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BOREHOLE ENGINEERING LOG BOREHOLE NO: BH-SKM-25 POSITION: E: 10565, N: 152777 (56 South East Transit Horizontal Datum) PAGE: 1 OF 6 CLIENT: TMR PROJECT: GUSBUS DATE DRILLED: 3/9/12 to 3/9/12 SURFACE ELEVATION: 40.1 (AHD) JOB NO: QB10312.540 DIP / AZIMUTH : 90° LOGGED BY: NC LOCATION: Within existing stockpile CONTRACTOR: Geodrill CHECKED BY: DWL DRILLING MATERIAL GROUND WATER LEVELS CLASSIFICATION LES & TESTS $\widehat{\Xi}$ CONSISTENCY MATERIAL DESCRIPTION MOISTURE Ξ DRILLING PENETRAT STRUCTURE DRILLING & CASING DEPTH GRAPHIC Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components & Other Observations WATER 귒 90 40.1 FILL (SANDY GRAVEL) (GW): Black, fine to coarse sub-rounded to sub-angular, fine to medium grained FILL . trace silt. 4.70-8.50m **ALLUVIUM** 8.50-14.50m RESIDUAL 39.6--0.5 14.50-TD XW ROCK 1.00m SPT 9, 13, 9 N=22 39.1 1.0 GW D MD 1.45m 38.6--1.5 38.1 -2.0 (GW): With silt and cobbles, trace rootlets. GW Μ 2.50m SPT 30/80mm HB N=R 2.58m 37.6--2.5 FILL (GRAVELLY CLAY) (CL): Orange brown, low plasticity, medium sized, sub-angular gravel. -3.0 37.1 CL GUSBUS.GPJ BH_SKM_25.GDW 19/12/2012 07:33 36.6--3.5(CL): Pale pink brown, fine to coarse sized gravel. CL 4.00m SPT 2, 2, 2 N=4 36.1 -4.0 (CL): Colour change to dark brown grey and black CL 4.45m 35.6--4.5 CURRENT.GLB Log BOREHOLE SAND (SP): Pale grey, medium grained sand. DRILLING SAMPLES & FIELD TESTS CONSISTENCY (Su) {N-value} DENSITY (SPT N-value) Hand Auger D Disturbed Sample ES Env Soil Sample EW Env Water Sample SPT Standard Penetration Tes U Undisturbed Tube Sample Rock Rolling RR VL Very Loose 0 - 4 < 12 kPa {0-2} Auger Screw HQ HQ Coring Auger Drill TC-bit NQ NQ Coring Auger Drill V-bit PQ PQ Coring Washbore NMLC NMLC Coring Undisturbed Tube Sample Loose 4 - 10 S Soft 12 - 25 {2-4} W Water Sample MD Medium Dense 10 - 30 25 - 50 {4-8} AD/V WB D Dense 30 - 50 St Stiff 50 - 100 {8-15} **HP Hand Penetrometer** MOISTURE CONDITION D = Dry M = Moist W = Wet DRILLING PENETRATION VEASY F Firm VH VD Very Dense 50 - 100 VSt Very Stiff 100 - 200 {15-30} HV Hand Vane Shear VE Very Easy E Easy Firm Hard VH Very Hard (P: Peak Su R: Residual Su) CO Compact >50/150mm Hard > 200 kPa {>30} N SPT blows per 300mm HW SPT penetration by hammer weight **GROUNDWATER SYMBOLS** RW SPT penetration by rod weight = Water level (static) = Water level (during drilling)

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	: TMR							POSITION : E: 10565, N: 152777 (56 South Eas	t Trar		· · · · · · · · · · · · · · · · · · ·
	CT : GL							SURFACE ELEVATION : 40.1 (AHD)			DATE DRILLED: 3/9/12 to 3/9/12
) : QB1		existing s	tocknil	۹			DIP / AZIMUTH : 90° CONTRACTOR : Geodrill			LOGGED BY: NC CHECKED BY: DWL
0,			LING					MATERIAL			
OGRES OWATE WATE		GROUND WATER LEVELS	SAMPLES & FIELD TESTS	(m) - 35.1-	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY	STRUCTURE & Other Observations
CASING				- 35.1-	5.0 · - - -		SP	SAND (SP): Pale grey, medium grained sand. (continued)	М	L	
			5.50m SPT 2, 1, 2 N=3	34.6-	5.5 			CLAYEY SAND (SC): Grey and brown, fine to coarse grained sand, low plasticity clay, trace fine sized, sub-angular and sub-rounded gravel.			Sample - 5.50m to 5.95m Grading: Gravel = 15%; Sand = 50%; Fines = 35% Moisture Content = 11.6%
			5.95m	34.1-	- -6.0 - -		SC				
				33.6-	- -6.5 - -						
		_₩	7.00m SPT 2, 4, 3 N=7	33.1-	- -7.0 - -			(SC): Pale grey, high plasticity clay fines , with fine sized, sub-rounded (quartz) gravel, trace organics (roots).	M	L	Sample - 7.00m to 7.45m Grading: Gravel = 15%; Sand = 59%; Fines = 26% Atterberg Limits: LL = 53.4%; Pl = 24.4%; Pl = 29.0%; LS = 11.2%: MC = 17.5%
			7.45m	32.6-	7.5 -		SC				LS = 11.2%; MC = 17.5%
				32.1-							
			8.50m SPT 3, 7, 12 N=19	31.6-	8.5 			8.50m CLAY (CI): Pale grey, medium plasticity, trace orange brown iron staining of rock fabric.			
			8.95m	31.1-	9.0 - -		CI		М	VSt	
				30.6-	- 9.5 - -						
			10.00m	30.1-	L _{10.0}		<u>L</u> _	10.00m			
DRILLING HA Hand Auger RR Rock Rolling AS Auger Screw HQ HQ Coring AD/IT Auger Drill TC-bit NQ NQ Coring AD/IV Auger Drill V-bit PQ PQ Coring WB Washbore NMLC NMLC Coring DRILLING PENETRATION VE Very Easy F Firm VH Very Hard E Easy H Hard							v Soil v Wate d Per d Var k Su F blows	CAMPLEC & FIELD TECTO	0 4 nse 10 30	value) CONSISTENCY (Su) {N-value} -4 VS Very Soft <12 kPa {0-2	

	5	K		1	В	OR	EHC	L	E ENGINEERING LO	OG		ı	BOREH	OLE NO : I	BH-SKM-25
CLIEN	NT : TI	MR							POSITION : E: 10565, N: 152777 (56	6 South Eas	st Trar	nsit H	orizontal Da	atum) PAG	GE: 3 OF 6
PROJ			SBU	S					SURFACE ELEVATION : 40.1 (AHE					LED: 3/9/12 to	o 3/9/12
JOB N	10 : Q	B10	312.	540					DIP / AZIMUTH : 90°	I	LOGGED B	Y : NC			
LOCA	TION			existing s	stockpil	е			CONTRACTOR : Geodrill	AATEDIAL		(CHECKED	BY : DWL	
PROGR	ree	_		LING	1			z	IV.	IATERIAL			T		
0 0	WATER S	PENETRATION	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	(E) 2 30.1-	0.0 DEPTH (m)	GRAPHIC	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Ch Secondary and Minor Componen	ts	MOISTURE	CONSISTENCY		STRUCTU & Other Observ	
				SPT 4, 6, 9 N=15		- - -			CLAY (CI): Pale grey, medium plasticity, orange brown iron staining of rock fabric.	trace					
				10.45m	29.6-	10.5 		CI							
					29.1-	- 11.0 - -									
				11.50m SPT 4, 5, 9 N=14	28.6-	- 11.5 - -			With iron stained bands.		M	St	11.50: relict	XW rock structure	observed
				11.95m	28.1-	- - 12.0 -									
					27.6-	- 12.5 - -			12.80m						
				13.00m SPT 5, 7, 14 N=21	- 27.1-	- 13.0 - -			CLAYEY SAND: Red brown and orange, medium grained sand, with grey, coarse rounded bands.						
				13.45m	26.6-	- 13.5 - -					М	MD			
					26.1-	- 14.0 - -									
				14.50m SPT 9, 14, 12 N=26	25.6-	- - -			14.50m INTERBEDDED: SANDSTONE (pale gre to coarse grained, sub-rounded) , CLAYS (Grey and orange-brown).		M to	MD and VSt	14.50: SANI medium der of CLAY, ve	DSTONE [Propertinse] and CLAYSTO	ies of SAND, DNE [properties
AD/T AD/V WB VE VE VE	ery Eas asy GR V = V	Auger Screw Drill Voore LLING by F COUNI	TC-bit /-bit B PEN F F I H DWA level	RR RO HQ HO NQ NO PQ PO NMLC N	N H Very BOLS	ring	ES Env EW Env HP Han HV Han (P: Peal N SPT HW SP	/ Soil / Wat d Per d Var κ Su F blows Γ pen	er Sample W Water Sample etrometer MOISTLIRE CONDITION	t VI Verv	e ium Der se Dense pact	0 4 nse 10 30 50 >:	- 4 - 10 0 - 30 0 - 50 0 - 100 50/150mm	VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Y (Su) {N-value} < 12 kPa {0-2} 12 - 25 {2-4} 25 - 50 {4-8} 50 - 100 {8-15} 100 - 200 {15-30} > 200 kPa {>30}

BOREHOLE ENGINEERING LOG BOREHOLE NO: BH-SKM-25 POSITION: E: 10565, N: 152777 (56 South East Transit Horizontal Datum) PAGE: 4 OF 6 CLIENT: TMR PROJECT: GUSBUS DATE DRILLED: 3/9/12 to 3/9/12 SURFACE ELEVATION: 40.1 (AHD) JOB NO: QB10312.540 DIP / AZIMUTH : 90° LOGGED BY: NC LOCATION: Within existing stockpile CONTRACTOR: Geodrill CHECKED BY: DWL DRILLING MATERIAL PROGRESS GROUND WATER LEVELS CLASSIFICATION LES & TESTS $\widehat{\Xi}$ CONSISTENCY MATERIAL DESCRIPTION MOISTURE Ξ DRILLING PENETRAT STRUCTURE DRILLING & CASING DEPTH **SRAPHIC** Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components & Other Observations 귒 SAMPLI FIELD T .0G 15.0 INTERBEDDED: SANDSTONE (pale grey, medium to coarse grained, sub-rounded) , CLAYSTONE (Grey and orange-brown). (continued) 24.6-MD 15.5 M to W and VSt 16.00m SPT 16.00n 24.1 16.0 CLAYSTONE: Grey, trace black carbonaceous 16.00: [Properties of CLAY, very stiff] 3, 8, 11 N=19 bands, extremely weathered, extremely low strength, with orange iron staining along joints. 16.45m 23.6 -16.523.1--17.0 17.50m SPT 6, 10, 16 N=26 17.5 Colour change to dark grey. 17.95m VSt 22.1 -18.0 GUSBUS.GPJ BH_SKM_25.GDW 19/12/2012 07:33 21.6--18.5 19.00m SPT 5, 13, 17 N=30 21.1--19.0 With iron staining along planar joints. 19.45m 20.6--19.5 CURRENT.GLB Log BOREHOLE SAMPLES & FIELD TESTS DRILLING CONSISTENCY (Su) {N-value} DENSITY (SPT N-value) Hand Auger D Disturbed Sample ES Env Soil Sample EW Env Water Sample SPT Standard Penetration Test U Undisturbed Tube Sample Rock Rolling RR VL Very Loose 0 - 4 VS < 12 kPa {0-2} Auger Screw HQ HQ Coring Auger Drill TC-bit NQ NQ Coring Auger Drill V-bit PQ PQ Coring Washbore NMLC NMLC Coring Undisturbed Tube Sample Loose 4 - 10 S Soft 12 - 25 {2-4} W Water Sample MD Medium Dense 10 - 30 25 - 50 {4-8} AD/V WB D Dense 30 - 50 St Stiff 50 - 100 {8-15} **HP Hand Penetrometer** MOISTURE CONDITION D = Dry M = Moist W = Wet DRILLING PENETRATION VEASY F Firm VH VD Very Dense 50 - 100 VSt Very Stiff 100 - 200 {15-30} HV Hand Vane Shear VE Very Easy E Easy F Firm H Hard VH Very Hard (P: Peak Su R: Residual Su) CO Compact >50/150mm Hard > 200 kPa {>30} N SPT blows per 300mm HW SPT penetration by hammer weight **GROUNDWATER SYMBOLS** RW SPT penetration by rod weight = Water level (static) = Water level (during drilling)

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BOREHOLE ENGINEERING LOG BOREHOLE NO: BH-SKM-25 POSITION: E: 10565, N: 152777 (56 South East Transit Horizontal Datum) PAGE: 5 OF 6 CLIENT: TMR PROJECT: GUSBUS DATE DRILLED: 3/9/12 to 3/9/12 SURFACE ELEVATION: 40.1 (AHD) JOB NO: QB10312.540 DIP / AZIMUTH : 90° LOGGED BY: NC LOCATION: Within existing stockpile CONTRACTOR: Geodrill CHECKED BY: DWL DRILLING MATERIAL PROGRESS GROUND WATER LEVELS CLASSIFICATION LES & TESTS (E CONSISTENCY MATERIAL DESCRIPTION MOISTURE Ξ DRILLING PENETRAT STRUCTURE DRILLING & CASING DEPTH GRAPHIC Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components & Other Observations 귒 SAMPLI FIELD T 90 20.1 CLAYSTONE: Dark grey, extremely weathered, extremely low strength, with iron staining along planar joints. 20.50m SPT 7, 12, 14 N=26 19.6--20.5 20.95m 19.1--21.0 18.6 21.5 VSt 22.00m SPT 6, 10, 14 N=24 -22 0 Colour change to green grey. 22.45m 17.6--22.5 -23.0 17.1 GUSBUS.GPJ BH_SKM_25.GDW 19/12/2012 07:33 23.50m SPT 12, 18, 14 N=32 16.6--23.5SANDSTONE: Green-grey, fine to medium grained 23.50: [Properties of Clayey SAND] sand in clay matrix. 23.95m 16.1-24.0 Μ 15.6 -24 5 CURRENT.GLB Log BOREHOLE SAMPLES & FIELD TESTS DRILLING CONSISTENCY (Su) {N-value} DENSITY (SPT N-value) Hand Auger Disturbed Sample Env Soil Sample SPT Standard Penetration Test U Undisturbed Tube Sample Rock Rolling RR VL Very Loose 0 - 4 VS < 12 kPa {0-2} Auger Screw HQ HQ Coring Auger Drill TC-bit NQ NQ Coring Auger Drill V-bit PQ PQ Coring Washbore NMLC NMLC Coring Undisturbed Tube Sample Loose 4 - 10 S Soft 12 - 25 {2-4} W Water Sample EW Env Water Sample MD Medium Dense 10 - 30 25 - 50 {4-8} AD/V WB D Dense 30 - 50 St Stiff 50 - 100 {8-15} **HP Hand Penetrometer** MOISTURE CONDITION D = Dry M = Moist W = Wet DRILLING PENETRATION VEASY F Firm VH VD Very Dense 50 - 100 VSt Very Stiff 100 - 200 {15-30} HV Hand Vane Shear VE Very Easy E Easy F Firm H Hard VH Very Hard (P: Peak Su R: Residual Su) CO Compact >50/150mm Hard > 200 kPa {>30} N SPT blows per 300mm HW SPT penetration by hammer weight **GROUNDWATER SYMBOLS** RW SPT penetration by rod weight = Water level (static) = Water level (during drilling)

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-		T : GL	JSBU	S					POSITION : E: 10565, N: 152777 (56 South East Transit SURFACE ELEVATION : 40.1 (AHD)								DATE DRILLED: 3/9/12 to 3/9/12					
JOB	NO :	QB1	0312.	540					DIP / AZIMUTH: 90°							L	.OGGED	BY : I	NC			
LOC	ATIO	N : W		existing s	tockpil	е			CONTR	ACTOR :	: Geodri	II				(CHECKE	DBY:	DWL			
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& CASING OS	WATER	DRILLING PENETRATION	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	(E) 12 15.1-	(m) 25.0	GRAPHIC LOG	CLASSIFICATION	S	, Colour, P Secondary	Plasticity of and Mind	CRIPTION or Particle (or Compon	Charact nents		MOISTURE	CONSISTENCY	25.00: [Pr	& O	STRUCTUI ther Observ			
				SPT 7, 10, 16 N=26		- -			extrem	nely low stre	ength, wit	h orange br	rown iroi	in			20.00. [орогиос	0.02			
				25.45m	14.6-	- - 25.5 - -															- -	
WB					14.1-	- - 26.0 - -									М	VSt					-	
				26.50m SPT 7, 12, 16 N=28	- 13.6-	- - 26.5 - -															_	
 	-			26.95m	13.1-	- - 27.0		2	26.95m								26.95: BH Piezomet		ated ed to 16.00n	n		
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AD/\ WB	HA Hand Auger RR Rock Rolling AS Auger Screw HQ HQ Coring AD/T Auger Drill TC-bit NQ NQ Coring WB Washbore NMLC NMLC Coring DRILLING PENETRATION VE Very Easy F Firm VH Very Hard GROUNDWATER SYMBOLS WS PT penet RW SPT penet RW SPT penet RW SPT penet RM SPT penet RW SPT penet RM							Sample Sample r Sample etrometer e Shear r Residual Su per 300mm tration by han	ample U Undisturbed Tube Sample L Loose MD Medium Dens Crometer Shear D = Dry M = Moist W = Wet Residual Su) U Undisturbed Tube Sample L Loose MD Medium Dens D Dense VD Very Dense CO Compact					0 4 nse 10 30 50	- 4 - 10	VS S F St VSt H	Very Soft Soft Firm Stiff Very Stiff Hard	Y (Su) {N-value < 12 kPa {I 12 - 25 {2- 25 - 50 {4- 50 - 100 {8 100 - 200 { > 200 kPa {	0-2} -4} -8} 3-15} 15-30}			
Ь	$\overline{\Delta}$	- vvalt	, 10 VC	(during dri	y <i>)</i>										File	e: QE	310312.	540 BH	I-SKM-2	5 Page 6	OF	