



Photo 21 : OC-9



Photo 22 : Échantillon de roc OC-1 le long de Bayside Road (côté sud)



PROJET No. 1411679

Créé par : ob

Revu par : WC

Date : Novembre 2015

PHOTOS D'AFFLEUREMENTS ROCHEUX

EEPL – ROC PEU PROFOND ET DRAINAGE
ROCHEUX ACIDE NOUVEAU-BRUNSWICK

FIGURE E11



Photo 23 : OC-3



Photo 24 : OC-3



PROJET No. 1411679

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PHOTOS D'AFFLEUREMENTS ROCHEUX

**EEPL – ROC PEU PROFOND ET DRAINAGE
ROCHEUX ACIDE NOUVEAU-BRUNSWICK**

FIGURE E12



Photo 25 : ER-5



Photo 26 : OC-4



PROJET No. 1411679

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Date : Novembre 2015

PHOTOS D'AFFLEUREMENTS ROCHEUX

**EEPL – ROC PEU PROFOND ET DRAINAGE
ROCHEUX ACIDE NOUVEAU-BRUNSWICK**

FIGURE E13



Photo 27 : ER-6



Photo 28 : ER-7



PROJET No. 1411679

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Revu par : WC

Date : Novembre 2015

PHOTOS D'AFFLEUREMENTS ROCHEUX

**EEPL – ROC PEU PROFOND ET DRAINAGE
ROCHEUX ACIDE NOUVEAU-BRUNSWICK**

FIGURE E14



Photo 29 : ER-8



Photo 30 : ER-9 (depuis ER-8)



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Revu par : WC

PROJET No. 1411679

Date : Novembre 2015

**EEPL – ROC PEU PROFOND ET DRAINAGE
ROCHEUX ACIDE NOUVEAU-BRUNSWICK**

FIGURE E15



Photo 31 : Échantillon OC-5



Photo 32 : Coupe rocheuse du côté sud de Bayside Road



PROJET No. 1411679

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Date : Novembre 2015

PHOTOS D'AFFLEUREMENTS ROCHEUX

**EEPL – ROC PEU PROFOND ET DRAINAGE
ROCHEUX ACIDE NOUVEAU-BRUNSWICK**

FIGURE E16



Photo 33 : Emplacement OC-5



Photo 34 : Emplacement OC-6


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	Revu par : WC		
PROJET No. 1411679	Date : Novembre 2015		



Photo 35 : OC-6 (le long de la route 111)



Photo 36 : Emplacement OC -7


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	Revu par : WC		
PROJET No. 1411679	Date : Novembre 2015		



Photo 37 : Échantillon OC-7



Photo 38 : Coupe rocheuse au sud de Bayside Road


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	Revu par : WC		
PROJET No. 1411679	Date : Novembre 2015		



Photo 39 : OC-2 Lieu d'échantillonnage



Photo 40 : OC-2 Lieu d'échantillonnage


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	Revu par : WC		
PROJET No. 1411679	Date : Novembre 2015		



Photo 41 : ER-2



Photo 42 : ER-1



PROJET No. 1411679

Créé par : ob

Revu par : WC

Date : Novembre 2015

PHOTOS D'AFFLEUREMENTS ROCHEUX

**EEPL – ROC PEU PROFOND ET DRAINAGE
ROCHEUX ACIDE NOUVEAU-BRUNSWICK**

FIGURE E21



Photo 43 : ER-3



Photo 44 : ER-4



PROJET No. 1411679

Créé par : ob

Revu par : WC

Date : Novembre 2015

PHOTOS D'AFFLEUREMENTS ROCHEUX

**EEPL – ROC PEU PROFOND ET DRAINAGE
ROCHEUX ACIDE NOUVEAU-BRUNSWICK**

FIGURE E22

ANNEXE F

Journaux de forage provenant d'investigations géotechniques antérieures



BOREHOLE RECORD

BH-46

CLIENT CH2M HILLPROJECT No. 121616995.800LOCATION Energy East Saint John Extension, Petite Riviere Iroquois CrossingBOREHOLE No. BH-46DATES: BORING 2015/07/23 WATER LEVEL 8.05 m on 2015/07/24DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa																	
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits																	
									Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●																	
0	368.05	75mm rootmat at surface							20 40 60 80 10 20 30 40 50 60 70 80 90																	
0		Poor to excellent quality dark grey SLATE - Strong - Very close to wide joint spacing - Slaty cleavage oriented at 20 degrees to the core axis - Some jointing oiredent at 45 to 60 degrees to the core axis - Fresh (unweathered) with some staining on joint surfaces above 40.8 m depth.																								
						SS	1	400	34																	
						SS	2	50	50/50																	
1						HQ	3	59%	14%																	
2																										
3						HQ	4	93%	66%																	
4						HQ	5	97%	75%																	
5						HQ	6	100%	56%																	
6																										
7					HQ	7	100%	55%																		
8																										
9					HQ	8	97%	63%																		
10																										

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-46

CLIENT CH2M HILLPROJECT No. 121616995.800LOCATION Energy East Saint John Extension, Petite Riviere Iroquois CrossingBOREHOLE No. BH-46DATES: BORING 2015/07/23 WATER LEVEL 8.05 m on 2015/07/24DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa												
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits												
									Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●												
								mm	20	40	60	80	10	20	30	40	50	60	70	80	90
10		SLATE continued			HQ	9	100%	84%													
11		Fractured zone (approximately 300 mm thick) with staining on joint surfaces			HQ	10	98%	81%													
12			HQ	11	100%	100%															
13			HQ	12	97%	97%															
14			HQ	13	100%	100%															
15			HQ	14	97%	87%															
16			HQ	15	100%	97%															
17																					
18					HQ	16	100%	93%													
19																					
20																					

- △ Unconfined Compression Test
- Field Vane Test ■ Remoulded
- ✕ Torvane

Continued Next Page



BOREHOLE RECORD

BH-46

CLIENT CH2M HILLPROJECT No. 121616995.800LOCATION Energy East Saint John Extension, Petite Riviere Iroquois CrossingBOREHOLE No. BH-46DATES: BORING 2015/07/23 WATER LEVEL 8.05 m on 2015/07/24DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa		Water Content & Atterberg Limits	
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80
20		SLATE continued										
21					HQ	17	100%	80%				
22					HQ	18	100%	100%				
23												
24					HQ	19	100%	78%				
25												
26					HQ	20	100%	93%				
27												
28					HQ	21	100%	100%				
29												
30					HQ	22	100%	95%				

- △ Unconfined Compression Test
- Field Vane Test
- Remoulded
- ✕ Torvane

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BOREHOLE RECORD

BH-46

CLIENT CH2M HILLPROJECT No. 121616995.800LOCATION Energy East Saint John Extension, Petite Riviere Iroquois CrossingBOREHOLE No. BH-46DATES: BORING 2015/07/23 WATER LEVEL 8.05 m on 2015/07/24DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits									
								mm	20 40 60 80 									
									10 20 30 40 50 60 70 80 90 									
30		SLATE continued			HQ	23	100%	95%										
31																		
32					HQ	24	100%	82%										
33																		
34					HQ	25	97%	95%										
35																		
	332.6																	
36		End of Borehole																
37		Standpipe not installed																
38		Observed 50% reduction in return water. Based on sampled core, water loss was likely associated with fractured zone at 12.1 m depth below ground surface.																
39		N: 7617414.478 E: 2361307.826																
40																		

- △ Unconfined Compression Test
- Field Vane Test ■ Remoulded
- ✕ Torvane



BOREHOLE RECORD

BH-03

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Riviere Verte Crossing, NBBOREHOLE No. BH-03DATES: BORING 2014/05/21 WATER LEVEL Not observedDATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa													
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits													
									Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●													
0	218.54								10	20	30	40	50	60	70	80	90					
0	218.4	Loose to compact brown silty SAND (SM) with organic material			SS	1	375	10	●													
1		Compact to very dense brown silty sand (SM) with gravel to silty gravel (GM) with sand TILL - Occasional boulders																				
2						SS	2	225	50/100	○												
3						SS	3	600	28	●												
4																						
5						SS	4	450	29	○	●											
6						SS	5	350	48	●												
7																						
8					SS	6	325	52	○	●												
9																						
10					SS	7	100	50/125														

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane

Continued Next Page



BOREHOLE RECORD

BH-03

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Riviere Verte Crossing, NBBOREHOLE No. BH-03DATES: BORING 2014/05/21 WATER LEVEL Not observedDATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80	Water Content & Atterberg Limits		Dynamic Penetration Test, blows/0.3m			
								mm										
10	207.6	TILL cont'd																
11		Poor to excellent quality dark grey SILTSTONE - Medium Strong to Strong - Very close to wide joint spacing - Joints oriented at 0 to 20 degrees to core axis - Minor jointing oriented at 45 and 75 degrees to core axis - Fresh (unweathered) with slight weathering on the joint surfaces (staining) - Rubble zone 11.0 to 14.2 meters			SS 8	0	50/50											
12					HQ 9	69%	13%											
13					HQ 10	32%	13%											
14					HQ 11	67%	17%											
15					HQ 12	100%	76%											
16					HQ 13	99%	80%											
17					HQ 14	100%	69%											
18					HQ 15	100%	100%											
19																		
20																		

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 × Torvane

Continued Next Page



BOREHOLE RECORD

BH-03

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Riviere Verte Crossing, NBBOREHOLE No. BH-03DATES: BORING 2014/05/21 WATER LEVEL Not observedDATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits					Standard Penetration Test, blows/0.3m				
								mm										
20		SILTSTONE cont'd																
21					HQ	16	100%	73%										
22		- Rubble zone 22.4 to 22.8 meters			HQ	17	100%	57%										
23					HQ	18	100%	73%										
24		- Rubble zone 24.4 to 25.1 meters			HQ	19	93%	38%										
25					HQ	20	100%	75%										
26																		
27		- Rubble zone 27.0 to 27.3 meters			HQ	21	100%	72%										
28					HQ	22	98%	83%										
29																		
30																		

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✘ Torvane
 Continued Next Page



BOREHOLE RECORD

BH-03

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, Riviere Verte Crossing, NB

BOREHOLE No. BH-03

DATES: BORING 2014/05/21 WATER LEVEL Not observed

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80						
30		SILTSTONE cont'd			HQ	23	100%	83%										
31					HQ	24	100%	77%										
32																		
33		- Rubble zone 33.5 to 34.1 meters			HQ	25	100%	62%										
34					HQ	26	100%	52%										
35																		
36					HQ	27	90%	58%										
37		- Rubble zone 37.1 to 37.2 meters			HQ	28	95%	53%										
38																		
39					HQ	29	100%	93%										
40																		

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
 Continued Next Page



BOREHOLE RECORD

BH-03

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, Riviere Verte Crossing, NB

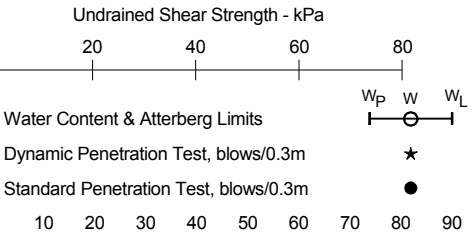
BOREHOLE No. BH-03

DATES: BORING 2014/05/21

WATER LEVEL Not observed

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa								
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80					
40		SILTSTONE cont'd															
41					HQ	30	100%	67%									
42					HQ	31	100%	55%									
43					HQ	32	100%	87%									
44					HQ	33	100%	80%									
45																	
46		- Rubble zone 45.8 to 46.0 meters															
47					HQ	34	98%	67%									
48					HQ	35	100%	100%									
49																	
50					HQ	36	100%	100%									



Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane

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BOREHOLE RECORD

BH-03

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Riviere Verte Crossing, NBBOREHOLE No. BH-03DATES: BORING 2014/05/21 WATER LEVEL Not observedDATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa											
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80								
50	167.9	SILTSTONE cont'd																		
51		End of Borehole																		
52		Standpipe Installed																		
53		No Water Loss Noted																		
54		N: 7617949.105																		
55		E: 2370219.707																		
56																				
57																				
58																				
59																				
60																				

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-38

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, Riviere Verte Crossing, NB
 DATES: BORING 2014/10/15 WATER LEVEL 13.2 m on 2014/10/16

PROJECT No. 121616995
 BOREHOLE No. BH-38
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa												
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80									
0	224.84	Rootmat at surface																			
0		Compact to very dense brown silty SAND (SM) with gravel			SS	1	475	15	○	●											
1																					
2					SS	2	450	31	○		●										
3					SS	3	550	23	○		●										
4																					
5					SS	4	275	50/125	○												
6	218.8	Dense to very dense grey well graded gravel (GW-GC) with silty clay and sand to silty clayey sand (SC-SM) with gravel TILL -cobbles and boulders throughout			HQ	5	175	0%													
7																					
8					SS	6	400	47	○		●										
9					SS	7	350	110/175	○												
10																					

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
 Continued Next Page



BOREHOLE RECORD

BH-38

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Riviere Verte Crossing, NBBOREHOLE No. BH-38DATES: BORING 2014/10/15 WATER LEVEL 13.2 m on 2014/10/16DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa												
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits												
									Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●												
								mm	10	20	30	40	50	60	70	80	90				
10		TILL continued																			
11	213.0					SS	8	175	103/275	○											
12		Poor to excellent quality dark grey SILTSTONE				HQ	9	0%	0%												
13		- Strong to Very Strong - Close to wide joint spacing - Joints oriented at 0 to 10, 30 - 50 (bedding) and 70 degrees to the core axis - Fresh (unweathered)				NQ	10	100%	38%												
14						NQ	11	100%	83%												
15						NQ	12	100%	78%												
16		-Lost water return from 15.2m to 36.6m				NQ	13	100%	92%												
17						NQ	14	98%	85%												
18						NQ	15	97%	80%												
19																					
20																					

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-38

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Riviere Verte Crossing, NBBOREHOLE No. BH-38DATES: BORING 2014/10/15 WATER LEVEL 13.2 m on 2014/10/16DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa																		
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits					Standard Penetration Test, blows/0.3m													
									20	40	60	80	W _p	W	W _L	10	20	30	40	50	60	70	80	90			
20		SILTSTONE continued -no water return																									
21					NQ	16	100%	77%																			
22					NQ	17	97%	83%																			
23					NQ	18	100%	95%																			
24					NQ	19	97%	97%																			
25					NQ	20	98%	93%																			
26					NQ	21	100%	73%																			
27		NQ	22	100%	100%																						
28																											
29																											
30																											

△ Unconfined Compression Test
□ Field Vane Test ■ Remoulded
✕ Torvane



BOREHOLE RECORD

BH-38

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Riviere Verte Crossing, NBBOREHOLE No. BH-38DATES: BORING 2014/10/15 WATER LEVEL 13.2 m on 2014/10/16DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa															
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits					Dynamic Penetration Test, blows/0.3m										
30		SILTSTONE continued -no water return	[Strata Plot Diagram]																					
31						NQ	23	97%	92%															
32																								
33						NQ	24	100%	100%															
34						NQ	25	97%	92%															
35						NQ	26	88%	63%															
36						NQ	27	94%	67%															
37						NQ	28	95%	86%															
38																								
39																								
40																								

- Approximately 50% water return from 36.6m

- △ Unconfined Compression Test
- Field Vane Test
- Remoulded
- ✕ Torvane



BOREHOLE RECORD

BH-38

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, Riviere Verte Crossing, NB

BOREHOLE No. BH-38

DATES: BORING 2014/10/15 WATER LEVEL 13.2 m on 2014/10/16

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits									
									<div style="display: flex; justify-content: space-between; width: 100%;"> 20 40 60 80 </div> <div style="display: flex; justify-content: space-between; width: 100%; margin-top: 5px;"> 10 20 30 40 50 60 70 80 90 </div> <div style="text-align: right; margin-top: 5px;"> W_p W W_L ★ ● </div>									
-40		SILTSTONE continued	[Brick pattern]		NQ	29	100%	100%										
-41		-Lost water return from 41.1m to 50.3m	[Brick pattern]															
-42			[Brick pattern]		NQ	30	97%	74%										
-43			[Brick pattern]		NQ	31	78%	53%										
-44	180.9	Very poor to poor quality dark grey to brown SILTSTONE - Extremely close to close joint spacing - Joints oriented at 25, 50 (bedding) and 65 degrees to the core axis - Slightly weathered	[Brick pattern]		NQ	32	97%	27%										
-45			[Brick pattern]		NQ	33	84%	0%										
-46			[Brick pattern]		NQ	34	97%	89%										
-47	177.6	Good to excellent quality dark grey SILTSTONE - Strong - Moderate to wide joint spacing - Joints oriented at 25 - 30 and 50 (bedding) degrees to the core axis - Fresh (unweathered)	[Brick pattern]		NQ	35	95%	95%										
-48			[Brick pattern]															
-49			[Brick pattern]															
-50			[Brick pattern]															

▲ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-38

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Riviere Verte Crossing, NBBOREHOLE No. BH-38DATES: BORING 2014/10/15 WATER LEVEL 13.2 m on 2014/10/16DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa		
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60
50		SILTSTONE continued - Approximately 50% water return from 50.3m							Water Content & Atterberg Limits		
51	NQ				36	98%	98%	Dynamic Penetration Test, blows/0.3m		★	
52								Standard Penetration Test, blows/0.3m		●	
53											
54	NQ				38	98%	87%				
55											
56											
57					NQ	40	100%	100%			
58											
59											
60											

- △ Unconfined Compression Test
- Field Vane Test
- Remoulded
- ✕ Torvane

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BOREHOLE RECORD

BH-38

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Riviere Verte Crossing, NBBOREHOLE No. BH-38DATES: BORING 2014/10/15 WATER LEVEL 13.2 m on 2014/10/16DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa														
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits														
									Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●														
								mm															
60	163.9	SILTSTONE continued -Approximately 50% water return			NQ	42	98%	97%															
61		End of Borehole																					
62		Standpipe installed to 60.92m																					
63		Borehole remained open to depth																					
64		N: 7617888.007																					
65		E: 2370909.555																					
66																							
67																							
68																							
69																							
70																							

- △ Unconfined Compression Test
- Field Vane Test ■ Remoulded
- ✕ Torvane



BOREHOLE RECORD

BH-45

CLIENT CH2M HILLPROJECT No. 121616995.800LOCATION Energy East Saint John Extension, Grande Riviere CrossingBOREHOLE No. BH-45DATES: BORING 2014/10/03 WATER LEVEL 16.3 m on 2014/10/10DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa															
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80												
0	191.35	Loose to compact brown silty clayey SAND (SC-SM) with gravel to stiff to very stiff brown sandy silty CLAY (CL-ML)																						
					SS	1	450	10																
1																								
2								SS	2	600	16													
3								SS	3	475	24													
4																								
5					SS	4	600	26																
6																								
6.7	184.7	Stiff to very stiff grey silty CLAY (CL-ML) to lean CLAY (CL) - trace gravel from 7.0 m to 9.0 m			SS	5	475	30																
7																								
8								SS	6	600	20													
9																								
10																								

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-45

CLIENT CH2M HILLPROJECT No. 121616995.800LOCATION Energy East Saint John Extension, Grande Riviere CrossingBOREHOLE No. BH-45DATES: BORING 2014/10/03WATER LEVEL 16.3 m on 2014/10/10DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80						
10		CL-ML to CL cont'd			SS	7	600	15										
11																		
12					SS	8	600	11										
13		- cobble/boulder at 12.7 m - trace sand seams below 13.0 m			SS	9	425	93/275										
14																		
15	176.6	Very dense brown clayey SAND (SC) with gravel to clayey GRAVEL (GC) with sand - cobbles and boulders throughout			SS	10	400	38										
16					SS	11	300	90/250										
17																		
18																		
19					SS	12	75	50/75										
20																		

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane

Continued Next Page



BOREHOLE RECORD

BH-45

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, Grande Riviere Crossing
 DATES: BORING 2014/10/03 WATER LEVEL 16.3 m on 2014/10/10

PROJECT No. 121616995.800
 BOREHOLE No. BH-45
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa	
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40
										Water Content & Atterberg Limits Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●
							mm			10 20 30 40 50 60 70 80 90
20		SC to GC cont'd	[Strata Plot: Sandstone/ shale pattern]							
21										
22					SS	13	600	52	○	●
23										
24										
25					SS	14	400	78	○	●
26										
27										
28					SS	15	50	50/100	○	
	162.7				HQ	16	150	N/A		
29	162.2	Very poor to excellent quality interbedded light grey, fine grained SANDSTONE and dark grey SHALE - Very strong - Extremely close to very wide joint spacing	[Strata Plot: Sandstone/ shale pattern]		NQ	17	57%	0%		
30										

▲ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
Continued Next Page



BOREHOLE RECORD

BH-45

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, Grande Riviere Crossing
 DATES: BORING 2014/10/03 WATER LEVEL 16.3 m on 2014/10/10

PROJECT No. 121616995.800
 BOREHOLE No. BH-45
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa								
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits								
							mm										
30		- Predominant joint set (bedding planes) oriented at 0 to 5 degrees to the core axis			NQ	18	95%	48%									
		- Some joints oriented at 30 degrees to the core axis															
31		- Fresh (unweathered)															
		- Rubble zone at 28.62m (525mm thick)															
		SANDSTONE / SHALE cont'd			NQ	19	83%	50%									
		SANDSTONE / SHALE cont'd															
	158.6	- Rubble zone at 32.8m (750mm thick)			NQ	20	55%	37%									
	157.8																
	157.0	- Rubble zone at 34.3m (300mm thick)			NQ	21	74%	25%									
	156.7																
35					NQ	22	48%	30%									
		Reduced water return (50%) from 36.6m to 42.9m			NQ	23	92%	78%									
	153.7	- Rubble zone at 37.6m (2.1m thick)			NQ	24	100%	65%									
					NQ	25	64%	0%									
					NQ	26	93%	0%									
	151.6																
40																	

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-45

CLIENT CH2M HILL

PROJECT No. 121616995.800

LOCATION Energy East Saint John Extension, Grande Riviere Crossing

BOREHOLE No. BH-45

DATES: BORING 2014/10/03 WATER LEVEL 16.3 m on 2014/10/10

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa														
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80											
								mm		Water Content & Atterberg Limits			W _p	W	W _L								
										Dynamic Penetration Test, blows/0.3m						★							
										Standard Penetration Test, blows/0.3m						●							
									10	20	30	40	50	60	70	80	90						
40		SANDSTONE / SHALE cont'd																					
					NQ 27	94%	76%																
41																							
42																							
43					No water return																		
44																							
45		Reduced water return (25%) from 44.4m to 45.7m																					
46																							
47																							
48																							
49																							
50																							

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
 Continued Next Page



BOREHOLE RECORD

BH-45

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, Grande Riviere Crossing
 DATES: BORING 2014/10/03 WATER LEVEL 16.3 m on 2014/10/10

PROJECT No. 121616995.800
 BOREHOLE No. BH-45
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa										
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80							
50		SANDSTONE / SHALE cont'd																	
51					NQ	34	97%	54%											
52		Reduced water return (50%) from 52m to 82.5m																	
53					NQ	35	100%	92%											
54					NQ	36	100%	100%											
55																			
56					NQ	37	98%	95%											
57																			
58					NQ	38	98%	93%											
59																			
60					NQ	39	100%	95%											

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
 Continued Next Page



BOREHOLE RECORD

BH-45

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, Grande Riviere Crossing
 DATES: BORING 2014/10/03 WATER LEVEL 16.3 m on 2014/10/10

PROJECT No. 121616995.800
 BOREHOLE No. BH-45
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa 20 40 60 80 Water Content & Atterberg Limits W _p W W _L Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ● 10 20 30 40 50 60 70 80 90														
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD															
60		SANDSTONE / SHALE cont'd	[Strata Plot: Alternating horizontal and vertical lines]				mm																
61																							
62																							
63																							
64																							
65																							
66																							
67																							
68																							
69																							
70																							

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✘ Torvane
Continued Next Page



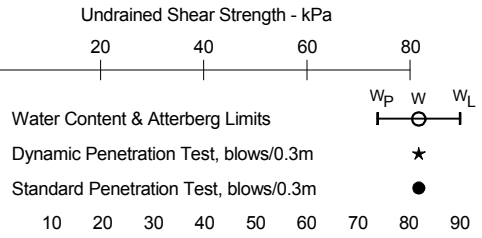
BOREHOLE RECORD

BH-45

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, Grande Riviere Crossing
 DATES: BORING 2014/10/03 WATER LEVEL 16.3 m on 2014/10/10

PROJECT No. 121616995.800
 BOREHOLE No. BH-45
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa			
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80
70		SANDSTONE / SHALE cont'd										
71					NQ	47	92%	35%				
72					NQ	48	100%	100%				
73					NQ	49	100%	92%				
74					NQ	50	92%	73%				
75					NQ	51	98%	97%				
76												
77												
78												
79												
80												



△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
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BOREHOLE RECORD

BH-45

CLIENT CH2M HILLPROJECT No. 121616995.800LOCATION Energy East Saint John Extension, Grande Riviere CrossingBOREHOLE No. BH-45DATES: BORING 2014/10/03 WATER LEVEL 16.3 m on 2014/10/10DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa													
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits													
									Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●													
								mm	20	40	60	80	10	20	30	40	50	60	70	80	90	
80		SANDSTONE / SHALE cont'd	[Strata Plot]		NQ	53	100%	97%														
81				NQ	54	100%	100%															
82				NQ	55	100%	92%															
83				NQ	56	100%	100%															
84				NQ	57	100%	100%															
85																						
86																						
87																						
88																						
89		Reduced water return (50%) from 88.6m to 89.3m																				
		No water return at 89.3m																				
90																						

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-45

CLIENT CH2M HILL

PROJECT No. 121616995.800

LOCATION Energy East Saint John Extension, Grande Riviere Crossing

BOREHOLE No. BH-45

DATES: BORING 2014/10/03 WATER LEVEL 16.3 m on 2014/10/10

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80						
										Water Content & Atterberg Limits								
								mm		Dynamic Penetration Test, blows/0.3m	★							
										Standard Penetration Test, blows/0.3m	●							
90		SANDSTONE / SHALE cont'd								10	20	30	40	50	60	70	80	90
91	99.8				NQ	60	97%	92%										
92		End of Borehole																
93		Standpipe Installed to 27.4m, flush mount installed																
94		N: 7591193.002																
95		E: 2398915.102																
96																		
97																		
98																		
99																		
100																		

- △ Unconfined Compression Test
- Field Vane Test ■ Remoulded
- ✕ Torvane



BOREHOLE RECORD

BH-77

CLIENT CH2M HILLPROJECT No. 121616995.800LOCATION Energy East Saint John Extension, Grande Riviere CrossingBOREHOLE No. BH-77DATES: BORING 2015/07/27 WATER LEVEL 4.9 m on 2015/07/27DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa													
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80										
0	187.69	75mm rootmat at surface																				
		Very loose to dense light brown sandy SILT (ML) to sandy SILT (ML) with gravel																				
1			SS 1	1	475	3																
			SS 2	2	600	19																
			SS 3	3	600	19																
2			SS 4	4	375	31																
			SS 5	5	525	44																
			SS 6	6	600	25																
4			SS 7	7	600	26																
			SS 8	8	275	38																
5			SS 9	9	550	38																
6	181.8	Very stiff to hard grey sandy silty CLAY (CL-ML) -cobbles and boulders throughout	SS 10	10	350	40																
7																						
8																						
9			SS 11	11	350	33																
10																						

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-77

CLIENT CH2M HILLPROJECT No. 121616995.800LOCATION Energy East Saint John Extension, Grande Riviere CrossingBOREHOLE No. BH-77DATES: BORING 2015/07/27 WATER LEVEL 4.9 m on 2015/07/27DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa		
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60
										Water Content & Atterberg Limits: W_p W W_L Dynamic Penetration Test, blows/0.3m: ★ Standard Penetration Test, blows/0.3m: ●	
								mm		10 20 30 40 50 60 70 80 90	
10		CL-ML continued			SS	12	225	59	○	●	
11											
12						SS	13	550	50	○	●
13						SS	14	600	33	○	●
14											
15						SS	15	600	25	○	●
16						SS	16	0	45		●
17											
18											
19	168.6	Compact to dense grey SILT (ML) with sand -cobbles and boulders throughout			SS	17	50	38	○	●	
20											

- △ Unconfined Compression Test
- Field Vane Test ■ Remoulded
- ✕ Torvane

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BOREHOLE RECORD

BH-77

CLIENT CH2M HILL

PROJECT No. 121616995.800

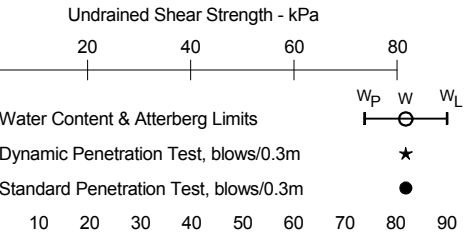
LOCATION Energy East Saint John Extension, Grande Riviere Crossing

BOREHOLE No. BH-77

DATES: BORING 2015/07/27 WATER LEVEL 4.9 m on 2015/07/27

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa	
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40
20		ML continued								
21										
22										
23					SS	18	50	20	●	
24										
25										
26					SS	19	400	49	○	●
27		Boulder at 27.4m								
28		Boulder at 28.3m			HQ	20	67%	-		
29					SS	21	100	50/100	○	
30										



Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-77

CLIENT CH2M HILLPROJECT No. 121616995.800LOCATION Energy East Saint John Extension, Grande Riviere CrossingBOREHOLE No. BH-77DATES: BORING 2015/07/27 WATER LEVEL 4.9 m on 2015/07/27DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa												
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80									
30		ML continued																			
31		Boulder at 30.9m			HQ	22	-	-													
32																					
33																					
34																					
35																					
36		Boulder at 35.6m			HQ	23	-	-													
37																					
38																					
39																					
40																					

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-77

CLIENT CH2M HILLPROJECT No. 121616995.800LOCATION Energy East Saint John Extension, Grande Riviere CrossingBOREHOLE No. BH-77DATES: BORING 2015/07/27 WATER LEVEL 4.9 m on 2015/07/27DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa													
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits													
									Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●													
								mm	20	40	60	80	10	20	30	40	50	60	70	80	90	
40		ML continued																				
		Boulder at 40.6m																				
	145.5																					
43		Very poor to excellent quality interbedded light grey, fine grained SANDSTONE and dark grey SHALE - Very strong - Extremely close to moderate joint spacing - Predominant joint set (bedding planes) oriented at 10 to 15 degrees to the core axis - Some joints oriented between 35 and 45 degrees to the core axis - Fresh (unweathered) - Potential fault zone at 42.67m (600mm thick)																				
45																						
	141.6																					
46		End of Borehole																				
		Standpipe Installed																				
47		No Water Loss Noted																				
		N: 7590905.931																				
		E: 2398938.489																				
48																						
49																						
50																						

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-04

CLIENT CH2M HILLPROJECT No. 121616995.800LOCATION Energy East Saint John Extension, Grande Riviere CrossingBOREHOLE No. BH-04DATES: BORING 2014/06/03 WATER LEVEL Artesian at 29.0 mDATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa											
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits											
					mm				Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●											
0	163.66	Very loose to dense grey well-graded GRAVEL (GW-GC) with silty clay and sand			SS	1	600	3												
1																				
2					SS	2	275	31												
3																				
4					SS	3	450	14												
5																				
6					SS	4	250	43												
7																				
8					SS	6	400	19												
9																				
10		SS	7	375	31															

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
 Continued Next Page



BOREHOLE RECORD

BH-04

CLIENT CH2M HILLPROJECT No. 121616995.800LOCATION Energy East Saint John Extension, Grande Riviere CrossingBOREHOLE No. BH-04DATES: BORING 2014/06/03 WATER LEVEL Artesian at 29.0 mDATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa														
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits														
10		GW-GC cont'd								Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●													
										10	20	30	40	50	60	70	80	90					
11					SS	8	50	17															
12																							
13					SS	9	375	15															
14																							
15																							
16					SS	10	350	17															
17					SS	11	425	25															
18																							
19					SS	12	450	49															
20																							

- △ Unconfined Compression Test
- Field Vane Test ■ Remoulded
- ✘ Torvane



BOREHOLE RECORD

BH-04

CLIENT CH2M HILL

PROJECT No. 121616995.800

LOCATION Energy East Saint John Extension, Grande Riviere Crossing

BOREHOLE No. BH-04

DATES: BORING 2014/06/03 WATER LEVEL Artesian at 29.0 m

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80						
20		GW-GC cont'd			SS	13	250	30										
21																		
22					SS	14	350	48										
23																		
24																		
25	138.8	Very stiff grey lean CLAY (CL)			SS	15	400	48										
26																		
27																		
28					SS	16	600	29										
29	134.5	- Artesian pressure from 29.0 to 30.5 m Compact grey well-graded SAND (SW-SM) with silt and gravel																
30																		

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane

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BOREHOLE RECORD

BH-04

CLIENT CH2M HILL

PROJECT No. 121616995.800

LOCATION Energy East Saint John Extension, Grande Riviere Crossing

BOREHOLE No. BH-04

DATES: BORING 2014/06/03 WATER LEVEL Artesian at 29.0 m

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits									
									Dynamic Penetration Test, blows/0.3m									
									Standard Penetration Test, blows/0.3m									
							mm		10	20	30	40	50	60	70	80	90	
30		SW-SM cont'd																
31						SS	17	350	21									
32																		
33																		
34																		
35																		
36	127.7	Very poor to excellent quality interbedded light grey, fine grained SANDSTONE and dark grey SHALE - Extremely close to moderate joint spacing - Predominant joint set (bedding planes) oriented at 0 degrees to the core axis - Some joints oriented at 45 - 60 degrees to the core axis - Fresh (unweathered)			NQ	18	74%	31%										
37						NQ	19	100%	78%									
38							NQ	20	100%	67%								
39																		
40																		

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✘ Torvane
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BOREHOLE RECORD

BH-04

CLIENT CH2M HILLPROJECT No. 121616995.800LOCATION Energy East Saint John Extension, Grande Riviere CrossingBOREHOLE No. BH-04DATES: BORING 2014/06/03 WATER LEVEL Artesian at 29.0 mDATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa														
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits														
									Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●														
								mm	20	40	60	80	10	20	30	40	50	60	70	80	90		
40		SANDSTONE / SHALE cont'd																					
41					NQ	21	92%	17%															
42					NQ	22	100%	68%															
43					NQ	23	100%	55%															
44					NQ	24	100%	57%															
45					NQ	25	100%	52%															
46					NQ	26	95%	87%															
47																							
48																							
49																							
50																							

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-04

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, Grande Riviere Crossing
 DATES: BORING 2014/06/03 WATER LEVEL Artesian at 29.0 m

PROJECT No. 121616995.800
 BOREHOLE No. BH-04
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa													
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits													
									Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●													
							mm		20	40	60	80	10	20	30	40	50	60	70	80	90	
50		SANDSTONE / SHALE cont'd																				
51						NQ	28	98%	92%													
52																						
53						NQ	29	100%	87%													
54																						
55						NQ	30	100%	88%													
56																						
57					NQ	31	100%	95%														
58																						
59					NQ	32	100%	60%														
60																						
61																						
62																						
63																						
64																						
65																						
66																						
67																						
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97																						
98																						
99																						
100																						

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
 Continued Next Page



BOREHOLE RECORD

BH-04

CLIENT CH2M HILLPROJECT No. 121616995.800LOCATION Energy East Saint John Extension, Grande Riviere CrossingBOREHOLE No. BH-04DATES: BORING 2014/06/03 WATER LEVEL Artesian at 29.0 mDATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits									
									Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●									
					mm				10	20	30	40	50	60	70	80	90	
60		SANDSTONE / SHALE cont'd			NQ	34	98%	87%										
61					NQ	35	100%	75%										
62					NQ	36	100%	68%										
63																		
64	99.6	End of Borehole																
65		Standpipe Installed																
66		No Water Loss Noted																
67		N: 7590200.437																
68		E: 2399031.187																
69																		
70																		

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-05

CLIENT CH2M HILL

PROJECT No. 121616995.800

LOCATION Energy East Saint John Extension, Grande Riviere Crossing

BOREHOLE No. BH-05

DATES: BORING 2014/06/09 WATER LEVEL Artesian at 16.8 m

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa											
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80								
0	163.79																			
	163.7	Loose black silty SAND (SM)			SS	1	300	5												
	163.2	Loose brown SILT (ML)																		
1		Compact to dense grey well-graded SAND (SW-SM) with silt and gravel																		
2						SS	2	250	36											
3						SS	3	300	24											
4																				
5						SS	4	350	31											
6						SS	5	300	43											
7																				
8					SS	6	325	16												
9																				
10					SS	7	600	36												

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
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BOREHOLE RECORD

BH-05

CLIENT CH2M HILL

PROJECT No. 121616995.800

LOCATION Energy East Saint John Extension, Grande Riviere Crossing

BOREHOLE No. BH-05

DATES: BORING 2014/06/09 WATER LEVEL Artesian at 16.8 m

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa	
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40
										Water Content & Atterberg Limits Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●
							mm			10 20 30 40 50 60 70 80 90 W _p W W _L
10		SW-SM cont'd								
11					SS	8	325	24		
12					SS	9	275	24		
13					SS	10	350	29		
14	150.1	Very stiff lean CLAY (CL)								
15	149.4	Compact grey poorly-graded GRAVEL (GP-GM) with silt and sand								
16					SS	11	300	25		
17	146.8	- Artesian pressure at 16.8 m								
18		Very poor to excellent quality interbedded light grey SANDSTONE and dark grey SHALE - Extremely close to close joint spacing - Predominant joint set (bedding planes) oriented at 0 - 5 degrees to the core axis - Fresh (unweathered)			HQ	12	67%	0%		
19					HQ	13	100%	0%		
20										

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
 Continued Next Page



BOREHOLE RECORD

BH-05

CLIENT CH2M HILLPROJECT No. 121616995.800LOCATION Energy East Saint John Extension, Grande Riviere CrossingBOREHOLE No. BH-05DATES: BORING 2014/06/09 WATER LEVEL Artesian at 16.8 mDATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa																			
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits					Standard Penetration Test, blows/0.3m														
								mm																				
20		SANDSTONE / SHALE cont'd																										
21					HQ	14	100%	26%																				
22					HQ	15	100%	61%																				
23					HQ	16	100%	77%																				
24					HQ	17	100%	48%																				
25					HQ	18	100%	77%																				
26					HQ	19	100%	77%																				
27					HQ	20	100%	80%																				
28																												
29																												
30																												

- △ Unconfined Compression Test
- Field Vane Test ■ Remoulded
- ✕ Torvane

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BOREHOLE RECORD

BH-05

CLIENT CH2M HILLPROJECT No. 121616995.800LOCATION Energy East Saint John Extension, Grande Riviere CrossingBOREHOLE No. BH-05DATES: BORING 2014/06/09 WATER LEVEL Artesian at 16.8 mDATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa														
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits														
30		SANDSTONE / SHALE cont'd																					
	132.3	Rubble zone at 31.5m (500mm thick)																					
32	131.8																						
33																							
34																							
35																							
36																							
37	127.0	Rubble zone at 36.8m (900mm thick)																					
38	126.1																						
39																							
40																							

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-05

CLIENT CH2M HILL

PROJECT No. 121616995.800

LOCATION Energy East Saint John Extension, Grande Riviere Crossing

BOREHOLE No. BH-05

DATES: BORING 2014/06/09 WATER LEVEL Artesian at 16.8 m

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa																			
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits																			
										Dynamic Penetration Test, blows/0.3m ★																		
										Standard Penetration Test, blows/0.3m ●																		
										10	20	30	40	50	60	70	80	90										
40		SANDSTONE / SHALE cont'd				HQ	27	98%	87%																			
41																												
42						HQ	28	100%	80%																			
43	121.1 120.9	Rubble zone at 42.7m (180mm thick)				HQ	29	98%	90%																			
44																												
45						HQ	30	100%	38%																			
46																												
47						HQ	31	98%	32%																			
48						HQ	32	99%	87%																			
49																												
50						HQ	33	100%	77%																			

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-05

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, Grande Riviere Crossing
 DATES: BORING 2014/06/09 WATER LEVEL Artesian at 16.8 m

PROJECT No. 121616995.800
 BOREHOLE No. BH-05
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa 20 40 60 80 Water Content & Atterberg Limits W _p W W _L Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ● 10 20 30 40 50 60 70 80 90									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD										
50		SANDSTONE / SHALE cont'd																
51					HQ	34	98%	80%										
52					HQ	35	90%	87%										
53					HQ	36	95%	63%										
54																		
55	108.7	End of Borehole																
56		Standpipe Installed																
57		No Water Loss Noted																
58		N: 7590097.464																
59		E: 2399040.708																
60																		

- △ Unconfined Compression Test
- Field Vane Test ■ Remoulded
- ✕ Torvane



BOREHOLE RECORD

BH-07

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, Salmon River North Crossing, New Brunswick

BOREHOLE No. BH-07

DATES: BORING 2014/04/22

WATER LEVEL 1.5 m on 2014/04/22

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa		
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60
0	151.00	Very loose brown silty SAND (SM)			SS	1	550	2	●		
1	149.9										
2	147.0	Loose to compact brown well graded GRAVEL (GW) with sand		▼	SS	2	300	17	○ ●		
3											
4											
5	147.0	Very stiff grey sandy silty clay (CL-ML) with gravel TILL			SS	4	150	31	○ ●		
6											
7											
8											
9											
10											
10											

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-07

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, Salmon River North Crossing, New Brunswick

BOREHOLE No. BH-07

DATES: BORING 2014/04/22 WATER LEVEL 1.5 m on 2014/04/22

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa																				
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits W_P W W_L Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●																				
								mm	10	20	30	40	50	60	70	80	90												
10		TILL (CL-ML) cont'd	[diagonal lines]																										
	138.8	Dense to very dense grey poorly graded gravel (GP) with sand TILL	[diagonal lines]																										
11			[diagonal lines]						SS	8	75	26		●															
12			[diagonal lines]																										
13			[diagonal lines]																										
14			[diagonal lines]						SS	9	350	50	○	●															
15			[diagonal lines]																										
16			[diagonal lines]						SS	10	200	112/200	○																
17			[diagonal lines]																										
18			[diagonal lines]						SS	11	175	70/250	○																
19			[diagonal lines]																										
20			[diagonal lines]						SS	12	350	47	○	●															

△ Unconfined Compression Test ■ Remoulded
 □ Field Vane Test ✕ Torvane
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BOREHOLE RECORD

BH-07

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Salmon River North Crossing, New BrunswickBOREHOLE No. BH-07DATES: BORING 2014/04/22WATER LEVEL 1.5 m on 2014/04/22DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa		Water Content & Atterberg Limits					
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80	W _p	W _L		
20		TILL (GP) cont'd														
				SS	13	375	57	○								
21																
				SS	14	400	63	○								
22																
23																
24																
25																
26																
27																
28																
29																
30																

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-07

CLIENT CH2M HILL PROJECT No. 121616995
 LOCATION Energy East Saint John Extension, Salmon River North Crossing, New Brunswick BOREHOLE No. BH-07
 DATES: BORING 2014/04/22 WATER LEVEL 1.5 m on 2014/04/22 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa			
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80
30		TILL (GP) cont'd										
31					SS	17	450	67	○	●		
32												
33												
34												
35					SS	18	0	45		●		
36												
37	113.5				NQ	19	60%	20%				
38		Very poor to fair quality grey SLATE - Close to extremely close joint spacing - Joints oriented at 40 to 70 (slaty cleavage) and at 0 to 20 degrees to the core axis - Fresh to slightly weathered										
39						NQ	20	83%	28%			
40												

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 × Torvane
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BOREHOLE RECORD

BH-07

CLIENT CH2M HILL PROJECT No. 121616995
 LOCATION Energy East Saint John Extension, Salmon River North Crossing, New Brunswick BOREHOLE No. BH-07
 DATES: BORING 2014/04/22 WATER LEVEL 1.5 m on 2014/04/22 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa 20 40 60 80 Water Content & Atterberg Limits W _p W W _L Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ● 10 20 30 40 50 60 70 80 90									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD										
40		SLATE cont'd			NQ	21	100%	53%										
41					NQ	22	100%	52%										
42	108.3																	
43		End of Borehole																
44		Standpipe Installed																
45		Water Loss Noted at 18.29 to 19.81m Drilling fluid used below 32.0 m depth																
46		N: 7563141.86																
47		E: 2419905.57																
48																		
49																		
50																		

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-08

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Salmon River North Crossing, New BrunswickBOREHOLE No. BH-08DATES: BORING 2014/04/29WATER LEVEL 14.0 m on 2014/05/07DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa													
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80										
0	253.22	Compact brown sandy SILT (ML) with gravel, some organic material			SS	1	600	12														
1		Poor to excellent quality grey SLATE - Very wide to extremely close joint spacing - Joints oriented at 20 to 40 and 70 to 80 degrees to the core axis - Fresh to slightly weathered			SS	2	400	57														
2	251.7																					
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-08

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Salmon River North Crossing, New BrunswickBOREHOLE No. BH-08DATES: BORING 2014/04/29WATER LEVEL 14.0 m on 2014/05/07DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa		Water Content & Atterberg Limits	
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80
20		SLATE cont'd										
21					HQ	16	97%	50%				
22					HQ	17	100%	68%				
23												
24					HQ	18	100%	50%				
25					HQ	19	100%	69%				
26					HQ	20	100%	73%				
27												
28					HQ	21	100%	73%				
29					HQ	22	100%	53%				
30												

- △ Unconfined Compression Test
- Field Vane Test
- Remoulded
- ✕ Torvane

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BOREHOLE RECORD

BH-08

CLIENT CH2M HILL PROJECT No. 121616995
 LOCATION Energy East Saint John Extension, Salmon River North Crossing, New Brunswick BOREHOLE No. BH-08
 DATES: BORING 2014/04/29 WATER LEVEL 14.0 m on 2014/05/07 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa 20 40 60 80 Water Content & Atterberg Limits W _p W W _L Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ● 10 20 30 40 50 60 70 80 90									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD										
30		SLATE cont'd						mm										
			HQ 23	23	100%	90%												
31																		
			HQ 24	24	100%	63%												
32																		
			HQ 25	25	100%	77%												
33																		
			HQ 26	26	100%	88%												
34																		
		HQ 27	27	100%	100%													
35																		
		HQ 28	28	100%	78%													
36																		
		HQ 29	29	100%	64%													
37																		
38																		
39																		
40																		

△ Unconfined Compression Test □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-08

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, Salmon River North Crossing, New Brunswick

BOREHOLE No. BH-08

DATES: BORING 2014/04/29

WATER LEVEL 14.0 m on 2014/05/07

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa		Water Content & Atterberg Limits	
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80
40		SLATE cont'd										
41					HQ	30	100%	84%				
42					HQ	31	98%	37%				
43												
44					HQ	32	95%	27%				
45												
46					HQ	33	96%	83%				
47												
48					HQ	34	100%	68%				
49												
50					HQ	35	100%	81%				

- △ Unconfined Compression Test
- Field Vane Test
- Remoulded
- ✕ Torvane

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BOREHOLE RECORD

BH-08

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Salmon River North Crossing, New BrunswickBOREHOLE No. BH-08DATES: BORING 2014/04/29WATER LEVEL 14.0 m on 2014/05/07DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa										
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80							
50		SLATE cont'd			HQ	36	100%	71%											
51					HQ	37	100%	63%											
52																			
53					HQ	38	100%	59%											
54																			
55					HQ	39	98%	78%											
56																			
57					HQ	40	100%	44%											
58					NQ	41	97%	47%											
59					NQ	42	100%	77%											
60		Rubble zone (300mm thick)			NQ	43	92%	70%											

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-08

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, Salmon River North Crossing, New Brunswick

BOREHOLE No. BH-08

DATES: BORING 2014/04/29

WATER LEVEL 14.0 m on 2014/05/07

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa																	
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits																	
										Dynamic Penetration Test, blows/0.3m																
										Standard Penetration Test, blows/0.3m																
								mm		10	20	30	40	50	60	70	80	90								
60		SLATE cont'd																								
61																										
62		Rubble zone (500mm thick)																								
63		Good to excellent quality grey SLATE - Very wide to close joint spacing - Joints oriented at 20 to 40 and 70 to 80 degrees to the core axis - Fresh (unweathered)																								
64																										
65																										
66																										
67																										
68																										
69																										
70																										

- △ Unconfined Compression Test
- Field Vane Test ■ Remoulded
- ✘ Torvane



BOREHOLE RECORD

BH-08

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, Salmon River North Crossing, New Brunswick

BOREHOLE No. BH-08

DATES: BORING 2014/04/29

WATER LEVEL 14.0 m on 2014/05/07

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa										
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits		Dynamic Penetration Test, blows/0.3m		Standard Penetration Test, blows/0.3m						
										W_p W W_L		★		●					
								mm		10	20	30	40	50	60	70	80	90	
70		SLATE cont'd																	
71					NQ	51	100%	98%											
72																			
73					NQ	52	100%	93%											
74																			
75					NQ	53	100%	100%											
76																			
77					NQ	54	96%	96%											
78																			
79					NQ	55	100%	93%											
80																			
					NQ	56	100%	100%											

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-08

CLIENT CH2M HILL PROJECT No. 121616995
 LOCATION Energy East Saint John Extension, Salmon River North Crossing, New Brunswick BOREHOLE No. BH-08
 DATES: BORING 2014/04/29 WATER LEVEL 14.0 m on 2014/05/07 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa										
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits					Dynamic Penetration Test, blows/0.3m					Standard Penetration Test, blows/0.3m
									<div style="display: flex; justify-content: space-around;"> 20 40 60 80 </div> <div style="display: flex; justify-content: space-around;"> 10 20 30 40 50 60 70 80 90 </div>										
80		SLATE cont'd			NQ	57	100%	85%	mm										
81																			
82						NQ	58	100%	82%										
83																			
84						NQ	59	100%	98%										
85						NQ	60	100%	92%										
86						NQ	61	100%	100%										
87																			
88					NQ	62	100%	100%											
89																			
90					NQ	63	100%	93%											

Δ Unconfined Compression Test □ Field Vane Test ■ Remoulded
 ✕ Torvane

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BOREHOLE RECORD

BH-08

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Salmon River North Crossing, New BrunswickBOREHOLE No. BH-08DATES: BORING 2014/04/29WATER LEVEL 14.0 m on 2014/05/07DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa		Water Content & Atterberg Limits	
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80
90		SLATE cont'd										
91					NQ	64	100%	100%				
92					NQ	65	98%	95%				
93												
94					NQ	66	100%	93%				
95					NQ	67	100%	95%				
96												
97					NQ	68	98%	98%				
98												
99					NQ	69	100%	100%				
100												

- △ Unconfined Compression Test
- Field Vane Test ■ Remoulded
- ✕ Torvane

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BOREHOLE RECORD

BH-08

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, Salmon River North Crossing, New Brunswick

BOREHOLE No. BH-08

DATES: BORING 2014/04/29 WATER LEVEL 14.0 m on 2014/05/07

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa								
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80					
									Water Content & Atterberg Limits $\begin{matrix} W_p \\ \\ W \\ \\ W_L \end{matrix}$								
								mm	Dynamic Penetration Test, blows/0.3m \star Standard Penetration Test, blows/0.3m \bullet								
									10	20	30	40	50	60	70	80	90
-100		SLATE cont'd			NQ	70	98%	98%									
-101																	
-102					NQ	71	100%	100%									
-103																	
-104					NQ	72	100%	100%									
-105																	
-106					NQ	73	100%	94%									
-107																	
-108					NQ	74	100%	100%									
-109																	
-110					NQ	75	100%	82%									
					NQ	76	100%	100%									

- Δ Unconfined Compression Test
- \square Field Vane Test \blacksquare Remoulded
- \times Torvane

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BOREHOLE RECORD

BH-08

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Salmon River North Crossing, New BrunswickBOREHOLE No. BH-08DATES: BORING 2014/04/29WATER LEVEL 14.0 m on 2014/05/07DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa																	
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits					Standard Penetration Test, blows/0.3m												
								mm																		
-110		SLATE cont'd																								
-111					NQ	77	100%	100%																		
-112					NQ	78	100%	93%																		
-113					NQ	79	100%	100%																		
-114					NQ	80	100%	87%																		
-115					NQ	81	100%	100%																		
-116					NQ	82	100%	100%																		
-117																										
-118																										
-119																										
-120																										

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane

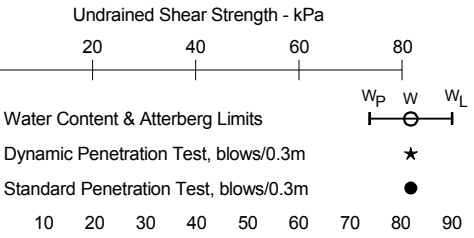


BOREHOLE RECORD

BH-08

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Salmon River North Crossing, New BrunswickBOREHOLE No. BH-08DATES: BORING 2014/04/29WATER LEVEL 14.0 m on 2014/05/07DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80						
-120		SLATE cont'd			NQ	83	98%	92%										
-121					NQ	84	100%	100%										
-122																		
-123					NQ	85	99%	97%										
-124					NQ	86	100%	100%										
-125																		
-126					NQ	87	100%	100%										
-127																		
-128					NQ	88	100%	100%										
-129					NQ	89	100%	100%										
-130																		



△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-08

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Salmon River North Crossing, New BrunswickBOREHOLE No. BH-08DATES: BORING 2014/04/29WATER LEVEL 14.0 m on 2014/05/07DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa								
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80					
-130		SLATE cont'd															
-131			NQ	90	100%	98%											
-132			NQ	91	100%	100%											
-133			NQ	92	100%	97%											
-134			NQ	93	100%	100%											
-135			NQ	94	99%	99%											
-136			NQ	95	98%	98%											
-137																	
-138																	
-139																	
-140																	

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane

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BOREHOLE RECORD

BH-08

CLIENT CH2M HILL PROJECT No. 121616995
 LOCATION Energy East Saint John Extension, Salmon River North Crossing, New Brunswick BOREHOLE No. BH-08
 DATES: BORING 2014/04/29 WATER LEVEL 14.0 m on 2014/05/07 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa 20 40 60 80 Water Content & Atterberg Limits W _p W W _L Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ● 10 20 30 40 50 60 70 80 90									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD										
-140	112.7	SLATE cont'd						mm										
-141		End of Borehole																
-142		Standpipe Installed to 22.9 m																
-143		No Water Loss Noted																
-144		N: 7562952.75																
-145		E: 2420177.89																
-146																		
-147																		
-148																		
-149																		
-150																		

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-09

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, Tobique River Crossing, New Brunswick
 DATES: BORING 2014/03/20 WATER LEVEL 4.0 m on 2014/03/25

PROJECT No. 121616995
 BOREHOLE No. BH-09
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa											
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80								
0	121.92																			
0	121.8	Topsoil / Rootmat Loose to compact reddish brown clayey gravel (GC) with sand to clayey sand (SC) with gravel TILL			SS	1	350	11												
1																				
2					SS	2	400	11												
3																				
4																				
5					SS	4	250	5												
6		- Visually appears to have increased clay content from 5.6 m																		
7	114.8				SS	6	150	50/75												
8		Very poor to fair quality reddish brown CONGLOMERATE - Weak - Close joint spacing - Joints at 90 degrees to core axis - Slightly weathered			HQ	7	89%	55%												
9	113.1				HQ	8	100%	23%												
10		Very poor to good quality reddish brown SILTSTONE - Weak - Very close to close joint spacing - Joints at 90 degrees to core axis																		

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
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BOREHOLE RECORD

BH-09

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, Tobique River Crossing, New Brunswick
 DATES: BORING 2014/03/20 WATER LEVEL 4.0 m on 2014/03/25

PROJECT No. 121616995
 BOREHOLE No. BH-09
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa															
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits															
									Dynamic Penetration Test, blows/0.3m Standard Penetration Test, blows/0.3m															
								mm																
10		- Generally slightly to moderately weathered with intermittent highly weathered to completely weathered zones (20mm to 300mm total)			HQ	9	100%	62%																
11																								
12						HQ	10	100%	22%															
13																								
14						HQ	11	100%	80%															
15																								
16																								
17	105.2	Good quality white to reddish brown SANDSTONE - Very strong - No observed jointing			HQ	12	100%	65%																
18	104.1	- Fresh to slightly weathered Good to excellent quality reddish brown SILTSTONE - Very close to moderate spacing - Joints generally at 90 degrees to core axis			HQ	13	100%	71%																
19		- Slightly to highly weathered																						
20					HQ	14	97%	79%																
					HQ	15	98%	98%																

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
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BOREHOLE RECORD

BH-09

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, Tobique River Crossing, New Brunswick

BOREHOLE No. BH-09

DATES: BORING 2014/03/20 WATER LEVEL 4.0 m on 2014/03/25

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa								
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80					
									Water Content & Atterberg Limits 								
									Dynamic Penetration Test, blows/0.3m Standard Penetration Test, blows/0.3m 								
20		SILTSTONE cont'd							10	20	30	40	50	60	70	80	90
21					HQ	16	100%	82%									
22																	
23	98.6				HQ	17	100%	87%									
24		Excellent quality reddish brown CONGLOMERATE - Medium Strong to Strong - Moderate joint spacing - Joints at 90 degrees to core axis - Fresh to slightly weathered			HQ	18	100%	90%									
25	96.7																
26		Good to excellent quality reddish brown to grey SILTSTONE - Close to moderate joint spacing - Joints at 70 to 90 degrees to core axis - Fresh to slightly weathered			HQ	19	100%	95%									
27					HQ	20	100%	78%									
28																	
29	93.3	Excellent quality reddish brown to grey SANDSTONE - Strong - Fine to medium grained - No observed joints - Fresh to slightly weathered			HQ	21	100%	100%									
30																	

- △ Unconfined Compression Test
- Field Vane Test ■ Remoulded
- ✕ Torvane

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BOREHOLE RECORD

BH-09

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, Tobique River Crossing, New Brunswick
 DATES: BORING 2014/03/20 WATER LEVEL 4.0 m on 2014/03/25

PROJECT No. 121616995
 BOREHOLE No. BH-09
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa														
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits W_p W W_L Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●														
							mm																
30	91.3	SANDSTONE cont'd	[Strata Plot]		HQ	22	100%	90%															
31		Good to excellent quality reddish brown to grey SILSTONE - Strong - Close to wide joint spacing - Joints generally at 90 degrees to core axis - Fresh to moderately weathered - 70mm thick weathered zone at 31.8 m depth	[Strata Plot]		HQ	23	100%	89%															
32			[Strata Plot]		HQ	24	100%	93%															
33			[Strata Plot]		HQ	25	100%	88%															
34			[Strata Plot]		HQ	26	100%	88%															
35			[Strata Plot]																				
36			[Strata Plot]																				
37			[Strata Plot]																				
38	83.8	Excellent quality reddish brown SANDSTONE	[Strata Plot]		HQ	27	100%	98%															
39	82.3	- Medium Strong to Strong - Medium to coarse grained - Moderate to wide joint spacing - Joints at 90 degrees to core axis - Fresh to slightly weathered	[Strata Plot]		HQ	28	100%	98%															
40		Good to excellent quality reddish brown	[Strata Plot]																				

▲ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
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BOREHOLE RECORD

BH-09

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, Tobique River Crossing, New Brunswick

BOREHOLE No. BH-09

DATES: BORING 2014/03/20 WATER LEVEL 4.0 m on 2014/03/25

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa										
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits										
									20 40 60 80 * (W _p W W _L) Dynamic Penetration Test, blows/0.3m Standard Penetration Test, blows/0.3m 10 20 30 40 50 60 70 80 90										
40		SILTSTONE - Medium Strong - Very close to moderate joint spacing - Joints at 90 degrees to core axis - Fresh to moderate weathering - 20mm completely weathered zone at 42.3 m depth	[Strata Plot]		HQ	29	100%	92%											
41																			
42																			
43																			
44					HQ	31	100%	93%											
45					HQ	32	100%	83%											
46	75.7	End of Borehole																	
47		Standpipe Installed																	
48		No Water Loss Noted																	
49		N: 7539397.161 E: 2428821.157																	
50																			

- △ Unconfined Compression Test
- Field Vane Test
- Remoulded
- ✱ Torvane



BOREHOLE RECORD

BH-10

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, Tobique River Crossing, New Brunswick
 DATES: BORING 2014/03/19 WATER LEVEL 1.1 m on 2014/03/25

PROJECT No. 121616995
 BOREHOLE No. BH-10
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa													
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80										
0	107.06																					
	106.9	Topsoil / Rootmat			SS	1	425	5	●													
	106.5	Loose brown silty SAND (SM), some organic material																				
1		Compact brown well-graded GRAVEL (GW-GM) with silt and sand		▼																		
2					SS	2	0	14	●													
3					SS	3	350	25	○	●												
4																						
5					SS	4	175	17	●													
6																						
7																						
8	99.9	Compact brown to grey SILT (ML) with fine sand seams			SS	6	450	12	●													
9																						
10		- material visually appears to have increased plasticity from 9.5 m			SS	7	600	11	●													

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
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BOREHOLE RECORD

BH-10

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, Tobique River Crossing, New Brunswick
 DATES: BORING 2014/03/19 WATER LEVEL 1.1 m on 2014/03/25

PROJECT No. 121616995
 BOREHOLE No. BH-10
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa	
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40
										Water Content & Atterberg Limits Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●
							mm			10 20 30 40 50 60 70 80 90
10		ML cont'd								
11	96.1	Fair to excellent quality reddish brown to grey SILTSTONE - Weak to Medium Strong - Close to wide joint spacing - Joints at 80 to 90 degrees to core axis - Fresh to moderately weathered			SS	8	100	50/125		
12					HQ	9	94%	64%		
13					HQ	10	100%	62%		
14					HQ	11	100%	93%		
15					HQ	12	98%	96%		
16					HQ	13	100%	83%		
17										
18										
19										
20										

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
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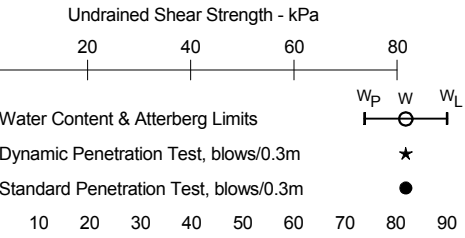


BOREHOLE RECORD

BH-10

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Tobique River Crossing, New BrunswickBOREHOLE No. BH-10DATES: BORING 2014/03/19 WATER LEVEL 1.1 m on 2014/03/25DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa										
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80							
	86.6	SILTSTONE cont'd																	
20																			
21		Fair to excellent quality reddish brown to grey SANDSTONE - Medium Strong to Strong - Fine to coarse grained - Close to moderate joint spacing - Joints at 90 degrees to core axis - Fresh to slightly weathered			HQ	15	100%	78%											
22					HQ	16	100%	90%											
23																			
24					HQ	17	100%	83%											
25	82.5	Good to excellent quality reddish brown to grey SILTSTONE - Medium Strong to Strong - Very close to moderate joint spacing - Joints at 90 degrees to core axis - Minor jointing at 45 to 60 degrees to core axis - Fresh to highly weathered			HQ	18	100%	92%											
26																			
27					HQ	19	100%	95%											
28		- Minor sandstone layer (0.5 m thick) at 28.1 m depth (very strong)			HQ	20	100%	75%											
29																			
30																			



Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
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BOREHOLE RECORD

BH-10

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, Tobique River Crossing, New Brunswick
 DATES: BORING 2014/03/19 WATER LEVEL 1.1 m on 2014/03/25

PROJECT No. 121616995
 BOREHOLE No. BH-10
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa 20 40 60 80 Water Content & Atterberg Limits W _p W W _L Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ● 10 20 30 40 50 60 70 80 90									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD										
30		SILTSTONE cont'd	[Strata Plot: Brick pattern]	[Water Level: 1.1 m]	HQ	21	100%	100%										
31					HQ	22	100%	83%										
32					HQ	23	100%	95%										
33					HQ	24	100%	92%										
34		End of Borehole Standpipe Installed No Water Loss Noted N: 7539289.4713 E: 2429069.375	[Strata Plot: Blank]	[Water Level: 1.1 m]														
35	71.8																	
36																		
37																		
38																		
39																		
40																		

- △ Unconfined Compression Test
- Field Vane Test ■ Remoulded
- ✕ Torvane



BOREHOLE RECORD

BH-11

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, Tobique River Crossing, New Brunswick
 DATES: BORING 2014/03/24 WATER LEVEL 3.9 m on 2014/03/25

PROJECT No. 121616995
 BOREHOLE No. BH-11
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa			
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80
0	109.07											
	108.9	Topsoil / Rootmat										
		Loose brown silty SAND (SM) (Frozen)			SS	1	450	8	●			○
1	108.0											
		Loose to compact brown well-graded GRAVEL (GW) with sand			SS	2	325	19		●		
2												
					SS	3	200	15		●		
3												
					SS	4	300	8	●			
4												
					SS	5	350	20	○	●		
5												
					SS	6	0	14		●		
6												
7												
8												
	100.4											
		Loose brown poorly-graded SAND (SP)			SS	7	550	9	●			
9												
10												

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
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BOREHOLE RECORD

BH-11

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Tobique River Crossing, New BrunswickBOREHOLE No. BH-11DATES: BORING 2014/03/24 WATER LEVEL 3.9 m on 2014/03/25DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa										
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80							
10	98.9	SP cont'd																	
		Compact brown SILT (ML) with sand and gravel																	
11					SS	8	500	20											
12																			
13					SS	9	300	18											
14	95.1	Dense to very dense brown well-graded GRAVEL (GP-GM) with silt and sand, frequent cobbles and boulders			SS	10	0	50/100											
15					HQ	11	400	N/A											
16					HQ	12	350	N/A											
17	92.2	Poor to excellent quality reddish brown to grey SILTSTONE - Very close to wide joint spacing - Majority of joints at 90 degrees to core axis			SS	13	325	41											
18		- Some joints at 45 to 60 degrees to core axis - Fresh to moderate weathering			HQ	14	64%	30%											
19					HQ	15	92%	54%											
20					HQ	16	100%	99%											

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-11

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Tobique River Crossing, New BrunswickBOREHOLE No. BH-11DATES: BORING 2014/03/24 WATER LEVEL 3.9 m on 2014/03/25DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa															
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits															
									Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●															
									20	40	60	80												
								mm	10	20	30	40	50	60	70	80	90							
20		SILTSTONE cont'd			HQ	17	98%	73%																
21					HQ	18	100%	82%																
22					HQ	19	100%	85%																
23					HQ	20	100%	93%																
24					HQ	21	100%	81%																
25					HQ	22	100%	92%																
26					HQ	23	100%	99%																
27																								
28	81.2	Good to excellent quality reddish brown to grey CONGLOMERATE - Close to wide joint spacing - Joints at 80 to 90 degrees to core axis - Fresh to slightly weathered - Intermittent siltstone layers with thickness less than 220mm - Minor sandstone layer (500mm thick) at 28.1 m depth			HQ	22	100%	92%																
29					HQ	23	100%	99%																
30																								

- △ Unconfined Compression Test
- Field Vane Test
- Remoulded
- ✕ Torvane



BOREHOLE RECORD

BH-11

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, Tobique River Crossing, New Brunswick
 DATES: BORING 2014/03/24 WATER LEVEL 3.9 m on 2014/03/25

PROJECT No. 121616995
 BOREHOLE No. BH-11
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa 20 40 60 80 Water Content & Atterberg Limits W_p W W_L Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ● 10 20 30 40 50 60 70 80 90									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD										
30		CONGLOMERATE cont'd	[Brick pattern]															
31					HQ 24	100%	87%											
32		Fair to excellent quality reddish brown to grey SILTSTONE - Very close to moderate joint spacing - Joints at 90 degrees to core axis - Fresh to moderately weathered	[Brick pattern]															
33	76.1				HQ 25	98%	71%											
34		Fair to excellent quality reddish brown to grey SILTSTONE - Very close to moderate joint spacing - Joints at 90 degrees to core axis - Fresh to moderately weathered	[Brick pattern]															
35	74.1				HQ 26	100%	93%											
36		End of Borehole Standpipe Installed No Water Loss Noted N: 7539154.275 E: 2429308.628																
37																		
38																		
39																		
40																		

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-48

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New Brunswick

BOREHOLE No. BH-48

DATES: BORING 2014/10/27 WATER LEVEL 3.1 m on 2014/10/28

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa											
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80								
0	281.48																			
	281.4	PEAT Loose brown SILT (ML)			SS	1	400	4												
1	280.5																			
		Stiff to very stiff brown sandy lean clay (CL)			SS	2	600	12												
2																				
3					SS	3	600	20												
4																				
5					SS	4	600	19												
6																				
7					SS	5	600	24												
8	274.2	Very poor to excellent quality interbedded dark grey SILTSTONE and light grey SANDSTONE - Alternating layers of siltstone (10 - 20 mm thick) and sandstone (<10 mm thick) - Medium strong to strong - Very close to moderate joint spacing - Joints oriented parallel to bedding at approximately 45 degrees to the core axis - Some joints oriented across bedding at 45 degrees to the core axis - Carbonate veining was oriented at 20			HQ	6	67%	0%												
			HQ	7	75%	0%														
			HQ	8	77%	0%														
			HQ	9	87%	0%														
10																				

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
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BOREHOLE RECORD

BH-48

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New Brunswick

BOREHOLE No. BH-48

DATES: BORING 2014/10/27 WATER LEVEL 3.1 m on 2014/10/28

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa 20 40 60 80 										
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ● 10 20 30 40 50 60 70 80 90 										
20		Interbedded SILTSTONE and SANDSTONE cont'd							mm										
21					HQ 17	96%	69%												
22					HQ 18	95%	57%												
23																			
24					HQ 19	98%	57%												
25																			
26					HQ 20	60%	38%												
27					HQ 21	100%	92%												
28																			
29		HQ 22	100%	97%															
30																			

▲ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-48

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New Brunswick

BOREHOLE No. BH-48

DATES: BORING 2014/10/27 WATER LEVEL 3.1 m on 2014/10/28

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa 20 40 60 80 Water Content & Atterberg Limits W _p W W _L Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	10	20	30	40	50	60	70	80	90	
50	230.7	Interbedded SILTSTONE and SANDSTONE cont'd	[Strata Plot]	[Water Level]	HQ	36	100%	100%										
51		End of Borehole																
52		Standpipe installed to 9.14m (borehole blocked)																
53		No water loss noted																
54		N: 7507833.51																
55		E: 2440529.67																
56																		
57																		
58																		
59																		
60																		

- △ Unconfined Compression Test
- Field Vane Test ■ Remoulded
- ✕ Torvane



BOREHOLE RECORD

BH-12

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New Brunswick

BOREHOLE No. BH-12

DATES: BORING 2014/05/15

WATER LEVEL Not observed

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa											
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80								
										Water Content & Atterberg Limits Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●										
							mm			10	20	30	40	50	60	70	80	90		
10		Interbedded SILTSTONE and SANDSTONE cont'd			HQ	10	98%	73%												
11					HQ	11	100%	79%												
12					HQ	12	100%	87%												
13					HQ	13	92%	70%												
14					HQ	14	100%	65%												
15					HQ	15	100%	53%												
16					HQ	16	100%	97%												
17																				
18																				
19																				
20																				

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-12

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New BrunswickBOREHOLE No. BH-12DATES: BORING 2014/05/15 WATER LEVEL Not observedDATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa		Water Content & Atterberg Limits				
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80	W _p	W _L	
20		Interbedded SILTSTONE and SANDSTONE cont'd													
21					HQ	17	97%	97%							
22					HQ	18	100%	73%							
23															
24					HQ	19	100%	68%							
25					HQ	20	100%	93%							
26															
27		HQ	21	97%	67%										
28															
29		HQ	22	100%	73%										
30															

- △ Unconfined Compression Test
- Field Vane Test
- Remoulded
- ✕ Torvane

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BOREHOLE RECORD

BH-12

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New Brunswick

BOREHOLE No. BH-12

DATES: BORING 2014/05/15 WATER LEVEL Not observed

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa 20 40 60 80 Water Content & Atterberg Limits W _p W W _L Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ● 10 20 30 40 50 60 70 80 90									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD										
40		Interbedded SILTSTONE and SANDSTONE cont'd	[Strata Plot: Alternating horizontal lines and brick pattern]	[Water Level: Two vertical lines]														
41					HQ	30	100%	98%										
42					HQ	31	100%	100%										
43					HQ	32	100%	100%										
44	229.1																	
45		End of Borehole																
46		Standpipe Installed																
47		No Water Loss Noted																
48		N: 7507624.9																
49		E: 2440600.6																
50																		

- △ Unconfined Compression Test
- Field Vane Test ■ Remoulded
- ✕ Torvane



BOREHOLE RECORD

BH-13

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New BrunswickBOREHOLE No. BH-13DATES: BORING 2014/05/13 WATER LEVEL 2.4 m on 2014/05/13DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa													
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80										
0	286.36	TOPSOIL Loose to very dense brown silty SAND (SM) with gravel																				
	286.3				SS	1	300	4														
1																						
2																						
	283.6	Very poor to excellent quality interbedded dark grey SILSTONE and light grey SANDSTONE - Alternating layers of shale and sandstone were 10 - 20 mm thick - Medium strong to strong - Very close to wide joint spacing - Joints oriented parallel to bedding at 40 to 50 degrees to the core axis - Some joints oriented across bedding between 0 to 25 degrees to the core axis - Fresh (unweathered)		▼																		
3					SS	3	0	50/25														
					HQ	4	91%	0%														
4					HQ	5	85%	0%														
5					HQ	6	98%	65%														
6					HQ	7	100%	65%														
7					HQ	8	100%	47%														
8					HQ	9	100%	59%														
9																						
10																						

▲ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✘ Torvane

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BOREHOLE RECORD

BH-13

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New Brunswick

BOREHOLE No. BH-13

DATES: BORING 2014/05/13 WATER LEVEL 2.4 m on 2014/05/13

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa																				
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits					Standard Penetration Test, blows/0.3m															
								mm	20	40	60	80	W _P	W	W _L	★	●	10	20	30	40	50	60	70	80	90			
10		Interbedded SILTSTONE and SANDSTONE cont'd				HQ	10	100%	58%																				
11				HQ	11	68%	68%																						
12				HQ	12	100%	58%																						
13				HQ	13	100%	87%																						
14				HQ	14	100%	85%																						
15				HQ	15	100%	97%																						
16				HQ	16	100%	100%																						
17				HQ	17	100%	72%																						

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-13

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New BrunswickBOREHOLE No. BH-13DATES: BORING 2014/05/13 WATER LEVEL 2.4 m on 2014/05/13DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa		Water Content & Atterberg Limits		Dynamic Penetration Test, blows/0.3m ★	Standard Penetration Test, blows/0.3m ●	
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80			W _p
20		Interbedded SILTSTONE and SANDSTONE cont'd													
				HQ	18	100%	100%								
21															
				HQ	19	100%	100%								
22															
				HQ	20	100%	100%								
23															
		HQ	21	100%	97%										
24															
		HQ	22	100%	100%										
25															
		HQ	23	100%	93%										
26															
27															
28															
29															
30															

- △ Unconfined Compression Test
- Field Vane Test ■ Remoulded
- ✕ Torvane

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BOREHOLE RECORD

BH-13

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New Brunswick

BOREHOLE No. BH-13

DATES: BORING 2014/05/13 WATER LEVEL 2.4 m on 2014/05/13

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa 20 40 60 80 Water Content & Atterberg Limits W_p W W_L Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ● 10 20 30 40 50 60 70 80 90											
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD												
30		Interbedded SILTSTONE and SANDSTONE cont'd																		
					HQ	24	100%	100%												
31																				
					HQ	25	100%	95%												
32																				
					HQ	26	100%	97%												
33																				
		HQ	27	100%	100%															
34																				
		HQ	28	100%	100%															
35																				
		HQ	29	97%	87%															
36																				
		HQ	30	100%	100%															
37																				
38																				
39																				
40																				

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
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BOREHOLE RECORD

BH-13

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New BrunswickBOREHOLE No. BH-13DATES: BORING 2014/05/13 WATER LEVEL 2.4 m on 2014/05/13DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa															
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits															
									Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●															
								mm	20	40	60	80	10	20	30	40	50	60	70	80	90			
40		Interbedded SILTSTONE and SANDSTONE cont'd																						
41					HQ	31	93%	83%																
42					HQ	32	100%	100%																
43																								
44					HQ	33	100%	87%																
45																								
46					HQ	34	100%	100%																
47																								
48																								
49																								
50																								

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
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BOREHOLE RECORD

BH-13

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New Brunswick

BOREHOLE No. BH-13

DATES: BORING 2014/05/13 WATER LEVEL 2.4 m on 2014/05/13

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa															
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits															
									Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●															
								mm	20	40	60	80	10	20	30	40	50	60	70	80	90			
50		Interbedded SILTSTONE and SANDSTONE cont'd			HQ	37	100%	82%																
51					HQ	38	100%	93%																
52					HQ	39	100%	100%																
53					HQ	40	100%	100%																
54					HQ	41	89%	89%																
55	230.3	End of Borehole																						
56		Standpipe Installed																						
57		No Water Loss Noted																						
58		N: 7507354.8 E: 2440699.3																						
59																								
60																								

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-49

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New Brunswick

BOREHOLE No. BH-49

DATES: BORING 2014/10/22 WATER LEVEL 2.1 m on 2014/10/22

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa										
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80							
0	295.49																		
	295.3	PEAT																	
		Very loose light greyclayey SAND (SC)			SS	1	400	2											
1																			
	294.0																		
		Stiff to hard brown sandy lean clay (CL)			SS	2	600	12											
2																			
3																			
	291.9																		
		Very poor to excellent quality interbedded dark grey SILTSTONE and light grey SANDSTONE																	
4		- Alternating layers of siltstone and sandstone were 5 - 20 mm thick			HQ	4	100%	47%											
5		- Strong to very strong			HQ	5	83%	0%											
6		- Close to wide joint spacing																	
7		- Joints oriented parallel to bedding at approximately 40 to 60 degrees to the core axis			HQ	6	100%	35%											
8		- Some joints oriented across bedding between 0 to 20 degrees to the core axis																	
9		- Carbonate veining			HQ	7	85%	36%											
10		- Some pyrite observed along bedding and veining																	
		- Fresh (unweathered)			HQ	8	100%	0%											
		Rubble Zone (150mm) at 7.3m																	
					HQ	9	96%	21%											
		Rubble Zone (375mm) at 8.8m																	

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
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BOREHOLE RECORD

BH-49

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New Brunswick

BOREHOLE No. BH-49

DATES: BORING 2014/10/22 WATER LEVEL 2.1 m on 2014/10/22

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa 20 40 60 80 Water Content & Atterberg Limits W _p W W _L Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ● 10 20 30 40 50 60 70 80 90									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD										
10		Interbedded SILTSTONE and SANDSTONE cont'd	[Strata Plot]		HQ	10	95%	81%										
11		Rubble Zone (325mm) at 11.7m	[Strata Plot]		HQ	11	98%	56%										
12			HQ	12	100%	72%												
13			HQ	13	98%	93%												
14			HQ	14	98%	69%												
15			HQ	15	100%	82%												
16			HQ	16	97%	45%												
17			[Strata Plot]															
18			[Strata Plot]															
19			[Strata Plot]															
20			[Strata Plot]															

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
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BOREHOLE RECORD

BH-49

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New Brunswick

BOREHOLE No. BH-49

DATES: BORING 2014/10/22 WATER LEVEL 2.1 m on 2014/10/22

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa																
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits																
					mm				20	40	60	80	W_p W W_L Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●												
									10	20	30	40	50	60	70	80	90								
20		Interbedded SILTSTONE and SANDSTONE cont'd			HQ	17	100%	80%																	
21																									
22								HQ	18	96%	65%														
23																									
24								HQ	19	98%	79%														
25																									
26								HQ	20	97%	74%														
27																									
28					HQ	21	100%	92%																	
29																									
30					HQ	22	97%	93%																	

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-49

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New Brunswick
 DATES: BORING 2014/10/22 WATER LEVEL 2.1 m on 2014/10/22

PROJECT No. 121616995
 BOREHOLE No. BH-49
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa 20 40 60 80 Water Content & Atterberg Limits W _p W W _L Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ● 10 20 30 40 50 60 70 80 90												
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD													
30		Interbedded SILTSTONE and SANDSTONE cont'd				HQ	23	100%	83%												
31								HQ	24	93%	83%										
32																					
33								HQ	25	100%	80%										
34								HQ	26	100%	97%										
35																					
36								HQ	27	100%	87%										
37																					
38								HQ	28	100%	90%										
39						HQ	29	100%	98%												
40																					

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
Continued Next Page



BOREHOLE RECORD

BH-49

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New BrunswickBOREHOLE No. BH-49DATES: BORING 2014/10/22 WATER LEVEL 2.1 m on 2014/10/22DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa		Water Content & Atterberg Limits			
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80	W _p	W _L
40		Interbedded SILTSTONE and SANDSTONE cont'd												
41					HQ	30	100%	100%						
42					HQ	31	100%	100%						
43					HQ	32	100%	100%						
44					HQ	33	100%	100%						
45					HQ	34	98%	83%						
46					HQ	35	100%	100%						
47														
48														
49														
50														

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-49

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, SB SW Miramichi Crossing, New Brunswick
 DATES: BORING 2014/10/22 WATER LEVEL 2.1 m on 2014/10/22

PROJECT No. 121616995
 BOREHOLE No. BH-49
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa 20 40 60 80 Water Content & Atterberg Limits W_p W W_L Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ● 10 20 30 40 50 60 70 80 90									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD										
60		Interbedded SILTSTONE and SANDSTONE cont'd	[Strata Plot: Alternating brick and sandstone patterns]	[Water Level: 2.1 m]														
61					HQ	43	100%	98%										
62					HQ	44	96%	57%										
63					HQ	45	98%	92%										
64					HQ	46	100%	90%										
65	229.8																	
66		End of Borehole																
67		Standpipe Installed to 65.65m (borehole remained open)																
68		N: 7507144.5																
69		E: 2440779.43																
70																		

- △ Unconfined Compression Test
- Field Vane Test ■ Remoulded
- ✕ Torvane



BOREHOLE RECORD

BH-14

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, Salmon River South Crossing, New Brunswick

BOREHOLE No. BH-14

DATES: BORING 2014/04/16

WATER LEVEL 3.7 m on 2014/04/17

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits									
									<div style="display: flex; justify-content: space-between; width: 100%;"> 20 40 60 80 </div> <div style="display: flex; justify-content: space-between; width: 100%; margin-top: 5px;"> 10 20 30 40 50 60 70 80 90 </div> <div style="display: flex; justify-content: space-between; width: 100%; margin-top: 5px;"> Dynamic Penetration Test, blows/0.3m ★ </div> <div style="display: flex; justify-content: space-between; width: 100%; margin-top: 5px;"> Standard Penetration Test, blows/0.3m ● </div>									
0	14.81	Rootmat at surface																
	14.8	Rootmat																
		Very loose brown sandy SILT (ML)			SS	1	275	2										
	13.3	Very poor to excellent quality brownish grey to grey SANDSTONE - Medium strong to strong - Extremely close to wide joint spacing - Joints oriented parallel to bedding at 90 degrees to the core axis - Some joints oriented between 25 and 45 degrees to the core axis - Fresh to slightly weathered - Interbedded conglomerate layers (<200mm thick)			HQ	2	71%	0%										
2					HQ	3	95%	0%										
3					HQ	4	98%	58%										
4					HQ	5	100%	60%										
5					HQ	6	100%	70%										
6					HQ	7	97%	63%										
7																		
8																		
9																		
10																		

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-14

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, Salmon River South Crossing, New Brunswick

BOREHOLE No. BH-14

DATES: BORING 2014/04/16

WATER LEVEL 3.7 m on 2014/04/17

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa													
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits													
										Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ●												
								mm		20	40	60	80	10	20	30	40	50	60	70	80	90
10		SANDSTONE cont'd			HQ	8	100%	80%														
11																						
12		Moderately weathered between 11.8m and 12.5m depth			HQ	9	100%	53%														
13																						
14					HQ	10	100%	78%														
15																						
16					HQ	11	98%	100%														
17																						
18		Siltstone layer at 17.4m (0.8m thick)			HQ	13	100%	47%														
19																						
20					HQ	14	100%	74%														

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-14

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, Salmon River South Crossing, New Brunswick

BOREHOLE No. BH-14

DATES: BORING 2014/04/16

WATER LEVEL 3.7 m on 2014/04/17

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa 20 40 60 80 									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ● 10 20 30 40 50 60 70 80 90 									
30		VOLCANIC BRECCIA cont'd	[Breccia symbol]		HQ	21	100%	0%										
31				HQ	22	100%	0%											
32		Good to excellent quality purplish grey BASALT - Strong to very strong - Close to wide joint spacing - Joints are oriented 70 and 30 to 45 degrees to the core axis - Random orientation of joints along veining - Fresh (unweathered)	[Basalt symbol]		HQ	23	100%	35%										
33	-18.4			HQ	24	100%	89%											
34				HQ	25	100%	97%											
35				HQ	26	100%	93%											
36				HQ	27	100%	100%											
37																		
38																		
39																		
40																		

△ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
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BOREHOLE RECORD

BH-14

CLIENT CH2M HILL PROJECT No. 121616995
 LOCATION Energy East Saint John Extension, Salmon River South Crossing, New Brunswick BOREHOLE No. BH-14
 DATES: BORING 2014/04/16 WATER LEVEL 3.7 m on 2014/04/17 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa 20 40 60 80 Water Content & Atterberg Limits W _p W W _L Dynamic Penetration Test, blows/0.3m ★ Standard Penetration Test, blows/0.3m ● 10 20 30 40 50 60 70 80 90									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD										
-40		BASALT cont'd						mm										
-41					HQ 28	100%	92%											
-42					HQ 29	100%	95%											
-43					HQ 30	98%	98%											
-44					HQ 31	100%	88%											
-45					HQ 32	98%	79%											
-46	-32.7	End of Borehole																
-47		Standpipe Installed																
-48		No Water Loss Noted																
-49		N: 7460495.641																
-50		E: 2543196.987																
									▲ Unconfined Compression Test □ Field Vane Test ■ Remoulded ✕ Torvane									



BOREHOLE RECORD

BH-15

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, Salmon River South Crossing, New Brunswick

BOREHOLE No. BH-15

DATES: BORING 2014/04/14 WATER LEVEL 4.7 m on 2014/04/16

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa										
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	<div style="display: flex; justify-content: space-between; width: 100%;"> 20 40 60 80 </div> <div style="display: flex; justify-content: space-between; width: 100%; margin-top: 5px;"> 10 20 30 40 50 60 70 80 90 </div>										
10		SANDSTONE cont'd	[Brick pattern]		mm	HQ	8	100%	80%										
11			[Brick pattern]																
12	-2.1		[Brick pattern]			HQ	9	97%	100%										
13		Poor quality light brown META SEDIMENT (siltstone protolith) - Extremely close to close joint spacing - Joints are oriented at 90 degrees to the core axis - Fresh to slightly weathered	[Brick pattern]			HQ	10	98%	40%										
14	-3.8	Rubble zone from depth 13.9m to 14.2m	[Dashed pattern]			HQ	11	92%	0%										
15		Very poor to excellent quality reddish VOLCANIC BRECCIA - Weak to strong - Joints are oriented at 50 to 70 and 30 degrees to the core axis - Fresh to slightly weathered - Rubble zone from depth 14.2m to 14.9m	[Dashed pattern]			HQ	12	100%	15%										
16			[Dashed pattern]			HQ	13	100%	57%										
17			[Dashed pattern]																
18			[Dashed pattern]			HQ	14	100%	92										
19			[Dashed pattern]			HQ	15	100%	93%										
20	-9.5		[Dashed pattern]																

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane

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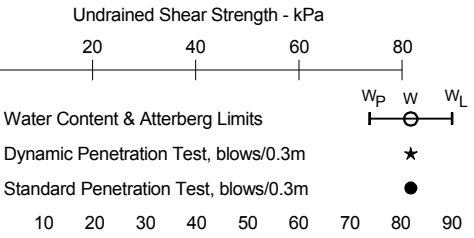


BOREHOLE RECORD

BH-15

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Salmon River South Crossing, New BrunswickBOREHOLE No. BH-15DATES: BORING 2014/04/14 WATER LEVEL 4.7 m on 2014/04/16DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa							
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80				
30		BASALT cont'd			HQ	22	100%	100%								
31					HQ	23	98%	98%								
32																
33					HQ	24	100%	100%								
34																
35																
36					HQ	26	100%	87%								
37																
38																
39																
40																



▲ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane



BOREHOLE RECORD

BH-15

CLIENT CH2M HILL

PROJECT No. 121616995

LOCATION Energy East Saint John Extension, Salmon River South Crossing, New Brunswick

BOREHOLE No. BH-15

DATES: BORING 2014/04/14 WATER LEVEL 4.7 m on 2014/04/16

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa									
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	Water Content & Atterberg Limits									
									<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>20 40 60 80</p> <hr style="width: 100%;"/> <p>W_P W W_L</p> </div> <div style="text-align: center;"> <p>★</p> <p>●</p> </div> </div>									
									<p>Dynamic Penetration Test, blows/0.3m ★</p> <p>Standard Penetration Test, blows/0.3m ●</p> <p style="text-align: center;">10 20 30 40 50 60 70 80 90</p>									
-40	-29.8	Fair to excellent quality VOLCANIC BRECCIA - Very stong - Very close to moderate joint spacing - Joints are oriented 70 degrees to the core axis - Fresh to slightly weathered	[Dashed Pattern]	[Water Level Line]	HQ	29	95%	75%										
-41					HQ	30	100%	98%										
-42																		
-43	-32.7	Fair to excellent quality META SEDIMENT (siltstone protolith) - Very strong - Extremely close to moderate joint spacing - Joints are oriented 45 to 90 degrees to the core axis - Fresh (unweathered)	[Horizontal Line Pattern]	[Water Level Line]	HQ	31	100%	100%										
-44					HQ	32	100%	82%										
-45					HQ	33	100%	57%										
-46																		
-47																		
-48	-37.1	End of Borehole																
-49		Standpipe Installed																
-50		No Water Loss Noted																
		N: 7460244.546 E: 2543463.901																
									<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>△ Unconfined Compression Test</p> <p>□ Field Vane Test</p> <p>✕ Torvane</p> </div> <div style="text-align: center;"> <p>■ Remoulded</p> </div> </div>									



BOREHOLE RECORD

BH-18

CLIENT CH2M HILLPROJECT No. 121616995LOCATION Energy East Saint John Extension, Coal Creek Crossing, New BrunswickBOREHOLE No. BH-18DATES: BORING 2014/04/10 WATER LEVEL 2.6 m on 2014/04/10DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa														
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80											
0	7.63	Compact yellowish brown to grey silty sand (SM) with gravel TILL																					
					SS	1	375	18															
1		Very poor quality greenish grey to grey SILTSTONE - Close to very close joint spacing - Joints oriented at 70 to 90 degrees to the core axis - Moderately to highly weathered																					
	5.9				SS	2	325	50/25															
2																							
3								HQ	3	90%	0%												
4								HQ	4	98%	0%												
5								HQ	5	100%	0%												
6								HQ	6	100%	0%												
7																							
8																							
9					HQ	7	100%	0%															
10																							

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
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BOREHOLE RECORD

BH-41

CLIENT CH2M HILL
 LOCATION Energy East Saint John Extension, Highway 2 Crossing, New Brunswick
 DATES: BORING 2014/10/20 WATER LEVEL 1.5 m on 2014/10/20

PROJECT No. 121616995
 BOREHOLE No. BH-41
 DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				Undrained Shear Strength - kPa											
					TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	20	40	60	80								
0	43.13																			
	43.1	Topsoil																		
		Loose to dense reddish brown clayey sand (SC) with gravel TILL			SS	1	550	5												
1																				
2		-cobbles at 2.08m			SS	2	400	20												
3																				
4					SS	3	425	22												
5																				
6					SS	4	550	43												
7		-cobbles at 6.58m																		
8	35.9	Fair quality grey SANDSTONE - Strong to very strong - Very close to moderate joint spacing - Joints oriented at 70 - 90 degrees (bedding) to the core axis - Fresh (unweathered)			HQ	6	69%	53%												
9					HQ	7	98%	75%												
10	33.3	Very poor to good quality maroon																		

Δ Unconfined Compression Test
 □ Field Vane Test ■ Remoulded
 ✕ Torvane
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