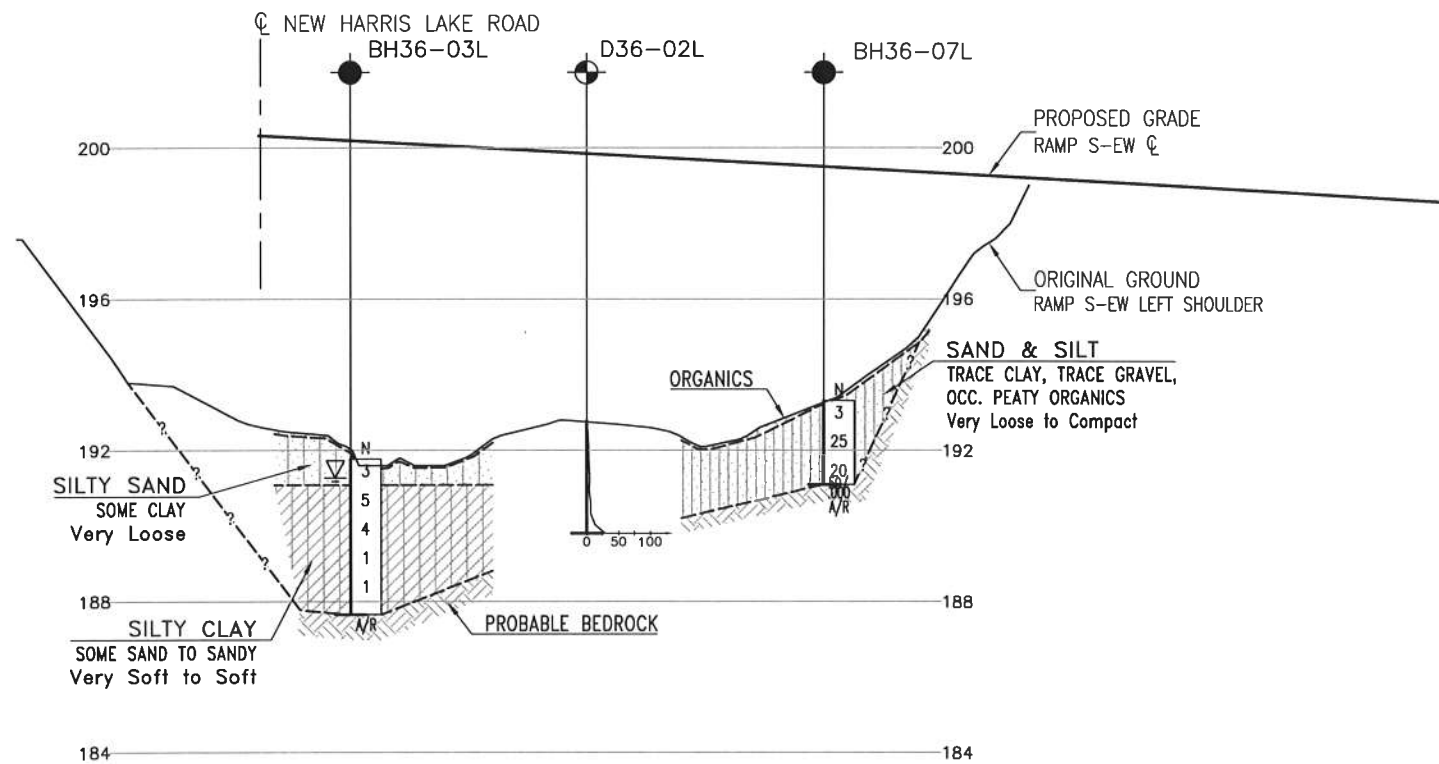
GEOCREs No. 41H-99

REVISIONS	DATE	BY	DESCRIPTION
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DRAWN	MFA	CHK PKC	SITE
			LOAD
			DATE
			DEC. 2012
			STRUCT
			DWG

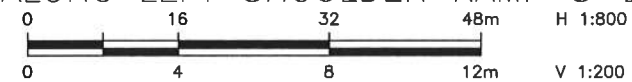




PLAN



PROFILE ALONG LEFT SHOULDER RAMP S-EW



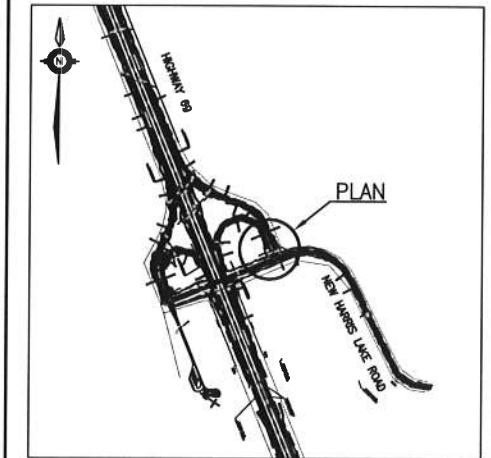
METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
GWP No 5294-08-00

HIGHWAY 69 FOUR-LANING
HARRIS LAKE RD RAMP S-EW-LT SHLDR
(STA 12+120 - 12+195)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



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

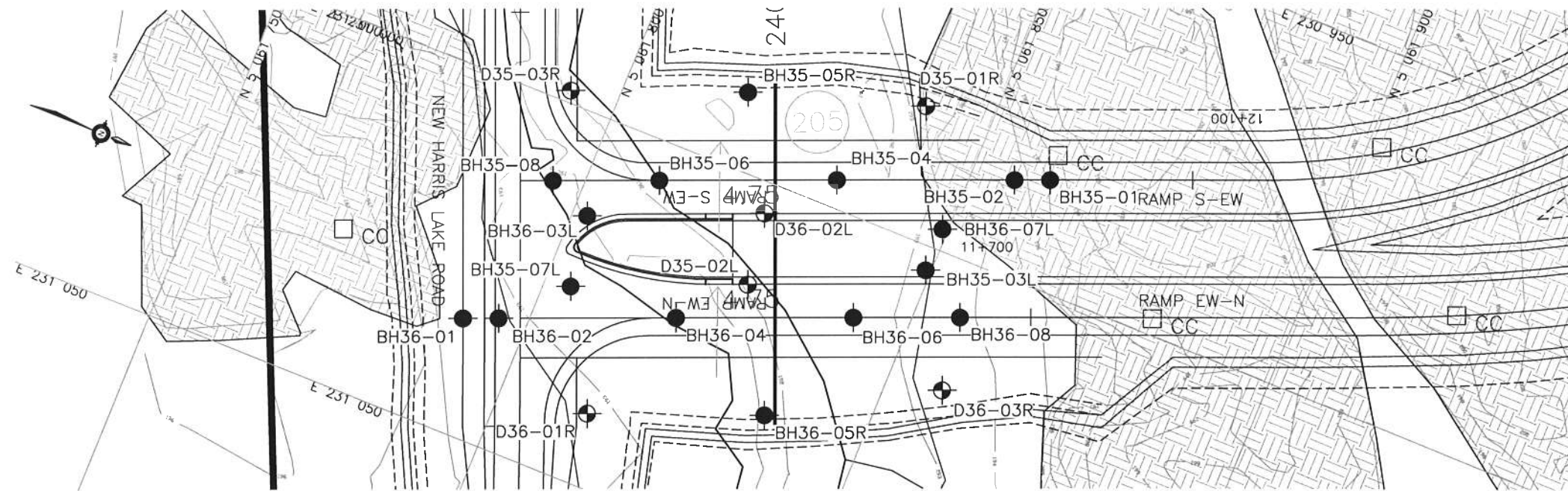
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BH35-02	195.4	5 061 856.0	230 986.8
BH35-03L	193.2	5 061 849.2	231 003.3
BH35-04	192.4	5 061 832.8	230 996.1
BH35-05R	192.6	5 061 816.6	230 989.2
BH35-06	192.2	5 061 809.7	231 005.5
BH35-07L	192.6	5 061 803.7	231 024.1
BH35-08	192.3	5 061 795.8	231 011.1
D35-01R	194.2	5 061 840.5	230 981.7
D35-02L	192.2	5 061 826.8	231 014.5
D35-03R	192.0	5 061 793.3	230 998.3
BH36-03L	191.8	5 061 802.1	231 013.9
BH36-07L	193.3	5 061 849.2	230 997.1
D36-02L	192.8	5 061 825.2	231 004.3

-NOTES-

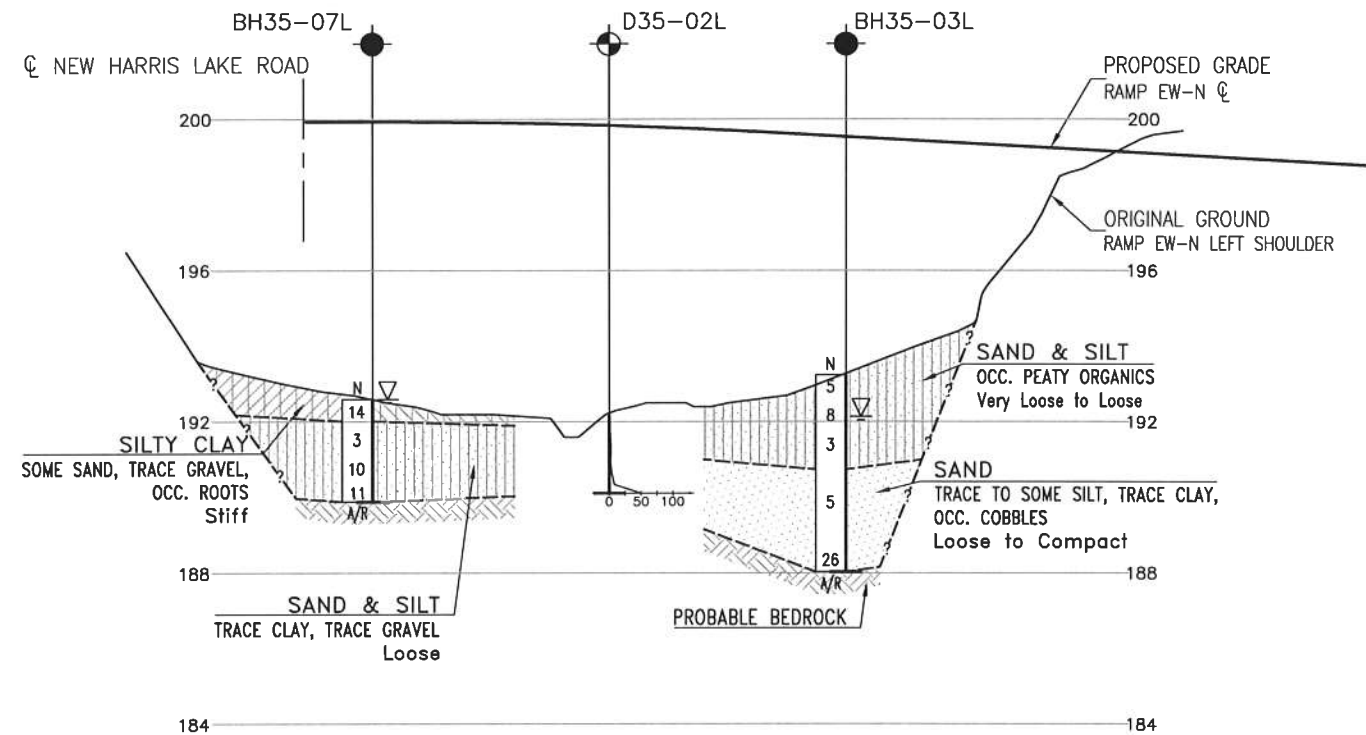
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GEOCRES No. 41H-99

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



PLAN
0 16 32 48m
SCALE 1:800



PROFILE ALONG LEFT SHOULDER RAMP EW-N

0 16 32 48m H 1:800
0 4 8 12m V 1:200

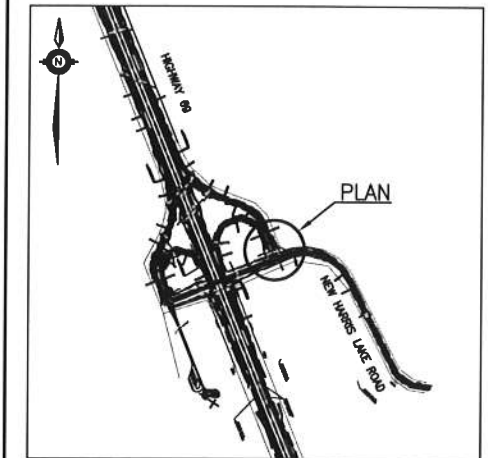
METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
GWP No 5294-08-00

HIGHWAY 69 FOUR-LANING
HARRIS LAKE RD RAMP EW-N-LT SHLDR
(STA 11+620 - 11+690)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH36-01	193.6	5 061 791.3	231 033.9
BH36-02	193.3	5 061 796.0	231 032.1
BH36-03L	191.8	5 061 802.1	231 013.9
BH36-04	192.3	5 061 819.1	231 022.7
BH36-05R	191.8	5 061 835.9	231 030.8
BH36-06	192.7	5 061 842.3	231 013.3
BH36-07L	193.3	5 061 849.2	230 997.1
BH36-08	193.8	5 061 856.2	231 007.7
D36-01R	193.1	5 061 812.6	231 039.9
D36-02L	192.8	5 061 825.2	231 004.3
D36-03R	193.4	5 061 857.8	231 018.2
BH35-03L	193.2	5 061 849.2	231 003.3
BH35-07L	192.6	5 061 803.7	231 024.1
D35-02L	192.2	5 061 826.8	231 014.5

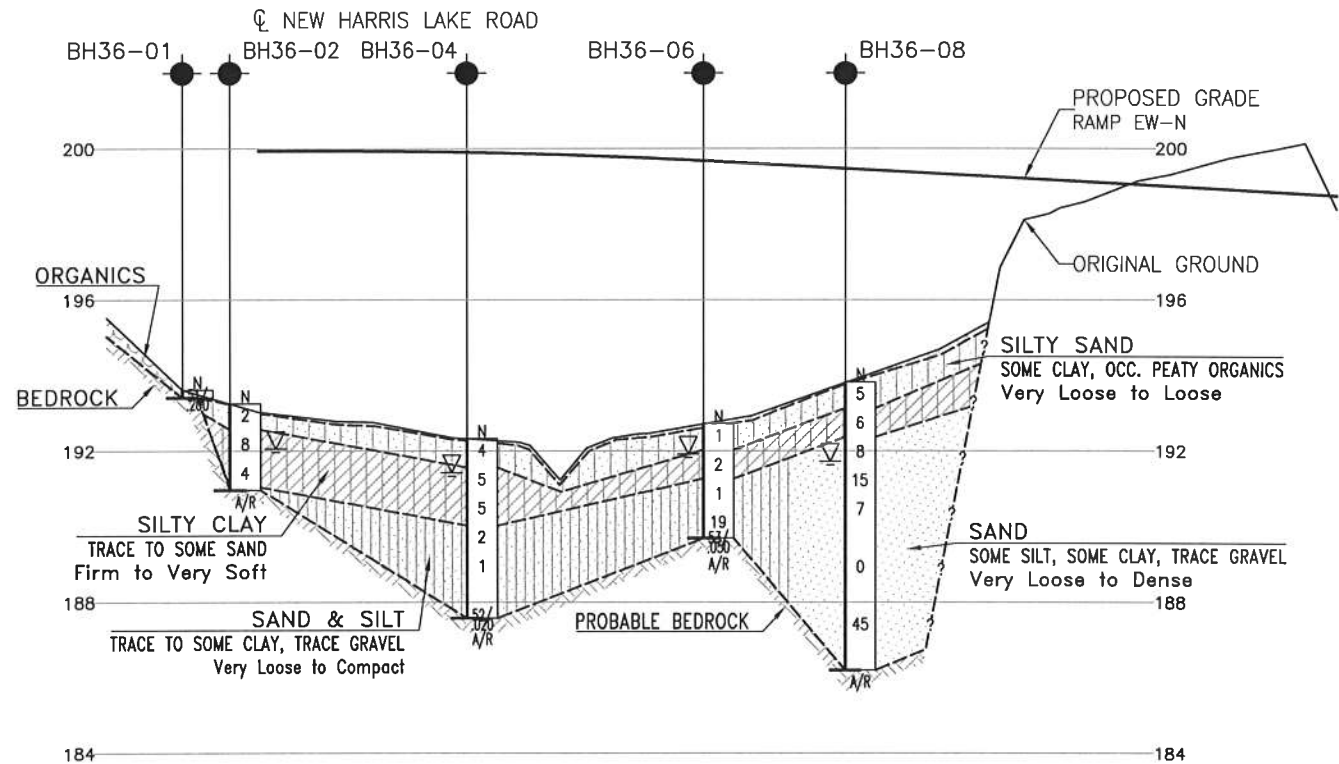
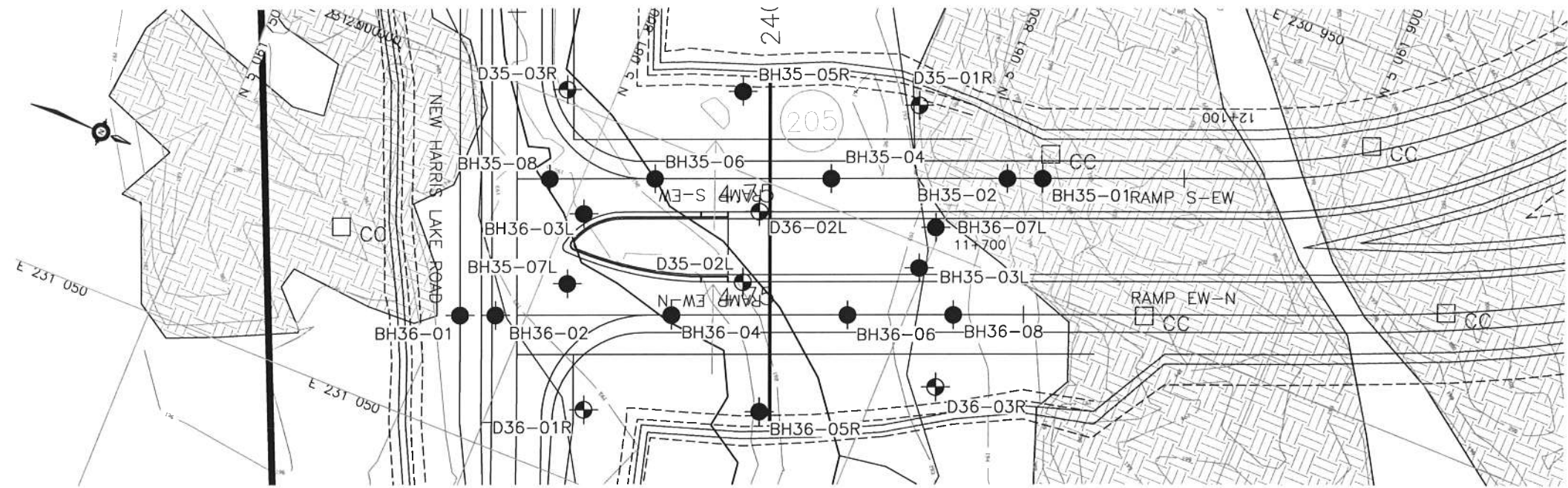
-NOTES-

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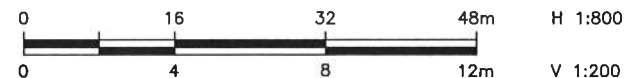
GEOCRES No. 41H-99

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



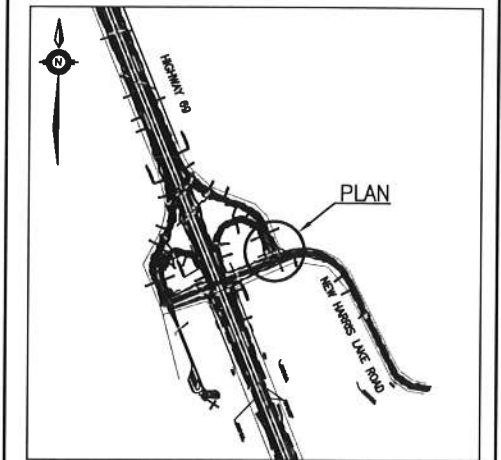


PROFILE ALONG CL RAMP EW-N



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

CONT No
GWP No 5294-08-00
HIGHWAY 69 FOUR-LANING
HARRIS LAKE RD RAMP EW-N
(STA 11+620 - 11+690)
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
W	Water Level
HA	Head Artesian Water
P	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

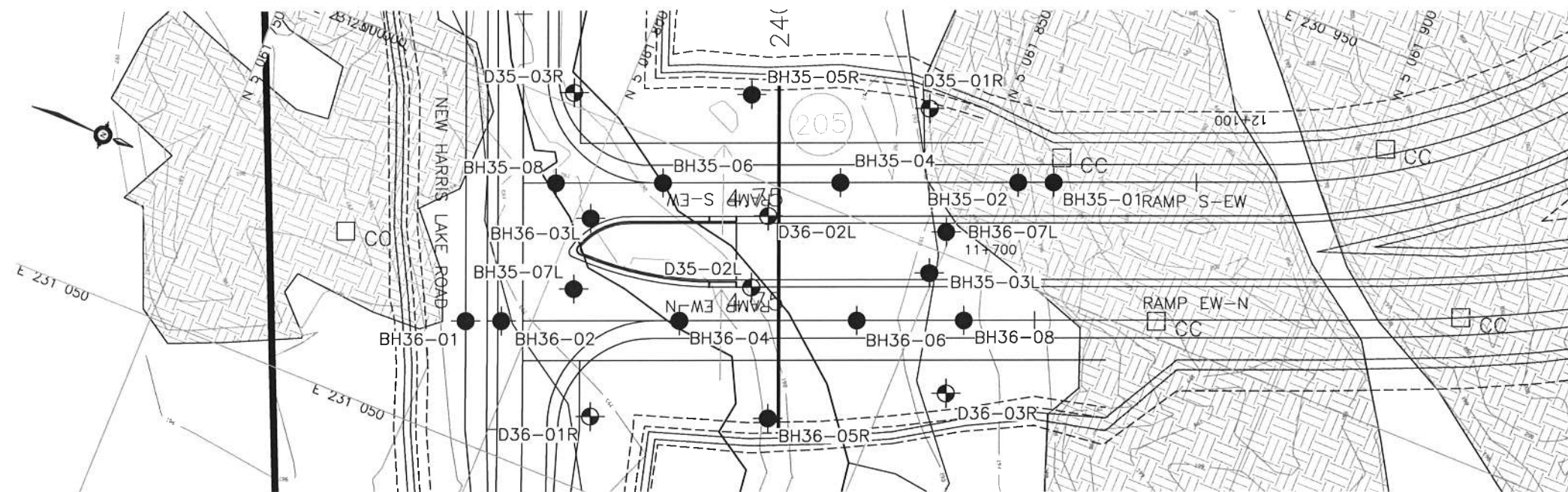
NO	ELEVATION	NORTHING	EASTING
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BH36-02	193.3	5 061 796.0	231 032.1
BH36-03L	191.8	5 061 802.1	231 013.9
BH36-04	192.3	5 061 819.1	231 022.7
BH36-05R	191.8	5 061 835.9	231 030.8
BH36-06	192.7	5 061 842.3	231 013.3
BH36-07L	193.3	5 061 849.2	230 997.1
BH36-08	193.8	5 061 856.2	231 007.7
D36-01R	193.1	5 061 812.6	231 039.9
D36-02L	192.8	5 061 825.2	231 004.3
D36-03R	193.4	5 061 857.8	231 018.2

-NOTES-

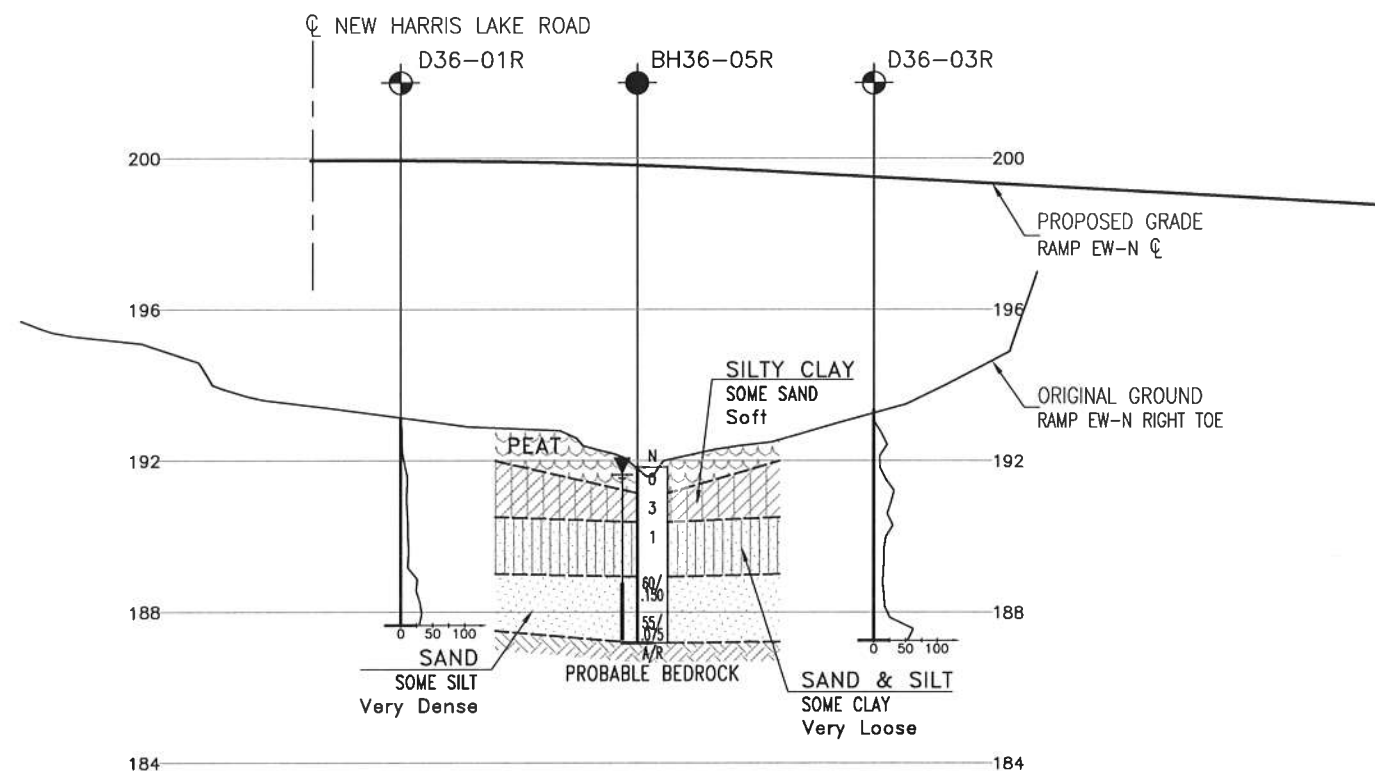
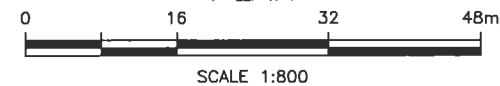
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GEOCRES No. 41H-99

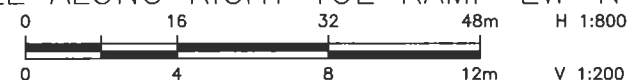
REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



PLAN



PROFILE ALONG RIGHT TOE RAMP EW-N



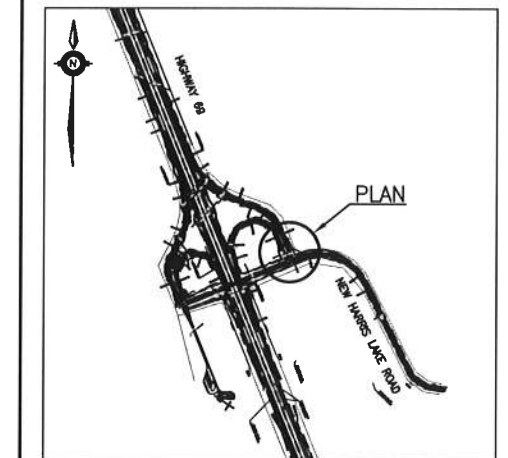
METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
GWP No 5294-08-00

HIGHWAY 69 FOUR-LANING
HARRIS LAKE RD RAMP EW-N-RT TOE
(STA 11+620 - 11+690)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH36-01	193.6	5 061 791.3	231 033.9
BH36-02	193.3	5 061 796.0	231 032.1
BH36-03L	191.8	5 061 802.1	231 013.9
BH36-04	192.3	5 061 819.1	231 022.7
BH36-05R	191.8	5 061 835.9	231 030.8
BH36-06	192.7	5 061 842.3	231 013.3
BH36-07L	193.3	5 061 849.2	230 997.1
BH36-08	193.8	5 061 856.2	231 007.7
D36-01R	193.1	5 061 812.6	231 039.9
D36-02L	192.8	5 061 825.2	231 004.3
D36-03R	193.4	5 061 857.8	231 018.2

-NOTES-

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- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 41H-99

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



Appendix Q

Harris Lake Road

Ramp EW-S, Sta. 12+070 to 12+110

Ramp N-EW, Sta. 11+650 to 11+690

Boreholes 37-01 to 37-05, 38-01 to 38-05

DCPTs D37-01R, D38-01R, D38-02L

Record of Borehole Sheets

Laboratory Test Results

Borehole Locations and Soil Strata Drawings

METRIC

[illegible]

METRIC

[illegible][illegible]


+³, ×³; Numbers refer to Sensitivity

RECORD OF BOREHOLE No BH37-03L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., E/W-S Ramp, Station 12+087.5 O/S 7.1L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY AN
 DATUM Geodetic DATE 2008.10.02 - 2008.10.02 CHECKED BY RPR

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 (%)				
196.0	Ground Surface														
0.0	ORGANICS: (300mm)														
195.7	Brown														
0.3	BEDROCK AT 0.3m.														

METRIC

[illegible]

RECORD OF BOREHOLE No BH37-05

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., E/W-S Ramp, Station 12+110 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.10.02 - 2008.10.02 CHECKED BY RPR

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									
193.4	Ground Surface							20	40	60	80	100					
0.0	ORGANICS: (75mm)							20	40	60	80	100					
0.1	SAND, some silt, trace clay, occasional peaty organics Very Loose to Very Dense Brown Moist		1	SS	4		193										
192.2			2	SS	64												0 90 10
1.2	END OF BOREHOLE (SAMPLER BOUNCING) AT 1.2m ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.																(SI+CL)

+ 3, X 3 : Numbers refer to
Sensitivity

20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No D37-01R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., E/W-S Ramp, Station 12+087.5 O/S 9.4R ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.10.02 - 2008.10.02 CHECKED BY RPR

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									
195.4	Ground Surface						20	40	60	80	100	W _p	W	W _L			
0.0	BEDROCK EXPOSED AT SURFACE.																

ONTMT4S 6121.GPJ 12/12/12

RECORD OF BOREHOLE No BH38-01

1 OF 1



METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., N-E/W Ramp, Station 11+650 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.10.02 - 2008.10.02 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100					
193.4	Ground Surface																
0.0	SAND, trace silt, trace clay, trace gravel, occasional rootlets		1	SS	5/												GR SA SI CL
193.0	Brown				250												4 86 8 2
0.4	Moist																
	END OF BOREHOLE (SAMPLER BOUNCING) AT 0.4m ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.																

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

METRIC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT		UNIT WEIGHT	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20 40 60 80 100	W _p W W _L	WATER CONTENT (%)		
195.4	Ground Surface											

[illegible]

ONTMT4S 6121.GPJ 12/11/12

+ 3, x 3: Numbers refer to Sensitivity

METRIC

[illegible]

METRIC

[illegible]

RECORD OF BOREHOLE No BH38-05

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., N-E/W Ramp, Station 11+690 C/L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY AN
DATUM Geodetic DATE 2008.10.02 - 2008.10.02 CHECKED BY RPR

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				
198.3	Ground Surface							20 40 60 80 100						
198.0	<div>ORGANICS: (25mm)</div> <div>BEDROCK AT 0.025m.</div>							20 40 60 80 100						

RECORD OF BOREHOLE No D38-01R

1 OF 1


METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., N-E/W Ramp, Station 11+662.5 O/S 11.6R ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.10.02 - 2008.10.02 CHECKED BY RPR

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						
194.5	Ground Surface							20 40 60 80 100						
8.8	BEDROCK AT 0.04m.							20 40 60 80 100						

ONTMT4S 6121.GPJ 12/12/12

METRIC

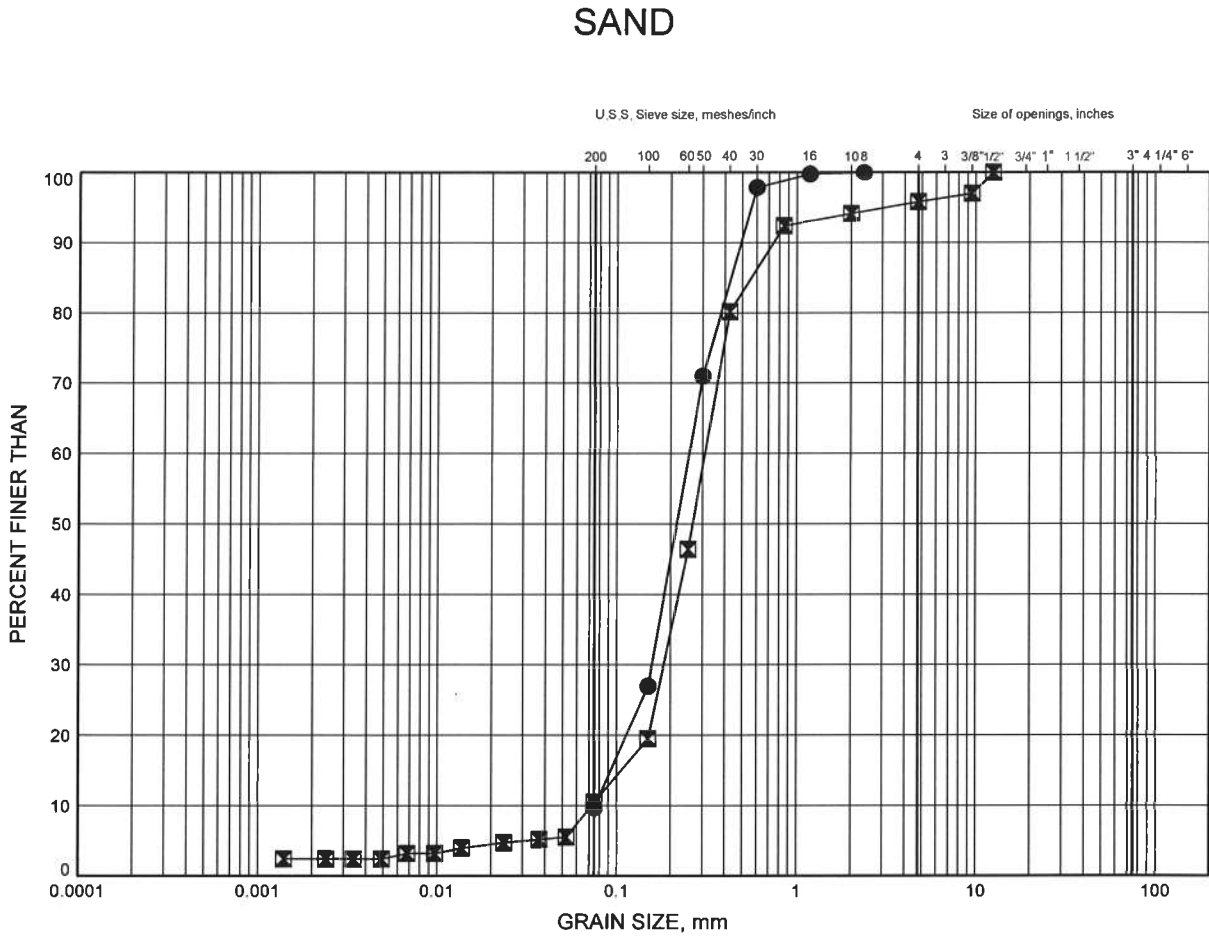
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT	UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI C	
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES				W _p W W _L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

ONTMT4S 6121.GPJ 12/12/12

+³, ×³: Numbers refer to Sensitivity

Hwy 69 Four-Laning North of Hwy 529
GRAIN SIZE DISTRIBUTION

FIGURE Q1



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

LEGEND

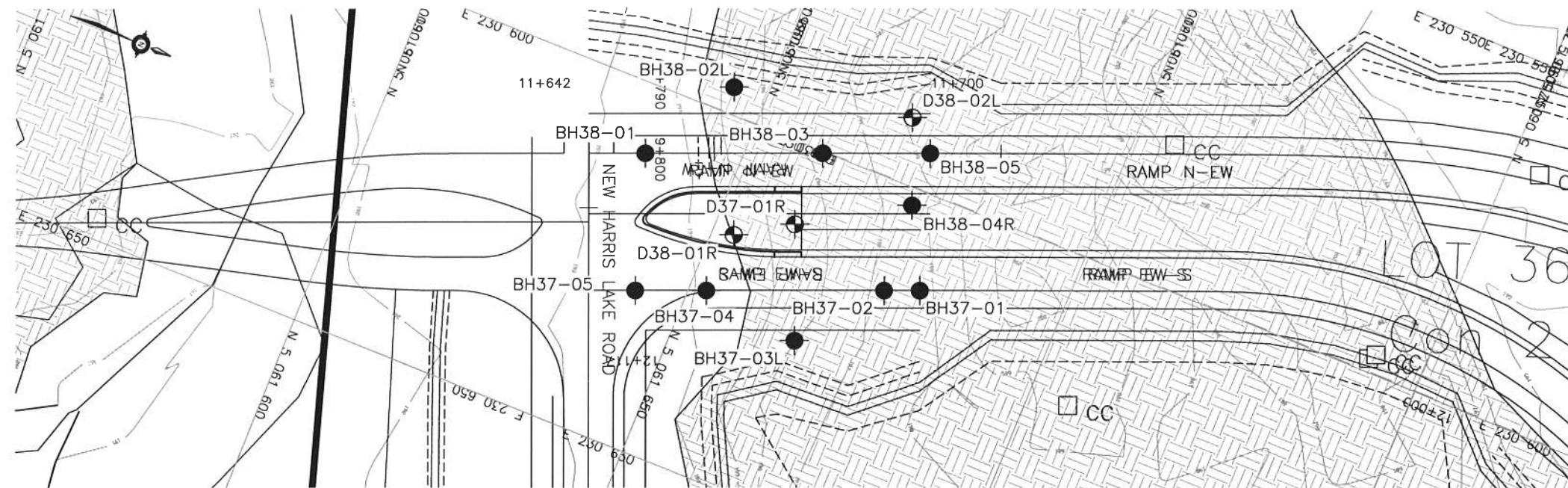
SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH37-05	1.07	192.33
■	BH38-01	0.20	193.20

GRAIN SIZE DISTRIBUTION - THURBER 6121 GPJ 12/13/12

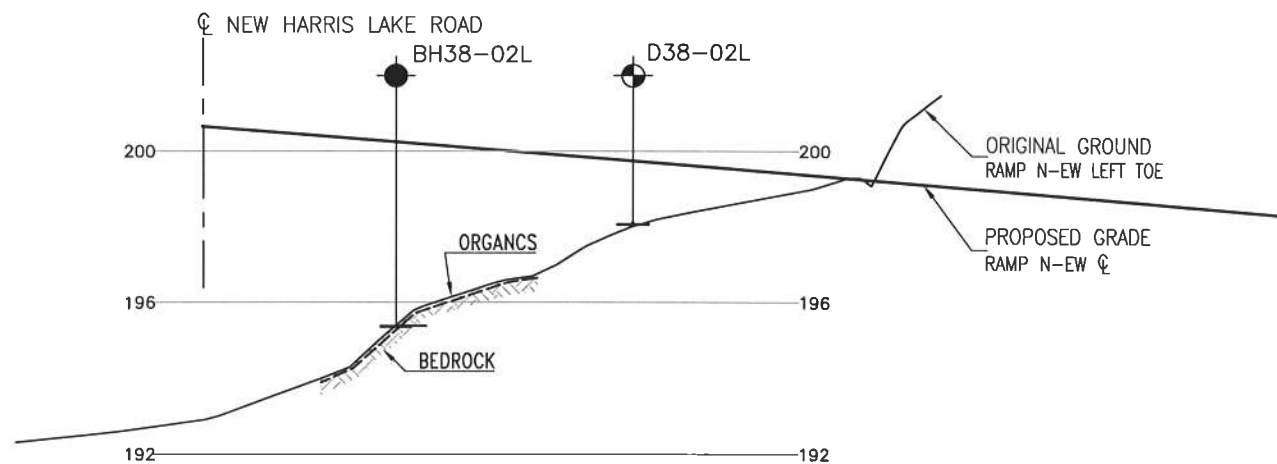
Date December 2012
 GWP# 5294-08-00



Prep'd MFA
 Chkd. MRA



PLAN



PROFILE ALONG LEFT TOE RAMP N-EW



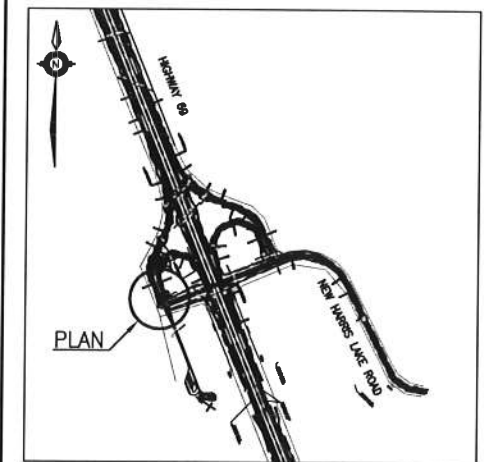
METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
GWP No 5294-08-00

HIGHWAY 69 FOUR-LANING
HARRIS LAKE RD RAMP N-EW-LT TOE
(STA 11+650 - 11+690)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH38-01	193.4	5 061 637.1	230 609.6
BH38-02L	195.4	5 061 645.2	230 596.2
BH38-03	196.2	5 061 660.3	230 600.2
BH38-04R	197.5	5 061 674.6	230 602.4
BH38-05	198.3	5 061 674.2	230 594.6
D38-01R	194.5	5 061 653.0	230 615.7
D38-02L	198.1	5 061 670.0	230 590.8

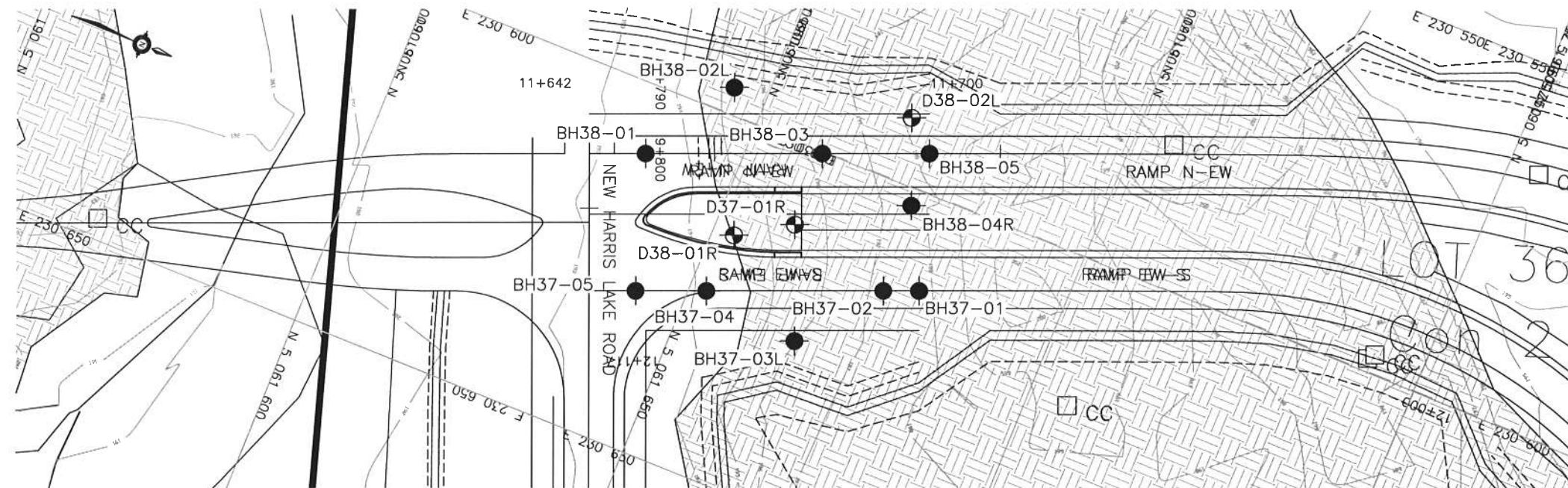
-NOTES-

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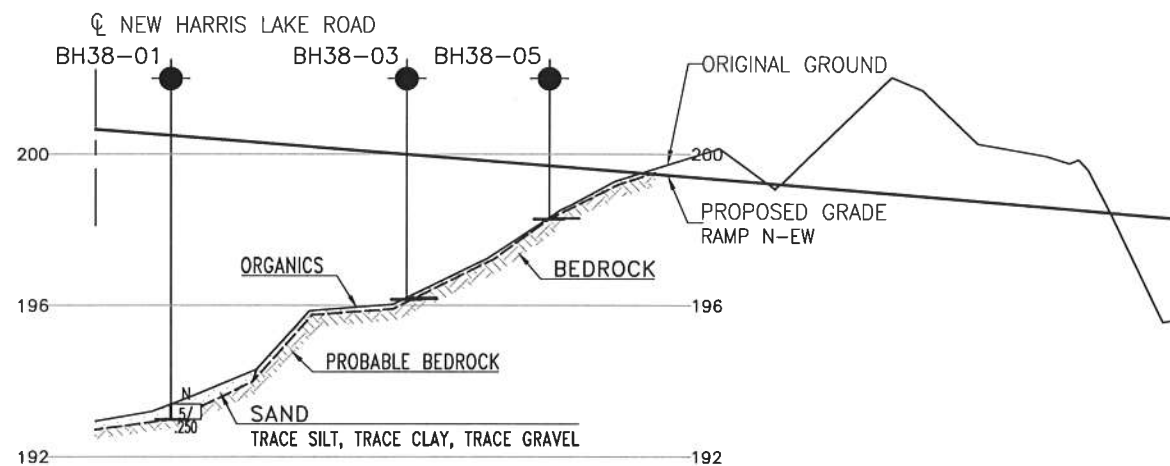
GEOCRES No. 41H-99

REVISIONS	DATE	BY	DESCRIPTION
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			LOAD
			STRUCT
			DWG
			DATE DEC. 2012

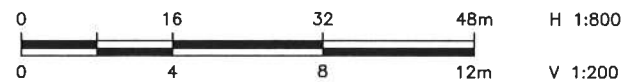




PLAN



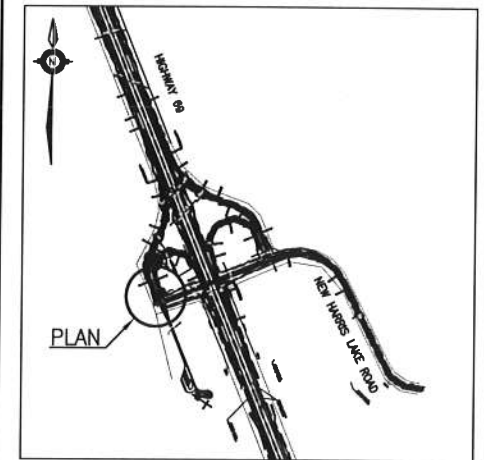
PROFILE ALONG C/RAMP N-EW



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

CONT No
GWP No 5294-08-00

HIGHWAY 69 FOUR-LANING
RAMP N-EW-C
(STA 11+650 - 11+690)
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
W	Water Level
↑	Head Artesian Water
⊥	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

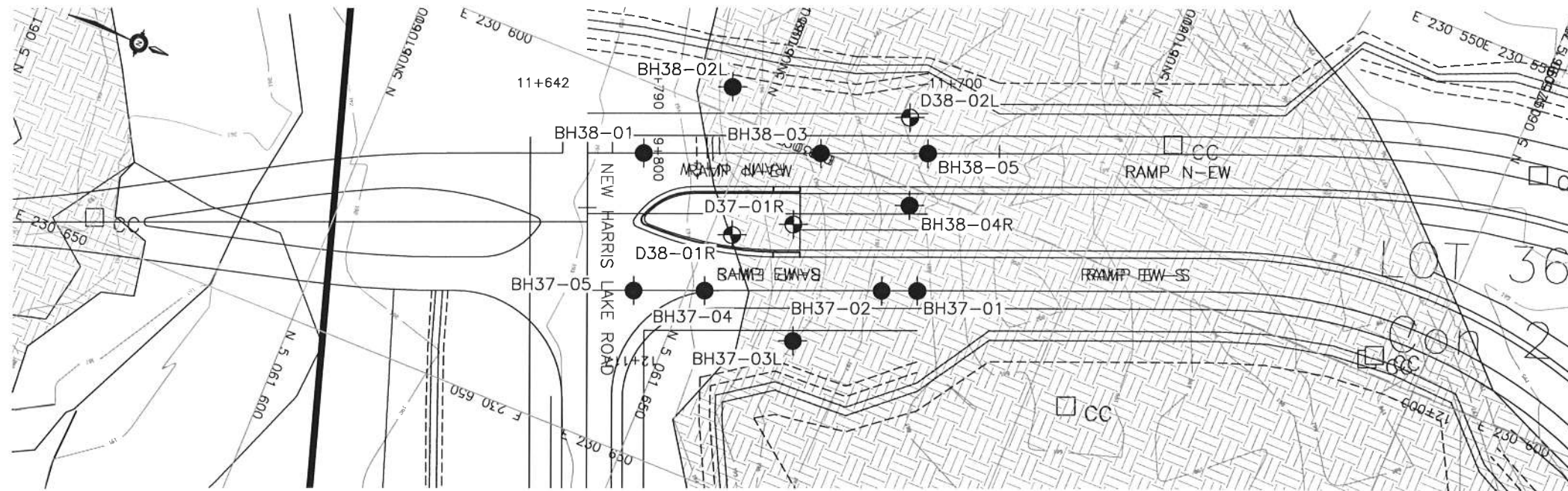
NO	ELEVATION	NORTHING	EASTING
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BH38-02L	195.4	5 061 645.2	230 596.2
BH38-03	196.2	5 061 660.3	230 600.2
BH38-04R	197.5	5 061 674.6	230 602.4
BH38-05	198.3	5 061 674.2	230 594.6
D38-01R	194.5	5 061 653.0	230 615.7
D38-02L	198.1	5 061 670.0	230 590.8

-NOTES-

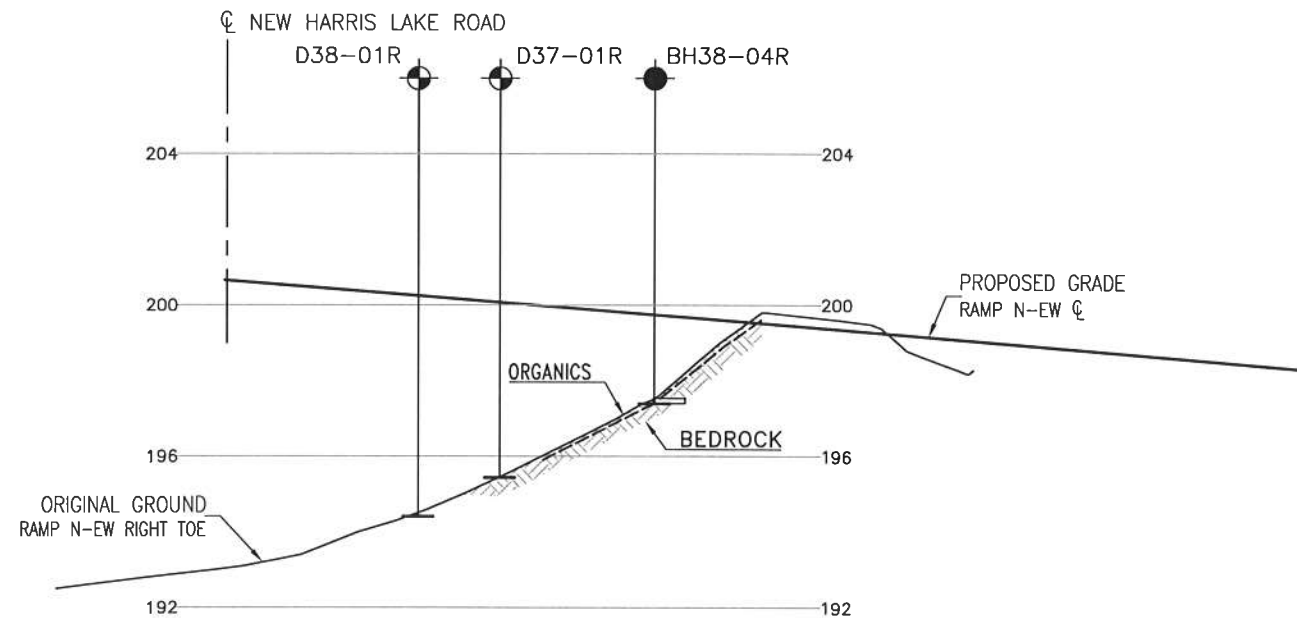
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GEOCRES No. 41H-99

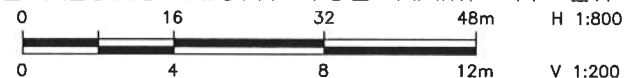
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DESIGN	RPR	CHK AEG	CODE
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			STRUCT
			DWG
			DATE DEC. 2012



PLAN



PROFILE ALONG RIGHT TOE RAMP N-EW



METRIC

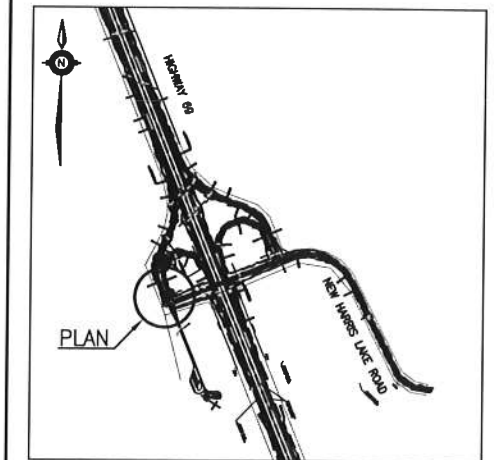
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
GWP No 5294-08-00

HIGHWAY 69 FOUR-LANING
HARRIS LAKE RD RAMP N-EW-RT TOE
(STA 11+650 - 11+690)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

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

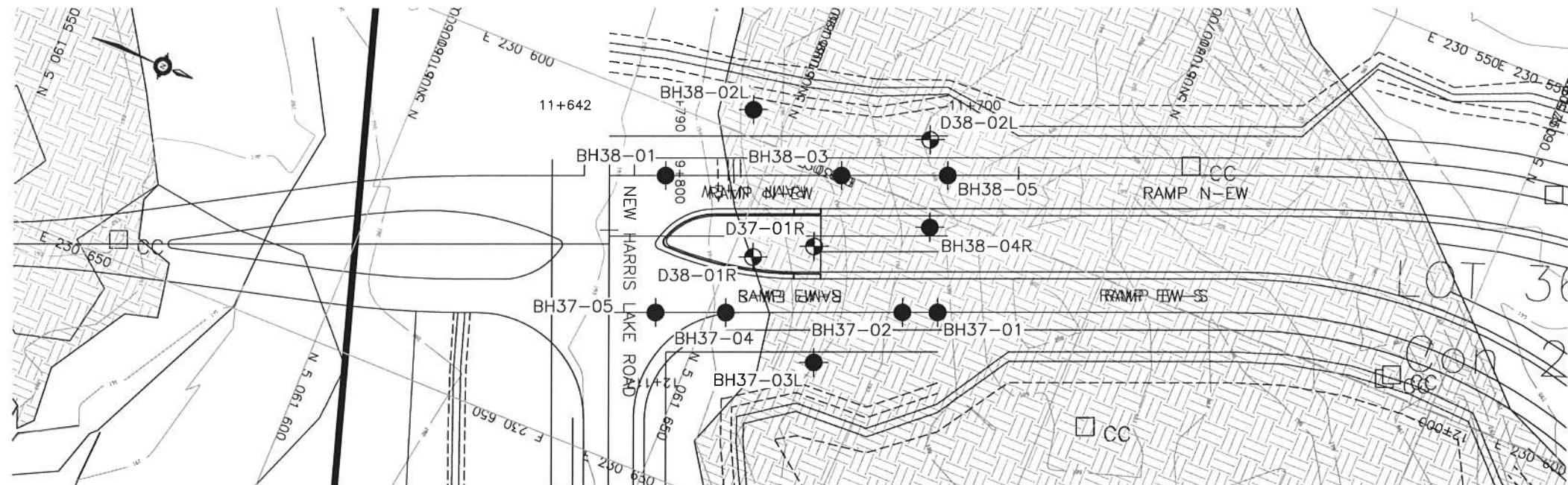
NO	ELEVATION	NORTHING	EASTING
BH38-01	193.4	5 061 637.1	230 609.6
BH38-02L	195.4	5 061 645.2	230 596.2
BH38-03	196.2	5 061 660.3	230 600.2
BH38-04R	197.5	5 061 674.6	230 602.4
BH38-05	198.3	5 061 674.2	230 594.6
D38-01R	194.5	5 061 653.0	230 615.7
D38-02L	198.1	5 061 670.0	230 590.8
D37-01R	195.4	5 061 660.5	230 611.0

-NOTES-

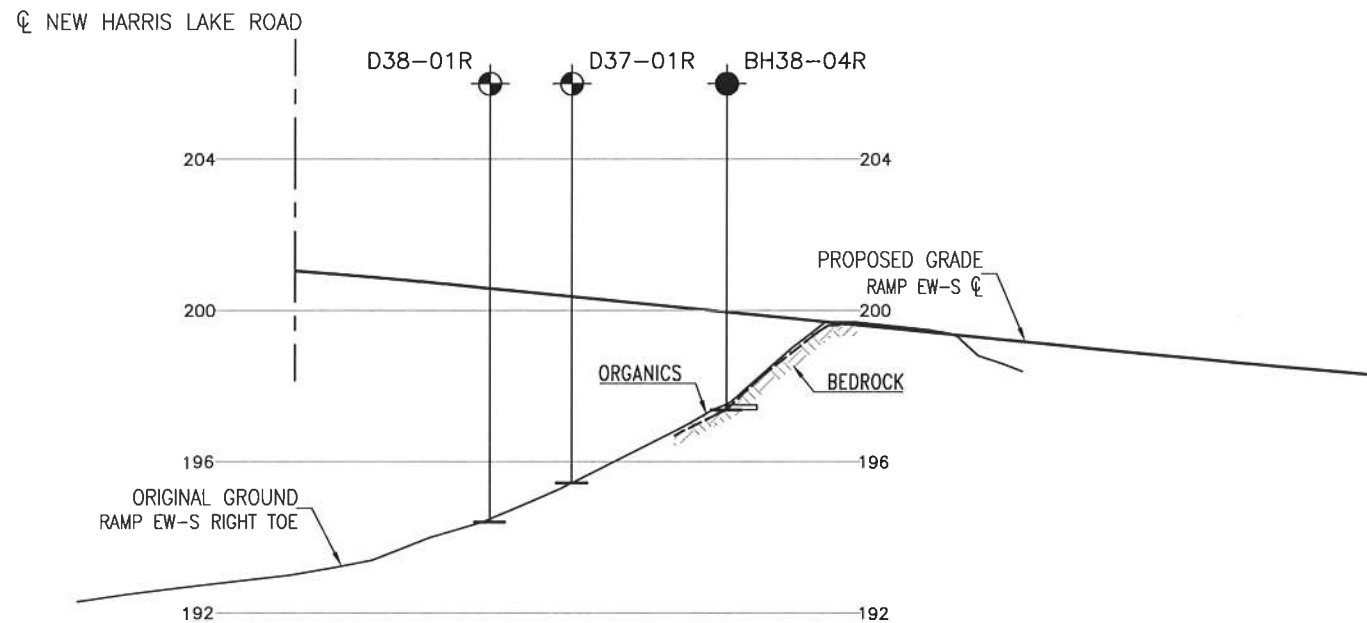
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GEOCRES No. 41H-99

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DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			STRUCT
			DWG
			DATE DEC. 2012



PLAN



PROFILE ALONG RIGHT TOE RAMP EW-S



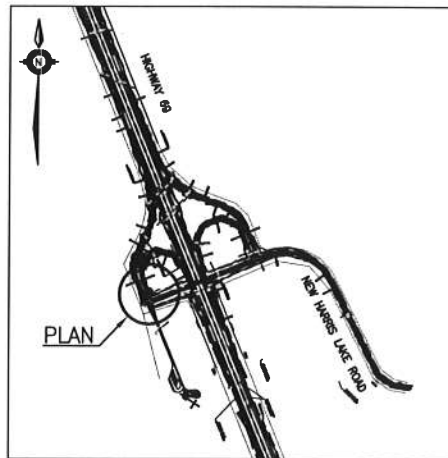
METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
GWP No 5294-08-00

HIGHWAY 69 FOUR-LANING
HARRIS LAKE RD RAMP EW-S-RT TOE
(STA 12+070 - 12+110)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



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

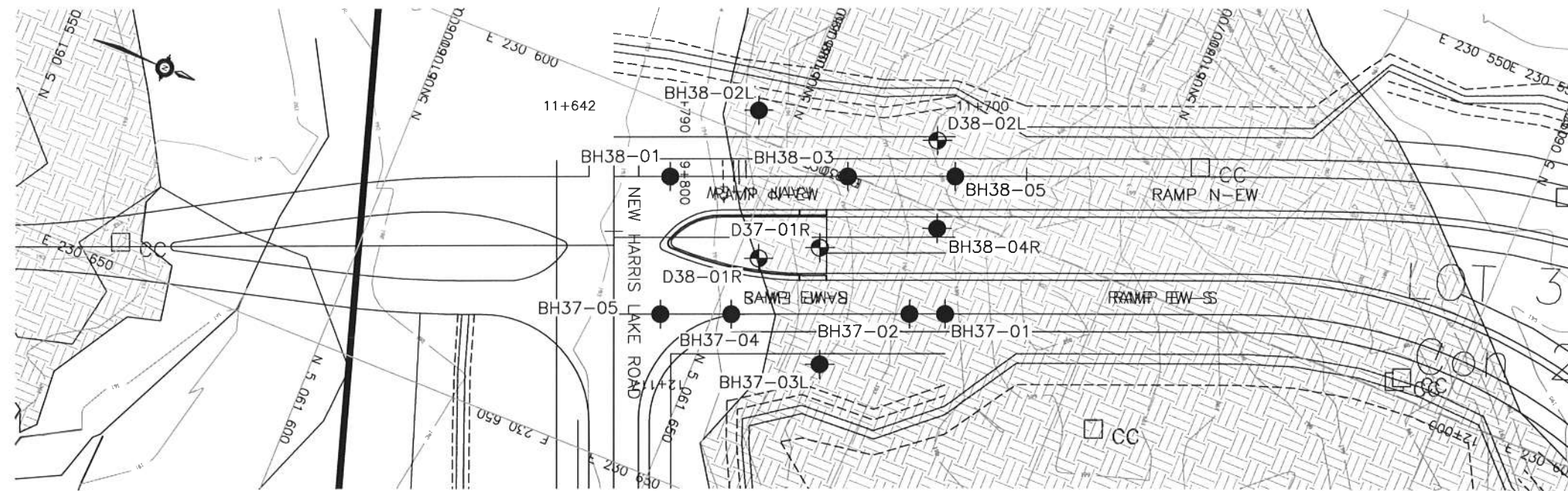
NO	ELEVATION	NORTHING	EASTING
BH37-01	197.7	5 061 680.2	230 613.2
BH37-02	197.2	5 061 675.6	230 615.1
BH37-03L	196.0	5 061 666.7	230 626.3
BH37-04	194.1	5 061 652.4	230 624.4
BH37-05	193.4	5 061 643.1	230 628.2
D37-01R	195.4	5 061 660.5	230 611.0
BH38-04R	197.5	5 061 674.6	230 602.4
D38-01R	194.5	5 061 653.0	230 615.7

-NOTES-

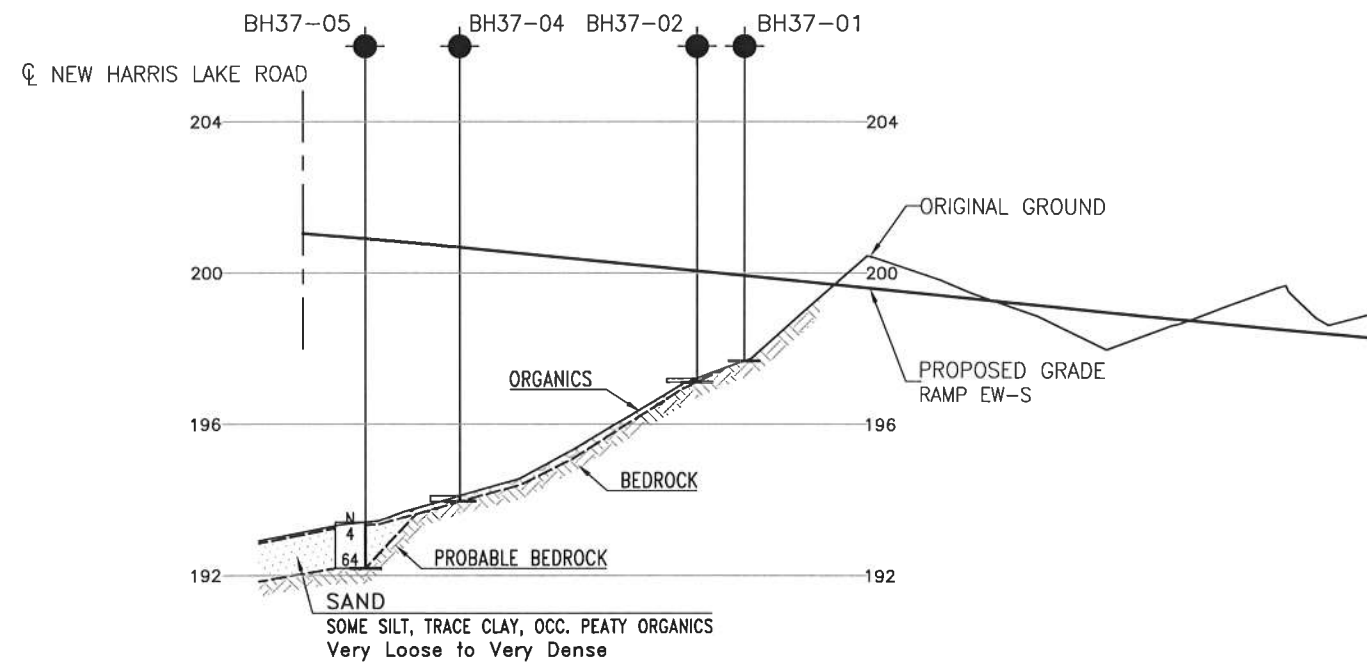
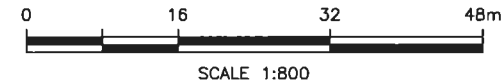
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GEOCRES No. 41H-99

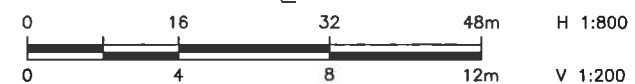
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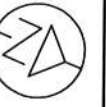
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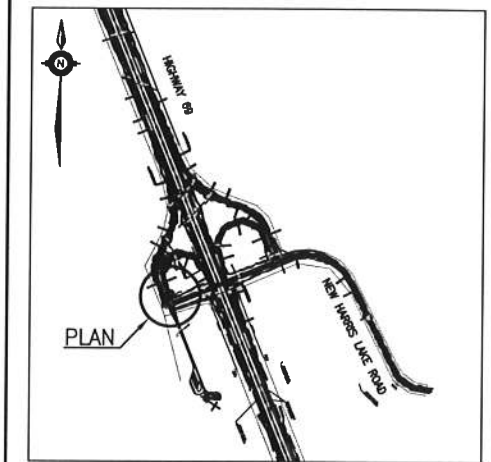
METRIC
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UNLESS OTHERWISE SHOWN

CONT No
GWP No 5294-08-00

HIGHWAY 69 FOUR-LANING
HARRIS LAKE RD RAMP EW-S-C
(STA 12+070 - 12+110)
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
BH37-01	197.7	5 061 680.2	230 613.2
BH37-02	197.2	5 061 675.6	230 615.1
BH37-03L	196.0	5 061 666.7	230 626.3
BH37-04	194.1	5 061 652.4	230 624.4
BH37-05	193.4	5 061 643.1	230 628.2
D37-01R	195.4	5 061 660.5	230 611.0

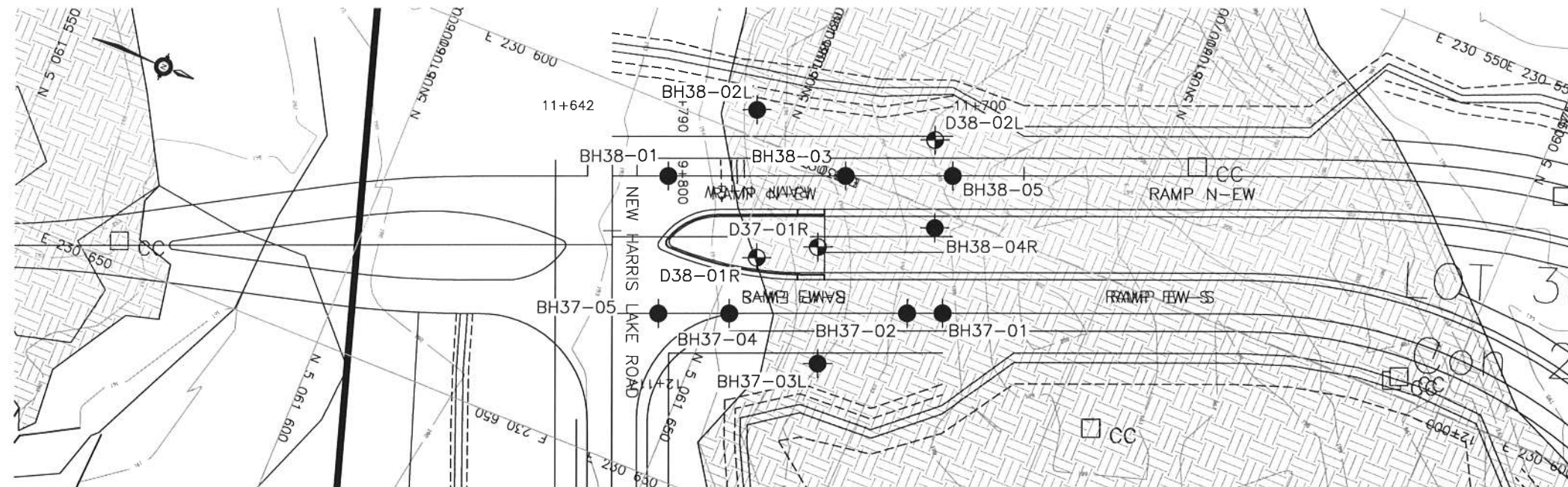
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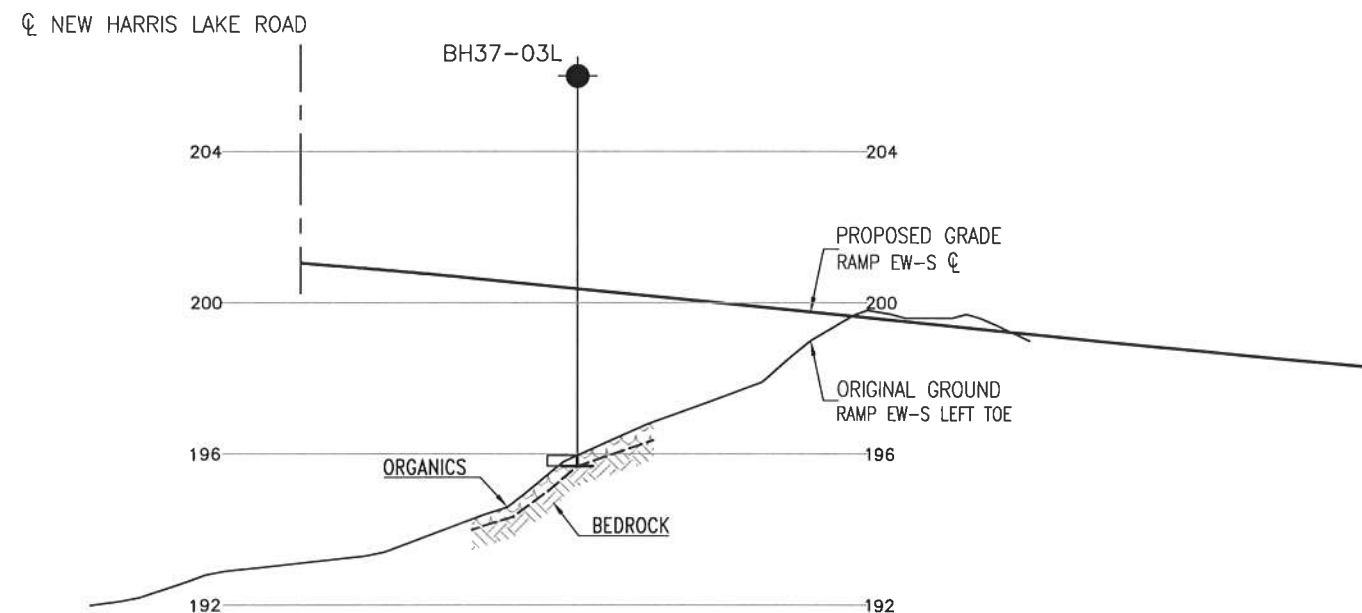
GEOCRES No. 41H-99

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
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			STRUCT
			DWG
			DATE DEC. 2012

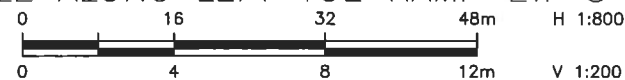




PLAN



PROFILE ALONG LEFT TOE RAMP EW-S



METRIC

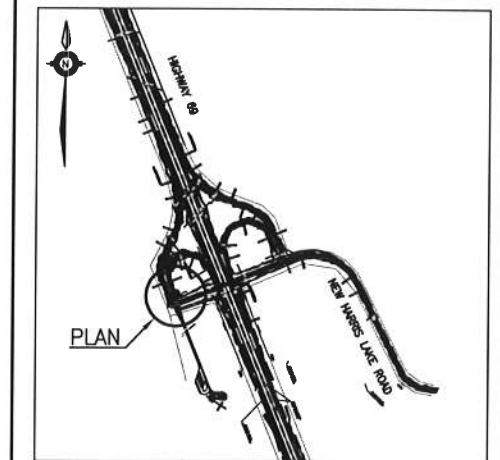
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AND/OR MILLIMETRES
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CONT No
GWP No 5294-08-00

HIGHWAY 69 FOUR-LANING
HARRIS LAKE RD RAMP EW-S-LT TOE
(STA 12+070 - 12+110)
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
W	Water Level
HA	Head Artesian Water
P	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
BH37-01	197.7	5 061 680.2	230 613.2
BH37-02	197.2	5 061 675.6	230 615.1
BH37-03L	196.0	5 061 666.7	230 626.3
BH37-04	194.1	5 061 652.4	230 624.4
BH37-05	193.4	5 061 643.1	230 628.2
D37-01R	195.4	5 061 660.5	230 611.0

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GEOCRES No. 41H-99

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			STRUCT
			DWG
			DATE DEC. 2012



Appendix R

**Harris Lake Road
Ramp N-EW, Sta. 11+840 to 11+910**

**Boreholes 39-01 to 39-09
DCPTs D39-01R to D39-03R**

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

METRIC

[illegible]

RECORD OF BOREHOLE No BH39-02

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., N-E/W Ramp, Station 11+850 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY AN
 DATUM Geodetic DATE 2008.10.03 - 2008.10.03 CHECKED BY RPR

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				
196.3	Ground Surface							20 40 60 80 100						
0.0	ORGANICS: (100mm)							○ UNCONFINED + FIELD VANE						
0.1	BEDROCK AT 0.1m.							● QUICK TRIAXIAL × LAB VANE						
		</												

ONTMT4S 6121.GPJ 12/11/12

+³, X³: Numbers refer to
Sensitivity

20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH39-03L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., N-E/W Ramp, Station 11+862.5 O/S 6.3L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY AN
 DATUM Geodetic DATE 2008.10.03 - 2008.10.03 CHECKED BY RPR

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		
196.1	Ground Surface													
0.0	ORGANICS: (300mm)						196							
195.8														
0.3	BEDROCK AT 0.3m.													

1 OF 1

METRIC

[illegible]

RECORD OF BOREHOLE No BH39-05R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., N-E/W Ramp, Station 11+887.5 O/S 6.3R ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY AN
 DATUM Geodetic DATE 2008.10.03 - 2008.10.03 CHECKED BY RPR


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 X LAB VANE					W _p	W		
194.3	Ground Surface						20	40	60	80	100					
0.0	BEDROCK AT SURFACE.															

RECORD OF BOREHOLE No BH39-06

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., N-E/W Ramp, Station 11+900 C/L ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2008.10.03 - 2008.10.03 CHECKED BY RPR

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 (%)
194.3	Ground Surface														
192.9	ORGANICS: (25mm) Silty CLAY , sandy, occasional topsoil, occasional rootlets Soft to Firm Brown		1	SS	3		194								0 33 32 35
			2	SS	8		193								
191.5	SAND and SILT , some clay Compact to Loose Brown to Grey Moist		3	SS	13		192								
			4	SS	6										
2.8	END OF BOREHOLE AT 2.8m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 1.3m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.														

RECORD OF BOREHOLE No BH39-07

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., N-E/W Ramp, Station 11+910 C/L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2008.10.03 - 2008.10.03 CHECKED BY RPR

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 (%)
194.3	Ground Surface							20	40	60	80	100					
194.0	ORGANICS , fibrous: (25mm) SAND , some silt, trace to some clay, trace gravel, occasional peaty organics Very Loose to Compact Grey		1	SS	1												
	Wet		2	SS	8												
			3	SS	16												5 70 25 (SI+CL)
			4	SS	12												
			5	SS	12												0 91 9 (SI+CL)
190.8	END OF BOREHOLE AT 3.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 0.8m UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Oct 29/08 0.3 194.0 Jan 16/09 Frozen at Surface Feb 19/09 Frozen at Surface Apr 21/09 0.1 194.2 Jun 04/09 0.3 194.0 Aug 20/09 0.4 193.9 Aug 25/09 0.4 193.9 Oct 27/09 0.4 193.9 Nov 20/09 0.6 193.7																
3.5																	

RECORD OF BOREHOLE No BH39-08L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., N-E/W Ramp, Station 11+907.5 O/S 7.0L ORIGINATED BY SLL
HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
DATUM Geodetic DATE 2010.11.16 - 2010.11.16 CHECKED BY MRA

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 (%)				
193.1	Ground Surface					▽							0 22 51 27	
0.0	ORGANICS , fibrous: (100mm)													
0.1	Sandy SILT , some clay		1	SS	6									
192.5	Loose													
0.6	Brown													
	Moist													
	Silty CLAY , some sand, with sand seams		2	SS	10									
	Stiff to Very Stiff													
	Brown		3	SS	23									
191.3														
1.8	SAND , trace silt and gravel		4	SS	36/									
190.8	Very Dense				275									
	Grey													
2.3	Wet													
END OF BOREHOLE AT 2.3m DUE TO CAVE. BOREHOLE OPEN TO 1.8m AND WATER LEVEL AT 0.6m UPON COMPLETION. BOREHOLE BACKFILLED WITH HOLEPLUG TO SURFACE.														

METRIC

[illegible]

RECORD OF BOREHOLE No D39-01R

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., N-E/W Ramp, Station 11+862.5 O/S 6.3R ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.10.03 - 2008.10.03 CHECKED BY RPR

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			
196.3	Ground Surface																
0.0	BEDROCK EXPOSED AT SURFACE																

ONTMT4S 6121.GPJ 12/12/12

RECORD OF BOREHOLE No D39-02L

1 OF 1

METRIC

GWP# 5294-08-00 LOCATION Harris Lake Rd., N-E/W Ramp, Station 11+887.5 O/S 6.3L ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2008.10.03 - 2008.10.03 CHECKED BY RPR

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 (%)	W _P	W	W _L		
195.8	Ground Surface													
0.0	BEDROCK EXPOSED AT SURFACE.													

RECORD OF BOREHOLE No D39-03R

1 OF 1

METRIC

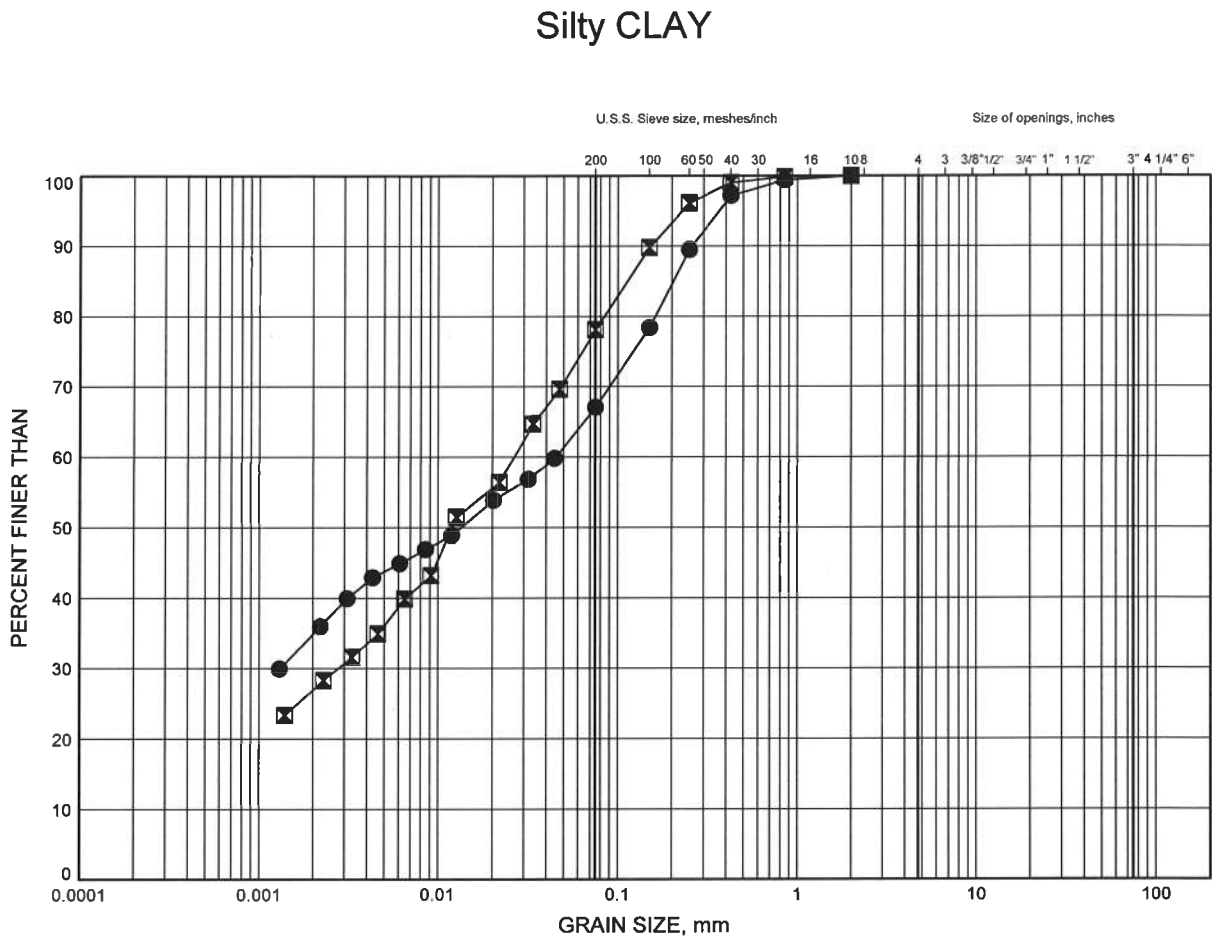
GWP# 5294-08-00 LOCATION Harris Lake Rd., N-E/W Ramp, Station 11+907.5 O/S 7.0R ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2010.11.16 - 2010.11.16 CHECKED BY MRA

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 x LAB VANE							
194.2 0.0	Ground Surface DCPT from surface.						194								
192.4 1.8	END OF DCPT AT 1.8m UPON REFUSAL ON PROBABLE BEDROCK.						193								

Hwy 69 Four-Laning North of Hwy 529

GRAIN SIZE DISTRIBUTION

FIGURE R1



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH39-06	1.07	193.23
■	BH39-08L	1.52	191.58

GRAIN SIZE DISTRIBUTION - THURBER 6121.GPJ 12/13/12

Date December 2012
GWP# 5294-08-00

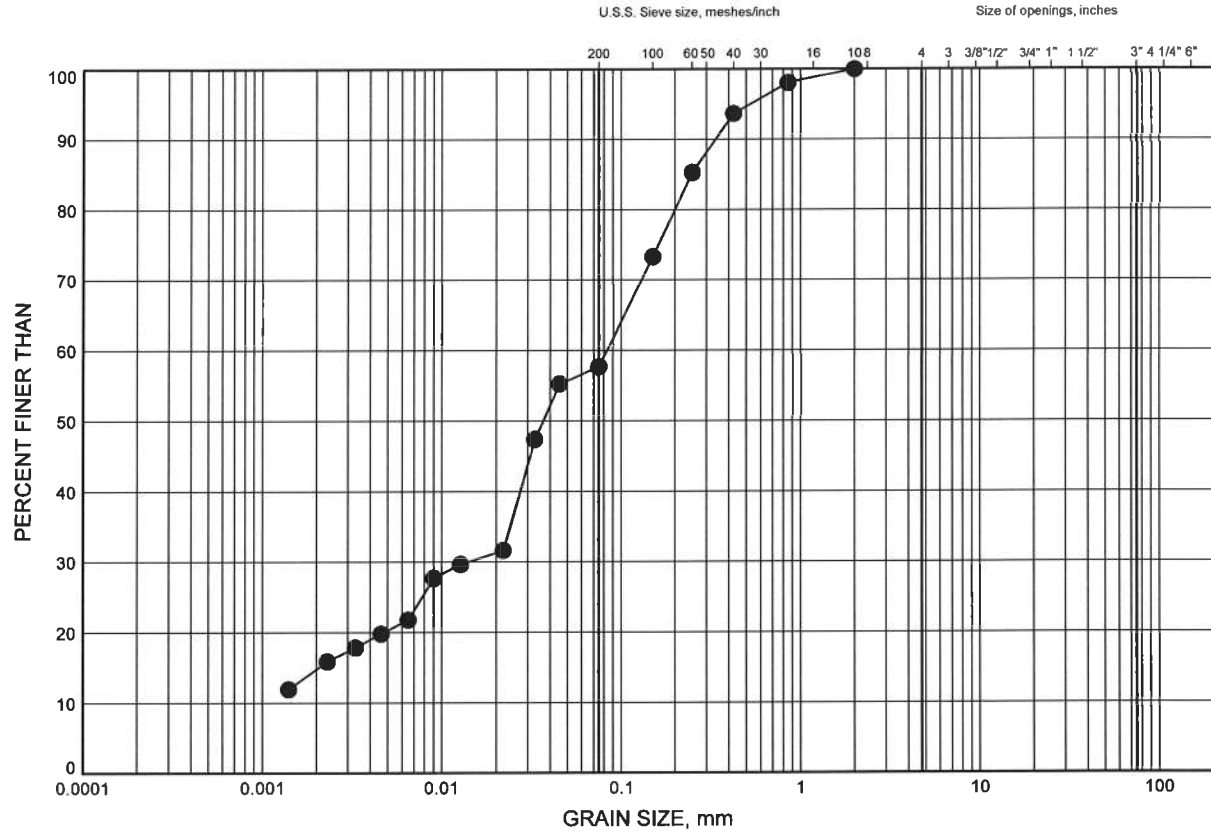


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE R2

SAND and SILT



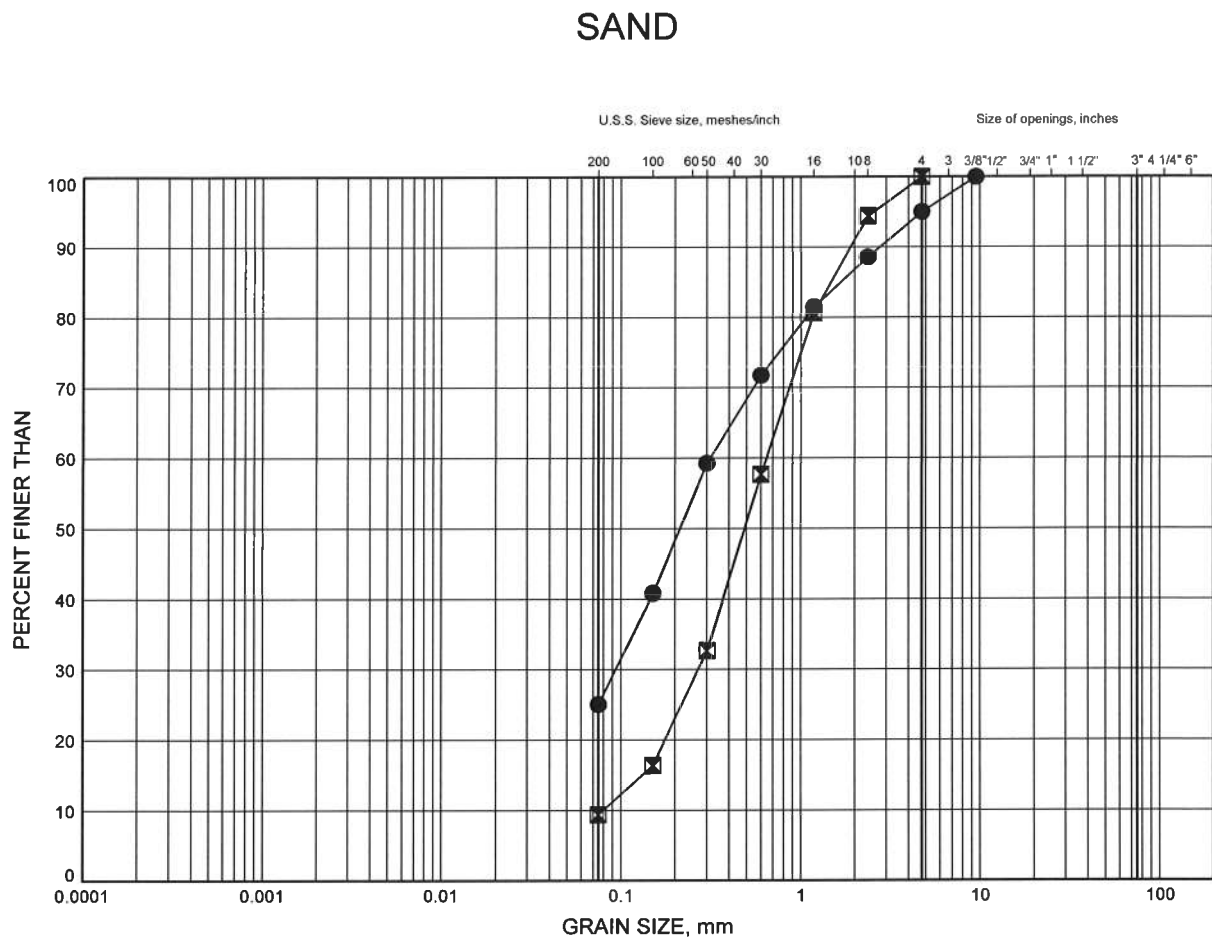
SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH39-06	2.59	191.71

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE R3



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH39-07	1.83	192.47
■	BH39-07	3.28	191.02

Date December 2012

GWP# 5294-08-00



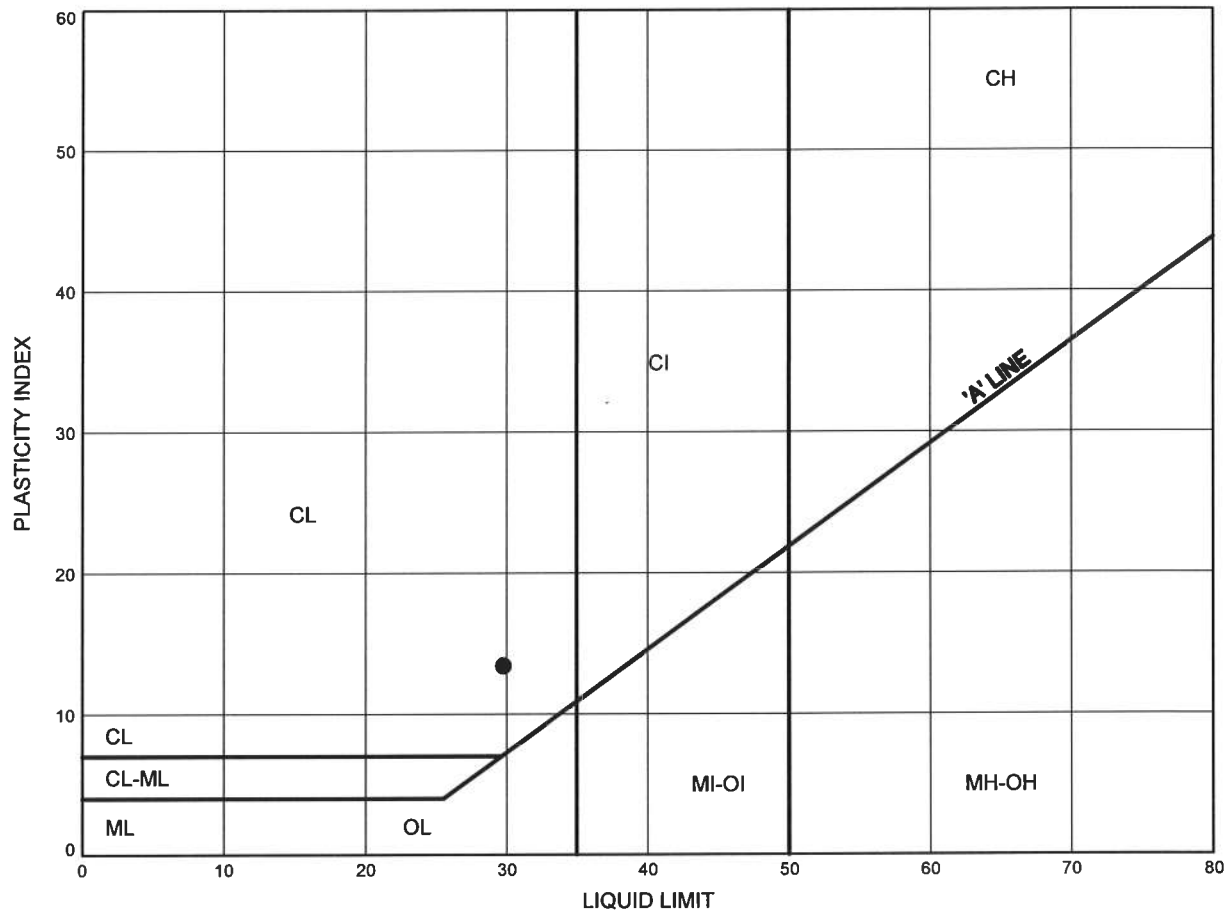
Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
ATTERBERG LIMITS TEST RESULTS

FIGURE R4

Silty CLAY



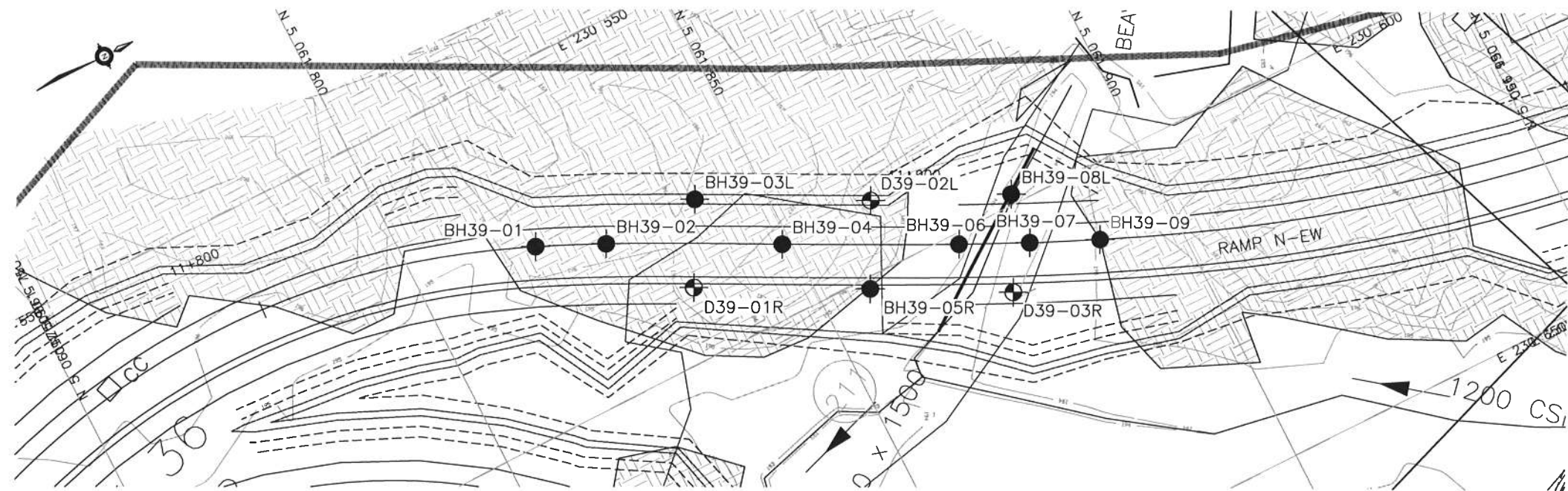
LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH39-08L	1.52	191.58

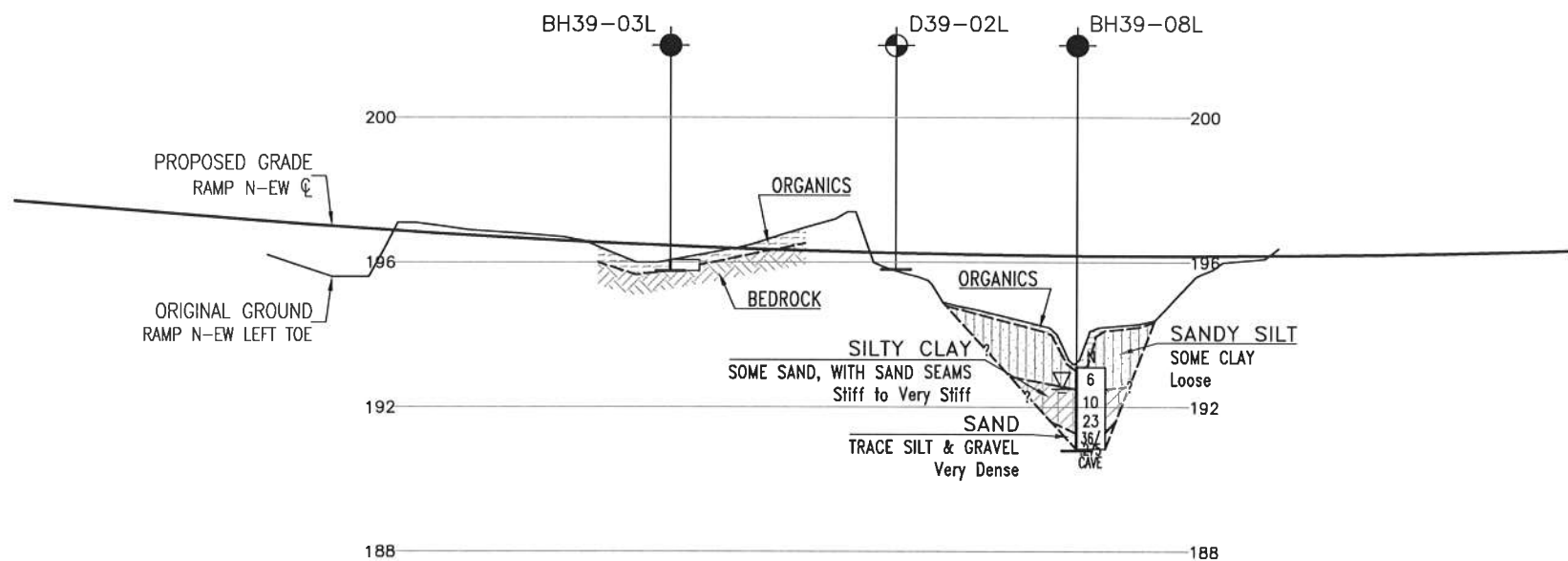
Date December 2012
 GWP# 5294-08-00



Prep'd MFA
 Chkd. MRA



PLAN
0 16 32 48m
SCALE 1:800



PROFILE ALONG LEFT TOE RAMP N-EW

0 16 32 48m H 1:800
0 4 8 12m V 1:200

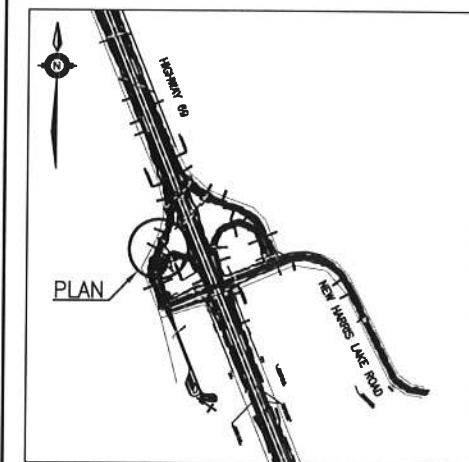
METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
GWP No 5294-08-00

HIGHWAY 69 FOUR-LANING
HARRIS LAKE RD RAMP N-EW-LT TOE
(STA 11+840 - 11+910)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

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

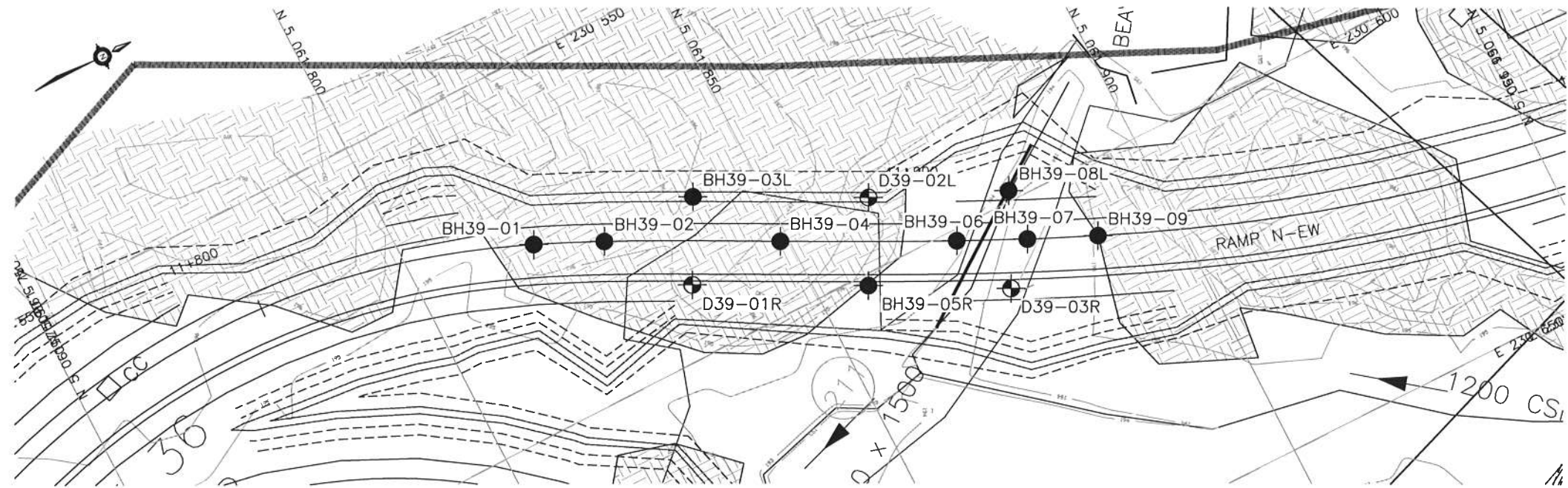
NO	ELEVATION	NORTHING	EASTING
BH39-01	196.5	5 061 817.5	230 574.5
BH39-02	196.3	5 061 826.6	230 578.7
BH39-03L	196.1	5 061 840.7	230 578.8
BH39-04	197.3	5 061 848.8	230 590.2
BH39-05R	194.3	5 061 857.0	230 601.6
BH39-06	194.3	5 061 871.1	230 601.6
BH39-07	194.3	5 061 880.1	230 605.9
BH39-08L	193.1	5 061 880.9	230 598.6
BH39-09	195.0	5 061 889.2	230 610.1
D39-01R	196.3	5 061 834.8	230 590.0
D39-02L	195.8	5 061 862.8	230 590.3
D39-03R	194.2	5 061 874.8	230 611.2

-NOTES-

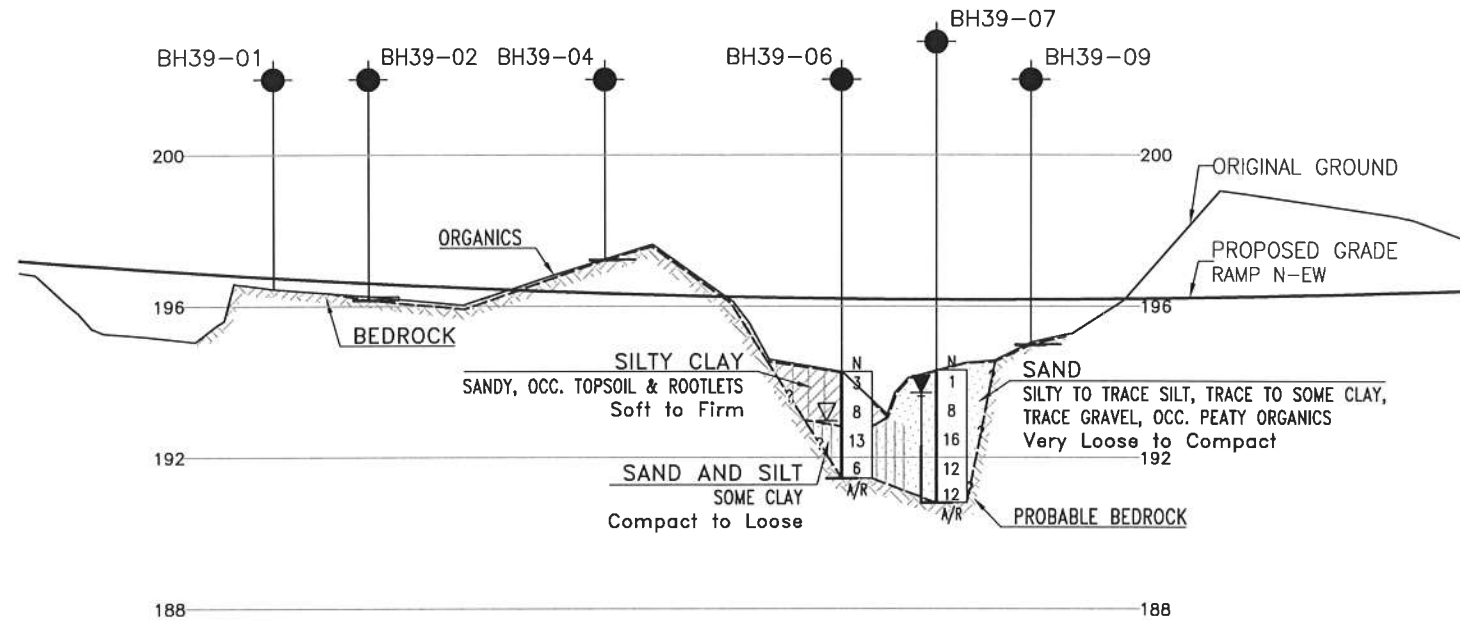
- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 41H-99

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



PLAN
0 16 32 48m
SCALE 1:800



PROFILE ALONG C_L RAMP N-EW

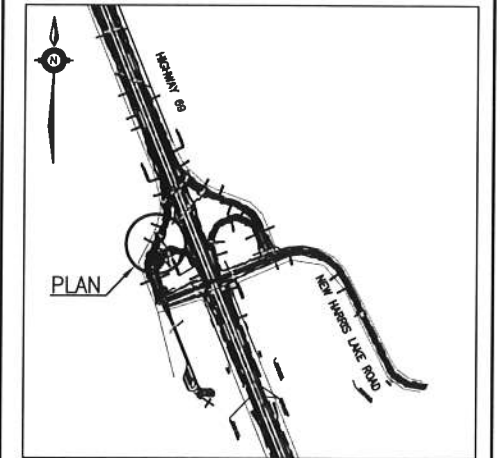
0 16 32 48m H 1:800
0 4 8 12m V 1:200

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

CONT No
GWP No 5294-08-00
HIGHWAY 69 FOUR-LANING
HARRIS LAKE RD RAMP N-EW-
(STA 11+840 - 11+910)
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
W	Water Level
↑	Head Artesian Water
⊥	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

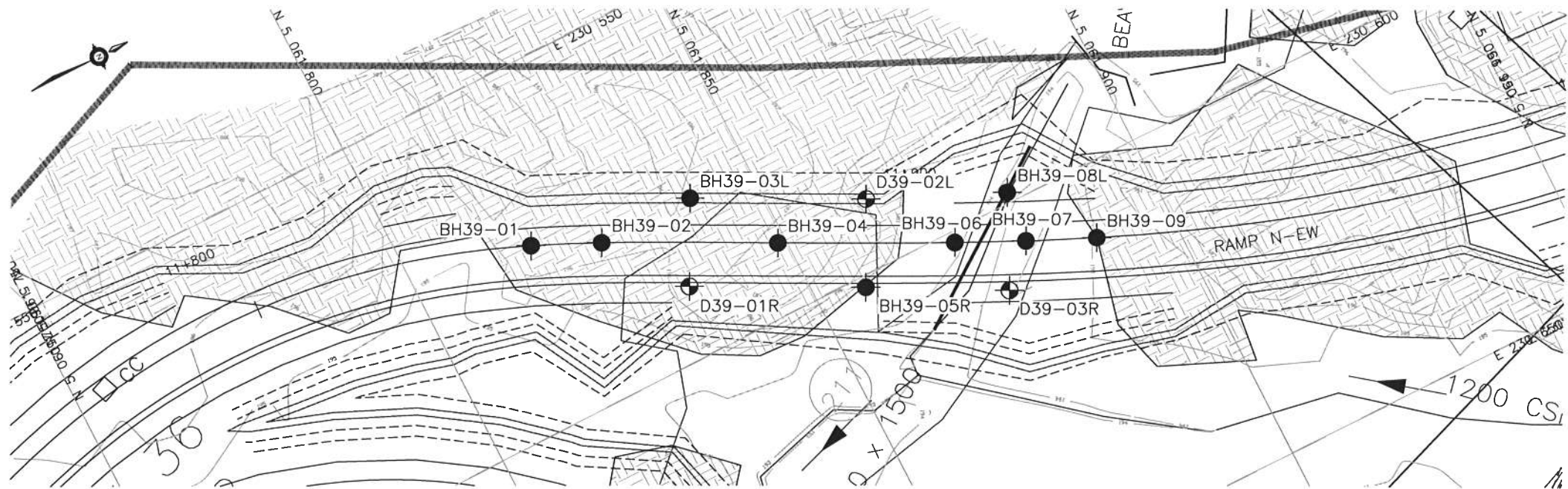
NO	ELEVATION	NORTHING	EASTING
BH39-01	196.5	5 061 817.5	230 574.5
BH39-02	196.3	5 061 826.6	230 578.7
BH39-03L	196.1	5 061 840.7	230 578.8
BH39-04	197.3	5 061 848.8	230 590.2
BH39-05R	194.3	5 061 857.0	230 601.6
BH39-06	194.3	5 061 871.1	230 601.6
BH39-07	194.3	5 061 880.1	230 605.9
BH39-08L	193.1	5 061 880.9	230 598.6
BH39-09	195.0	5 061 889.2	230 610.1
D39-01R	196.3	5 061 834.8	230 590.0
D39-02L	195.8	5 061 862.8	230 590.3
D39-03R	194.2	5 061 874.8	230 611.2

-NOTES-

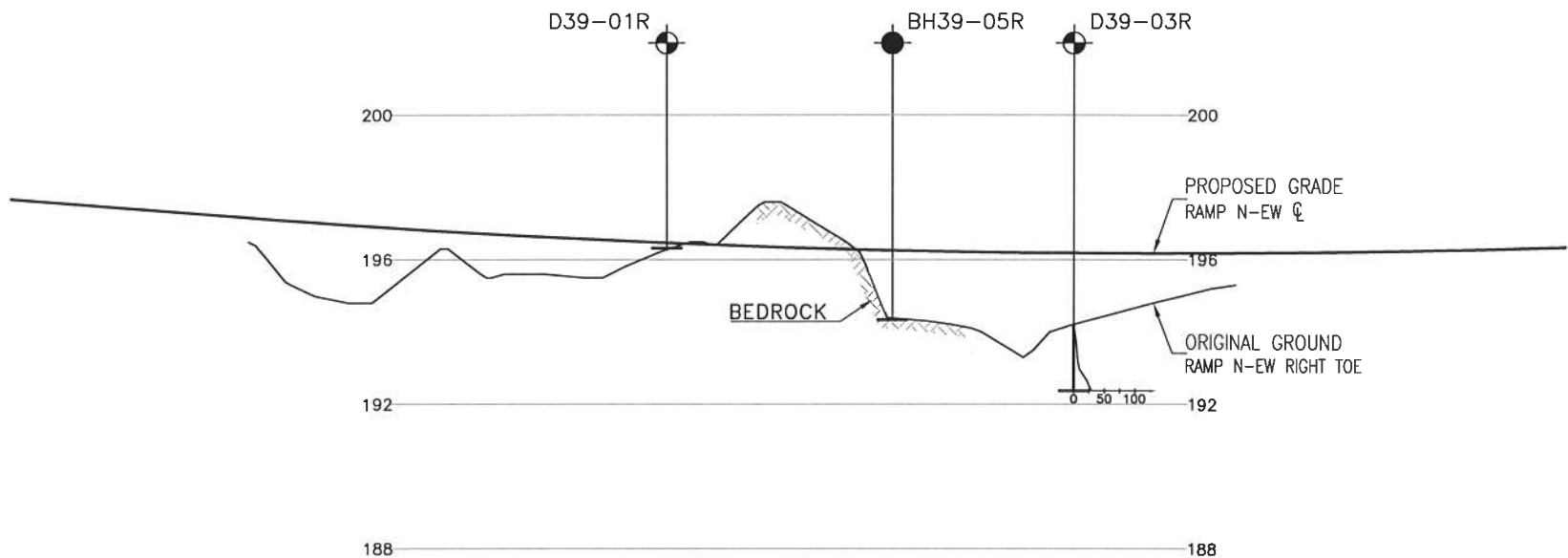
- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 41H-99

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



PLAN



PROFILE ALONG RIGHT TOE RAMP N-EW



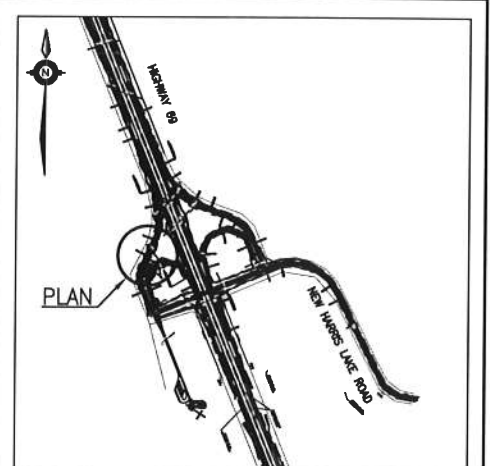
METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
GWP No 5294-08-00

HIGHWAY 69 FOUR-LANING
HARRIS LAKE RD RAMP N-EW-RT TOE
(STA 11+840 - 11+910)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



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
BH39-01	196.5	5 061 817.5	230 574.5
BH39-02	196.3	5 061 826.6	230 578.7
BH39-03L	196.1	5 061 840.7	230 578.8
BH39-04	197.3	5 061 848.8	230 590.2
BH39-05R	194.3	5 061 857.0	230 601.6
BH39-06	194.3	5 061 871.1	230 601.6
BH39-07	194.3	5 061 880.1	230 605.9
BH39-08L	193.1	5 061 880.9	230 598.6
BH39-09	195.0	5 061 889.2	230 610.1
D39-01R	196.3	5 061 834.8	230 590.0
D39-02L	195.8	5 061 862.8	230 590.3
D39-03R	194.2	5 061 874.8	230 611.2

-NOTES-

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- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 41H-99

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK	AEG
DRAWN	MFA	CHK	PKC
CODE	LOAD	DATE	DEC. 2012
SITE	STRUCT	DWG	

