BOREHOLE ENGINEERING LOG

HOLE NO : N071B_BH01

CLIENT : TRANSPORT AND MAIN ROADS	POSITION : E: 358642, N: 8137284 (56 MGA94)	PAGE : 1 OF 3
PROJECT : TNRP	SURFACE ELEVATION : 336.7 (AHD)	DATE DRILLED : 11/2/12 TO 11/2/12
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/V		H	NOT OBSERVED		336.7	0.0			0.08m ASPHALT: (0.08 m).			FILL
								GP	SANDY GRAVEL (GP): Grey, fine to medium gravel, angular, fine to coarse grained sand, with fines.			
									0.70m			
								CI-CH	SANDY CLAY (CI-CH): Red brown, medium to high plasticity, medium to coarse grained sand.		VSt - H	RESIDUAL SOIL
				1.00m	335.7	1.0			1.00m			
WB		F		SPT 1/5mm HB N=R 1.01m					QUARTZITE: Red brown, grey brown, extremely weathered, extremely low strength, appears as , CLAYEY GRAVEL (GC), fine to coarse gravel, angular.	D	VD	EXTREMELY WEATHERED ROCK
					334.7	2.0			2.00m			
									Continued as Cored Drill Hole			
					333.7	3.0						
					332.7	4.0						
					331.7	5.0						
					330.7	6.0						

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)
▽ = Water level (during drilling)

SAMPLES & FIELD TESTS

DS 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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CORED BOREHOLE ENGINEERING LOG

HOLE NO : N071B_BH01

CLIENT : TRANSPORT AND MAIN ROADS	POSITION : E: 358642, N: 8137284 (56 MGA94)	PAGE : 2 OF 3
PROJECT : TNRP	SURFACE ELEVATION : 336.7 (AHD)	DATE DRILLED : 2/11/12 TO 2/11/12
JOB NO : CB27000.F687	DIP / AZIMUTH : 90°	LOGGED BY : KMF
LOCATION : KENNEDY HWY (CAIRNS - MAREEBA)	CONTRACTOR : SAXON DRILLING	CHECKED BY : AJ

DRILLING | MATERIAL | DEFECTS & COMMENTS

DRILLING	WATER DETAIL	TCR/RQD / DRILL DEPTH	RL (m)	DEPTH (m)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	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	COMMENTS Description of joints, seams, defects, additional observations and comments	GENERAL
			336.7	0.0							
			335.7	1.0							
			334.7	2.0		START CORING AT 2.00m					
NMLC		100% TCR 76% RQD	333.7	3.0		QUARTZITE: Grey green, indistinct to distinct foliation at 30° to 40°. From 2.80 m becoming orange brown, grey.	MW - SW			JT 30° UN RF JT 40° ST RF JT 60° PR RF JT 60° PR RF JT 40° CU RF JT 60° CU RF JT 70° UN RF	
		4.00	332.7	4.0		From 4.50 m grey green, grey, orange brown.	EW - HW MW - SW			JT 40° UN RF JT 40° UN RF JT 30° CU RF JT 70° PR RF JT 80° UN RF JT 40° UN RF SZ GC 180 mm JT 30° PR S JT 80° PR S	
		100% TCR 56% RQD	331.7	5.0						JT 50° UN RF JT 60° UN RF JT 30° CU RF	
		5.65 100% TCR 100% RQD	330.7	6.0			EW - HW MW - SW			Clay 50 mm JT 60° UN RF JT 60° UN RF	

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
W Water Sample
ES Env Soil 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

CORED BOREHOLE ENGINEERING LOG

HOLE NO : N071B_BH01

CLIENT : TRANSPORT AND MAIN ROADS	POSITION : E: 358642, N: 8137284 (56 MGA94)	PAGE : 3 OF 3
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LOCATION : KENNEDY HWY (CAIRNS - MAREEBA)	CONTRACTOR : SAXON DRILLING	CHECKED BY : AJ

DRILLING					MATERIAL			DEFECTS & COMMENTS	
DRILLING	WATER DETAIL	TCR/RQD / DRILL DEPTH	RL (m)	DEPTH (m)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	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	COMMENTS Description of joints, seams, defects, additional observations and comments
NMLC		100% TCR 100% RQD 6.65	330.7	6.0		QUARTZITE: Grey green, indistinct to distinct foliation at 30° to 40°. *(continued)*	MW - SW			JT 30° UN RF JT 30° UN RF
			329.7	7.0		End of Borehole				
			328.7	8.0						
			327.7	9.0						
			326.7	10.0						
			325.7	11.0						
			324.7	12.0						

GENERAL

DRILLING

NMLC NMLC Coring — HQ HQ Coring
NQ NQ Coring — PQ PQ Coring

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

GROUNDWATER SYMBOLS
▼ = Water level (static)
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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	08/11/2012	Core Photograph – N071B_BH01	
scale	NTS	Project no. CB27000	Photo No: N071B_BH01 1 of 1