BOREHOLE ENGINEERING LOG

HOLE NO : GE057M_BH03

CLIENT : TRANSPORT AND MAIN ROADS	POSITION : E: 358893, N: 8136930 (56 MGA94)	PAGE : 1 OF 3
PROJECT : TNRP	SURFACE ELEVATION : 303.1 (AHD)	DATE DRILLED : 6/11/12 TO 6/11/12
JOB NO : CB27000.F687	DIP / AZIMUTH : 90°	LOGGED BY : KMF
LOCATION : KENNEDY HWY (CAIRNS - MAREEBA)		CHECKED BY : AJ

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
AD/T		H			303.1	0.0		GP	SANDY GRAVEL (GP): Grey, fine to coarse gravel, angular, fine to coarse grained sand.			FILL
									0.50m			
					302.1	1.0		SC	SANDY CLAY (SC): Red brown, brown, medium to high plasticity, fine to coarse grained sand.	D		
				1.50m					1.50m			
				SPT 5, 3, 4 N=7					SILTY CLAY (CH): Red brown, brown, high plasticity, with fine to medium grained sub angular gravel, trace of cobbles.		F	
				1.95m	301.1	2.0		CH				
WB		F	NOT OBSERVED									
				3.00m	300.1	3.0			3.00m			
				SPT 5, 6, 9 N=15					SILTY CLAY (CH): Red brown, brown, high plasticity, with fine to medium grained sub angular gravel, trace of cobbles.			COLLUVIUM
				3.45m				CH			St	
					299.1	4.0			4.20m			
				4.50m					SILTY CLAY (CH): Grey brown, high plasticity, with fine to coarse grained angular gravel.			RESIDUAL SOIL
				SPT 26, 30/80mm N=R 4.73m								
		H			298.1	5.0		CH			VSt - H	
					297.1	6.0						

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DRILLING

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

DS	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}

BOREHOLE ENGINEERING LOG

HOLE NO : GE057M_BH03

CLIENT : TRANSPORT AND MAIN ROADS	POSITION : E: 358893, N: 8136930 (56 MGA94)	PAGE : 2 OF 3
PROJECT : TNRP	SURFACE ELEVATION : 303.1 (AHD)	DATE DRILLED : 6/11/12 TO 6/11/12
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LOCATION : KENNEDY HWY (CAIRNS - MAREEBA)		CHECKED BY : AJ

DRILLING							MATERIAL					
PROGRESS												
DRILLING & CASING	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					297.1	6.0		CH	6.12m			RESIDUAL SOIL
									Continued as Cored Drill Hole			
					296.1	7.0						
					295.1	8.0						
					294.1	9.0						
					293.1	10.0						
					292.1	11.0						
					291.1	12.0						

DRILLING

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

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SAMPLES & FIELD TESTS

DS	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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CORED BOREHOLE ENGINEERING LOG

HOLE NO : GE057M_BH03

CLIENT : TRANSPORT AND MAIN ROADS | POSITION : E: 358893, N: 8136930 (56 MGA94) | PAGE : 3 OF 3

PROJECT : TNRP | SURFACE ELEVATION : 303.1 (AHD) | DATE DRILLED : 6/11/12 TO 6/11/12

JOB NO : CB27000.F687 | DIP / AZIMUTH : 90° | LOGGED BY : KMF

LOCATION : KENNEDY HWY (CAIRNS - MAREEBA) | CHECKED BY : AJ

DRILLING					MATERIAL			DEFECTS & COMMENTS	
DRILLING	WATER DETAIL	TCR/RQD / DRILL DEPTH	RL (m)	DEPTH (m)	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	DEFECT SPACING (mm)	Description of joints, seams, defects, additional observations and comments	GENERAL
			297.1	6.0	START CORING AT 6.12m				
NMLC		100% TCR 11% RQD 7.00	296.1	7.0	PHYLLITE: Dark grey green, grey green, orange brown, indistinct to distinct bedding at 20° to 30°.	MW EW - HW MW HW MW HW MW		6.12 JT 10° CU RF 6.26 JT 80° PR RF 6.28 JT 60° PR RF 6.39 SS GC 210 mm 6.50 SM Clay 70 mm 6.63 JT 20° UN RF 6.67 JT 20° UN RF 6.72 JT 60° PR RF 6.76 JT 10° IR RF 6.81 SS GC 190 mm 7.07 JT 40° ST RF 7.11 JT 50° UN RF 7.19 JT 30° UN RF 7.22 JT 30° UN RF 7.29 JT 60° IR RF 7.33 JT 80° IR RF 7.39 JT 80° IR RF 7.42 JT 80° PR RF 7.48 JT 60° PR RF 7.50 JT 60° PR RF 7.70 JT 50° PR RF 7.76 JT 40° PR RF 7.86 JT 80° PR RF 7.92 JT 50° PR RF	
		100% TCR 20% RQD 8.00	295.1	8.0				8.09 JT 60° PR RF 8.18 JT 40° UN RF 8.22 JT 40° UN RF 8.26 JT 30° PR RF 8.29 JT 50° UN RF 8.35 SS 30° GC IR RF 20 mm 8.41 SS 40° GC IR RF 10 mm 8.45 SS 50° GC IR RF 20 mm 8.56 JT 40° ST RF	
		67% TCR 14% RQD	294.1	9.0		HW MW		8.76 JT 40° CU RF 8.84 JT 80° UN RF 8.86 JT 40° IR RF 8.92 JT 30° IR RF 9.00 JT 30° IR RF	
		9.50			CORE LOSS 0.25m (9.25-9.50)	HW		9.15 JT 70° PR RF 9.18 SS GC 70 mm	
					Cored Drill Hole Terminated at 9.50 m.				
			293.1	10.0					
			292.1	11.0					
			291.1	12.0					

ESTIMATED STRENGTH Is(50) — ● - Axial ○ - Diametral; EL -0.03, VL -0.1, L -0.3, M -1, H -3, VH -10, EH

DEFECT SPACING (mm): 20, 60, 200, 600, 2000

DRILLING

NMLC NMLC Coring; NQ NQ Coring; HQ HQ Coring; PQ PQ Coring

TCR % core run recovered

RQD % core run > 100mm long (rock fraction only measured)

GROUNDWATER SYMBOLS

▼ = Water level (static)

▽ = Water level (during drilling)

SAMPLES & FIELD TESTS

D Disturbed Sample; ES Env Soil Sample; W Water Sample; EW Env Water Sample; SPT SPT Sample; U Undisturbed Tube Sample

DEFECT ABBREVIATIONS

CS Crushed Seam; CZ Crushed Zone; DB Drill Break; FZ Fractured Zone; JT Joint; IS Infilled Seam; SZ Shear Zone; VN Vein

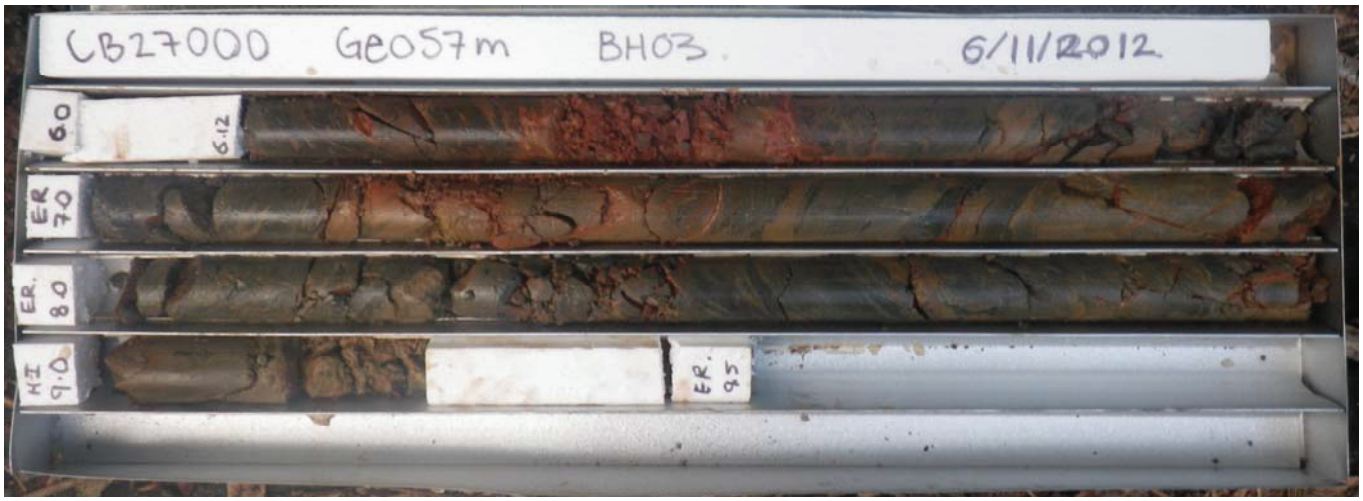
CN Clean; CT Coating; SN Stain; VR Veneer

POL Polished; RF Rough; S Smooth; SL Slickensided

Cu Curved; IR Irregular; PR Planar; ST Stepped; Un Undulated

ROCK STRENGTH (Is50 MPa)

0-0.03	Extremely Low
0.03-0.1	Very Low
0.1-0.3	Low
0.3-1.0	Medium
1.0-3.0	High
3.0-10	Very High



SINCLAIR KNIGHT MERZ SKM		Client: Transport and Main Roads	
drawn	KMF	Project: Transport Network Reconstruction Program	
date	8/11/2012	Core Photograph – GE057M_BH03	
scale	NTS	Project no. CB27000	Photo No: GE057M_BH03 1 of 1