BOREHOLE ENGINEERING LOG

BOREHOLE NO : BH-SKM-23

CLIENT : TMR	POSITION : E: 10481, N: 152837 (56 South East Transit Horizontal Datum)	PAGE : 1 OF 6
PROJECT : GUSBUS	SURFACE ELEVATION : 33.9 (AHD)	DATE DRILLED : 28/8/12 to 29/8/12
JOB NO : QB10312.540	DIP / AZIMUTH : 90°	LOGGED BY : NC
LOCATION : Adjacent to Gateway Mwy (Northbound)	CONTRACTOR : Geodrill	CHECKED BY : DWL

DRILLING | MATERIAL

PROGRESS: DRILLING & CASING	PROGRESS: WATER	DRILLING PENETRATION	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	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
AS					33.9	0.0		CL	FILL (SANDY CLAY) (CL): Brown mottled orange and red, low plasticity, fine to medium grained sand , trace fine sized, sub-rounded gravel.		S	0.00: - 2.60m FILL 2.60-4.20m ALLUVIUM 4.20-7.00m RESIDUAL 7.00-TD XW ROCK
					33.4	0.5			0.70m			
								CL	(CL): With pale grey, fine grained sand.	M		
				1.00m SPT 3, 4, 4 N=8	32.9	1.0			1.00m			
								CL	(CL): Trace medium sized, sub-angular gravel, trace red ironstained sandstone gravel.		S to F	
				1.45m	32.4	1.5			1.60m			
								ML	FILL (SANDY SILT) (ML): Grey brown, medium plasticity, fine to coarse grained, sub-angular, sand.			
									1.90m			
					31.9	2.0		ML	(ML): Grey, with fine to medium sized, sub-rounded gravel.	M	F	
CASING				2.50m SPT 6, 14, 30/130mm HB N=R	31.4	2.5			2.60m			
								SM	SILTY SAND (SM): Black, fine grained sand, trace rootlets.	M	D	
				2.93m					2.75m			
									SAND (SP): Pale grey, fine to medium grained sand, with silt.			2.95: - 4.00m No returns, 100% water loss
					30.9	3.0		SP				
WB					30.4	3.5				M	D	
				4.00m SPT 6, 8, 10 N=18	29.9	4.0			4.00m			
								SW	(SW): Fine to coarse, with fine sized, sub-rounded gravel, trace silt, trace organics (rootlets).			
				4.45m					4.20m			
					29.4	4.5			SILTY SAND (SM): Pale grey to white, fine grained sand, high plasticity silt.			
								SM		M	MD	
					28.9	5.0						

DRILLING

HA	Hand Auger	RR	Rock Rolling
AS	Auger Screw	HQ	HQ Coring
AD/T	Auger Drill TC-bit	NQ	NQ Coring
AD/V	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		

GROUNDWATER SYMBOLS

▼ = Water level (static)

▽ = Water level (during drilling)

SAMPLES & FIELD TESTS

D	Disturbed Sample	SPT	Standard Penetration Test
ES	Env Soil Sample	U	Undisturbed Tube Sample
EW	Env Water Sample	W	Water Sample

HP Hand Penetrometer
HV Hand Vane Shear
(P: Peak Su R: Residual Su)
N SPT blows per 300mm
HW SPT penetration by hammer weight
RW SPT penetration by rod weight

MOISTURE CONDITION
D = Dry M = Moist W = Wet

DENSITY (SPT N-value)

VL	Very Loose	0 - 4
L	Loose	4 - 10
MD	Medium Dense	10 - 30
D	Dense	30 - 50
VD	Very Dense	50 - 100
CO	Compact	>50/150mm

CONSISTENCY (Su) {N-value}

VS	Very Soft	< 12 kPa	{0-2}
S	Soft	12 - 25	{2-4}
F	Firm	25 - 50	{4-8}
St	Stiff	50 - 100	{8-15}
VSt	Very Stiff	100 - 200	{15-30}
H	Hard	> 200 kPa	{>30}

BRISBANE_OFFICE_LIBRARY_CURRENT.GLB Log BOREHOLE GUSBUS.GPJ BH_SKM_23.GDW 19/12/2012 07:28

BOREHOLE ENGINEERING LOG

BOREHOLE NO : BH-SKM-23

CLIENT : TMR | POSITION : E: 10481, N: 152837 (56 South East Transit Horizontal Datum) | PAGE : 2 OF 6

PROJECT : GUSBUS | SURFACE ELEVATION : 33.9 (AHD) | DATE DRILLED : 28/8/12 to 29/8/12

JOB NO : QB10312.540 | DIP / AZIMUTH : 90° | LOGGED BY : NC

LOCATION : Adjacent to Gateway Mwy (Northbound) | CONTRACTOR : Geodrill | CHECKED BY : DWL

DRILLING | MATERIAL

PROGRESS: DRILLING & CASING	PROGRESS: WATER	DRILLING PENETRATION	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	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
					28.9	5.0			SILTY SAND (SM): Pale grey to white, fine grained sand, high plasticity silt. *(continued)*			
				5.50m SPT 6, 7, 12 N=19	28.4	5.5		SM		M	MD	
			▽	5.95m	27.9	6.0			SANDY SILT (ML): Pale grey, low plasticity, fine grained sand, with fine to medium sized, sub-angular, quartz gravel.			
CASING					27.4	6.5		ML		M	VSt	
				7.00m SPT 6, 8, 14 N=22	26.9	7.0			SILTSTONE: Orange and dark red, extremely weathered, extremely low strength.		VSt	7.00: [Properties of Clayey SILT, medium plasticity]
									7.20m Colour change to pale grey.			7.20: [Properties of Clayey SILT, low plasticity]
WB				7.45m	26.4	7.5				M	H	
					25.9	8.0			8.20m CLAYSTONE: Grey and orange brown, extremely weathered, extremely low strength, with some dark red iron staining and cementation.			8.20: [Properties of CLAY, high plasticity]
				8.50m SPT 10, 15, 19 N=34	25.4	8.5						Sample - 8.50m to 8.95m Atterberg Limits: LL = 50.2%; PL = 19.6%; PI = 30.6%; LS = 14.6%; MC = 21.0%
				8.95m	24.9	9.0				M	VSt	
					24.4	9.5						
				10.00m	23.9	10.0			10.00m			

DRILLING

HA	Hand Auger	RR	Rock Rolling
AS	Auger Screw	HQ	HQ Coring
AD/T	Auger Drill TC-bit	NQ	NQ Coring
AD/V	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

GROUNDWATER SYMBOLS

▼ = Water level (static)
▽ = Water level (during drilling)

SAMPLES & FIELD TESTS

D Disturbed Sample
ES Env Soil Sample
EW Env Water Sample
SPT Standard Penetration Test
U Undisturbed Tube Sample
W Water Sample

HP Hand Penetrometer
HV Hand Vane Shear
(P: Peak Su R: Residual Su)
N SPT blows per 300mm
HW SPT penetration by hammer weight
RW SPT penetration by rod weight

MOISTURE CONDITION
D = Dry M = Moist W = Wet

DENSITY (SPT N-value)

VL	Very Loose	0 - 4
L	Loose	4 - 10
MD	Medium Dense	10 - 30
D	Dense	30 - 50
VD	Very Dense	50 - 100
CO	Compact	>50/150mm

CONSISTENCY (Su) {N-value}

VS	Very Soft	< 12 kPa {0-2}
S	Soft	12 - 25 {2-4}
F	Firm	25 - 50 {4-8}
St	Stiff	50 - 100 {8-15}
VSt	Very Stiff	100 - 200 {15-30}
H	Hard	> 200 kPa {>30}

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BOREHOLE ENGINEERING LOG

BOREHOLE NO : BH-SKM-23

CLIENT : TMR | POSITION : E: 10481, N: 152837 (56 South East Transit Horizontal Datum) | PAGE : 3 OF 6

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DRILLING							MATERIAL					
PROGRESS: DRILLING & CASING	PROGRESS: WATER	DRILLING PENETRATION	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	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
WB				SPT 9, 14, 22 N=36	23.9	10.0			CLAYSTONE: Grey and orange brown, with fine grained sand, extremely weathered, extremely low strength, without dark red staining.	M	VSt	10.00: [Properties of CLAY, high plasticity]
				10.45m	23.4	10.5						
					22.9	11.0						
				11.50m	22.4	11.5			11.50m			
				SPT 19, 30/130mm HB N=R					SANDSTONE: Pale grey, fine grained sand in clay matrix, extremely weathered, extremely low strength, with orange staining.			11.50: [Properties of Clayey SAND]
				11.78m	21.9	12.0					D	
					21.4	12.5						
				13.00m	20.9	13.0			13.00m	M		
				SPT 22, 30/110mm HB N=R					Pink red, fine to medium grained.			
				13.26m	20.4	13.5						
					19.9	14.0					VD	
				14.50m	19.4	14.5			14.50m			
				SPT 28, 30/70mm HB N=R					Pink and grey, with red iron staining.			
				14.72m	18.9	15.0			15.00m			

DRILLING

HA	Hand Auger	RR	Rock Rolling
AS	Auger Screw	HQ	HQ Coring
AD/T	Auger Drill TC-bit	NQ	NQ Coring
AD/V	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		

GROUNDWATER SYMBOLS

= Water level (static)

= Water level (during drilling)

SAMPLES & FIELD TESTS

D	Disturbed Sample	SPT	Standard Penetration Test
ES	Env Soil Sample	U	Undisturbed Tube Sample
EW	Env Water Sample	W	Water Sample

HP Hand Penetrometer
HV Hand Vane Shear
(P: Peak Su R: Residual Su)
N SPT blows per 300mm
HW SPT penetration by hammer weight
RW SPT penetration by rod weight

MOISTURE CONDITION
D = Dry M = Moist W = Wet

DENSITY (SPT N-value)

VL	Very Loose	0 - 4
L	Loose	4 - 10
MD	Medium Dense	10 - 30
D	Dense	30 - 50
VD	Very Dense	50 - 100
CO	Compact	>50/150mm

CONSISTENCY (Su) {N-value}

VS	Very Soft	< 12 kPa {0-2}
S	Soft	12 - 25 {2-4}
F	Firm	25 - 50 {4-8}
St	Stiff	50 - 100 {8-15}
VSt	Very Stiff	100 - 200 {15-30}
H	Hard	> 200 kPa {>30}

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BOREHOLE ENGINEERING LOG

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PROJECT : GUSBUS | SURFACE ELEVATION : 33.9 (AHD) | DATE DRILLED : 28/8/12 to 29/8/12

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DRILLING | MATERIAL

PROGRESS: DRILLING & CASING	PROGRESS: WATER	DRILLING PENETRATION	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	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
					18.9	15.0			SANDSTONE: Pink and grey, fine to medium grained sand, with red iron staining.			15.00: [Properties of Clayey SAND]
					18.4	15.5						
				16.00m SPT 23, 30/130mm HB N=R 16.28m	17.9	16.0			16.00m Yellow grey, predominantly fine to medium grained sand, some coarse sub-angular sand, with orange staining.			
					17.4	16.5						
					16.9	17.0				M	VD	
WB				17.50m SPT 20, 30/100mm HB N=R 17.75m	16.4	17.5			17.50m 17.60m Band of coarse grained sand with fine to medium sized sub-rounded gravels (predominantly quartz). Grey, fine to coarse grained, poorly cemented clay matrix, stained pink.			
					15.9	18.0						
					15.4	18.5						
				19.00m SPT 6, 10, 16 N=26 19.45m	14.9	19.0			19.00m CLAYSTONE: Green-grey, highly weathered, medium strength, with brown staining.			19.00: [Properties of CLAY]
					14.4	19.5				M	VSt	
					13.9	20.0						

DRILLING

HA	Hand Auger	RR	Rock Rolling
AS	Auger Screw	HQ	HQ Coring
AD/T	Auger Drill TC-bit	NQ	NQ Coring
AD/V	Auger Drill V-bit	PQ	PQ Coring
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CO	Compact	>50/150mm

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St	Stiff	50 - 100 {8-15}
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H	Hard	> 200 kPa {>30}

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BOREHOLE ENGINEERING LOG

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PROJECT : GUSBUS | SURFACE ELEVATION : 33.9 (AHD) | DATE DRILLED : 28/8/12 to 29/8/12

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					13.9	20.0			CLAYSTONE: Green-grey, highly weathered, medium strength, with brown staining. *(continued)*	M	VSt	
				20.50m SPT 9, 15, 30/90mm HB N=R	13.4	20.5						
				20.89m					20.80m			
					12.9	21.0			SANDSTONE: Grey, fine to medium grained, extremely weathered, extremely low strength.	M	VD	20.80: [Properties of SAND]
									21.30m			
					12.4	21.5			CLAYSTONE: Blue grey, highly weathered, medium strength, trace red iron staining.			21.30: [Properties of CLAY]
				22.00m SPT 10, 19, 24 N=43	11.9	22.0						
				22.45m	11.4	22.5						
					10.9	23.0				M	H	
				23.50m SPT 12, 18, 25 N=43	10.4	23.5			23.50m Iron staining absent.			
				23.95m	9.9	24.0						
					9.4	24.5						
				25.00m	8.9	25.0			25.00m			

WB

DRILLING

HA	Hand Auger	RR	Rock Rolling
AS	Auger Screw	HQ	HQ Coring
AD/T	Auger Drill TC-bit	NQ	NQ Coring
AD/V	Auger Drill V-bit	PQ	PQ Coring
WB	Washbore	NMLC	NMLC Coring

DRILLING PENETRATION

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SAMPLES & FIELD TESTS

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CONSISTENCY (Su) {N-value}

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				SPT 9, 19, 23 N=42	8.9	25.0			CLAYSTONE: Grey, with prominent dark red iron staining throughout.			25.00: [Properties of CLAY]
				25.45m								
					8.4	25.5						
					7.9	26.0			26.00m With some white bands.			
				26.50m SPT 6, 13, 18 N=31	7.4	26.5			26.50m Colour change to blue grey and pink.	M	H	
				26.95m								
					6.9	27.0						
					6.4	27.5			27.50m With some sand.			
				28.00m SPT 29, 30/90mm N=R 28.24m	5.9	28.0			28.00m SANDSTONE: Pale grey, fine to medium grained with some coarse grained, extremely weathered, low strength, with orange staining.			28.00: [Properties of SAND, with clay]
					5.4	28.5				M	VD	
					4.9	29.0						
				29.50m SPT 23, 30/110mm HB N=R 29.76m	4.4	29.5			29.76m			29.76: BH Terminated Piezometer installed to 19.00m
	WB				3.9	30.0						

DRILLING

HA	Hand Auger	RR	Rock Rolling
AS	Auger Screw	HQ	HQ Coring
AD/T	Auger Drill TC-bit	NQ	NQ Coring
AD/V	Auger Drill V-bit	PQ	PQ Coring
WB	Washbore	NMLC	NMLC Coring

DRILLING PENETRATION

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