LEGEND

BOREHOLE LOCATION

REFERENCE

1. IMAGE OBTAINED FROM GOOGLE EARTH PRO, USED UNDER LICENSE. IMAGERY DATE: MAY 26, 2012. GOOGLE EARTH IMAGE IS NOT TO SCALE.
2. COORDINATES AND ELEVATIONS REFERENCE NAD83 / UTM ZONE 11N.

0 50 100
1:2,500 METRES

CLIENT
PARKS CANADA AGENCY

PROJECT
EAST GATE LANDSLIDE
DEFLECTION BERM

TITLE
BOREHOLE LOCATION PLAN

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-03-27
PREPARED	CV
DESIGN	IT
REVIEW	IT
APPROVED	PT

PROJECT No. 1654746 | CONTROL | Rev. 0 | FIGURE 2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

Path: \\golder.gds\calgary\EDCAD\2016\1654746\PRODUCTION\FIGURES\ | File Name: 1654746FIG003.dwg

General Lab Testing Summary

Project No.: 1654746 | Phase: 3000.3204
Short Title: PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide | Sched: C091
Tested By: KH | Date: 12-Oct-16

Sample Identification					Laboratory Test Results					
Borehole No.	Sample No.	Depth (m)		Lab No.	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	SPMDD (kg/m^3)	Optimum w (%)
		from	to							
EG-16-01	2	1.5	2.0	C091-01	6.6					
	4	3.0	3.5	C091-02	11.5					
	6	4.6	5.0	C091-03	14.6					
	8	6.1	6.6	C091-04	43.0					
	9	6.9	7.3	C091-05	8.1					
	10	7.6	8.1	C091-06	8.9					
	12	9.1	9.6	C091-07	7.1					
	15	12.2	12.6	C091-08	5.3					
	17	13.7	14.2	C091-09	13.6					
	19	15.2	15.7	C091-10	11.5					
	21	16.8	17.2	C091-11	6.2					
	23	18.3	18.7	C091-12	9.2					

Reviewed By:_____

General Lab Testing Summary

Project No.: 1654746 | Phase: 3000.3204
Short Title: PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide | Sched: C091
Tested By: KH | Date: 12-Oct-16

Sample Identification					Laboratory Test Results					
Borehole No.	Sample No.	Depth (m)		Lab No.	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	SPMDD (kg/m^3)	Optimum w (%)
		from	to							
EG-16-02	25	1.5	2.0	C091-13	8.5					
	28	4.6	5.0	C091-14	7.9					
	30	6.1	6.6	C091-15	11.8					
	31	6.9	7.3	C091-16	11.8					
	32	7.6	8.1	C091-17	11.7					
	37	11.4	11.9	C091-18	12.4					
	38	12.2	12.6	C091-19	8.0					
	40	13.7	14.2	C091-20	13.1					
	43	16.8	17.2	C091-21	10.9					
	45	18.3	18.7	C091-22	5.7					
	46	19.1	19.5	C091-23	4.0					
	47	19.8	20.3	C091-24	7.1					
	49	21.3	21.8	C091-25	19.4					
	51	22.9	23.3	C091-26	37.1					
	53	24.4	24.8	C091-27	8.9					
	55	25.9	26.4	C091-28	8.3					
	57	27.4	27.9	C091-29	7.6					

Reviewed By:_____

General Lab Testing Summary

Project No.: 1654746 | Phase: 3000.3204
Short Title: PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide | Sched: C091
Tested By: KH | Date: 12-Oct-16

Sample Identification					Laboratory Test Results					
Borehole No.	Sample No.	Depth (m) from	Depth (m) to	Lab No.	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	SPMDD (kg/m^3)	Optimum w (%)
EG-16-03	59	1.5	2.0	C091-30	5.8					
	61	3.0	3.5	C091-31	4.7					
	63	4.6	5.0	C091-32	4.1					
	65	6.1	6.6	C091-33	7.6					
	67	7.6	8.1	C091-34	6.9					
	69	9.1	9.6	C091-35	3.5					
	71	10.7	11.1	C091-36	2.7					
	73	12.2	12.6	C091-37	6.9					
	75	13.7	14.2	C091-38	30.2					
	77	15.2	15.7	C091-39	11.5					
	79	16.8	17.2	C091-40	13.0					
	81	18.3	18.7	C091-41	4.9					
	83	19.8	20.3	C091-42	6.3					
	85	21.3	21.8	C091-43	7.5					
	87	22.9	23.3	C091-44	5.8					
	89	24.4	24.8	C091-45	7.7					
	91	25.9	26.4	C091-46	6.9					
	93	27.4	27.9	C091-47	7.9					
	96	30.5	30.9	C091-48	7.0					

Reviewed By:_____

General Lab Testing Summary

Project No.: 1654746 | Phase: 3000.3204
Short Title: PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide | Sched: C091
Tested By: KH | Date: 12-Oct-16

Sample Identification					Laboratory Test Results					
Borehole No.	Sample No.	Depth (m)		Lab No.	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	SPMDD (kg/m^3)	Optimum w (%)
		from	to							
EG-16-04	98	1.5	2.0	C091-49	7.7					
	100	3.0	3.5	C091-50	13.5					
	102	4.6	5.0	C091-51	7.8					
	104	6.1	6.6	C091-52	8.9					
	106	7.6	8.1	C091-53	13.4					
	108	9.1	9.6	C091-54	10.0					
	110	10.7	11.1	C091-55	12.1					
	112	12.2	12.6	C091-56	27.0					
	114	13.7	14.2	C091-57	6.9					
	116	15.2	15.7	C091-58	8.9					
	118	16.8	17.2	C091-59	8.4					
	120	18.3	18.7	C091-60	16.1					
	122	19.8	20.3	C091-61	9.3					
	124	21.3	21.8	C091-62	4.7					
	126	22.9	23.3	C091-63	7.4					
	128	24.4	24.8	C091-64	5.6					
	130	25.9	26.4	C091-65	6.1					

Reviewed By:_____

General Lab Testing Summary

Project No.: 1654746 | Phase: 3000.3204
Short Title: PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide | Sched: C091
Tested By: KH | Date: 12-Oct-16

Sample Identification					Laboratory Test Results					
Borehole No.	Sample No.	Depth (m)		Lab No.	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	SPMDD (kg/m^3)	Optimum w (%)
		from	to							
	134	1.5	2.0	C091-66	8.7					
	136	3.0	3.5	C091-67	11.3					
	138	4.6	5.0	C091-68	10.9					
	140	6.1	6.6	C091-69	9.4					
	142	7.6	8.1	C091-70	11.3					
	144	9.1	9.6	C091-71	34.3					
	146	10.7	11.1	C091-72	6.8					
EG-16-05	148	12.2	12.6	C091-73	12.8					
	150	13.7	14.2	C091-74	3.3					
	152	15.2	15.7	C091-75	7.7					
	154	16.8	17.2	C091-76	4.8					
	156	18.3	18.7	C091-77	4.9					
	158	19.8	20.3	C091-78	6.4					
	160	21.3	21.8	C091-79	5.9					
	162	22.9	23.3	C091-80	6.7					

Reviewed By:_____

General Lab Testing Summary

Project No.: 1654746 | Phase: 3000.3204
Short Title: PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide | Sched: C091
Tested By: KH | Date: 12-Oct-16

Sample Identification					Laboratory Test Results					
Borehole No.	Sample No.	Depth (m)		Lab No.	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	SPMDD (kg/m^3)	Optimum w (%)
		from	to							
EG-16-06	164	1.5	2.0	C091-81	8.5					
	166	3.0	3.5	C091-82	6.9					
	168	4.6	5.0	C091-83	14.0					
	170	6.1	6.6	C091-84	9.7					
	172	7.6	8.1	C091-85	8.3					
	174	9.1	9.6	C091-86	11.4					
	176	10.7	11.1	C091-87	11.6					
	178	12.2	12.6	C091-88	6.4					
	180	13.7	14.2	C091-89	4.4					
	182	15.2	15.7	C091-90	5.1					
	184	16.8	17.2	C091-91	7.4					
	186	18.3	18.7	C091-92	6.9					

Reviewed By:_____

General Lab Testing Summary

Project No.: 1654746 | Phase: 3000
Short Title: PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide | Sched: C100
Tested By: KH | Date: 01-Nov-16

Sample Identification					Laboratory Test Results					
Borehole No.	Sample No.	Depth (m) from	Depth (m) to	Lab No.	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	SPMDD (kg/m^3)	Optimum w (%)
EG-16-01	8	6.10	6.55	C100-01	43.0	45	32	13		
EG-16-02	47	19.80	20.30	C100-02	7.1	29	23	6		
EG-16-03	81	18.30	18.70	C100-03	4.9					
EG-16-04	102	4.60	5.00	C100-04	7.8					
	112	12.20	12.60	C100-05	27.0					
EG-16-05	146	10.70	11.10	C100-06	6.8					
	150	13.70	14.20	C100-07	3.3					
EG-16-06	172	7.60	8.10	C100-08	8.3					
SA2	SA2	-	-	C100-09	7.3				2010	10.8

Note: All oversize gravel > 16 mm was removed from C100-09 prior to testing the SPMDD.

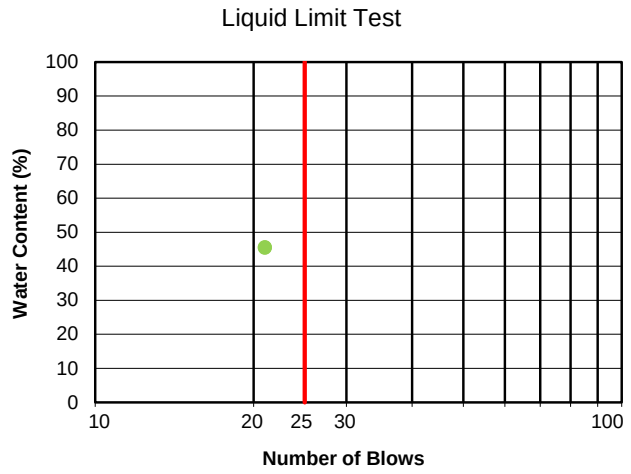
Reviewed By:

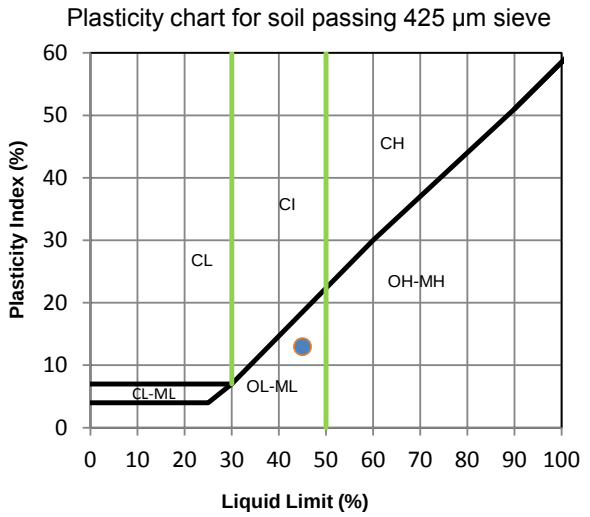
Atterberg Limits (ASTM D 4318)

Project No.:	1654746	Phase:	3000
Short Title:	PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide	Lab No.:	C100-01
Tested By:	DS	Date:	26-Oct-16

Borehole: EG-16-01 Sample No.: 8 Depth: 6.1-6.6 m

Liquid Limit Determination:			Natural Water Content:		
Number of Blows	21	21	As Received Water Content (%)		43.0%
Blow Correction Factor	0.98	0.98	**Plastic Limit Determination:**		
Mass of wet sample + tare (g)	27.46	27.07	Mass of wet sample + tare (g)	19.19	19.71
Mass of dry sample + tare (g)	25.11	24.66	Mass of dry sample + tare (g)	17.09	17.63
Mass of tare (g)	19.96	19.36	Mass of tare (g)	10.40	11.20
Weight of Water (g)	2.35	2.41	Weight of Water (g)	2.10	2.08
Weight of dry soil (g)	5.15	5.3	Weight of dry soil (g)	6.69	6.43
Water Content (%)	45.6	45.5	Water Content (%)	31.39	32.35
Liquid Limit	45.0	45.0	Average Water Content (%)		31.87





Liquid Limit =	45	%
Plastic Limit =	32	%
Plasticity Index =	13	

Comments:

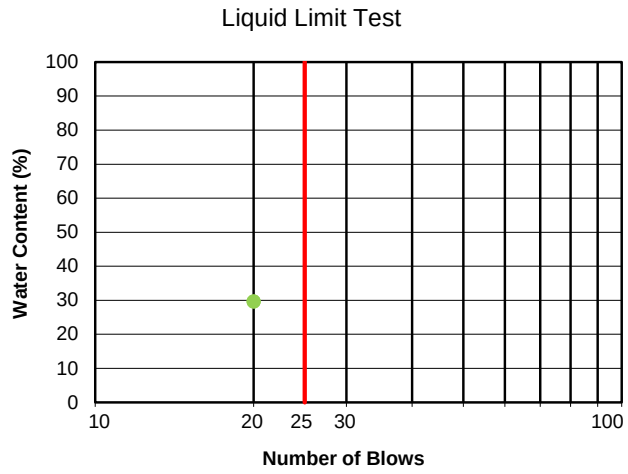
Reviewed:

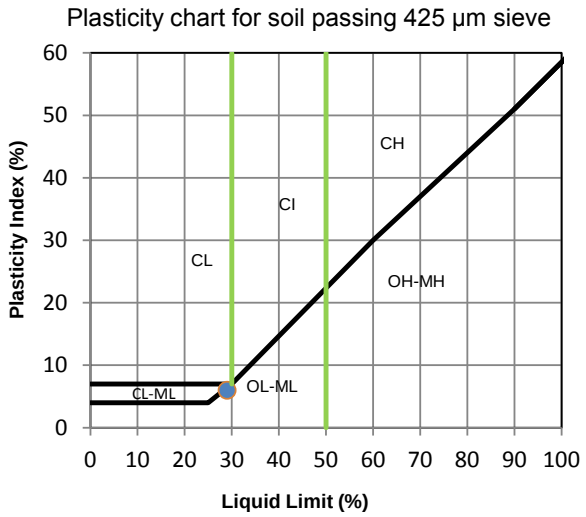
Atterberg Limits (ASTM D 4318)

Project No.:	1654746	Phase:	3000
Short Title:	PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide	Lab No.:	C100-02
Tested By:	DS	Date:	26-Oct-16

Borehole: EG-16-02 Sample No.: 47 Depth: 20 m

Liquid Limit Determination:			Natural Water Content:		
Number of Blows	20	20	As Received Water Content (%)		7.1%
Blow Correction Factor	0.97	0.97	**Plastic Limit Determination:**		
Mass of wet sample + tare (g)	23.99	30.29	Mass of wet sample + tare (g)	17.92	17.76
Mass of dry sample + tare (g)	22.71	29.35	Mass of dry sample + tare (g)	16.63	16.42
Mass of tare (g)	18.39	26.19	Mass of tare (g)	10.82	10.61
Weight of Water (g)	1.28	0.94	Weight of Water (g)	1.29	1.34
Weight of dry soil (g)	4.32	3.16	Weight of dry soil (g)	5.81	5.81
Water Content (%)	29.6	29.7	Water Content (%)	22.20	23.06
Liquid Limit	29.0	29.0	Average Water Content (%)		22.63





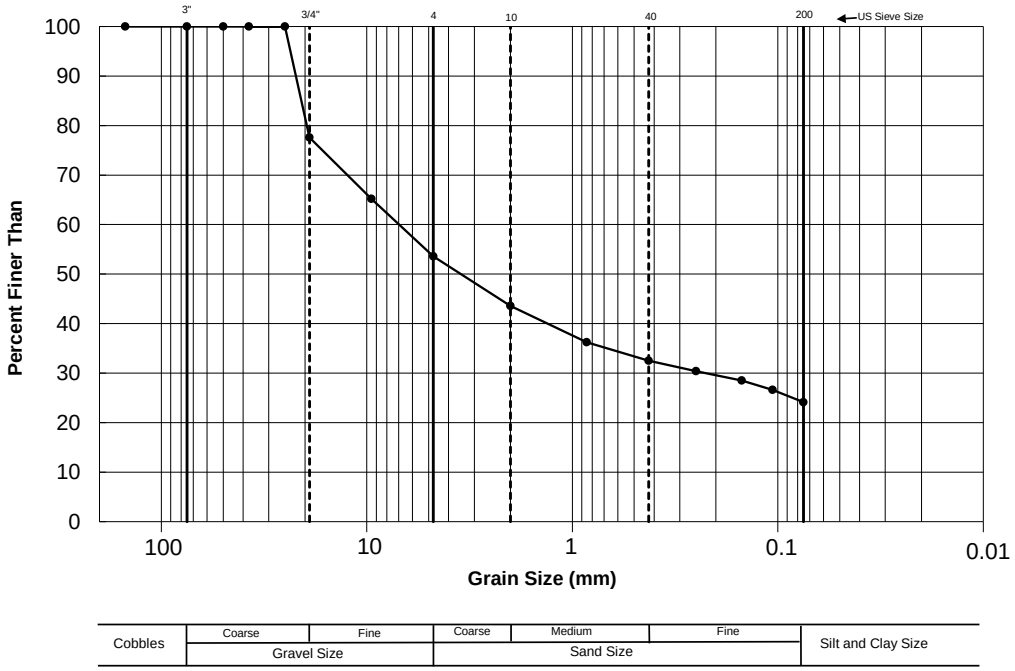
Liquid Limit =	29	%
Plastic Limit =	23	%
Plasticity Index =	6	

Comments:

Reviewed:

Particle Size Distribution of Soils using Sieve Analysis
(ASTM D6913-04)

Project No.:	1654746		Phase:	3000		Date:	26-Oct-16
Short Title:	PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide						
Sub Sampled By:	DS		Washed By:	DS		Sieved By:	DS
Field Tag No.:	-		Source:		-	BH No.:	EG-16-02
Lab No.:	C100-02		Northing:	-	m	Sample No.:	47
Sampled By:	JT		Easting:	-	m	Depth From:	20.0 m
Sample Date:	1-Oct-16		Elevation:	-	m	Depth To:	20.0 m
Test Method:		A	Drying Method:	Air Dry			
Composite Sieve:		Yes	if Yes, Split on:	4.75	mm		
Material Excluded from Sieve:		No	Describe:				
Prior Testing on Sample:		No	Describe:				



Sieve Size (mm)	Passing %
150	100
75	100
50	100
37.5	100
25.0	100
19.0	78
9.5	65
4.75	54
2.00	44
0.85	36
0.425	32
0.250	30
0.150	29
0.106	27
0.075	24

Received Water Content (%)	Cobbles (%)	Gravel (%)	Sand (%)	Fines (%)	D60 (mm)	D30 (mm)	D10 (mm)	Cu	Cc
8.8	0	46	29	24	7.4	0.2	N/A	N/A	N/A

Sample Description: (GM) sandy SILTY GRAVEL, fine to coarse sub-angular to angular gravel, fine to coarse sand; brown; non-cohesive, moist

USCS Classification: GM

Remarks:

Bay 8, 820 - 28 St. NE
Calgary, AB T2A 6K1

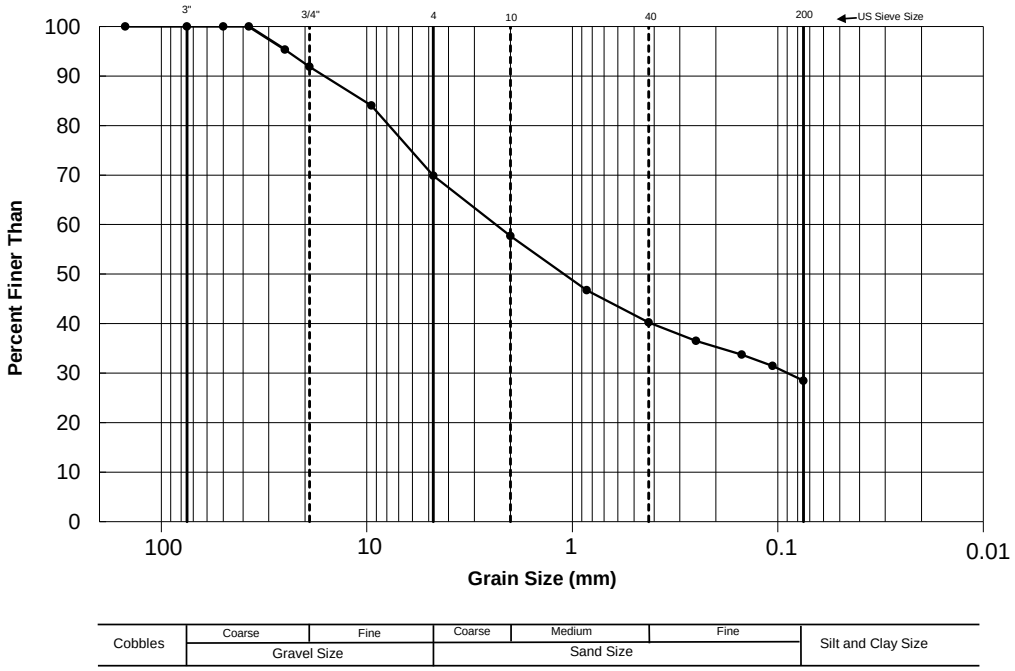
Reviewed by:

Particle Size Distribution of Soils using Sieve Analysis

(ASTM D6913-04)

Project No.:	1654746	Phase:	3000	Date:	26-Oct-16
Short Title:	PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide				
Sub Sampled By:	DS	Washed By:	DS	Sieved By:	DS
Field Tag No.:	-	Source:	-	BH No.:	EG-16-03
Lab No.:	C100-03	Northing:	- m	Sample No.:	81
Sampled By:	JT	Easting:	- m	Depth From:	18.0 m
Sample Date:	2-Oct-16	Elevation:	- m	Depth To:	19.0 m

Test Method:	A	Drying Method:	Air Dry	
Composite Sieve:	Yes	if Yes, Split on:	4.75	mm
Material Excluded from Sieve:	No	Describe:		
Prior Testing on Sample:	No	Describe:		



Sieve Size (mm)	Passing %
150	100
75	100
50	100
37.5	100
25.0	95
19.0	92
9.5	84
4.75	70
2.00	58
0.85	47
0.425	40
0.250	37
0.150	34
0.106	31
0.075	28

Received Water Content (%)	Cobbles (%)	Gravel (%)	Sand (%)	Fines (%)	D60 (mm)	D30 (mm)	D10 (mm)	Cu	Cc
4.9	0	30	41	28	2.5	0.1	N/A	N/A	N/A

Sample Description: (SM) gravelly SILTY SAND, fine to coarse sand, fine to coarse sub-angular to angular gravel; brown; non-cohesive, moist

USCS Classification: SM

Remarks:

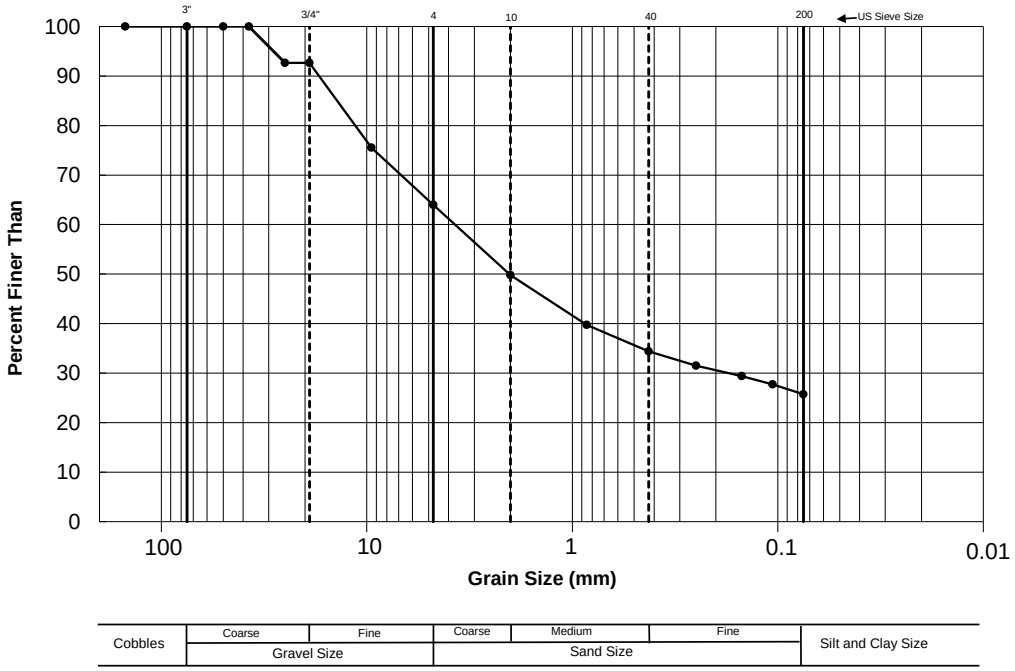
Bay 8, 820 - 28 St. NE
Calgary, AB T2A 6K1

Reviewed by:

Particle Size Distribution of Soils using Sieve Analysis
(ASTM D6913-04)

Project No.:	1654746	Phase:	3000		Date:	26-Oct-16
Short Title:	PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide					
Sub Sampled By:	DS	Washed By:	DS		Sieved By:	DS
Field Tag No.:	-	Source:		-	BH No.:	EG-16-04
Lab No.:	C100-04	Northing:	-	m	Sample No.:	102
Sampled By:	JT	Easting:	-	m	Depth From:	4.6 m
Sample Date:	3-Oct-16	Elevation:	-	m	Depth To:	5.0 m

Test Method:	A	Drying Method:	Air Dry	
Composite Sieve:	Yes	if Yes, Split on:	4.75	mm
Material Excluded from Sieve:	No	Describe:		
Prior Testing on Sample:	No	Describe:		



Sieve Size (mm)	Passing %
150	100
75	100
50	100
37.5	100
25.0	93
19.0	93
9.5	76
4.75	64
2.00	50
0.85	40
0.425	34
0.250	32
0.150	29
0.106	28
0.075	26

Received Water Content (%)	Cobbles (%)	Gravel (%)	Sand (%)	Fines (%)	D60 (mm)	D30 (mm)	D10 (mm)	Cu	Cc
9.3	0	36	38	26	4.0	0.2	N/A	N/A	N/A

Sample Description: (SM) SILTY SAND and fine to coarse sub-angular to angular GRAVEL, fine to coarse sand; brown; non-cohesive, moist

USCS Classification: SM

Remarks:

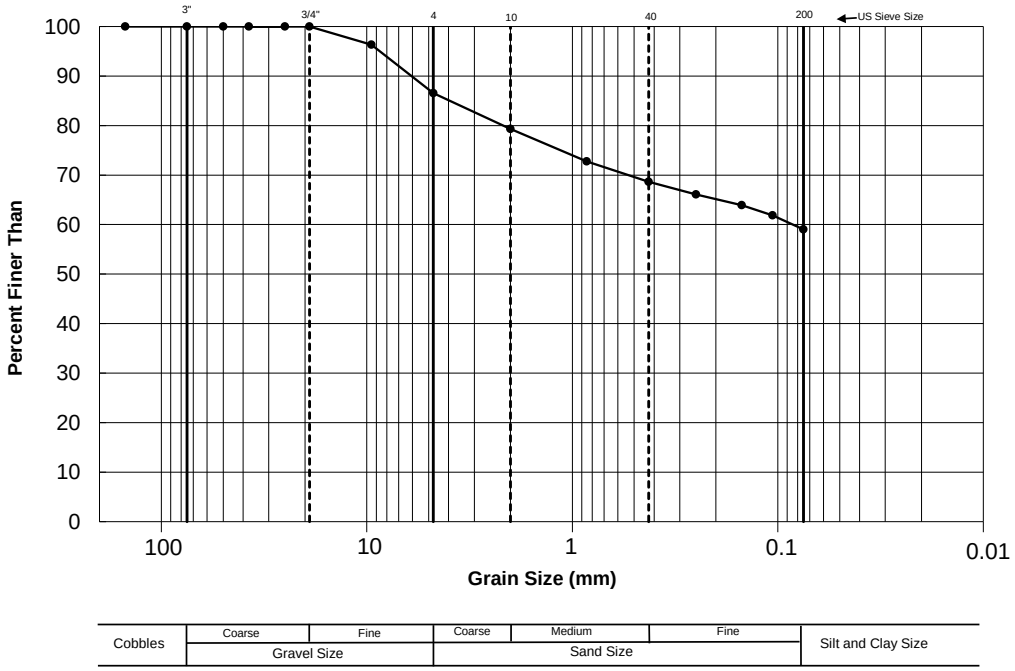
Bay 8, 820 - 28 St. NE
Calgary, AB T2A 6K1

Reviewed by:

Particle Size Distribution of Soils using Sieve Analysis
(ASTM D6913-04)

Project No.:	1654746	Phase:	3000	Date:	26-Oct-16
Short Title:	PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide				
Sub Sampled By:	DS	Washed By:	DS	Sieved By:	DS
Field Tag No.:	-	Source:	-	BH No.:	EG-16-04
Lab No.:	C100-05	Northing:	- m	Sample No.:	112
Sampled By:	JT	Easting:	- m	Depth From:	12.0 m
Sample Date:	3-Oct-16	Elevation:	- m	Depth To:	13.0 m

Test Method:	A	Drying Method:	Air Dry	
Composite Sieve:	Yes	if Yes, Split on:	4.75	mm
Material Excluded from Sieve:	No	Describe:		
Prior Testing on Sample:	No	Describe:		



Sieve Size (mm)	Passing %
150	100
75	100
50	100
37.5	100
25.0	100
19.0	100
9.5	96
4.75	87
2.00	79
0.85	73
0.425	69
0.250	66
0.150	64
0.106	62
0.075	59

Received Water Content (%)	Cobbles (%)	Gravel (%)	Sand (%)	Fines (%)	D60 (mm)	D30 (mm)	D10 (mm)	Cu	Cc
24.7	0	13	28	59	0.1	N/A	N/A	N/A	N/A

Sample Description: (ML) sandy gravelly SILT with slight plasticity, fine to coarse sand, fine sub-angular to angular gravel, trace organics; brown; cohesive, w < PL

USCS Classification: Silt or Clay - See Limits Test

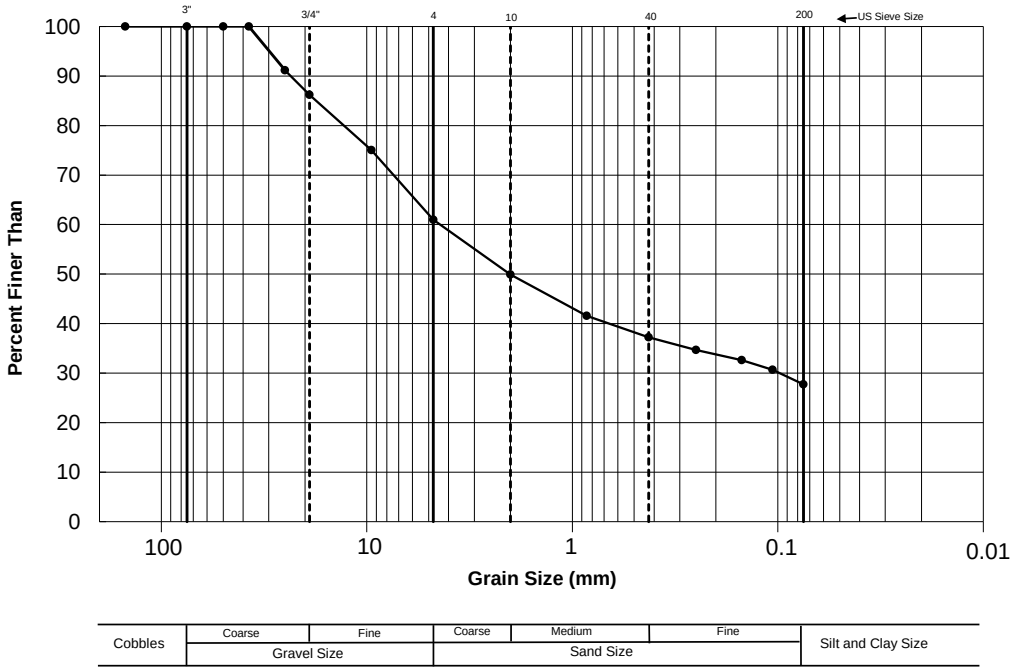
Remarks: No limits were scheduled for this sample.

Bay 8, 820 - 28 St. NE
Calgary, AB T2A 6K1

Reviewed by:

Particle Size Distribution of Soils using Sieve Analysis
(ASTM D6913-04)

Project No.:	1654746		Phase:	3000		Date:	26-Oct-16
Short Title:	PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide						
Sub Sampled By:	DS		Washed By:	DS		Sieved By:	DS
Field Tag No.:	-		Source:		-	BH No.:	EG-16-05
Lab No.:	C100-06		Northing:	-	m	Sample No.:	146
Sampled By:	JT		Easting:	-	m	Depth From:	11.0 m
Sample Date:	4-Oct-16		Elevation:	-	m	Depth To:	11.0 m
Test Method:		A	Drying Method:	Air Dry			
Composite Sieve:		Yes	if Yes, Split on:	4.75	mm		
Material Excluded from Sieve:		No	Describe:				
Prior Testing on Sample:		No	Describe:				



Sieve Size (mm)	Passing %
150	100
75	100
50	100
37.5	100
25.0	91
19.0	86
9.5	75
4.75	61
2.00	50
0.85	42
0.425	37
0.250	35
0.150	33
0.106	31
0.075	28

Received Water Content (%)	Cobbles (%)	Gravel (%)	Sand (%)	Fines (%)	D60 (mm)	D30 (mm)	D10 (mm)	Cu	Cc
5.9	0	39	33	28	4.5	0.1	N/A	N/A	N/A

Sample Description: (GM) sandy SILTY GRAVEL, fine to coarse sub-angular to angular gravel, fine to coarse sand; brown; non-cohesive, moist

USCS Classification: GM

Remarks:

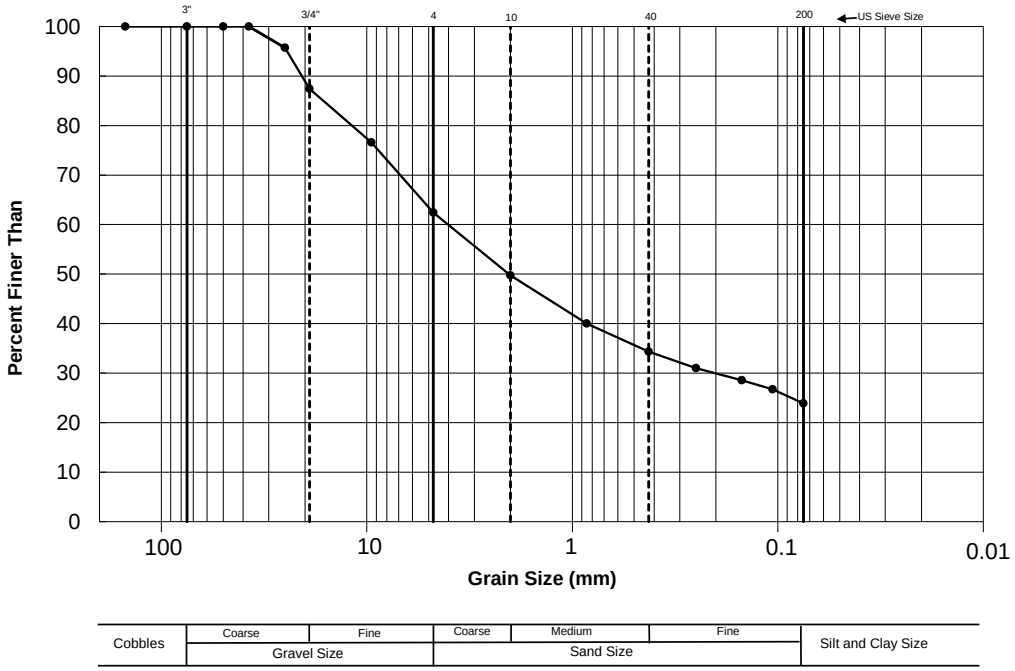
Bay 8, 820 - 28 St. NE
Calgary, AB T2A 6K1

Reviewed by:

Particle Size Distribution of Soils using Sieve Analysis

(ASTM D6913-04)

Project No.:	1654746		Phase:	3000		Date:	26-Oct-16
Short Title:	PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide						
Sub Sampled By:	DS		Washed By:	DS		Sieved By:	DS
Field Tag No.:	-		Source:		-	BH No.:	EG-16-05
Lab No.:	C100-07		Northing:	-	m	Sample No.:	150
Sampled By:	JT		Easting:	-	m	Depth From:	14.0 m
Sample Date:	4-Oct-16		Elevation:	-	m	Depth To:	14.0 m
Test Method:		A	Drying Method:	Air Dry			
Composite Sieve:		Yes	if Yes, Split on:	4.75	mm		
Material Excluded from Sieve:		No	Describe:				
Prior Testing on Sample:		No	Describe:				



Sieve Size (mm)	Passing %
150	100
75	100
50	100
37.5	100
25.0	96
19.0	87
9.5	77
4.75	62
2.00	50
0.85	40
0.425	34
0.250	31
0.150	29
0.106	27
0.075	24

Received Water Content (%)	Cobbles (%)	Gravel (%)	Sand (%)	Fines (%)	D60 (mm)	D30 (mm)	D10 (mm)	Cu	Cc
3.4	0	38	38	24	4.2	0.2	N/A	N/A	N/A

Sample Description: (SM) SILTY SAND and fine to coarse sub-angular to angular GRAVEL, fine to coarse sand; brown; non-cohesive, moist

USCS Classification: SM

Remarks:

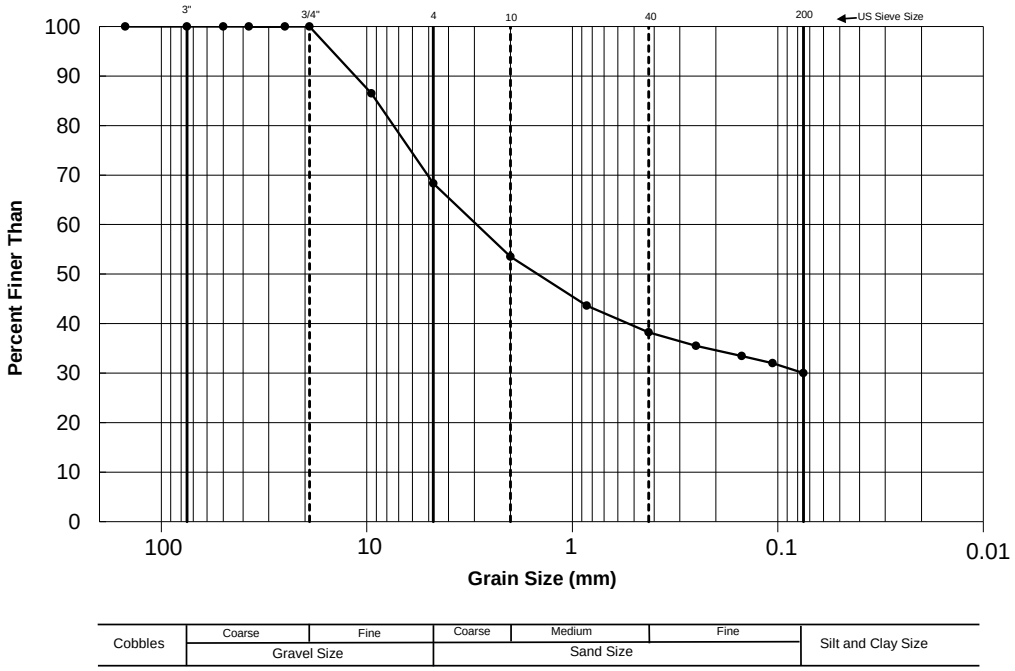
Bay 8, 820 - 28 St. NE
Calgary, AB T2A 6K1

Reviewed by:

Particle Size Distribution of Soils using Sieve Analysis
(ASTM D6913-04)

Project No.:	1654746		Phase:	3000		Date:	26-Oct-16
Short Title:	PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide						
Sub Sampled By:	DS		Washed By:	DS		Sieved By:	DS
Field Tag No.:	-		Source:		-	BH No.:	EG-16-06
Lab No.:	C100-08		Northing:	-	m	Sample No.:	172
Sampled By:	JT		Easting:	-	m	Depth From:	7.6 m
Sample Date:	5-Oct-16		Elevation:	-	m	Depth To:	8.1 m

Test Method:	A	Drying Method:	Air Dry	
Composite Sieve:	Yes	if Yes, Split on:	4.75	mm
Material Excluded from Sieve:	No	Describe:		
Prior Testing on Sample:	No	Describe:		



Sieve Size (mm)	Passing %
150	100
75	100
50	100
37.5	100
25.0	100
19.0	100
9.5	86
4.75	68
2.00	53
0.85	44
0.425	38
0.250	35
0.150	33
0.106	32
0.075	30

Received Water Content (%)	Cobbles (%)	Gravel (%)	Sand (%)	Fines (%)	D60 (mm)	D30 (mm)	D10 (mm)	Cu	Cc
9.6	0	32	38	30	3.2	N/A	N/A	N/A	N/A

Sample Description: (SM) gravelly SILTY SAND, fine to coarse sand, fine sub-angular to angular gravel; brown; non-cohesive, moist

USCS Classification: SM

Remarks:

Bay 8, 820 - 28 St. NE
Calgary, AB T2A 6K1

Reviewed by:

GOLDER ASSOCIATES - Calgary Lab
Bay 7, 820 28th St. NE
Calgary, AB, T2A 6K1
ASTM D3080/ D3080M-11

Direct Shear Test of Soils Under Consolidated Drained Conditions
(ASTM D3080/D3080M-11)

Sample Identification

Project No.:	1654746 Phase: 3000	Test Condition:	Moist - Optimum w
Client:	Parks Canada Agency	Sample:	Combined SPT Samples
Project Title:	PCA/GlacierNP-Cu14/Avalanche Mitigation - Eastgate Landslide	Lab No.:	C100-09

INITIAL - Sample Dimensions

Test No.	1	2	3
Shear Box Geometry	Rectangular	Rectangular	Rectangular
Length, mm	250	250	250
Width, mm	150	150	150
Height, mm	96	96	100
Area, cm^2	375	375	375
Volume, cm^3	3600	3600	3754

Weight Volume Relationships

Test No.	1	2	3
Sample Type	Reconstituted	Reconstituted	Reconstituted
Initial Wet Wt, kg	7.86	7.86	8.23
Initial Dry Wt, kg	7.09	7.09	7.39
Initial w, %	10.81	10.81	11.24
Final w, %	10.11	10.11	9.81
Initial γ_{dry}, kg/m^3	1970	1970	1970
Specific Gravity (assumed)	2.65	2.65	2.65
Initial Void Ratio, e	0.35	0.35	0.35

Equipment Description - LDS_30S

Axial LDT	Serial #	512414
Normal Load Cell	Serial #	618236
Shear Load Cell	Serial #	1084597
Vertical LDT	Serial #	BBD110465

Combined SPT Sample List

- Combined Proctor sample (SA2_1-4 Combined)
- EG-16-01, Sample 2 (5 ft to 6.5 ft)
- EG-16-02, Sample 28 (15 ft and 16.5 ft)_Sample 30 (20 ft and 21.5 ft) _Sample 31 (22.5 ft to 24 ft)_Sample 32 (25 ft to 26.5 ft)
- EG-16-05, Sample 134 (5 ft to 6.5 ft) and Sample 136 (10 ft to 11.5 ft)
- EG-16-06, Sample 166 (10 ft to 11.5 ft)

Remarks

- Area correction applied to normal and shear stress calculations
- Each of the test specimens were placed and compated in 3 layers
- Each of the three layers were compacted to 98% SPMDD at a targeted optimum water content of ~ 10.8%
- Three test specimens were built and sheared at 75, 200, and 400 kPa normal stresses
- The 200 kPa and 400 kPa material had to be reused due to insufficient sample amount
- All the residual shear points were done on the last post-400 kPa shear specimen (I.e. normal stress was backed off to 50 kPa and tested, then 200 kPa, etc.)
- There was one complete carrier-return pass completed prior to each of the residual shear points

Sample Description: (SM) gravelly SILTY SAND, fine sub-angular to angular gravel, fine to coarse sand; brown; low plastic fines, w<PL

Tested By: MB/KP Date Completed: 14-Nov-16

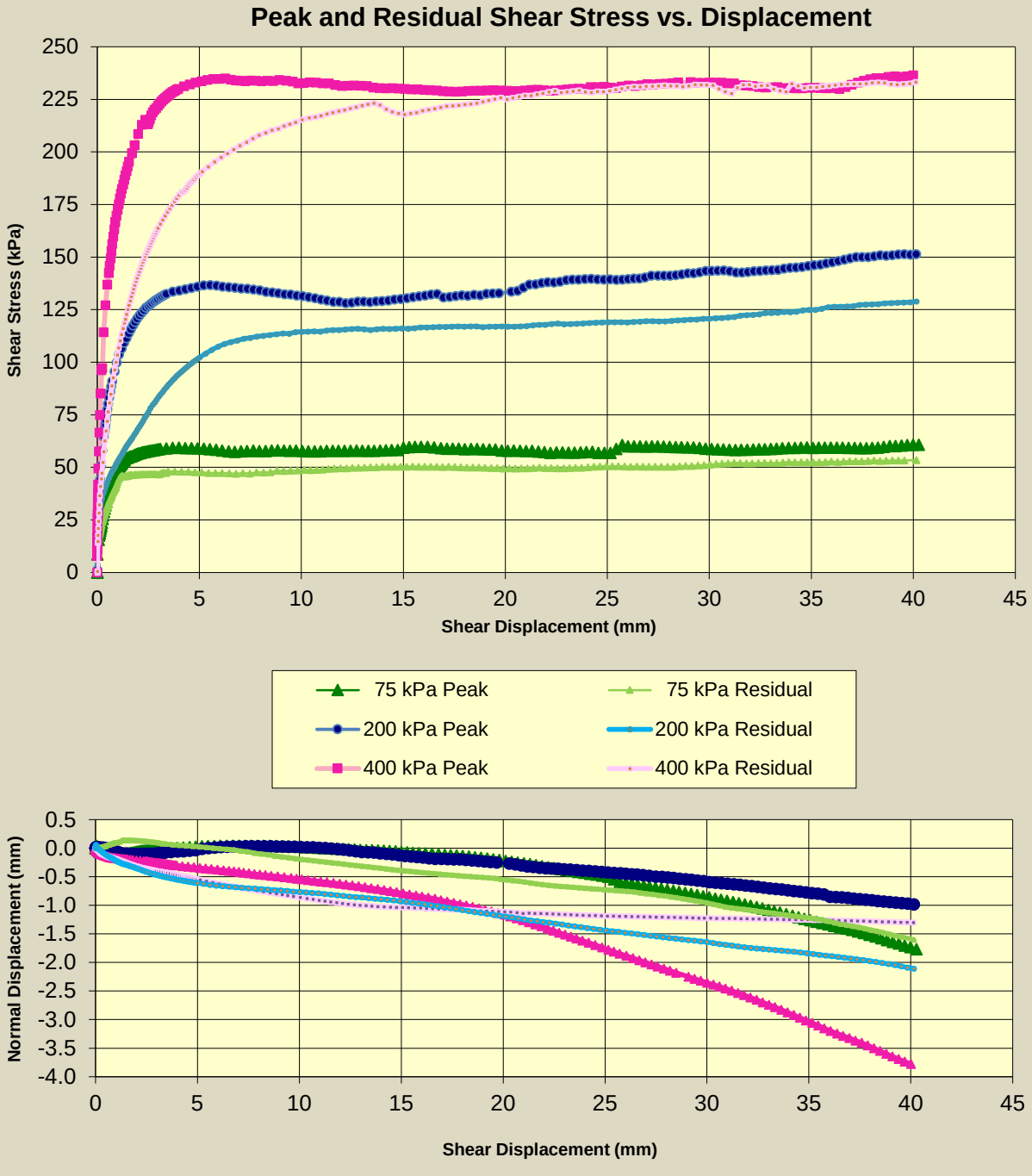
Reviewed By: MB Signature:

GOLDER ASSOCIATES - Calgary Lab
Bay 7, 820 28th St. NE
Calgary, AB, T2A 6K1
ASTM D3080/ D3080M-11

Direct Shear Test of Soils Under Consolidated Drained Conditions
(ASTM D3080/D3080M-11)

Sample Identification

Project No.:	1654746	Phase:	3000	Test Condition:	Moist - Optimum w
Client:	Parks Canada Agency			Sample:	Combined SPT Samples
Project Title:	PCA/GlacierNP-Cu14/Avalanche Mitigation - Eastgate Landslide			Lab No.:	C100-09

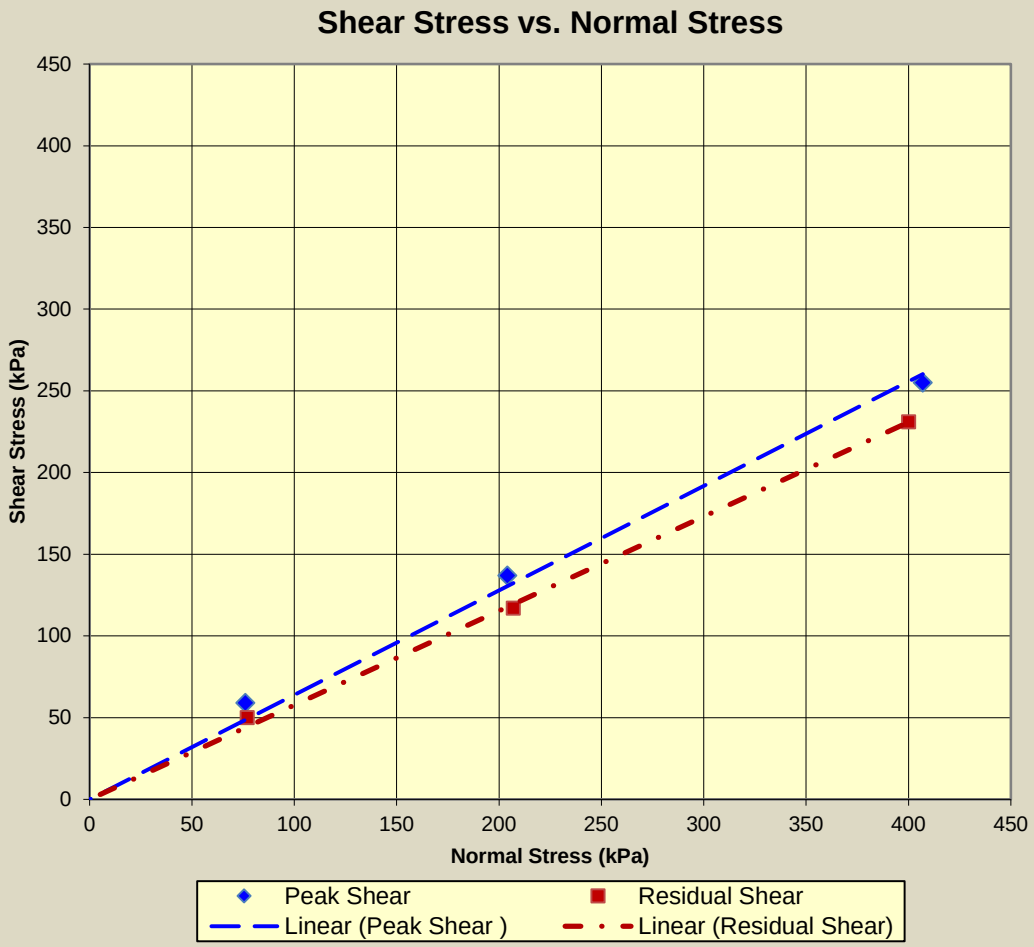


GOLDER ASSOCIATES - Calgary Lab
Bay 7, 820 28th St. NE
Calgary, AB, T2A 6K1
ASTM D3080/ D3080M-11

Direct Shear Test of Soils Under Consolidated Drained Conditions
(ASTM D3080/D3080M-11)

Sample Identification

Project No.:	1654746	Phase:	3000	Test Condition:	Moist - Optimum w
Client:	Parks Canada Agency			Sample:	Combined SPT Samples
Project Title:	PCA/GlacierNP-Cu14/Avalanche Mitigation - Eastgate Landslide			Lab No.:	C100-09



	Peak			Residual		
Test No.	1	2	3	1	2	3
Normal Stress, kPa	76	204	407	77	207	400
Shear Stress, kPa	59	137	255	50	117	231

	Peak	Residual
Friction Angle, Degrees	**33**	**30**
Cohesion, kPa	**0**	**0**

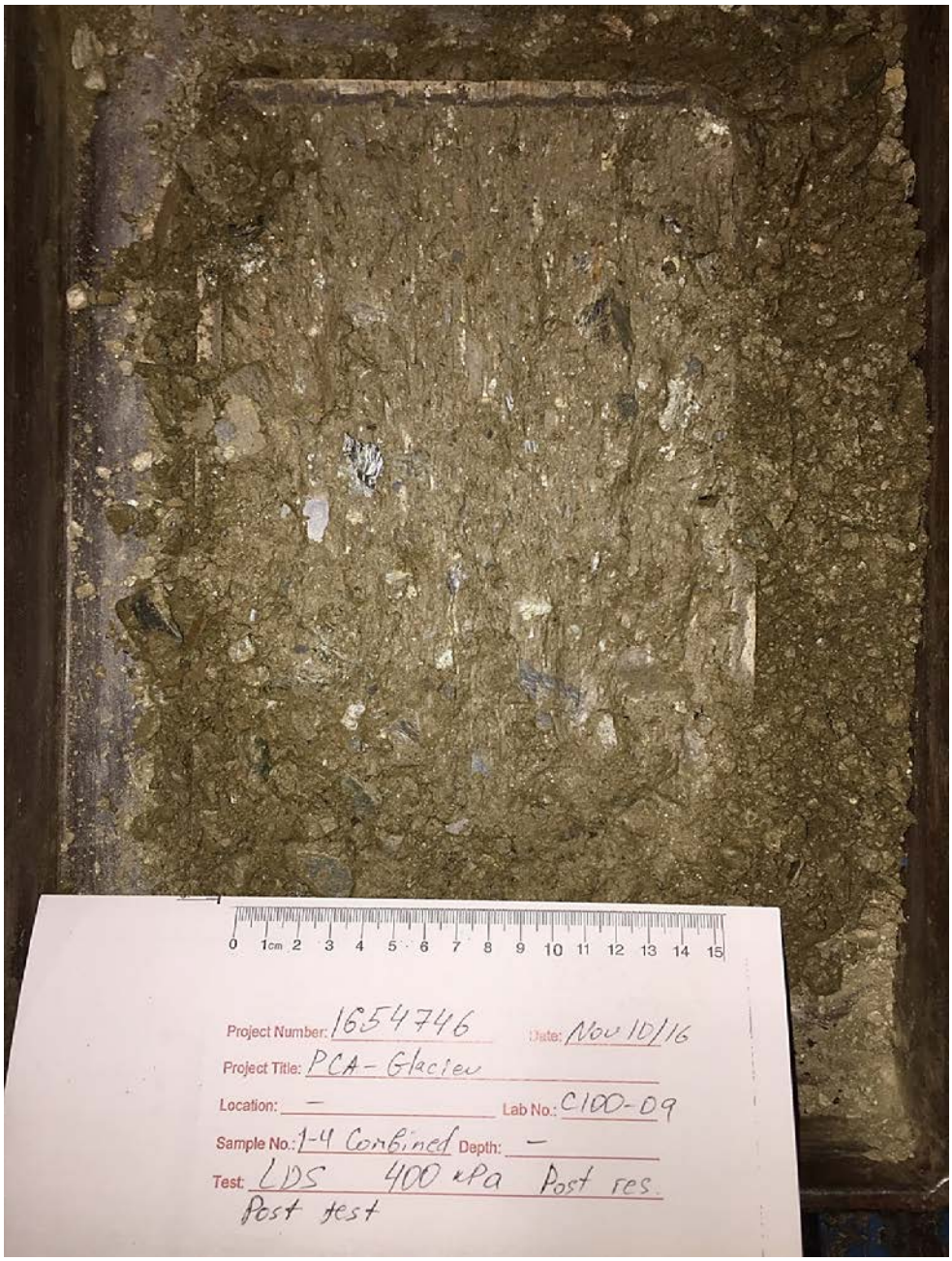
Large Direct Shear Testing - Test Photos

Project No.:	1654746	Phase:	3000
Short Title:	PCA/GlacierNP-Cu14/Avalanche Mitigation - Eastgate Landslide		
Tested by:	MB/KP	Date:	17-Sep-15

Lab No.: C100-09 Test Condition: Moist - Optimum w Sample: Combined SPT Samples

Sample Description: (SM) gravelly SILTY SAND, fine sub-angular to angular gravel, fine to coarse sand; brown; low plastic fines, w<PL

Post-Test Photo - 400 kPa Residual Point

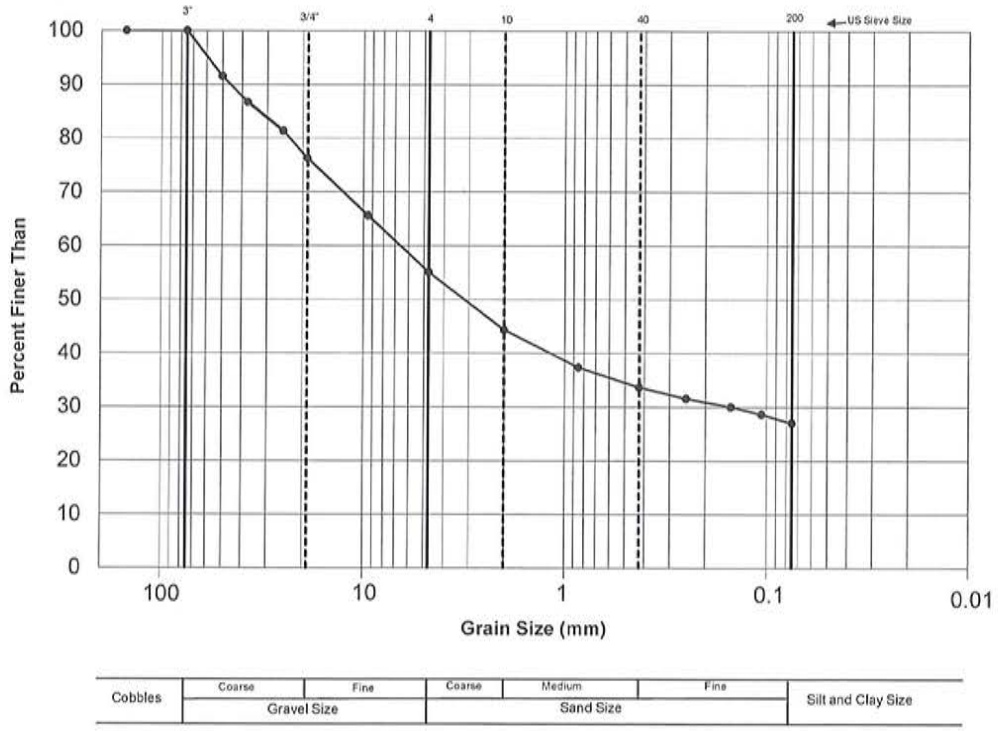


Particle Size Distribution of Soils using Sieve Analysis

(ASTM D6913-04)

Project No.:	1654746	Phase:	3000	Date:	26-Oct-16
Short Title:	PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide				
Sub Sampled By:	KH	Washed By:	KH	Sieved By:	KH
Field Tag No.:	-	Source:	-	BH No.:	SA2
Lab No.:	C100-09	Northing:	- m	Sample No.:	1-4 Combined
Sampled By:	JT	Easting:	- m	Depth From:	- m
Sample Date:	21-Sep-16	Elevation:	- m	Depth To:	- m

Test Method:	A	Drying Method:	Air Dry	
Composite Sieve:	Yes	if Yes, Split on:	4.75	mm
Material Excluded from Sieve:	No	Describe:		
Prior Testing on Sample:	No	Describe:		



Sieve Size (mm)	Passing %
150	100
75	100
50	92
37.5	87
25.0	81
19.0	76
9.5	66
4.75	55
2.00	44
0.85	37
0.425	34
0.250	32
0.150	30
0.106	29
0.075	27

Received Water Content (%)	Cobbles (%)	Gravel (%)	Sand (%)	Fines (%)	D60 (mm)	D30 (mm)	D10 (mm)	Cu	Cc
7.3	0	45	28	27	7.0	0.2	N/A	N/A	N/A

Sample Description: (GM) sandy SILTY GRAVEL, fine coarse sub-angular to angular gravel, fine to coarse sand; brown; low plastic fines, w < PL

USCS Classification: GM

Remarks:

Bay 8, 820 - 28 St. NE
Calgary, AB T2A 6K1

Reviewed by:

Laboratory Compaction Characteristics of Soil using Standard Effort

(ASTM D698)

Project No.:	1654746	Phase:	3000
Short Title:	PCA/GlacierNP-CU14/Avalanche Mitigation - Eastgate Landslide	Lab No.:	C100-09
Tested By:	MB	Test Date:	30-Oct-16

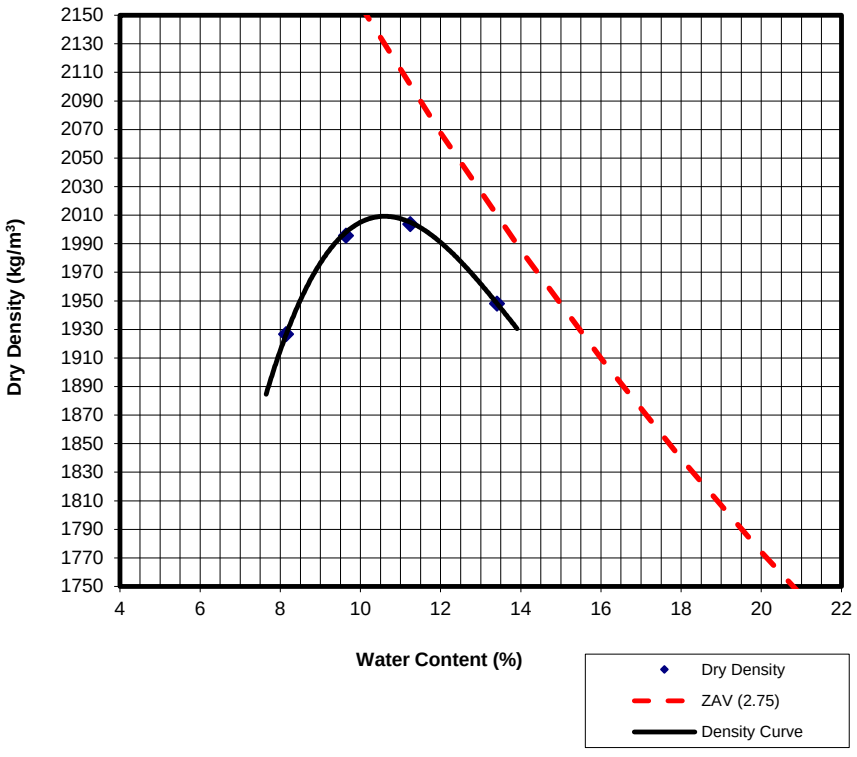
Borehole:	SA2	Date Sampled:	21-Sep-16
Sample No.:	1-4 Combined	Sample Source:	-
Sampled By:	JT	Sample Description:	Please see remarks

MOISTURE DENSITY RELATIONSHIP

Trial No.	1	2	3	4	5	6
Mold No.						
Wt of sample wet + mold (g)	10087.90	10308.20	10394.50	10352.90		
Wt. Of mold (g)	5695.80	5695.80	5695.80	5695.80		
Wt. Of sample wet (g)	4392.10	4612.40	4698.70	4657.10		
Volume of Mold (cm^3)	2107.97	2107.97	2107.97	2107.97		
Wet Density (kg/m^3)	2083.57	2188.08	2229.02	2209.28		
Dry Density (kg/m^3)	1927	1996	2004	1948		

WATER CONTENT

Tare No.						
Wt of sample wet + tare (g)	307.74	401.43	412.64	436.94		
Wt of sample dry + tare (g)	295.45	379.90	392.05	412.57		
Wt. Water	12.29	21.53	20.59	24.37		
Tare mass (g)	144.60	156.47	208.92	230.79		
Wt. Dry soil (g)	150.85	223.43	183.13	181.78		
Water content (%)	8.15	9.64	11.24	13.41		



Maximum Dry Density

Max. Dry Density **2010** kg/m^3

Optimum w **10.8** %

Method **C**

Note: scalped > 16 mm gravel

Rock Correction (if required)

% Oversize _____ %

Max. Dry Density _____ kg/m^3 @ _____

Assumed Specific Gravity = 2.75

Remarks:

(SM) gravelly SILTY SAND, fine sub-angular to angular gravel, fine to coarse sand; brown; low plastic fines, w<PL

As Received Water Content: 7.3%

Reviewed: _____

Golder Associates Ltd.
8 - 820 28th Street N.E
Calgary, AB
T2A 6K1

Golder Associates Ltd.
ATTN: DEREK HUDSON
8, 820-28th Street NE
Calgary AB T2A 6K1

Date Received: 27-OCT-16
Report Date: 02-NOV-16 13:43 (MT)
Version: FINAL

Client Phone: 403-248-6386

Certificate of Analysis

Lab Work Order #: L1849804

Project P.O. #: NOT SUBMITTED
Job Reference: 1654746
C of C Numbers: 10-254762
Legal Site Desc:

Jessica Spira, Env. Tech. DIPL
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1849804-1 EG-16-01 SA #8 (6.1-6.6M)							
Sampled By: CLIENT							
Matrix:							
Organic Matter by LOI at 375 deg C.							
Organic Matter	7.1		1.0	%	31-OCT-16	01-NOV-16	R3584872
Loss on Ignition @ 375 C	8.7		1.0	%	31-OCT-16	01-NOV-16	R3584872
L1849804-2 EG-16-05 SA #146 (11.0M)							
Sampled By: CLIENT							
Matrix:							
Organic Matter by LOI at 375 deg C.							
Organic Matter	<1.0		1.0	%	31-OCT-16	01-NOV-16	R3584872
Loss on Ignition @ 375 C	<1.0		1.0	%	31-OCT-16	01-NOV-16	R3584872

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
OM-LOI-SK	Soil	Organic Matter by LOI at 375 deg C.	CSSS (1978) p. 160

The dry-ash method involves the removal of organic matter by combustion at 375 degrees C for a minimum of 16 hours. Samples are dried prior to combustion.

Reference: McKeague, J.A. Soil Sampling and Methods of Analysis. Can. Soc. Soil Sci.(1978) method 4.23

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA

Chain of Custody Numbers:

10-254762

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Golder Associates Ltd.
8, 820-28th Street NE
Calgary AB T2A 6K1
Contact: DEREK HUDSON

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
OM-LOI-SK	**Soil**							
Batch R3584872								
WG2422915-3 IRM		**SAL2001**						
Organic Matter			102.4		%		80-120	01-NOV-16
Loss on Ignition @ 375 C			102.2		%		80-120	01-NOV-16
WG2422915-2 MB								
Organic Matter			<1.0		%		1	01-NOV-16
Loss on Ignition @ 375 C			<1.0		%		1	01-NOV-16

Quality Control Report

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

10-254762

ALS Environmental

Chain of Custody / Analyt
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www.alsglobal

L1849804-COFC

Page 1 of 1

Report To		Report Format / Distribution		Service Request: (Rush subject to availability - Contact ALS to confirm TAT)
Company:	Golder Associates Ltd.	Standard: ✓	Other (specify):	✓ Regular (Standard Turnaround Times - Business Days)
Contact:	Derek Hudson	Select: PDF ✓	Excel Digital Fax	Priority (2-4 Business Days) - 50% surcharge - Contact ALS to confirm TAT
Address:	8-820, 28th St. NE Calgary, AB	Email 1:	dhudson@golder.com	Emergency (1-2 Business Days) - 100% Surcharge - Contact ALS to confirm TAT
		Email 2:	melda_sivrac@golder.com	Same Day or Weekend Emergency - Contact ALS to confirm TAT
Phone:	Fax:			

Invoice To	Same as Report ? (circle) Yes or No (if No, provide details)	Client / Project Information	
	Copy of Invoice with Report? (circle) Yes or No	Job #:	1654746
Company:		PO / AFE:	
Contact:		LSD:	Eastgate Landslide
Address:			
Phone:	Fax:	Quote #:	
Lab Work Order # (lab use only)		ALS Contact:	Sampler:

Analysis Request

(Indicate Filtered or Preserved, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Organic Content	Number of Containers
	EG-16-01 SA #8 (6.1-6.6 m)				1	
	EG-16-05 SA #146 (11.0 m)				1	

Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date:	Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SI
D. Sobredo	26 Oct 16	15:35		10/27	11:55	19 °C				

DATA ENTRY:

PROJECT No.: 1654746 Eastgate Landslide

RECORD OF BOREHOLE: EG-16-01

SHEET 1 OF 2

LOCATION:

BORING DATE: 30 September 2016

DATUM: NAD83
UTM Zone 11

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		851.73							
0		(ML) sandy, gravelly SILT; light brown; non-cohesive, loose to compact		0.00	1	AS					
1					2	DO	18		○		
2					3	AS					
3					4	DO	14		○		
4					5	AS					
5					6	DO	6		○		
6					7	AS					
				845.48							
		(OL) ORGANIC SILT, some sand, some gravel; brown to black; cohesive, compact		6.25	8	DO	10		W ⊖	OC	
				844.87							
7		(ML) SILT, some sand, some gravel; light greyish brown; non-cohesive, compact		6.86	9	DO	25		○		
		- light brown at 7.6m			10	DO	REF 50 for 50mm		○		
8					11	AS					
9					12	DO	16		○		
					13	AS					
10		*CONTINUED NEXT PAGE*									

BOREHOLE - EXPANDED ADD. LAB TESTING 1654746 BOREHOLE LOGS.GPJ CALGARY.GDT 17/3/17

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: JT

CHECKED: IGT

PROJECT No.: 1654746 Eastgate Landslide

RECORD OF BOREHOLE: EG-16-01

SHEET 2 OF 2

LOCATION:

BORING DATE: 30 September 2016

DATUM: NAD83 UTM Zone 11

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		(ML) SILT, some sand, some gravel; light greyish brown; non-cohesive, compact *(continued)*			13	AS					
		- rock from 10.5m to 11.0m		841.06							
		(ML) SILT, some sand, some gravel; reddish brown, oxidization; non-cohesive, compact		10.67							
11					14	AS					
12					15	DO	25		○		
13					16	AS					
14					17	DO	15		○		
					18	AS					
15					19	DO	REF 50 for 50mm		○		
		- rock from 15.4m to 16.2m									
16					20	AS					
17					21	DO	32		○		
					22	AS					
18					23	DO	23		○		
				832.98							
19		END OF BOREHOLE = 18.75m Notes: 1. Upon completion of drilling, the borehole was backfilled with cuttings to the ground surface. End of .		18.75							
20											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JT

CHECKED: IGT

DATA ENTRY:

BOREHOLE - EXPANDED ADD. LAB TESTING 1654746 BOREHOLE LOGS.GPJ CALGARY.GDT 17/3/17

DATA ENTRY:

PROJECT No.: 1654746 Eastgate Landslide

RECORD OF BOREHOLE: EG-16-02

SHEET 1 OF 3

LOCATION:

BORING DATE: 1 October 2016

DATUM: NAD83
UTM Zone 11

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		856.31							
		(ML) SILT, some sand, some gravel; light brown; non-cohesive, compact		0.00							
					24	AS					
1											
					25	DO	29		○		
2											
					26	AS					
3		- rock from 2.9m to 3.4m									
					27	AS					
4											
		- dark grey at 4.6m									
					28	DO	21		○		
5		- greyish brown at 5.2m									
					29	AS					
6											
					30	DO	10		○		
7					31	DO	14		○		
					32	DO	12		○		
8											
		- rock at 8.2m to 8.8m									
9					33	AS					
				847.17							
		ORGANICS, trees, some silt, some gravel		9.14	34	DO	REF 50 for 25mm				
					35	AS					
10		*CONTINUED NEXT PAGE*									

BOREHOLE - EXPANDED ADD. LAB TESTING 1654746 BOREHOLE LOGS.GPJ CALGARY.GDT 17/3/17

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: JT

CHECKED: IGT

PROJECT No.: 1654746 Eastgate Landslide

RECORD OF BOREHOLE: EG-16-02

SHEET 2 OF 3

LOCATION:

BORING DATE: 1 October 2016

DATUM: NAD83 UTM Zone 11

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		ORGANICS, trees, some silt, some gravel *(continued)*			35	AS					
11					36	AS					
				845.04							
		(ML) SILT, some sand, some gravel; olive brown, oxidization; non-cohesive, dense to very dense		11.28	37	DO	31				
12					38	DO	48				
13					39	AS					
14					40	DO	REF 50 for 100mm				
					41	AS					
15											
16					42	AS					
17					43	DO	54				
					44	AS					
18											
				837.72	45	DO	37				
		(ML) SILT, trace organics, trace sand, trace gravel; light grey with reddish brown, oxidization; non-cohesive, compact to dense		18.59							
19				837.11							
		(GM) sandy SILTY GRAVEL, fine to coarse, sub-angular to angular gravel, fine to coarse sand; light greyish brown to reddish brown; non-cohesive, dense		19.20	46	DO	20				
20					47	DO	34				
		CONTINUED NEXT PAGE									

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: JT

CHECKED: IGT

DATA ENTRY:

BOREHOLE - EXPANDED ADD. LAB TESTING 1654746 BOREHOLE LOGS.GPJ CALGARY.GDT 17/3/17

PROJECT No.: 1654746 Eastgate Landslide

RECORD OF BOREHOLE: EG-16-02

SHEET 3 OF 3

LOCATION:

BORING DATE: 1 October 2016

DATUM: NAD83 UTM Zone 11

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		(GM) sandy SILTY GRAVEL, fine to coarse, sub-angular to angular gravel, fine to coarse sand; light greyish brown to reddish brown; non-cohesive, dense *(continued)*			47	DO	34			M	
21					48	AS					
22					49	DO	31				
				834.06							
		(ML) sandy, gravelly SILT; reddish brown; non-cohesive, compact		22.25	50	AS					
				833.45							
23		(ML) SILT, some sand, trace gravel; brown to dark brown, oxidization; non-cohesive, compact		22.86	51	DO	17				
24					52	AS					
				831.93							
		(ML) sandy, gravelly SILT; brown with reddish brown, oxidization; non-cohesive, compact to very dense		24.38	53	DO	29				
25					54	AS					
26					55	DO	REF 50 for 150mm				
27					56	AS					
					57	DO	76				
				828.42							
28		END OF BOREHOLE = 27.89m Notes: 1. Upon completion of drilling, the borehole was backfilled with cuttings to the ground surface. End of .		27.89							
29											
30											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JT

CHECKED: IGT

DATA ENTRY:

BOREHOLE - EXPANDED ADD. LAB TESTING 1654746 BOREHOLE LOGS.GPJ CALGARY.GDT 17/3/17

DATA ENTRY:

PROJECT No.: 1654746 Eastgate Landslide

RECORD OF BOREHOLE: EG-16-03

SHEET 1 OF 4

LOCATION:

BORING DATE: 3 October 2016

DATUM: NAD83
UTM Zone 11

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		864.41							
0		(ML) sandy, gravelly SILT; greyish brown; non-cohesive, compact		0.00							
					58	AS					
1											
					59	DO	17		○		
2											
		- trace organics (tree matter) at 2.3m			60	AS					
		- becomes dense to very dense at 9.1m									
3					61	DO	REF 50 for 100mm		○		
		- rock from 3.5m to 3.7m									
4					62	AS					
		- tree matter from 4.0m to 4.3m									
		- trace tree matter at 4.6m			63	DO	15		○		
5											
		- trace tree matter at 5.5m			64	AS					
6											
					65	DO	12		○		
7		- rock from 6.9m to 7.5m			66	AS					
					67	DO	14		○		
8		- trace tree matter at 8.2m									
					68	AS					
9											
					69	DO	38		○		
					70	AS					
10		*CONTINUED NEXT PAGE*									

BOREHOLE - EXPANDED ADD. LAB TESTING 1654746 BOREHOLE LOGS.GPJ CALGARY.GDT 17/3/17

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: JT

CHECKED: IGT

PROJECT No.: 1654746 Eastgate Landslide

RECORD OF BOREHOLE: EG-16-03

LOCATION:

BORING DATE: 3 October 2016

DATUM: NAD83
UTM Zone 11

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ○ W WI) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		(ML) sandy, gravelly SILT; greyish brown; non-cohesive, compact *(continued)* - rock from 9.8m to 10.5m			70	AS					
					71	DO	REF 50 for 50mm		○		
11											
					72	AS					
12											
					73	DO	19		○		
13											
				851.00							
		(OL) ORGANIC SILT, some organics, trace sand; grey with reddish brown, oxidization; cohesive, compact		13.41	74	AS					
				850.39	75	DO	21		○		
14		(ML) SILT, some sand, some gravel, trace organics; reddish brown, oxidization; non-cohesive, compact to dense		14.02							
					76	AS					
15											
					77	DO	32		○		
16											
					78	AS					
17											
					79	DO	18		○		
				847.19							
		(SM) gravelly SILTY SAND, fine to coarse sand, fine to coarse sub-angular to angular gravel; reddish brown to greyish brown; non-cohesive, compact to dense		17.22							
18					80	AS					
					81	DO	29		○	M	
19											
					82	AS					
20					83	DO	37				
		CONTINUED NEXT PAGE									

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: JT

CHECKED: IGT

PROJECT No.: 1654746 Eastgate Landslide

RECORD OF BOREHOLE: EG-16-03

SHEET 3 OF 4

LOCATION:

BORING DATE: 3 October 2016

DATUM: NAD83 UTM Zone 11

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		(SM) gravelly SILTY SAND, fine to coarse sand, fine to coarse sub-angular to angular gravel; reddish brown to greyish brown; non-cohesive, compact to dense *(continued)*			83	DO	37		○		
21					84	AS					
22					85	DO	38		○		
23					86	AS					
24					87	DO	74		○		
25					88	AS					
26					89	DO	45		○		
27					90	AS					
28					91	DO	55		○		
29		- rock from 28.0m to 28.7m			92	AS					
30					93	DO	REF 50 for 75mm		○		
					94	AS					
					95	AS					
		CONTINUED NEXT PAGE									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JT

CHECKED: IGT

DATA ENTRY:

BOREHOLE - EXPANDED ADD. LAB TESTING 1654746 BOREHOLE LOGS.GPJ CALGARY.GDT 17/3/17

DATA ENTRY:

PROJECT No.: 1654746 Eastgate Landslide

RECORD OF BOREHOLE: EG-16-03

SHEET 4 OF 4

LOCATION:

BORING DATE: 3 October 2016

DATUM: NAD83
UTM Zone 11

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ○ W WI) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
30		(SM) gravelly SILTY SAND, fine to coarse sand, fine to coarse sub-angular to angular gravel; reddish brown to greyish brown; non-cohesive, compact to dense *(continued)*			95	AS					
					96	DO			○		
				833.48							
31		END OF BOREHOLE = 30.94m Notes: 1. Upon completion of drilling, the borehole was backfilled with cuttings to the ground surface. End of .		30.94							
32											
33											
34											
35											
36											
37											
38											
39											
40											

BOREHOLE - EXPANDED ADD. LAB TESTING 1654746 BOREHOLE LOGS.GPJ CALGARY.GDT 17/3/17

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: JT

CHECKED: IGT

DATA ENTRY:

PROJECT No.: 1654746 Eastgate Landslide

RECORD OF BOREHOLE: EG-16-04

SHEET 1 OF 3

LOCATION:

BORING DATE: 4 October 2016

DATUM: NAD83
UTM Zone 11

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		864.47							
0		(SM/GM) SILTY SAND and fine to coarse sub-angular to angular GRAVEL, fine to coarse sand; greyish brown; non-cohesive, compact		0.00	97	AS					
1					98	DO	10		○		
2					99	AS					
3					100	DO	14		○		
4					101	AS					
5					102	DO	16		○	M	
					103	AS					
6				858.37							
		(ML) SILT, some sand, some gravel; dark olive brown; non-cohesive, compact		6.10	104	DO	14		○		
7		- trace organics at 7.0m			105	AS					
8					106	DO	10		○		
					107	AS					
9				855.32							
		(ML) sandy, gravelly SILT, with slight plasticity, fine to coarse sand, fine sub-angular to angular gravel, trace organics; dark greyish brown, oxidization; non-cohesive, compact		9.14	108	DO	14		○		
					109	AS					
10		*CONTINUED NEXT PAGE*									

BOREHOLE - EXPANDED ADD. LAB TESTING 1654746 BOREHOLE LOGS.GPJ CALGARY.GDT 17/3/17

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: JT

CHECKED: IGT

PROJECT No.: 1654746 Eastgate Landslide

RECORD OF BOREHOLE: EG-16-04

SHEET 2 OF 3

LOCATION:

BORING DATE: 4 October 2016

DATUM: NAD83 UTM Zone 11

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ○ W WI) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		(ML) sandy, gravelly SILT, with slight plasticity, fine to coarse sand, fine sub-angular to angular gravel, trace organics; dark greyish brown, oxidization; non-cohesive, compact *(continued)*			109	AS					
11					110	DO	20		○		
					111	AS					
12					112	DO	29		○	M	
					113	AS					
13											
14					114	DO	12		○		
				849.84							
		(ML) sandy, gravelly SILT; reddish brown, oxidization; non-cohesive, dense		14.63	115	AS					
15											
					116	DO	33		○		
16					117	AS					
17					118	DO	36		○		
					119	AS					
18											
					120	DO	46		○		
19					121	AS					
20					122	DO	32				
		CONTINUED NEXT PAGE									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JT

CHECKED: IGT

DATA ENTRY:

BOREHOLE - EXPANDED ADD. LAB TESTING 1654746 BOREHOLE LOGS.GPJ CALGARY.GDT 17/3/17

PROJECT No.: 1654746 Eastgate Landslide

RECORD OF BOREHOLE: EG-16-04

SHEET 3 OF 3

LOCATION:

BORING DATE: 4 October 2016

DATUM: NAD83 UTM Zone 11

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20											
		(ML) sandy, gravelly SILT; reddish brown, oxidization; non-cohesive, dense *(continued)*			122	DO	32				
21					123	AS					
					124	DO	26				
22					125	AS					
23					126	DO	43				
					127	AS					
24					128	DO	REF 50 for 50mm				
25					129	AS					
26					130	DO	REF 50 for 100mm				
					131	AS					
27				836.88	132	DO	REF 50 for 75mm				
				27.58							
		END OF BOREHOLE = 27.58m Notes: 1. Upon completion of drilling, the borehole was backfilled with cuttings to the ground surface. End of .									
28											
29											
30											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JT

CHECKED: IGT

DATA ENTRY:

BOREHOLE - EXPANDED ADD. LAB TESTING 1654746 BOREHOLE LOGS.GPJ CALGARY.GDT 17/3/17

DATA ENTRY:

PROJECT No.: 1654746 Eastgate Landslide

RECORD OF BOREHOLE: EG-16-05

SHEET 1 OF 3

LOCATION:

BORING DATE: 5 October 2016

DATUM: NAD83
UTM Zone 11

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		860.39							
0		(ML) SILT, some sand, some gravel; olive brown; non-cohesive, loose to compact		0.00							
					133	AS					
1											
					134	DO	27				
2											
					135	AS					
3											
					136	DO	17				
4					137	AS					
					138	DO	8				
5											
					139	AS					
6											
					140	DO	13				
7					141	AS					
					142	DO	16				
8				852.17							
		(GM) sandy SILTY GRAVEL, fine to coarse sub-angular to angular gravel, fine to coarse sand, trace organics; dark greyish brown; non-cohesive, compact to dense		8.23	143	AS					
9											
					144	DO	24				
					145	AS					
10		*CONTINUED NEXT PAGE*									

BOREHOLE - EXPANDED ADD. LAB TESTING 1654746 BOREHOLE LOGS.GPJ CALGARY.GDT 17/3/17

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: JT

CHECKED: IGT

DATA ENTRY:

PROJECT No.: 1654746 Eastgate Landslide

RECORD OF BOREHOLE: EG-16-05

SHEET 2 OF 3

LOCATION:

BORING DATE: 5 October 2016

DATUM: NAD83
UTM Zone 11

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		- interbedded organic soils from 9.1m to 10.7m (GM) sandy SILTY GRAVEL, fine to coarse sub-angular to angular gravel, fine to coarse sand, trace organics; dark greyish brown; non-cohesive, compact to dense *(continued)*			145	AS					
11					146	DO	38		○	M, OC	
12					148	DO	14		○		
				847.75							
13		(SM/GM) SILTY SAND and fine to coarse sub-angular to angular GRAVEL, fine to coarse sand; reddish brown, oxidization; non-cohesive, dense		12.65	149	AS					
14					150	DO	44		○	M	
					151	AS					
15											
					152	DO	44		○		
16					153	AS					
17					154	DO	31		○		
					155	AS					
18					156	DO	REF 50 for 25mm		○		
19					157	AS					
20					158	DO	27				
		CONTINUED NEXT PAGE									

BOREHOLE - EXPANDED ADD. LAB TESTING 1654746 BOREHOLE LOGS.GPJ CALGARY.GDT 17/3/17

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: JT

CHECKED: IGT

DATA ENTRY:

PROJECT No.: 1654746 Eastgate Landslide

RECORD OF BOREHOLE: EG-16-05

SHEET 3 OF 3

LOCATION:

BORING DATE: 5 October 2016

DATUM: NAD83
UTM Zone 11

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		(SM/GM) SILTY SAND and fine to coarse sub-angular to angular GRAVEL, fine to coarse sand; reddish brown, oxidization; non-cohesive, dense *(continued)*			158	DO	27		○		
21					159	AS					
22					160	DO	65		○		
23					161	AS					
					162	DO	56		○		
				837.08							
		END OF BOREHOLE = 23.32m		23.32							
24		Notes: 1. Upon completion of drilling, the borehole was backfilled with cuttings to the ground surface. End of .									
25											
26											
27											
28											
29											
30											

BOREHOLE - EXPANDED ADD. LAB TESTING 1654746 BOREHOLE LOGS.GPJ CALGARY.GDT 17/3/17

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JT

CHECKED: IGT

PROJECT No.: 1654746 Eastgate Landslide

RECORD OF BOREHOLE: EG-16-06

SHEET 1 OF 2

LOCATION:

BORING DATE: 5 October 2016

DATUM: NAD83 UTM Zone 11

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ○ W WI) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		848.71							
0		(ML) SILT, some sand, some gravel; light grey brown; non-cohesive, compact		0.00							
					163	AS					
1											
					164	DO	11		○		
2											
					165	AS					
3											
					166	DO	26		○		
4											
					167	AS					
				844.14							
		(ML) SILT, some sand, some gravel; greyish brown; non-cohesive, compact		4.57							
					168	DO	12		○		
5											
		- organics, dark greyish brown at 5.5m			169	AS					
6											
		- oxidization at 6.1m			170	DO	REF 50 for 50mm		○		
				842.16							
		(SM) gravelly SILTY SAND, fine to coarse sand, fine sub-angular to angular gravel; reddish brown, oxidization; non-cohesive, compact to very dense		6.55							
7					171	AS					
					172	DO	22		○	M	
8											
					173	AS					
9											
					174	DO	REF 50 for 50mm		○		
					175	AS					
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JT

CHECKED: IGT

DATA ENTRY:

BOREHOLE - EXPANDED ADD. LAB TESTING 1654746 BOREHOLE LOGS.GPJ CALGARY.GDT 17/3/17

PROJECT No.: 1654746 Eastgate Landslide

RECORD OF BOREHOLE: EG-16-06

SHEET 2 OF 2

LOCATION:

BORING DATE: 5 October 2016

DATUM: NAD83 UTM Zone 11

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		(SM) gravelly SILTY SAND, fine to coarse sand, fine sub-angular to angular gravel; reddish brown, oxidization; non-cohesive, compact to very dense *(continued)*			175	AS					
11					176	DO	18		○		
					177	AS					
12					178	DO	52		○		
13					179	AS					
14					180	DO	65		○		
					181	AS					
15					182	DO	51		○		
16					183	AS					
		- rock from 16.5m to 16.6m - 7cm wet silt layer at 16.8m			184	DO	50		○		
17					185	AS					
18					186	DO	31		○		
				829.97							
		END OF BOREHOLE = 18.75m		18.75							
19		Notes: 1. Upon completion of drilling, the borehole was backfilled with cuttings to the ground surface. End of .									
20											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JT

CHECKED: IGT

DATA ENTRY:

BOREHOLE - EXPANDED ADD. LAB TESTING 1654746 BOREHOLE LOGS.GPJ CALGARY.GDT 17/3/17