

Ministry of Transportation and Infrastructure South Coast Region 310 1500 Woolridge St. Coquitlam BC V3K 0B8

January 9, 2023 Project No. 12712-2018 File No. 07-RG-1043

EGBC Permit To Practice No.: 1003429

Serene Cachelin, Project Manager Stantec 300-175 2nd Avenue Kamloops, BC V2C 5W1

Re: HWY #3 SNASS CREEK BRIDGE (Bridge 01214) REPLACEMENT FACTUAL GEOTECHNICAL INVESTIGATION REPORT

1.0 INTRODUCTION

The existing Snass Creek Bridge (Bridge 01214) is approaching its design life. It was originally constructed in 1949 with additional widening in 1963. The Ministry of Transportation and Infrastructure (the Ministry) is planning to replace the existing bridge with a new bridge. In order to support the design of the proposed new bridge and required highway realignment, a subsurface geotechnical investigation has been completed by the Ministry.

This report presents the factual data obtained from the geotechnical investigation and provides a summary of the subsoil and groundwater conditions encountered.

2.0 SITE DESCRIPTION

2.1 General

The existing Snass Creek Bridge is located approximately 37.8 km east of Hope, BC on Hwy #3. The existing bridge is a single span structure carrying one eastbound and one westbound lane over Snass Creek. The location of the existing Bridge is shown on Figure 1 Key Plan attached in Appendix A.

2.2 Proposed Bridge

Based on 50% Structural drawings, the proposed new bridge will be a single-span structure located at the same location as the existing bridge. The proposed new bridge will be designed to carry three travel lanes and the width of the proposed new bridge will be adequate for future expansion to 4 travel lanes. The alignment of the existing highway (approximately 400m on each side of the bridge) will be slightly shifted to match the wider and higher new bridge.

2.3 Surficial Geology

Based on the Geological Survey of Canada Map 41-1989, sheet 1, Hope, BC, the subsoil conditions at the site are anticipated to consist of thick colluvium deposits over bedrock (PMu, Ultramafic Rock, local Gabbro).

3.0 GEOTECHNICAL INVESTIGATION

3.1 GENERAL

In order to assess the subsoil and groundwater conditions, the Ministry completed a field geotechnical investigation program between September 20 and 23, 2018. A total of 10 test holes were completed during the site investigation, including 2 deep mud rotary bore holes and 8 shallow solid stem auger holes. The test hole locations are shown on Figure 2 Test Hole Location Plan attached in Appendix A.

All test holes were completed using a subcontracted truck mounted drill rig supplied and operated by Sea-To-Sky Drilling Ltd. of Burnaby. The mud rotary bore holes were designated as BH18-01 to BH18-02, and solid stem auger holes were designated as AH18-01 to AH18-10.

Two deep mud rotary bore holes were drilled within the proposed abutment footprints as shown on Figure 2. BH18-01 (east abutment) and BH18-02 (west abutment) were drilled to depths of 30.33m (99.5 ft.) and 29.26m (96 ft.), respectively. Standard Penetration Tests (SPTs) were conducted at regular intervals of 1.5m (5 ft.) within the mud rotary bore holes. Where obstacles (cobbles or boulders) were encountered, a Tricone drill bit was used to drill through making it necessary to skip SPTs at some depths. Once the target depths were achieved, the bore holes were terminated and backfilled using bentonite chips and sand in accordance with the *Groundwater Protection Regulation* of British Columbia.

As the Hwy #3 repaying work around the existing Snass Creek Bridge was completed a few days previous to the to the drilling, all eight (8) shallow solid stem auger holes were drilled on the paved shoulder close to the fog line to minimize disturbance. The auger holes were generally drilled to auger refusal between depths of 1.07m (3.5 ft.) and 3.66m (12 ft.). The auger holes were backfilled using the drilling spoils with cold asphalt patch at the road surface.

A summary of the completed test holes is presented in Table 1 below.

Testhole	Location Zone	•	Test Hole	Exploration Method	Location Comments
	Northing	Easting	Depth (m)	Wethou	
BH18-01	5454751	641343	30.33	Mud Rotary	Proposed East Abutment
BH18-02	5454752	641323	29.26	Mud Rotary	Proposed West Abutment
AH18-01	5454565	641158	1.98	Solid Stem Auger	
AH18-02	5454627	641183	3.05	Solid Stem Auger	
AH18-03	5454686	641209	3.05	Solid Stem Auger	
AH18-04	5454730	641251	1.07	Solid Stem Auger	
AH18-05	5454731	641411	1.37	Solid Stem Auger	
AH18-06	5454685	641458	2.29	Solid Stem Auger	
AH18-07	5454630	641477	3.66	Solid Stem Auger	
AH18-08	5454564	641486	2.74	Solid Stem Auger	

Table 1: Summary of Geotechnical Site Investigation

Due to the nature of the Mud Rotary drilling (using mud), the depth of the Groundwater table couldn't be located in the Mud Rotary bore holes. All the solid stem auger holes were terminated between depths of between 1.07m and 3.66m, and no groundwater was encountered in the auger holes.

^{*} Please note, the UTM coordinates are approximate and derived from Google Earth 2018.

3.2 IN-SITU TESTING

Standard Penetration Tests (SPTs) were conducted in BH18-01 and BH18-02 to evaluate the insitu density of the subsoils as well as the soil consistency. The testing was undertaken in accordance with ASTM D1586 using an automatic trip hammer with a nominal mass of 63.5 kg (140 lb.) and a drop height of 762 mm (30 in.). The SPTs were driven to a terminus depth of 600 mm (24 in.) or effective refusal, whichever occurred first. SPT blow counts were recorded in 150 mm (6 in.) increments and are presented in the test hole logs.

Please note that the SPT N-values presented on the bore hole logs (BH18-01 and BH18-02 in Appendix B) are the field-measured values, and have not been corrected for hammer energy, overburden stress, hole diameter, sampler dimensions, or rod length.

3.3 LABORATARY TESTING

Representative soil samples recovered from the test holes, including samples from the SPT split spoon sampler (BH18-01 and BH18-02) and grab samples from auger flights of the solid stem auger holes were transported to the Ministry's Coquitlam office for review and visual classification. Selected soil samples were sent to Golder Associates Ltd. Burnaby Lab for routine index tests. A total of eight (8) moisture content determinations (ASTM D2216), four (4) grand size analyses (ASTM D7928), four (4) Sulphate Content determination (CSA A23.2-3B) and four (4) Chloride Content determination (ASTM C1218) were completed. The results of the laboratory tests are presented on the test hole logs in Appendix B and provided separately in Appendix C.

4.0 Closure

We trust this report meet your current requirements. If you have any question or comment, please contact the undersigned.

Prepared by:

Reviewed by:

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Enclosures: Appendix A – Figures

Appendix B – Test Hole Logs

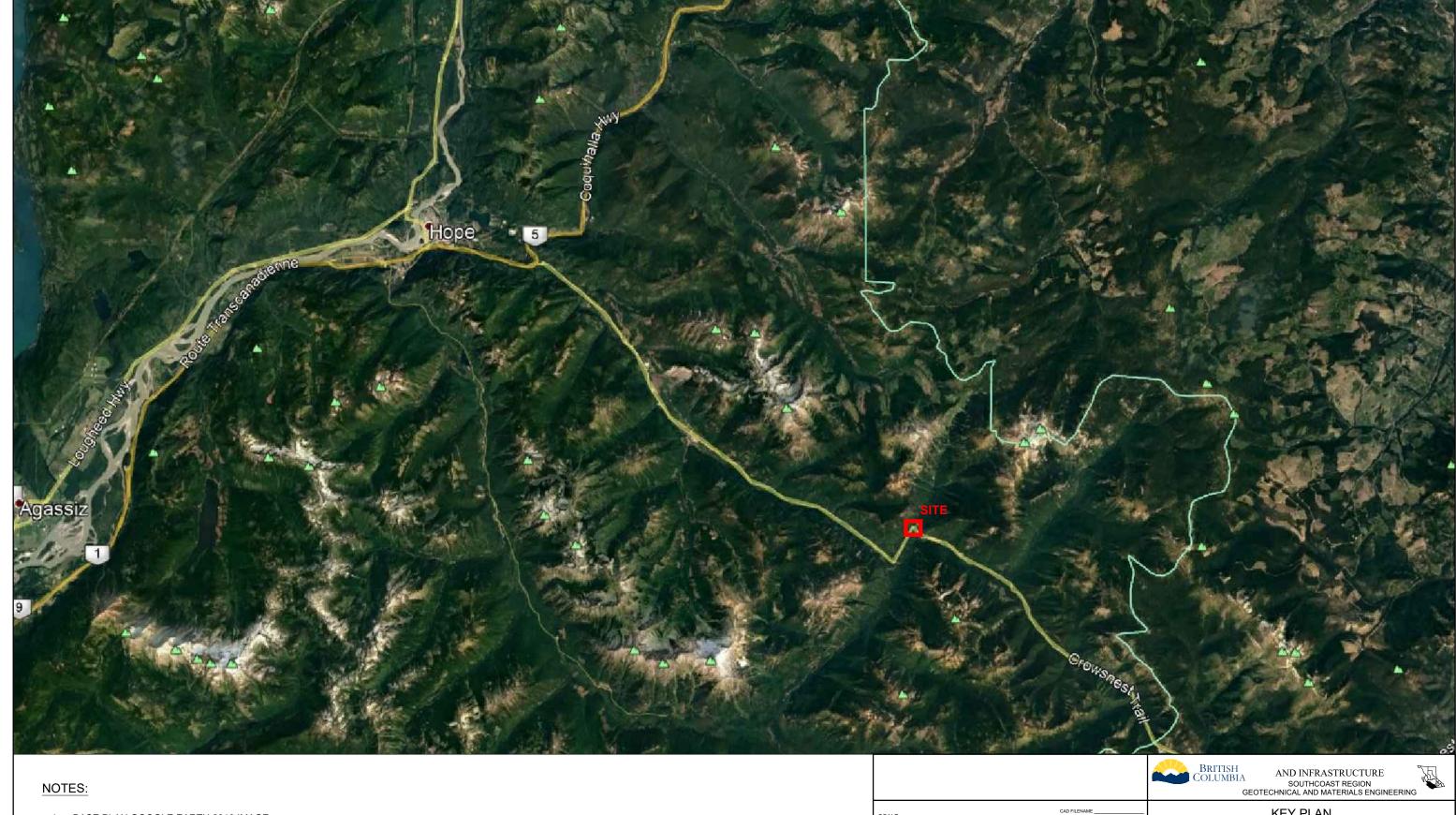
Appendix C - Laboratory Testing Results

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Figure 1 Key Plan
Figure 2 Test Hole Location Plan



1. BASE PLAN GOOGLE EARTH 2018 IMAGE.

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					FILE NUMBER	PROJECT NUMBER	F	REG	DRAWING NUMBER	REV
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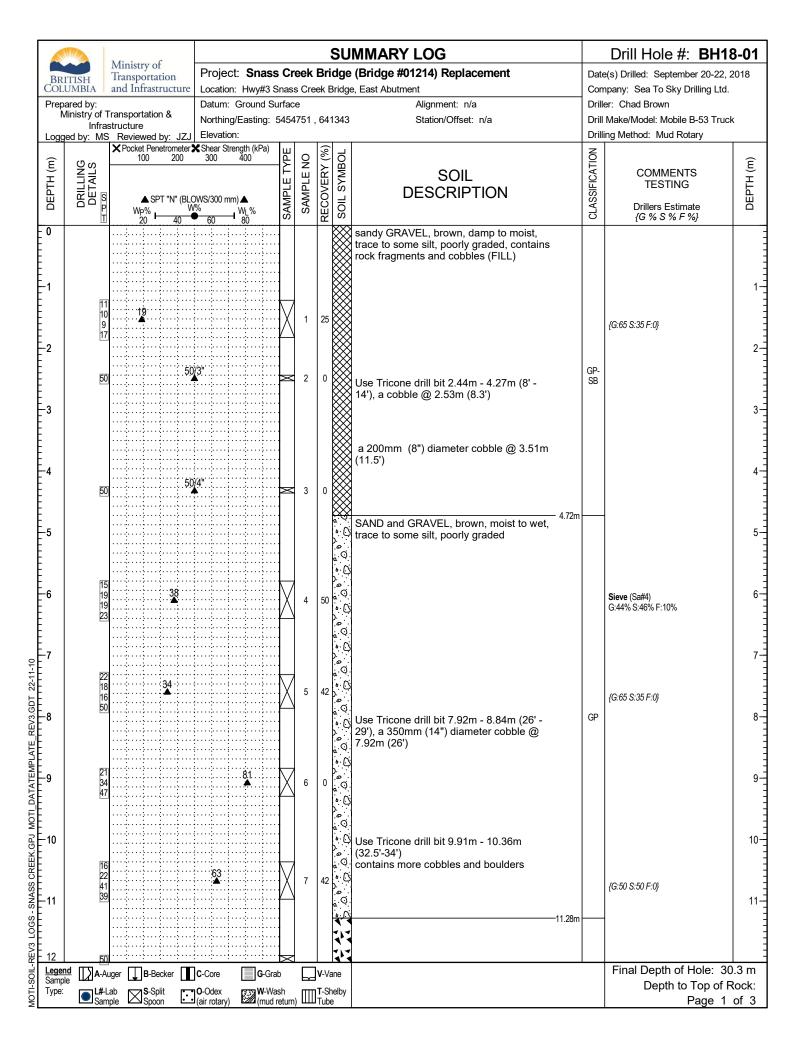


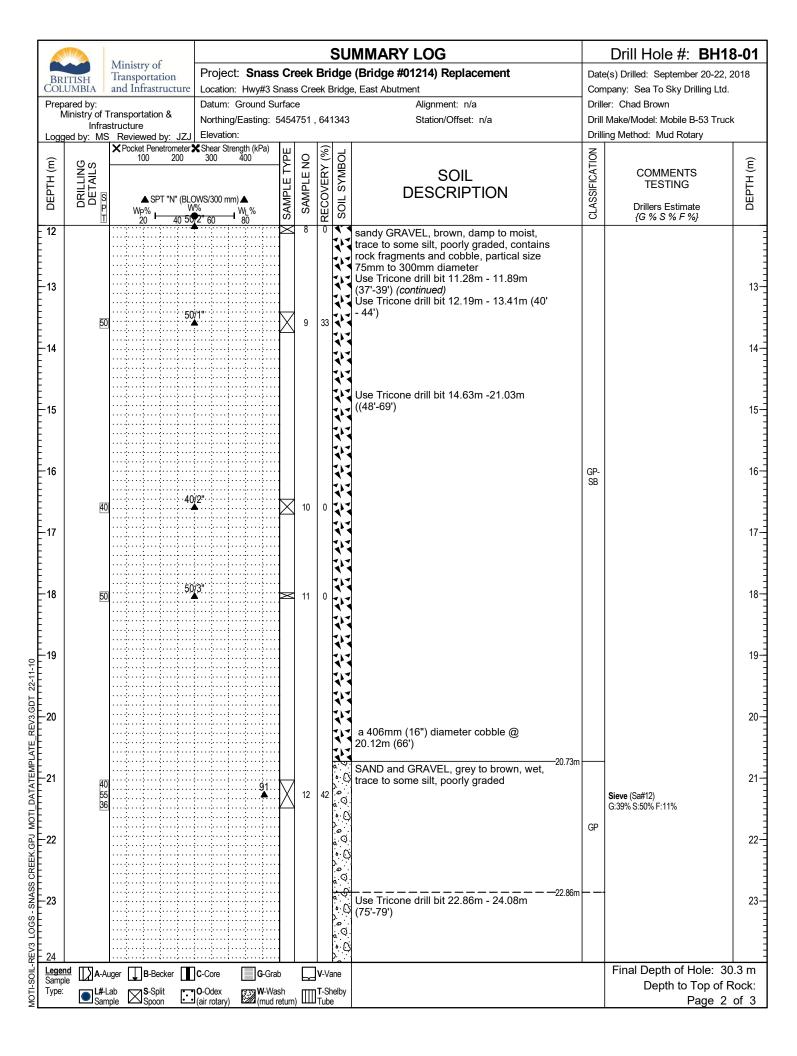
Appendix B

Soil Classification Table
Test Hole Logs

SOIL CLASSIFICATION

Majo	r Divisions	Symbol	Soil Type
	d siis	GW	Well-graded gravels or gravel-sand mixtures, little or no fines
siis	Gravel and Gravelly Soils	GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines
og p	irave	GM*	Silty gravels, gravel-sand-silt mixtures
Coarse Grained Soils	Gris	GC*	Clayey gravels, gravel-sand-clay mixtures
Gre	-5 ≅	SW*	Well-graded sands or gravelly sands, little to no fines
arse	l and / Soi	SP	Poorly-graded sands or gravelly sands, little or no fines
ő	Sand and Sandy Soils	SM*	Silty sands, sand-silt mixtures
	o, ii	SC*	Clayey sands, sand-clay mixtures
s	nd -<50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity
Fine Grained Soils	Silts and Clays LL<50	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
ine	_	OL	Organic silts and organic silt-clays of low palsticity
le Gra	Silts and Clays LL>50	МН	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
늍	ilts a	СН	Inorganic clays of high plasticity, fat clays
	S	ОН	Organic clays of medium to high plasticity, organic silts
Org	anic Soils	Pt	Peat and other highly organic soils
1	Γopsoil	TS	Topsoil with roots, etc.
С	obbles	SB	Rock fragments and cobbles, particle size 75mm to 300mm diameter
В	oulders	LB	Boulders, particle size over 300mm in diameter
	*GP-GM ; 0	SP-GC; SP-SM	; SP-SC; 6-12% Passing #200 (0.075mm) Sieve
	* GM1; G0	C1; SM1; SC	1; 12-20% Passing #200 (0.075mm) Sieve
	* GM2; G0	C2; SM2; SC	2; 20-30% Passing #200 (0.075mm) Sieve
	* GM3; G0	C3; SM3; SC	3; 30-40% Passing #200 (0.075mm) Sieve
	* GM4; G0	C4; SM4; SC	4; 40-50% Passing #200 (0.075mm) Sieve





												SU	MMARY LOG		Drill Hole #: BH18	 8-01
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	oared by: Ministry of T			<u> </u>				una S sting:			. 64 ⁻	1343	Alignment: n/a Station/Offset: n/a		ler: Chad Brown I Make/Model: Mobile B-53 Trucl	k
Log	Infras ged by: MS	structi Rev		: JZJ		vatio	-	9.			,				ling Method: Mud Rotary	
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ATATEMPLATE_REV3.GDT 22-11-10	577			114						14	0		Target depth achieved. Test hole terminated at 30.33m	GP	1) Coordinates were approximated based on the field measurements and Google Earth. 2) Groundwater conditions could not be observed during mud rotary drilling. 3) The testhole was advanced using an open faced bit, but switched to a tricone drill bit when suspected cobbles or boulders were encountered at depths 2.4m to 4.3m, 7.9m to 8.8m, 9.9m to 10.4m, 11.3m to 11.9m, 12.2m to 13.4m, 14.6m to 21.0m, 22.9m to 24.1m.	25- 26- 27- 28- 29- 30- 31- 32- 33-
MOTI-SOIL-REV3 LOGS - SNASS CREEK GPU MOTI_DATATEMPLATE_REV3.GDT 22-11-10 MOTI-SOIL-REV3 LOGS - SNASS CREEK GPU MOTI_DATATEMPLATE_REV3.GDT 22-11-10 A STATE OF THE PROPERTY															Drill hole was backfilled in accordance with Groundwater Protection Regulation.	34- 35-
Lege		uger	B -Becke	er T	C-Cor	re		G -Gra	ab		V -Va	ane			Final Depth of Hole: 30	
Samp	JIC		S-Split Spoon	٠.٠	10 -Od	ex	3	W -Wa (mud	ash	, IIII	_]T -Sh	nelby			Depth to Top of F	
Σ	ے Sam	pie Z	opoon <u>د</u>	ئت	(air ro	лагу)	-2//	⊿ (mud	returr) ши	ı ube	t			Page 3	<u> </u>

Ministry of Transportation & Francisco Check Bridge (Bridge #01214) Replacement Description and distributions and distr	MILE	11/1/2	M: .	C						SU	MMARY LOG		Drill Hole #: BH18	<u>8-0</u>
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moist, trace to some silt, poorly graded, contains rock fragments and cobbles (FILL) a 250mm (10*) diameter cobble @ 2.59m (8.5) a 250mm (10*) diameter cobble @ 2.59m (8.5) a 250mm (10*) diameter cobble @ 2.59m (8.5) a 3 3 6 (8.5) a 3 4 4 (8.5) a 3 5 (8.5) a 3 6 (8.5) a 3 7 (8.5) a 3 7 (8.5) a 3 8 (8.5) a 3 8 (8.5) a 4 9 (8.5) a 4 9 (8.5) a 5 9 (8.5) a 6 9 (8.5) a 7 9 (8.5) a 7 9 (8.5) a 7 9 (8.5) a 8 (8.5) a 7 9 (8.5) a 8 (8.5) a 9 (8.5) a 9 (8.5) a 10 (1				00		:		╫	\otimes	sandy GRAVEL, grey to brown, damp to	1	(control of	
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r repa	linistry of ⁻		ation &		n: Groun ng/Eastir				64133	23	Alignment: n/a Station/Offset: n/a		er: Cnad Brown Make/Model: Mobile B-53 Tru	ck
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				<u>.</u>	. !				1	13	poorly graded, contain cobbles			
19									२	1				
										13				
	26 25 31			56:			\square	,.		13				
20	31 21			<u> </u>			M	11	42				{G:60 S:40 F:0}	
	<u> </u>													
21				<u>:</u>	. . 	; ;								
				· · · · · · · · · · · · · · · · · · ·										
-22											Use Tricone drill bit 21.79m - 22.56m			
										17	(71.5'-74') , rock fragments and cobbles			
	31					1	\$ /			1				
23	48 67					.>>4	\triangle	12	8	1			{G:70 S:30 F:0}	
										1				
						} · · · · ·			२	1				
24				<u> </u>		};			1		Use Tricone drill bit 23.62m - 25.60m (77.5'-84')	GP		
Legen Sample	d DA-A	uger J E	B-Becker	C -Core		3 -Grab)		V -Vane	9			Final Depth of Hole: 2	
Type:	L#-I San	Lab 🔀	Spoon Spoon	O-Odex (air rotan	y) (r	V -Was	sh 、	m	T -Shelb Tube	by			Depth to Top of Page 2	

											SII	IMMARY LOG		Drill Hole #: BH1 8	 გ_∩ว
Dr	TELEVI		istry of sportatio	on	Proje	ect: S	nass	Cr	eek			e (Bridge #01214) Replacement	Date	e(s) Drilled: September 22 -23,	
	ITISH UMBIA	and .	Infrastru	cture	Locati	ion: Hw	y#3 S	Snas	s Cre		_	ie, West Abutment	1	npany: Sea To Sky Drilling Ltd.	-
Prep	oared by: Ministry of 1	ransr	ortation 8	 &		n: Grou						Alignment: n/a		er: Chad Brown	
	Infra	structi	ure			ing/East	ing:	5454	1752	, 64	1323	Station/Offset: n/a		Make/Model: Mobile B-53 Trucking Method: Mud Rotary	K
Logo	ged by: MS	X Po	cket Penetr	ometer	X Shear ∶	Strength (kPa)	Ш		ि	7		1	Ing Method. Midd Notary	
Œ	ည္ခ်လ		100	200	300	400		TYPE	SAMPLE NO	RECOVERY (%)	SYMBOL	00"	CLASSIFICATION	COMMENTS	Œ
DEРТН (m)	DRILLING DETAILS							<u>Н</u>	PE	Æ	SYN	SOIL	FIC/	TESTING	DEРТН (m)
1 8	R B B		▲ SPT '	'N" (BLC	OWS/300			SAMPLE	AM	18	SOIL	DESCRIPTION	ASS	Drillers Estimate	
			W _P % ⊢	40	60	→ WL%)	SA	S	RE	SC		C C	{G % S % F %}	
- 24							· · · · · · · · · · · · · · · · · · ·	1				sandy GRAVEL, brown, trace to some silt, poorly graded, contain cobbles			
E			. . 				. ,				*	(continued)			-
F			. . 		<u>.</u>		. .				4				
-25			. . 		<u>:</u>	·	. 				1				25-
Ē			. .		<u> </u>		. .	1							
Ė	28				ļ <u>.</u>	72		\vdash			1	Turn to grey and brown			
E -26	28 36 36					. 🛋		X	13	33	1	ram to groy and brown		{G:65 S:35 F:0}	26-
Ę ¯								Г			1				-
Ė			· · · · · · · · · · · · · · · · · · ·		· · · · · · ·		· · · · · · · · · · · · · · · · · · ·	1			1	4			
Ė								1			1				
-27			· · · · . · · · · . · ·		·····		· · ; · · ·	1			1				27
Ė			· · · · · · · · · · · · · · · · · · ·	· · · · · · · · ·			· · <u>;</u> · · ·				1				
E							.				1				
F -28					<u> </u>		. ,								28-
F			. . 			· [· · · ·] · ·	. ,								
F			. .				.	L			2)				:
Ē.,	27 28 34				62			\mathbb{N}	14	١]
F-29	34 44							\backslash	14	25		20 20		{G:70 S:30 F:0}	29-
Ē	"							П				Target depth achieved. Test hole			
Ē]				terminated at 29.26m			
-30			· · · · · · · · · · · · · · · · · · ·	• • • • • • • • • • • • • • • • • • • •			· · · · · · · · · · · · · · · · · · ·	1						Coordinates were approximated	30-
Ē								1						based on the field measurements	
Ė					<u> </u>			1						and Google Earth. 2) Groundwater conditions could	
_=31			· · · · · · · · · · · · · · · · · · ·		·····	· ! · · · · · · · · · · · · · · · · · ·	· ·] · · ·	1						not be observed during mud rotary drilling.	31-
5F							· · <u>}</u> · · ·	1						The testhole was advanced using an open faced bit, but	":
22-1							· · ; · · ·	1						switched to a tricone drill bit when suspected cobbles or	
GDT				;			. ,							boulders were encountered at	
E −32			. 		<u>.</u>	·	; ;							depths 5.3m to 5.8m, 7.6m to 8.8m, 14.8m to 16.5m, 17.2m	32-
쁜			. .	· . ; · · ·	:		. .							to 19.5m, 21.8m to 22.6m, 23.6m to 25.6m.	
PLA T				;			;							Drill hole was backfilled in accordance with Groundwater	
■ [-33			. <u></u>		<u>.</u>		. .							Protection Regulation.	33-
ATA E							.	1							
ĘF								1							
ĭ ĭ								}							
급 - 34								1							34-
					<u>.</u>			1							:
SSC							· · ! · · ·	1							
-35			· · · · · · · · · · · · · · · · · · ·		····		· · <u>}</u> · · ·	1							35-
GS-															
카			. .		<u></u>		. ,								
∑ F - 36		<u>:</u> .	. .	· . · · ·	<u>:</u>	. <u></u> .	. .	_		L]
Lege Samp	nd Da-A	iger [B -Beck	er 🔲	C -Core		G -Gra	ıb		v -v	/ane			Final Depth of Hole: 29	
MOTI-SOIL-REV3 LOGS - SNASS CREEK.GPJ MOTI_DATATEMPLATE_REV3.GDT_22-11-10 ALM SOID ALM SOID B. S.		ab F	S-Split Spoon	·	0 -Odex (air rotar		W-Wa (mud	sh	<u>,</u> Ш	T-S	Shelby			Depth to Top of F Page 3	
≥	Sam د	pie Z	⊸ oµoon	٠-٠	⊸(a⊪ rotaľ	y) =2//	(mud	elurr	, ши	∍ ru©	Æ	1		raye 3	υι ગ

															SU	IMMARY LOG		Drill Hole #: AH18	B-01
	BRIT	TSH	Tra	nistr nspo	rtatio	n		roje	ct:	Sna	ass	Cr	eek			e (Bridge #01214) Replacement	Dat	e(s) Drilled: September 21, 2018	
	COLU	MBIA	and	Inf	rastru	cture				_		nas	s Cre	eek E	Bridg	e, West Side	-	npany: Sea To Sky Drilling Ltd.	
	Prepar Mir	ed by: nistry of T	rans	sport	ation 8	k				round		- 1 - 1	EGE	64	1150	Alignment: n/a Station/Offset: n/a		er: Chad Brown	
		Infras d by: MS	struc	cture				evati		asun	ıg. t	0404	500	, 04	1158	Station/Offset. 11/a		Make/Model: Mobile B-53 Truck ing Method: Solid Stem Auger	
Г			XP		Penetro		X She		treng	th (kP	Pa)	Ä	_	18	7				
	DEPTH (m)	NG LS		IC	0	200	30	00	- 4	00		TYPE	N =	}	SYMBOL	SOIL	ATIC	COMMENTS	DЕРТН (m)
	Ӗ											J/E	IPLI	M	S	DESCRIPTION	SIFIC	TESTING	H
	핌	DRILLING DETAILS		Wp	SPT "	N" (BLO V	OWS/: /%	300 r		▲ /∟%		SAMPLE	SAMPLE NO	RECOVERY (%)	SOIL	DEGOINI HOIV	CLASSIFICATION	Drillers Estimate	B
-	0			. 2		40	. 6	0	8	30		S		<u> </u>	o	Assist O	0	{G % S % F %}	
t	١ ،						<u>:</u> :	: :	 	<u>:</u> 	: :	L				Asphalt 8" 0.2m			-
ŀ							<u>.</u>	: :		<u>.</u>	: :	\prod	1		\bowtie	SAND and GRAVEL, damp, brown, trace silt, 25mm minus (FILL)	GP	{G:50 S:50 F:0}	
t							<u>.</u>	: :	 ! !	<u>.</u>	: : :				\bowtie	SAND and GRAVEL, damp, brown, trace	<u> </u>		
ŀ				: :			: 	: :	: 	: :	: ;				\bowtie	to some silt, 38mm minus (FILL)	0.0		
ţ				: :			<u>.</u>	: : :		<u>:</u>	: :	$\frac{1}{1}$			\bowtie		GP		
ŀ				: :			: :	: :	: : · · · ·	<u>:</u>	: : :	И	2		\bowtie	SAND and GRAVEL, damp, redish brown,	<u> </u>	{G:55 S:45 F:0}	٠.
þ	-1		ļ				: :	: :	<u>.</u>	<u>:</u> :	 !				\bigotimes	trace tio some silt, 75mm minus (FILL)			1-
-			ļ	:			<u>:</u>	<u>:</u>	<u>.</u>	<u>:</u> :	: : :	15	2		\bigotimes				-
F			ļ				<u>.</u>	<u>:</u>		<u>:</u> :		И	3		\bigotimes		GP	{G:55 S:40 F:5}	
ŀ							 !	<u>.</u>		<u>.</u>	 :	ł			\bowtie		GP		-
F															\bowtie				
t															\bowtie				
-	-2						 :	 :		<u>.</u>		1			\bowtie	Auger Refusal. Test hole terminated at		1) Coordinates were approximated	2-
t																1.98m.		based on the field measurements and Google Earth.	
ŀ																		Auger hole was drilled at the center of the paved east bound	-
ţ						. :	<u>:</u>	<u>:</u> :	 :	<u>:</u>								shoulder.	-
ŀ				: :		· ! · · ·	: :	: :	: :	<u>:</u>	: :								-
ļ							 :	: :		<u>.</u>	 :								
ŀ				 :			 :	: :	 :	 :	; :	1							
F	-3			 :			 :	: :		 :	 :								3-
ŀ							 :	: :		 :									-
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9							 :	 :		 :		1							
22-11																			
Ĭ					···÷							1							
=V3.G	-4				····							1							4-
in in				:: :	····	;						1							
PLAT				:	:	· · ; · · · ·	: :	 :		 :	; · · · · :								-
TEM					:							1							
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Σ-	-5				:		:			 :		1							5-
EK.G																			Ŭ .
CREI			[
IASS			[-
NS-S																			
-068			[
=73 [_																		
MOTI-SOIL-REV3 LOGS - SNASS CREEK.GPJ MOTI_DATATEMPLATE_REV3.GDT 22-11-10	6 Legend	A -A	Ider	<u></u>	B-Becke	er	c -co	ore	Г	G	-Gral	L b] v -v:	ane		1	Final Depth of Hole: 2	.0 m
TI-SC	Sample Type:						-		L	_				_				Depth to Top of R	lock:
Θ	, r · ·	L#-L Sam	ple	M	S -Split Spoon	<u></u>	0 -O (air r	rotary	_{')}	V (r	nud r	eturn) Ш	J _{Tub}	е			Page 1	of 1

															SU	MMARY LOG		Drill Hole #: AH18-	-02
	BRITI	SH	Tra	nistr nspo	rtation	1	Pr	oje	ct:	Sna	ss (Cre	eek			e (Bridge #01214) Replacement	Date	e(s) Drilled: September 21, 2018	
(COLUM	/IBIA	and	Infi	rastruct	ture								ek E	Bridge	e, West Side	4	npany: Sea To Sky Drilling Ltd.	
	Prepare Mini	ed by: istry of T	rans	porta	ation &					ound				644	1100	Alignment: n/a Station/Offset: n/a		er: Chad Brown Make/Model: Mobile B-53 Truck	
Ι,		Infras by: MS	struc	ture				vatio		sting	. 54	1041	021	, 04	1103	Station/Offset. 11/a		ing Method: Solid Stem Auger	
			ΧP		Penetron			ar St) [ц	$\overline{}$	(%	۲		†		
	DEPTH (m)	NG ILS		10	0 2	200	30	0	40	0	-	I YPE	N) }	SYMBOL	SOIL	ATIC	COMMENTS	DЕРТН (m)
	든 :											빌	1PL	VE.		DESCRIPTION	SFIC	TESTING	PTH
Į į		DRILLING DETAILS		Wp	SPT "N %	BLC) "I)WS/3 %	300 m	m) ▲ Wլ			SAMPLE	SAMPLE NO	RECOVERY (%)	SOIL	BECOM HOW	CLASSIFICATION	Drillers Estimate	
L,	0			20		40	60)	8			S)		<u> </u>	_O	Applied O	0	{G % S % F %}	
ŧ`	,										[Asphalt 8" 0.2m			
ŀ												Σ	1		\bowtie	SAND and GRAVEL, damp, brown, trace silt, 25mm minus (FILL)	GP	{G:55 S:45 F:0}	
t															\bowtie	sin, 25mm minus (FIEE) ——————————————————————————————————	<u> </u>		
F				;								$\overline{\zeta}$			\bowtie	trace to some silt, contains cobbles (FILL)			•
t				;		.,				;		Ц	2		\bowtie	, , ,		{G:60 S:35 F:5}	
ŀ															\bowtie				
<u> </u>	1			;		. .									\bowtie				1-
ŀ															\bowtie				
ļ															\bigotimes				
F				.											\bowtie				
F															\bowtie		0.0		
F															\bowtie		GP		•
[- ₂	2			}		÷									\bowtie				2-
Ŀ						÷;									\bowtie				
F															\bowtie				
Ł												5	•		\bowtie				•
F												И	3		\bowtie			{G:60 S:35 F:5}	
Ł															\bowtie				
F															\bowtie				
- [-3	3					÷									\bowtie	Target depth achieved. Test hole 3.05m		1) Coordinates were approximated	3-
ŀ				}												terminated at 3.05 m		based on the field measurements and Google Earth.	
ļ								• • • • •		• • • • • • • • • • • • • • • • • • • •								Auger hole was drilled at the center of the paved east bound	,
_																		shoulder.	
1-1-1																			
T 22																			
33.6	4																		4-
FF-				;				• • • • •											
LATE						.; <u>;</u>				· · · · ;									
EMP						· · · · · · ·		• • • • •											-
4TAT																			
<u>M</u> -																			
GPJ-	5																		5-
					;														
SSC				;						• • • • • • • • • • • • • • • • • • • •									
SNA						·}····		• • • • •		• • • • • • •									
- gg-				}		·}····		• • • • •		• • • • • •									
3 LC																			
<u> </u>				····;		· <u>; · · · ·</u>				<u>-</u>			_	<u>L</u>				Fig.1D (1.11) 2.2	
8	<u>-egend</u> Sample	A -Au			B -Becker				_	G-(V -Va				Final Depth of Hole: 3.0 Depth to Top of Ro	
TOM_	Гуре:	L#-L Sam	ab ple		3 -Split Spoon	$\overline{\cdot \cdot}$	0 -Od (air re	lex otary)	8	₩ -' (mı	Wash ud ret	urn)		T-Sh Tube	elby			Page 1 of	

													S	U	MMARY LOG		Drill Hole #: AH18	8-03
R	RITISH	Tra	nistry inspo	rtation		Pro	ojec	et: \$	Snas	s C	rec	k E			(Bridge #01214) Replacement	Dat	e(s) Drilled: September 21, 201	
Co	DLUMBIA	and	d Infr	rastruct	ure							Cree	k Bri	dge	e, West Side	-	npany: Sea To Sky Drilling Ltd.	
Pre	epared by: Ministry of	Tran	sporta	ation &					ound S sting:			6	6440	00	Alignment: n/a Station/Offset: n/a		er: Chad Brown Make/Model: Mobile B-53 Truck	٠.
1,0	Infra gged by: M	astru	cture			Elev		-	sung.	540	400	ο, ι	0412	.09	Station/Offset. 11/a		ing Method: Solid Stem Auger	Λ.
		X		Penetrom			ar Str			Įμ	Τ,	\Box	ŵ,	٦				
DEPTH (m)	NG NG		10	0 20	JU	300)	40	J	-\F	}	ź) 	SYMBOL	SOIL	ATIC	COMMENTS	DEРТН (m)
IΗ										느	ן ב	[DESCRIPTION	SIFIC	TESTING	l H
	DRILLING DETAILS	5	Wp	SPT "N"	(BLO) W%		00 mr	m) ▲ _WL		SAMPI F	5	SAINIPLE NO	RECOVERY (%)	SOIL	DECORA TION	CLASSIFICATION	Drillers Estimate	le le
0		<u> </u>	20		0	60		80		100	+	\dashv	<u>~</u> 0	(I)	Asphalt 9"	0	{G % S % F %}	_
ţ															•			
-		4.3	<u>.</u>							$-\square$	Σ	1	8	\otimes	SAND and GRAVEL, damp, brown, trace 0.23m	SP	Sieve (Sa#1)	
ţ			<u>.</u> ;			· :				╌┟╴	5			$\stackrel{\otimes}{\rtimes}$	silt (FILL) silty SAND and GRAVEL, damp, brown	l	G:39% S:52% F:9%	
ŀ		1	0.9		: } {					ك	4	2	×	\otimes	(FILL)		{G:60 S:35 F:5}	
ļ			<u>.</u>		. .								8	\boxtimes				
+,			<u>.</u>		: : · · · :			···:					Š	\boxtimes				١,
F ¹			<u> </u>		· · · · · · ·	:							×	\otimes		Ch4		1-
+			: :	: : :	: :	· · · :	:	<u>:</u>						\otimes		SM- GP		
F				:	:	· · · :		· · · :		╌╁╴	5	3	×	\otimes				
ţ			18		<u>i</u> .	·:					4	,	×	\otimes			Sieve (Sa#3) G:36% S:26% F:38%	
-			<u>.</u>		<u>.</u> .		• • • • •		;				8	\otimes			0.00% 0.20% 1.00%	
ţ						· · ·							X	$\stackrel{\times}{\otimes}$	SAND and GRAVEL, damp, brown, trace			
-2			<u> </u>			••••	• • • • •	•••					\aleph	\otimes	to some silt, contain cobble (FILL)			2-
ļ			<u> </u>		· · · · · ·		••••						×	\boxtimes				
+						••••	••••	•••					8	\otimes				
ļ			•			••••		•••			s .	4	\aleph	\otimes		SP		
-			15.8.			· · · :	••••	· · · :			4		×	\boxtimes			{G:50 S:50 F:0}	
F			÷;		: :	• • • • • • • • • • • • • • • • • • • •	• • • • •	•••	;	•			8	\otimes				
-3			; :	()	; ; . :	····:	••••	····:	;	··			\Diamond	\otimes				3-
+ *			·····		} · · · · {· :	••••	!	••••	;				ř	× x	Target depth achieved. Test hole		Coordinates were approximated based on the field measurements	
ļ		1	÷····		} · · · · {·	••••	!	••••		''					terminated at 3.05 m		and Google Earth.	
ŀ			: :	: :	· · · · · · · ·	••••	!	••••									Auger hole was drilled at the center of the paved east bound	
1-1								••••	:								shoulder.	
22-1				:		:											Auger hole was drilled at inner side of the east bound fogline.	
GDT																		
£ −4																		4-
바																		
- FE																		
ATEN																		
DAT																		
트 -							:											
로 - 로 - 5		l			<u> </u>													5-
EK.							;		;									
S CRE		ļ	<u>.</u> ;			;	;		;									
NASS		ļ	<u>.</u> ,		; ;;	;	;		;									
S-S		ļ	<u>.</u> ,		; ; ;				;									
9		ļ	<u>.</u>															
EX3 6		ļ			: :													
Fee	gend DA-	Auger		3-Becker		C-Cor	e .	Ī		rab		<u> </u>	/ -Vane	Э			Final Depth of Hole: 3	
MOTI-SOIL-REV3 LOGS - SNASS CREEK.GPJ MOTI DATATEMPLATE_REV3.GDT 22-11-10 ゴ 窓 原	Tipic				ا د. م ا(0 -Ode	ex	-	 W -V (mu								Depth to Top of R	
ž	Sar	mple	کلاے	poon)ئت	air ro	τary)	22	mu) فس	ı retu	n) L	إلس	upe				Page 1	UI T

ſ							- ;	SU	IMMARY LOG		Drill Hole #: AH18	3-04
	BRI	TISH	Ministry of Transportation	1			Bri	dge	e (Bridge #01214) Replacement	Date	e(s) Drilled: September 21, 201	
	COL	UMBIA	and Infrastructure	,			ek E	Bridg		-	npany: Sea To Sky Drilling Ltd.	
	Prepa M	ared by: ⁄linistry of T	ransportation &	Datum: Ground S Northing/Easting:			641	1251	Alignment: n/a Station/Offset: n/a		er: Chad Brown Make/Model: Mobile B-53 Truck	(
	Logg		structure Reviewed by: JZJ				, 01		Ctation of the Ctatio		ing Method: Solid Stem Auger	•
	DEPTH (m)	DRILLING DETAILS H→ 5 Ø	Pocket Penetrometer 100 200	Shear Strength (kPa) 300 400 DWS/300 mm) WL % 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING Drillers Estimate {G % S % F %}	DEPTH (m)
ļ	0				$\overline{\mathbf{L}}$	1		\otimes	Asphalt 5" / 0.05m	1 80	(0.40 0.60 5.0)	
MOTI-SOIL-REV3 LOGS - SNASS CREEK.GPJ MOTI_DATATEMPLATE_REV3.GDT 22-11-10	_ 0					2			gravelly SAND to SAND and GRAVEL, idamp, brown, trace silt, 25mm minus (FILL) Very boney drilling, contains rock fragments and cobbles Auger Refusal. Test hole terminated at 1.07m.	GP- SB	(G:40 S:60 F:0) 1) Coordinates were approximated based on the field measurements and Google Earth. 2) Auger hole was drilled at the paved road shouder, about 0.3m outside the east bound fogline.	2-
(.GPJ	-5 -											5-
REEK	-				-							
SS CF	-				.							
-SNA	-				1							
SSO	-				1							
=V3 L	-											
Ĭ-RE	6 Legen	nd A-Au	uger B-Becker	C-Core G-Gra	ab	┰	V -Va	L ane			Final Depth of Hole: 1	.1 m
TI-SC	Sampl Type:	е шал					_				Depth to Top of R	Rock:
9		L#-L Sam	ab S-Split Spoon	O-Odex (air rotary) W-Wa (mud	returr) Ш	T-Sh Tube	9			Page 1	of 1

															SU	IMMARY LOG		Drill Hole #: AH18	 3-05
	BRI	TISH	Tra	nspo	y of ortatio	n		oje	ct:	Sn	ass	Cr	eek			e (Bridge #01214) Replacement	Date	e(s) Drilled: September 21, 201	
	COLU	JMBIA	and	Inf	rastruo	cture	_							ek E	3ridg	e, east side	-	npany: Sea To Sky Drilling Ltd.	
	Prepa M	ared by: linistry of T	Γrans	sport	ation 8	k				roun astin				. 64 ⁻	1411	Alignment: n/a Station/Offset: n/a		er: Chad Brown Make/Model: Mobile B-53 Truck	<
	Logge	Infras ed by: MS	Re	eviev	ved by:		Εle	evati	ion:					,				ing Method: Solid Stem Auger	
	DEPTH (m)	DRILLING DETAILS		10	SPT"	200 N" (BLC	30	00	mm) ⊿	00`	Pa)	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING Drillers Estimate	DEPTH (m)
	0	I		2		40	6	<u>0</u>		30	:	S		<u> </u>	Ø	Asphalt 6"	0	{G % S % F %}	
	-						: : :	: : : :		 		13	1		\bigotimes	SAND and GRAVEL, damp, brown, trace silt, 25mm minus (FILL)	GP	G:45 S:55 F:0}	-
	- - -						: : : : : :	: : : : : : :			; ; ; ; :					sandy GRAVEL, damp, brown, trace to some silt, contain rock fragments and cobbles (FILL)			-
	- - -1 -						· · · · · · · · · · · · · · · · · · ·					13	2		$\overset{\otimes}{\otimes}$		GP- SB		1-
	-							:		 		И	2		\bigotimes	1.37m		{G:70 S:30 F:0}	-
.10	- - - - - - - - - - - - - - - - - - -															Auger Refusal. Test hole terminated at 1.37m.		Coordinates were approximated based on the field measurements and Google Earth. Auger hole was drilled at the center of the paved east bound shoulder.	2—
MOTI-SOIL-REV3 LOGS - SNASS CREEK.GPJ MOTI_DATATEMPLATE_REV3.GDT 22-11-10																		Final Danth of Halas 4	5-
SOIL-I	<u>Legen</u> Sample	е шалуу		$\overline{\downarrow}$	B -Becke	-]c -Cd			_	Gral			V -Va				Final Depth of Hole: 1	
MOTI-:	Type:	L#-L Sam	ab ple	\boxtimes	S -Split Spoon	<u>::</u>	0 -0 (air r	dex rotary	_{/)}	V (r	V -Was	sh eturn) [[[T-St Tube	nelby e			Depth to Top of F Page 1	

ſ															SU	MMARY LOG		Drill Hole #: AH18	 3-06
	BRIT	TSH	Tra	nistry nspoi	rtation		Pr	oje	ct:	Sna	SS	Cr	eek			e (Bridge #01214) Replacement	Date	e(s) Drilled: September 21, 201	
	COLU	MBIA	and	Infra	astruct	ture				_				ek E	3ridg	e, east side		npany: Sea To Sky Drilling Ltd.	
	Prepar Mir	red by: nistry of T	rans	porta	tion &					ound 						Alignment: n/a		er: Chad Brown	
		Infras d by: MS	struc	ture		171	No		-	asting	j: 5	454	685	, 64	1458	Station/Offset: n/a		Make/Model: Mobile B-53 Trucking Method: Solid Stem Auger	· ·
ŀ	Logge	u by. IVIS		ocket F	Penetron	neter >	She	ar St	rengtl		a)	ш	_	<u>@</u>				Ing Wethod: Solid Steff Adger	
	Œ	ည်လ		100) 2	.00	30	0	40	00	-	TYPE	SAMPLE NO	RECOVERY (%)	SYMBOL		CLASSIFICATION	COMMENTS	Œ
	푸	III										Ш	片	le R	3₹	SOIL	FIC/	TESTING	Ŧ
	DEPTH (m)	DRILLING DETAILS			SPT "N	" (BLO W	WS/3	800 m				SAMPLE	¥	8	SOIL (DESCRIPTION	ASS	Drillers Estimate	DЕРТН (m)
				W _P %		40	60)	→ W _L	_% 0		S	o	R	Š		겁	{G % S % F %}	
ŀ	. 0		3.8		<u>.</u>	<u>.</u>]	L	1		\bowtie	Asphalt 6" 0.05m		{G:35 S:65 F:0}	-
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-	.		4.6 .						:		Ĭ	\mathcal{V}	2		\bowtie	` ´		{G:40 S:60 F:0}	
ŀ	-		л.u .								···				\bowtie	SAND and GRAVEL, damp, brown, trace		(0.10 0.00 1.0)	-
Ī			8.2					• • • • • • • • • • • • • • • • • • • •		;	···†	abla	3		\bowtie	to some silt, 25mm minus (FILL)	SP	{G:45 S:50 F:5}	-
ŀ	-		0.2				• • • • •	• • • • • • • • • • • • • • • • • • • •		• • • • • •	···†				\bowtie			(0.40 0.00 1 .0)	-
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ŀ	.		ļ	. .	· · · ! · · · ·			• • • • •								2.29m.		based on the field measurements and Google Earth.	
-																		Auger hole was drilled at the center of the paved east bound	-
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MOTI-SOIL-REV3 LOGS - SNASS CREEK.GPJ MOTI_DATATEMPLATE_REV3.GDT 22-11-10	6 Legend	ПЛ			D!	· · · · · :	• • • •	····:	····:	<u>;</u>	···· <u>·</u>			lv.	<u> </u>			Final Depth of Hole: 2	3 m
OS-I	Sample Type:	Ш///			-Becker				-	G-W				V -Va				Depth to Top of R	
MO	ı ype.	L#-L Sam	ple	$\boxtimes_{\mathbb{S}}^{\mathbf{S}}$	poon	\cdot	O -Od (air ro	otary)	Š	₩ (m	ud re	turn)	Ш	Tub	e e			Page 1	

												SU	MMARY LOG		Drill Hole #: AH18	B- 07
	BRI	TISH	Minist	ortation		Proje	ect: \$	Snass	s Cr	eek	Brid	dge	(Bridge #01214) Replacement	Date	e(s) Drilled: September 21, 201	8
	COLU	JMBIA	and In	frastructi							ek B	ridge	e, east side		npany: Sea To Sky Drilling Ltd.	
	Prepa M	ared by: inistry of T	ranspo	rtation &				ound So sting:			641	∆ 77	Alignment: n/a Station/Offset: n/a		er: Chad Brown Make/Model: Mobile B-53 Truck	
	Logae	Infras ed by: MS	structur Revie			Elevat		surig.	J - J-	+000	, 041	711	Station/Offset. Tha		ing Method: Solid Stem Auger	`
			X Pock	et Penetrom	neter 🗙	Shear 9	Strength 400	(kPa)	Щ	0	(%)	۲		S		
	DЕРТН (m)	DRILLING DETAILS		100 20		- 000	700	,	TYPE	SAMPLE NO	R 	SYMBOL	SOIL	ATI	COMMENTS	DЕРТН (m)
		SILL ETA							띪	Æ	%		DESCRIPTION	SIFIC	TESTING	Ė
	품		W	▲ SPT "N" /p%	(BLOV	VS/300	mm) ▲ — J WL 80	%	SAMPLE	SAI	RECOVERY (%)	SOIL	2233.11. 1.3.1	CLASSIFICATION	Drillers Estimate	
	0			20 4	0 :	60 :	80		100		2	0)	Asphalt 5"	0	{G % S % F %}	_
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					} <u>}</u> .				ł			\bowtie	sandy GRAVEL, damp, brown and grey, trace to some silt, 75mm minus (FILL)			
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1-10	[,	1			\bowtie	200			-
22-1													Auger Refusal. Test hole terminated at		Coordinates were approximated based on the field measurements	-
GDT													3.66m.		and Google Earth. 2) Auger hole was drilled at the	-
EV3.	<u> </u>			.,											inside of the east bound fogline.	4-
TE_R	-			.,												-
/PLA																-
ATEN																-
DAT,																-
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PJ N	_5															5-
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EV3	6				<u>.</u>											
MOTI-SOIL-REV3 LOGS - SNASS CREEK.GPJ MOTI_DATATEMPLATE_REV3.GDT 22-11-10	Legen		iger [B -Becker		-Core	Ī	G -Gra	ab	<u></u>	V -Va	ne		1	Final Depth of Hole: 3	
S-ITC	Sample Type:	, L#-L		S-Split Spoon) -Odex air rotar	-	W -Wa (mud			T-She Tube	- 1			Depth to Top of R	
Ĭ,		Sam	pie 🔼	≥ Spoon)كت	aır rotar	y) 🖾	∠ (mud	returr	ı) шШ	ıube	!			Page 1	UI I

Ministry of Transportation & Infrastructure Logated by: Ms Reviewed by: JZJ Project: Snass Creek Bridge (Bridge #01214) Replacement Date(s) Drilled: Sept Company: Sea To St Compan	e #: AH18	 3-08
Prepared by: Ministry of Transportation & Infrastructure Logged by: MS Reviewed by: JZJ Elevation: Application		8
Ministry of Transportation & Infrastructure Logged by: MS Reviewed by: JZJ September Morthing/Easting: 5454564 , 641486 Station/Offset: n/a		
Logged by: MS Reviewed by: JZJ Elevation: Drilling Method: Solid Solid		ζ.
COMMETESTI SAND and GRAVEL, damp, brown, trace Commetes Co	olid Stem Auger	
Asphalt 4" SAND and GRAVEL, damp, brown, trace silt, 25mm minus (FILL) sandy GRAVEL, damp, brown and grey, trace to some silt, 75mm minus (FILL) [GP] {G:55 S:45 F:0}	TING Estimate	DEPTH (m)
SAND and GRAVEL, damp, brown, trace silt, 25mm minus (FILL) sandy GRAVEL, damp, brown and grey, trace to some silt, 75mm minus (FILL) 2 (G:55 S:45 F:0) (G:55 S:45 F:0)	70. 70	-
Sandy GRAVEL damp, brown and grey, trace to some silt, contain cobbles (FILL) Auger Refusal. Test hole terminated at 2.74m 2.74m. 1) Coordinates were based on the faird and doops leath. 2) Auger hole was a made of the east to some silt. 2) Auger hole was a made of the east to some silt. 2) Auger hole was a made of the east to some silt. 2) Auger hole was a made of the east to some silt. 2) Auger hole was a made of the east to some silt. 2) Auger hole was a made of the east to some silt. 2) Auger hole was a made of the east to some silt. 3) Auger hole was a made of the east to some silt. 3) Auger hole was a made of the east to some silt. 3) Auger hole was a made of the east to some silt. 3) Auger hole was a made of the east to some silt. 4.4 Auger hole was a made of the east to some silt. 4.4 Auger hole was a made of the east to some silt. 5 Auger hole was a made of the east to some	I measurements I measurements S drilled at the	2
$\left[\begin{array}{cccccccccccccccccccccccccccccccccccc$		
<u>8</u> [-
		.
Legend Sample Depth Sample Dept	oth of Hole: 2.	
Sample Type: L#-Lab Spoon Spoon (mud return) T-Shelby Tube	th to Ton of D.	≀ock.





Laboratory Testing Results



SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D6913

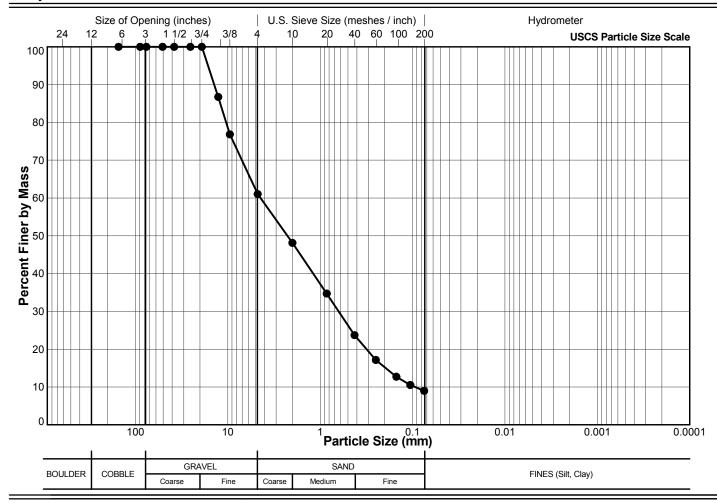
Client: Ministry of Transportation and Infrastructure Sample Location: AH18-03

Project: Highway #3, Snass Creek Bridge Replacement Sample No.:

Location: Highway #3, Snass Creek Bridge, BC

Depth Interval (m): 0.23 to 0.33

Project No.: 1414739 Phase: 13000 Lab Schedule No.:



Sieve S (USS)	ize (mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		100.0
1/2"	12.7		86.7
3/8"	9.5		76.8
#4 US MESH	4.75		61.0
#10 US MESH	2		48.1
#20 US MESH	0.85		34.7
#40 US MESH	0.425		23.7
#60 US MESH	0.25		17.2
#100 US MESH	0.15		12.7
#140 US MESH	0.106		10.5
#200 US MESH	0.075		9.0

_	SJ	10/10/2018	LH	10/12/2018	
_	Tech	Date	Checked	Date	



SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D6913

Client: Ministry of Transportation and Infrastructure

Project: Highway #3, Snass Creek Bridge Replacement

Location: Highway #3, Snass Creek Bridge, BC

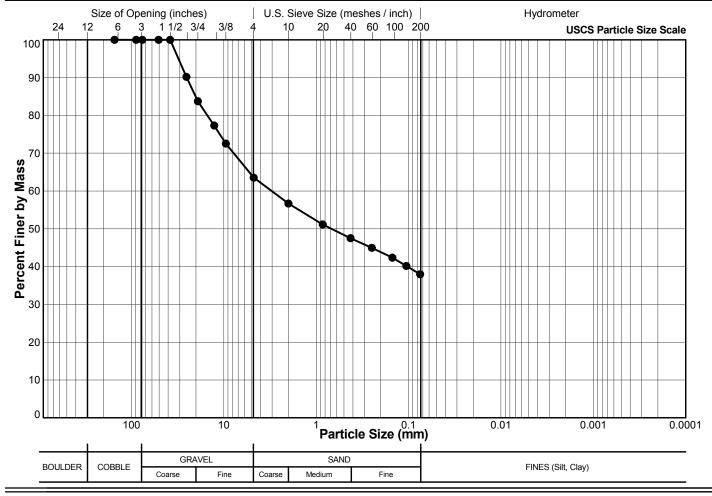
Project No.: 1414739 Phase: 13000

Sample Location: AH18-03

Sample No.: 3

Depth (m): 1.37

Lab Schedule No.:



Sieve S	ize (mm)	Particle Size (mm)	Percent Passing
6"	152.4	, ,	100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		90.2
3/4"	19.1		83.7
1/2"	12.7		77.3
3/8"	9.5		72.5
#4 US MESH	4.75		63.5
#10 US MESH	2		56.7
#20 US MESH	0.85		51.2
#40 US MESH	0.425		47.5
#60 US MESH	0.25		45.0
#100 US MESH	0.15		42.4
#140 US MESH	0.106		40.2
#200 US MESH	0.075		38.0

SJ	10/10/2018	LH	10/12/2018	_
Tech	Date	Checked	Date	-



SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D6913

Ministry of Transportation and Infrastructure Client:

Highway #3, Snass Creek Bridge Replacement Project:

Highway #3, Snass Creek Bridge, BC Location:

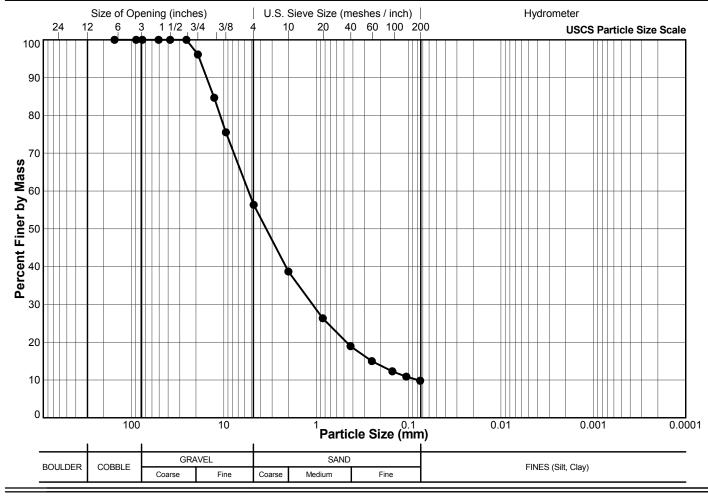
Project No.: 1414739 Phase: 13000

Sample Location: BH18-01

Sample No.:

Depth Interval (m): 5.79 to 6.40

Lab Schedule No.:



Sieve S (USS)	ize (mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		96.1
1/2"	12.7		84.7
3/8"	9.5		75.5
#4 US MESH	4.75		56.3
#10 US MESH	2		38.7
#20 US MESH	0.85		26.3
#40 US MESH	0.425		18.9
#60 US MESH	0.25		15.0
#100 US MESH	0.15		12.3
#140 US MESH	0.106		10.9
#200 US MESH	0.075		9.8

	SJ	10/10/2018	LH	10/12/2018	
-	Tech	Date	Checked	Date	



Client:

SUMMARY OF PARTICLE SIZE DISTRIBUTION

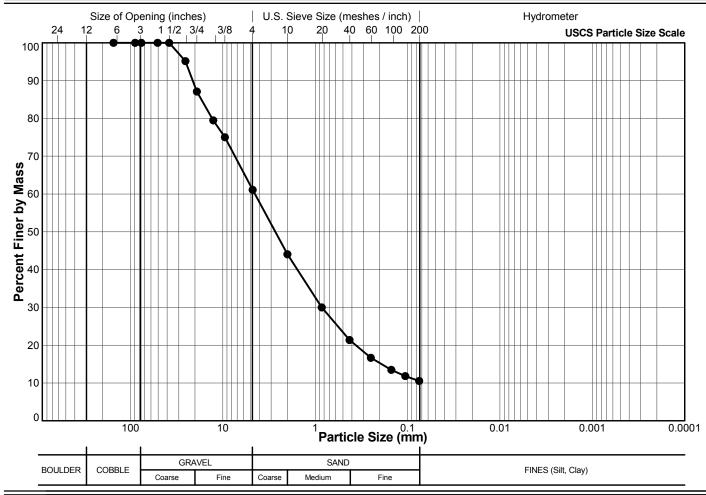
ASTM D6913

Ministry of Transportation and Infrastructure Sample Location: BH18-01

Project: Highway #3, Snass Creek Bridge Replacement 12

Location: Highway #3, Snass Creek Bridge, BC Depth Interval (m): 21.03 to 21.49

Project No.: 1414739 Phase: 13000 Lab Schedule No.:



Sieve S (USS)	ize (mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		95.2
3/4"	19.1		87.1
1/2"	12.7		79.5
3/8"	9.5		75.0
#4 US MESH	4.75		61.1
#10 US MESH	2		44.1
#20 US MESH	0.85		30.0
#40 US MESH	0.425		21.4
#60 US MESH	0.25		16.7
#100 US MESH	0.15		13.5
#140 US MESH	0.106		11.8
#200 US MESH	0.075		10.5

 SJ	10/10/2018	LH	10/12/2018
Tech	Date	Checked	Date

GOLDER

WATER CONTENT DETERMINATION

ASTM D 2216

Client: Ministry of Transportation and Infrastructure

Lab Schedule No.:

Project: Highway #3, Snass Creek Bridge Replacement

Location: Highway #3, Snass Creek Bridge, BC

Project No.: 1414739 Phase: 13000

Sample	Sample	Specimen	Depth	Water	
Location	No.	No.	Depth (m)	Bottom (m)	Content (%)
AH18-03	1		0.23	0.33	4.3
AH18-03	2		0.46	0.46	10.9
AH18-03	3		1.37	1.37	18.0
AH18-03	4		2.44	2.44	15.8
AH18-06	1		0.05	0.10	3.8
AH18-06	2		0.30	0.30	4.6
AH18-06	3		0.61	0.61	8.2
AH18-06	4		1.37	1.37	6.1

GINT_GAL_NATIONALIM Unique Project ID: Output Form:_LAB_WATER CONTENT (REPORT) 2018 LHu 12/10/18:

LH 10/12/2018

Checked

Date



DETERMINATION OF TOTAL OR WATER-SOLUBLE SULPHATE ION CONTENT OF SOIL

CSA A23.2-3B

Client: Ministry of Transportation and Infrastructure Project No.: 1792837 Project: Snass Creek Bridge Phase No.: 19000 Date sampled: September, 2018 Date tested: September 17, 2019 Sampled by: Client Tested by: R. Zhu

Sample ID	Horizon Depth	Total Sulphate Ion Content %	Water-Soluble Sulphate Ion Content %
TH18-02, SA2	10'-12'	0.07	Not Applicable *
TH18-02, SA4	19'-21'	0.09	Not Applicable *
TH18-02, SA6	29'-29'9"	0.08	Not Applicable *
TH18-02, SA7	34'-36'	0.01	Not Applicable *

Notes:

- 1. * Per Clause 9.1.4, the water-soluble sulphate ion content need not be tested when the total sulphate ion content is less than 0.20%
- 2. Detection limit for the test is 0.005%

Reported by: R. Zhu

Reviewed by: ______S. John, AScT





WATER-SOLUBLE CHLORIDE ION CONTENT (ASTM C1218)

Ministry of Transportation and Infrastructure

September 20, 2019

Golder Project Number: 1792837-19000

Sample Description: Snass Creek Bridge, TH18-02

Date Sampled:	September, 2018	Date Tested:	September 19, 2019
Date Received:	September 12, 2019	Tested By:	J. Allen

Golder Laboratory Number	Horizon Depth	Chloride Ion Content (% by weight)
C-19-945	10'-12'	0.000
C-19-946	19'-21'	0.000
C-19-947	29'-29'9"	0.000
C-19-948	34'-36'	0.000
	Number C-19-945 C-19-946 C-19-947	Number

Reviewed by:

Jeremy Rose, Laboratory Supervisor



Notice: The test data given herein pertain to the sample provided, and may not be applicable to material from other production zones/periods.

This report constitutes a testing service only. Interpretation of the data given here may be provided upon request.