

August 28<sup>th</sup>, 2013

DST Reference No.: GS-TB-017188

**To: J.P. Perron**

Ministry of Transportation  
Geotechnical Section  
Northeastern Region  
447 McKeown Avenue, Suite 301  
North Bay, ON P1B 9S9

**Dear J.P.,**

**Re: Agreement # 5011-E-0037, Assignment # 6  
Highway 17 – Salter Lake Culvert Sta. 12+763, Laronde Twp  
2.5 km North of Old Woman River Bridge, Geotechnical Investigation  
Sault Ste. Marie Area**

DST Consulting Engineers Inc. has been retained by the Ministry of Transportation Northeastern Region Geotechnical Section to provide Geotechnical Services on retainer. Assignment # 6, under Agreement #5011-E-0037 involved power auger and hand auger investigations, sample collection, pedo sketching, and laboratory testing.

During the weeks of July 21<sup>st</sup> and 28<sup>th</sup>, 2013, on Highway 17, DST completed 3 foundation boreholes to depths ranging from 2.2 to 13.1 m and 16 power auger boreholes to depths ranging from 1.0 m to 6.1 m between Sta. 12+702 to 12+878 at the Salter Lake culvert location.

The record of the boreholes are enclosed with this letter. All reported soils are based on field calls and visual identification as no laboratory testing was completed on samples obtained.

We trust this satisfies your present needs. If you have any questions or comments, please contact the undersigned at your convenience.

Yours Truly,

For DST Consulting Engineers Inc.,



Wesley Saunders, P.Eng  
Jr. Associate / Project Manager  
Encl.

## Township of Laronde

### Borehole 12+702 2.0 Rt

0 - 150 Asph  
150 - 450 Br Sa & Cr Gr Tr Si  
450 - 1.2 Br F - Co Sa some Gr Tr Si Occ  
Cob  
1.2 NFP RF

### Borehole 12+732 5.5 Lt

0 - 140 Asph  
140 - 470 Br Sa & Cr Gr Tr Si  
470 - 570 Asph  
570 - 1.5 Br F - Co Sa some Gr Tr Si  
1.5 NFP RF

### Borehole 12+739 1.9 Rt

0 - 160 Asph  
160 - 430 Br Sa & Cr Gr Tr Si  
430 - 2.3 Br F - Co Sa some Gr Tr Si Occ  
Cob  
2.3 NFP RF

### Borehole 12+742 8.2 Lt

0 - 120 Asph  
120 - 450 Br Sa & Cr Gr Tr Si  
450 - 1.25 Br F - Co Sa some Gr Tr Si  
1.25 NFP RF

### Borehole 12+754 1.9 Rt

0 - 160 Asph  
160 - 460 Br Sa & Cr Gr Tr Si  
460 - 1.5 Br F - Co Sa some Gr Tr Si Occ  
Cob  
1.5 NFP RF

### Borehole 12+760 7.6 Lt

0 - 125 Asph  
125 - 370 Br Sa & Cr Gr Tr Si  
370 - 900 Br F - Co Sa some Gr Tr Si  
900 NFP RF

### Borehole 12+769 7.5 Lt

0 - 130 Asph  
130 - 400 Br Sa & Cr Gr Tr Si  
350 - 800 Br F - Co Sa some Gr Tr Si  
800 NFP RF

### Borehole 12+770 5.5 Lt

0 - 140 Asph  
140 - 360 Br Sa & Cr Gr Tr Si  
360 - 720 Br F - Co Sa some Gr Tr Si Occ  
Cob  
720 - 870 Asph  
870 - 1.55 Br F - Co Sa some Gr Tr Si Occ  
Cob  
1.55 NFP RF

### Borehole 12+782 5.5 Lt

0 - 150 Asph  
150 - 350 Br Sa & Cr Gr Tr Si  
350 - 700 Br F - Co Sa some Gr Tr Si  
700 NFP Sh Rk

### Borehole 12+787 2.2 Rt

0 - 140 Asph  
140 - 430 Br Sa & Cr Gr Tr Si  
430 - 1.5 Br F - Co Sa some Gr Tr Si Occ  
Cob  
1.5 NFP RF

### Borehole 12+798 2.2 Rt

0 - 145 Asph  
145 - 300 Br Sa & Cr Gr Tr Si  
300 NFP Poss BR

### Borehole 12+807 5.5 Lt

0 - 140 Asph  
140 - 370 Br Sa & Cr Gr Tr Si  
370 - 900 Br F - Co Sa some Gr Tr Si  
900 NFP Sh Rk

### Borehole 12+821 2.1 Rt

0 - 140 Asph  
140 - 370 Br Sa & Cr Gr Tr Si  
370 - 900 Br F - Co Sa some Gr Tr Si  
900 NFP Sh Rk

### Borehole 12+843 5.4 Lt

0 - 150 Asph  
150 - 340 Br Sa & Cr Gr Tr Si  
340 - 850 Br F - Co Sa some Gr Tr Si  
850 NFP poss BR

### Borehole 12+848 2.1 Rt

0 - 140 Asph  
140 - 360 Br Sa & Cr Gr Tr Si  
360 - 1.4 Br F - Co Sa some Gr Tr Si Occ  
Cob  
1.4 NFP RF

## **Township of Laronde**

### Borehole 12+878 5.4 Lt

0	-	125	Asph
125	-	350	Br Sa & Cr Gr Tr Si
350	-	500	Br F - Co Sa some Gr Tr Si
		500	NFP RF

#### Notes:

3 attempts made within 1 m, no further penetration possible.

All reported soils are based on field calls as no laboratory testing was completed on samples obtained.

# RECORD OF BOREHOLE No BH1

1 OF 1

METRIC

W.P. 5011-E-0037 LOCATION STA. 12+743 - 5.5 m LT (UTM 16T 5297277 m N, 657782 m E) ORIGINATED BY PR  
 DIST            HWY 17 BOREHOLE TYPE Hollow Stem Auger (80 mm ID) COMPILED BY ML  
 DATUM Geodetic DATE 2013 07 24 CHECKED BY WS

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100					
255.0	GROUND SURFACE																
254.9	ASPHALT - 140 mm		AS7	AS													
254.7	FILL - SAND - some gravel, trace silt, brown		AS8	AS													
0.3	FILL - SAND - with gravel, trace silt, brown																
			SS9	SS	15												
252.8			SS10	SS	21												
2.2	End of Borehole at 2.2 m Auger Refusal on Rockfill																

ON\_MOT GS-TB-017188 - ASSIGNMENT 6 - 5011-E-0037 - HWY 17 - WAWA.GPJ DST\_MIN.GDT 8/30/13

NR = NO RECOVERY

+ <sup>3</sup>, X <sup>3</sup>: Numbers refer to Sensitivity

○ <sup>3</sup>% STRAIN AT FAILURE

ENCLOSURE 1

# RECORD OF BOREHOLE No BH2

1 OF 1

METRIC

W.P. 5011-E-0037 LOCATION STA. 12+761 - 7.5 m LT (UTM 16T 5297263 m N, 657771 m E) ORIGINATED BY PR  
 DIST HWY 17 BOREHOLE TYPE Hollow Stem Auger (80 mm ID) COMPILED BY ML  
 DATUM Geodetic DATE 2013 07 25 CHECKED BY WS

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
255.2	GROUND SURFACE							20	40	60	80	100		
255.1	ASPHALT - 115 mm		AS1	AS										
254.9	FILL - SAND & CRUSHED GRAVEL - trace silt, brown		RC1	RC										
253.4	FILL - SAND - some gravel to gravelly, brown, compact - ROCKFILL at 0.75 m		SS2	SS	13									
1.8	ROCKFILL		RC2	RC										
252.9														
2.3	FILL - SAND - some gravel to gravelly, brown, loose to dense - ROCKFILL		SS3	SS	30									
			SS4	SS	10									
			SS5	SS	8									
			SS6	SS	9									
250.1														
5.1	ROCKFILL		RC3	RC										
			RC4	RC										
248.9														
6.3	FILL - SAND - trace silt, brown, loose		SS7	SS	6									
247.6														
7.6	SAND & GRAVEL - trace silt, brown, loose - COBBLES		SS8	SS	8									
246.9														
8.3	BEDROCK													
	RC5 - 1.52 m, REC - 1.52 m, RQD - 75%		RC5	RC										
	RC6 - 1.52 m, REC - 1.52 m, RQD - 62%		RC6	RC										
243.9														
11.3	End of Borehole at 11.3 m													

ON\_MOT GS-TB-017188 - ASSIGNMENT 6 - 5011-E-0037 - HWY 17 - WAWA.GPJ DST\_MIN.GDT 8/30/13

NR = NO RECOVERY

+ 3, X 3: Numbers refer to  
Sensitivity

○ 3% STRAIN AT FAILURE

ENCLOSURE 2

# RECORD OF BOREHOLE No BH4

1 OF 1

METRIC

W.P. 5011-E-0037 LOCATION STA. 12+766 - 4.6 m RT (UTM 16T 5297291 m N, 657777 m E) ORIGINATED BY PR  
DIST HWY 17 BOREHOLE TYPE Hollow Stem Auger (80 mm ID) COMPILED BY ML  
DATUM Geodetic DATE 2013 07 28 CHECKED BY WS

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				
255.1	GROUND SURFACE						20 40 60 80 100	PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>		
255.0	ASPHALT - 140 mm		AS1	AS								
254.7	FILL - SAND & CRUSHED GRAVEL - trace silt, brown											
0.4	FILL - SAND - some gravel to gravelly, trace silt, brown, very loose to compact - ROCKFILL		SS2	SS	25							
	- ROCKFILL (450 mm)		RC	RC								
			SS3	SS	2							
			SS4	SS	4							
			SS5	SS	8							
	- ROCKFILL		RC	RC								
			SS6	SS	5							
			SS7	SS	15							
			SS8	SS	11							
248.3	ROCKFILL											
6.8			RC1	RC								
			SS9	SS	100+							
246.7												
8.4	SILT - Sandy, with gravel, grey, loose											
			SS10	SS	7							
244.4	GRAVEL & COBBLES - compact		SS11	SS	26							
10.7 244.1	BEDROCK											
11.0	RC2 - 0.61 m, REC - 0.36 m, RQD - 20%		RC2	RC								
	RC3 - 1.52 m, REC - 1.52 m, RQD - 100%		RC3	RC								
242.0	End of Borehole at 13.1 m											
13.1												

SPT Values:  
8 blows/150 mm  
50 blows/75 mm

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+ 3, X 3: Numbers refer to  
Sensitivity

○ 3% STRAIN AT FAILURE

ENCLOSURE 3