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CLIENT : TRANSPORT AND MAIN ROADS

POSITION : E: 358886, N: 8136930 (56 MGA94)

PAGE : 1 OF 4

PROJECT : TNRP

SURFACE ELEVATION : 304.2 (AHD)

DATE DRILLED : 5/11/12 TO 5/11/12

JOB NO : CB27000.F687

DIP / AZIMUTH : 90°

LOGGED BY : KMF

LOCATION : KENNEDY HWY (CAIRNS - MAREEBA)

CHECKED BY : AJ

DRILLING										MATERIAL			
PROGRESS			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
DRILLING & CASING	WATER	DRILLING											
AD/V													
			H			304.2	0.0		GP	SANDY GRAVEL (GP): Grey, fine to medium gravel, angular, fine to coarse grained sand.			FILL
			F			303.2	1.0		CI-CH	GRAVELLY CLAY (CI-CH): Pale brown, medium to high plasticity, fine to coarse grained angular gravel, with medium to coarse grained sand.			
					SPT 8, 11, 12/30mm HB N*=R 1.83m				CH	SILTY CLAY (CH): Red brown to brown, high plasticity, with fine to coarse grained sand.	D		
			H			302.2	2.0			SOIL (30%) AND ROCK FRAGMENTS (70%): Pale red brown, soil comprises of SILTY CLAY (CH), high plasticity, with some fine to medium grained sand, rock fragments comprise of fine to coarse grained angular gravel and cobbles.		F - St	COLLUVIUM
			F		3.00m SPT 5, 9, 12 N*=21	301.2	3.0		CI-CH	SILTY CLAY (CI-CH): Red brown, medium to high plasticity, with fine to medium grained angular to subangular gravel.		VSt	
					3.45m						W		
			H			300.2	4.0			SOIL (60%) AND ROCK FRAGMENTS (40%): Red brown, blue grey, pale orange brown, soil comprises of SILTY CLAY (CH), high plasticity, with some fine to medium grained sand, rock fragments comprise of fine to coarse grained angular gravel and cobbles which comprise of extremely high strength quartzite.		M	H
			F		4.50m SPT 17, 23, 21 N*=44								
			H		4.95m	299.2	5.0						
			H-VH		6.00m	298.2	6.0					D -	EXTREMELY WEATHERED ROCK

DRILLING				SAMPLES & FIELD TESTS				DENSITY (SPT N-value)		CONSISTENCY (Su) {N-value}			
HA	Hand Auger	RR	Rock Rolling	DS	Disturbed Sample	SPT Standard Penetration Test		VL	Very Loose	0 - 4	VS	Very Soft	< 12 kPa {0-2}
AS	Auger Screw	AT	Air Track	ES	Env Soil Sample	U Undisturbed Tube Sample		L	Loose	4 - 10	S	Soft	12 - 25 {2-4}
AD/T	Auger Drill TC-bit	HQ	HQ Coring	EW	Env Water Sample	W Water Sample		MD	Medium Dense	10 - 30	F	Firm	25 - 50 {4-8}
AD/V	Auger Drill V-bit	NQ	NQ Coring					D	Dense	30 - 50	St	Stiff	50 - 100 {8-15}
WB	Washbore	NMLC	NMLC Coring	HP	Hand Penetrometer	MOISTURE CONDITION		VD	Very Dense	50 - 100	VSt	Very Stiff	100 - 200 {15-30}
				HV	Hand Vane Shear	D = Dry M = Moist W = Wet		CO	Compact	>50/150mm	H	Hard	> 200 kPa {>30}
DRILLING PENETRATION				(P: Peak Su R: Residual Su)									
VE	Very Easy	F	Firm	VH	Very Hard								
E	Easy	H	Hard										
GROUNDWATER SYMBOLS				N SPT blows per 300mm									
▼ = Water level (static)				HW SPT penetration by hammer weight									
▽ = Water level (during drilling)				RW SPT penetration by rod weight									



BOREHOLE ENGINEERING LOG

HOLE NO : GE057M_BH01

CLIENT : TRANSPORT AND MAIN ROADS

POSITION : E: 358886, N: 8136930 (56 MGA94)

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PROJECT : TNRP

SURFACE ELEVATION : 304.2 (AHD)

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JOB NO : CB27000.F687

DIP / AZIMUTH : 90°

LOGGED BY : KMF

LOCATION : KENNEDY HWY (CAIRNS - MAREEBA)

CHECKED BY : AJ

DRILLING						MATERIAL						
PROGRESS		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
DRILLING & CASING	WATER											
AD/V ↓		H-VH		SPT 24/150mm HB N*=R 6.15m	298.2	6.0			EXTREMELY WEATHERED PHYLLITE: Red brown, extremely low to low strength, remolds to CLAYEY GRAVEL (GC), fine to coarse grained angular gravel, with some fine to medium grained sand, trace of cobbles , with some fine to medium grained sand and trace of cobbles. <i>(continued)</i>		VD	EXTREMELY WEATHERED ROCK
					297.2	7.0		7.00m	Continued as Cored Drill Hole			
					296.2	8.0						
					295.2	9.0						
					294.2	10.0						
					293.2	11.0						
					292.2	12.0						

DRILLING				SAMPLES & FIELD TESTS				DENSITY (SPT N-value)		CONSISTENCY (Su) {N-value}			
HA	Hand Auger	RR	Rock Rolling	DS	Disturbed Sample	SPT	Standard Penetration Test	VL	Very Loose	0 - 4	VS	Very Soft	< 12 kPa {0-2}
AS	Auger Screw	AT	Air Track	ES	Env Soil Sample	U	Undisturbed Tube Sample	L	Loose	4 - 10	S	Soft	12 - 25 {2-4}
AD/T	Auger Drill TC-bit	HQ	HQ Coring	EW	Env Water Sample	W	Water Sample	MD	Medium Dense	10 - 30	F	Firm	25 - 50 {4-8}
AD/V	Auger Drill V-bit	NQ	NQ Coring					D	Dense	30 - 50	St	Stiff	50 - 100 {8-15}
WB	Washbore	NMLC	NMLC Coring	HP	Hand Penetrometer			VD	Very Dense	50 - 100	VSt	Very Stiff	100 - 200 {15-30}
DRILLING PENETRATION				HV	Hand Vane Shear	MOISTURE CONDITION		CO	Compact	>50/150mm	H	Hard	> 200 kPa {>30}
VE	Very Easy	F	Firm	VH	Very Hard	D = Dry M = Moist W = Wet							
E	Easy	H	Hard										
GROUNDWATER SYMBOLS													



CORED BOREHOLE ENGINEERING LOG HOLE NO : GE057M_BH01

CLIENT : TRANSPORT AND MAIN ROADS

POSITION : E: 358886, N: 8136930 (56 MGA94)

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PROJECT : TNRP

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DATE DRILLED : 5/11/12 TO 5/11/12

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)	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	DEFECT SPACING (mm)	Description of joints, seams, defects, additional observations and comments	GENERAL
			298.2	6.0							
			297.2	7.0		START CORING AT 7.00m PHYLLITE: Dark green grey, indistinct bedding.	SW			7.04 JT 70° PR RF 7.07 JT 20° PR RF 7.10 JT 50° UN RF 7.17 SS 50° Clay UN RF 140 mm 7.31 SS 50° GC UN RF 190 mm	
		50% TCR 0% RQD 7.50								7.56 JT 20° PR RF 7.60 JT 20° ST RF 7.64 JT 60° UN RF 7.67 JT 30° UN RF 7.74 JT 30° UN RF 7.77 JT 40° ST RF 7.87 JT 70° PR RF 7.93 JT 50° ST RF 8.00 SS 60° GC PR RF 140 mm	
		100% TCR 0% RQD 8.20		296.2	8.0					8.14 JT 60° IR RF 8.25 JT 60° PR RF 8.32 JT 60° PR RF 8.40 JT 60 - 70° PR RF 8.51 JT 70° ST RF 8.55 JT 80° ST RF 8.59 JT 40° IR RF 8.61 SS 50° GC IR RF 270 mm	
		100% TCR 0% RQD 8.80				CORE LOSS 0.60m (8.80-9.40)					
		50% TCR 0% RQD		295.2	9.0					9.40 SS Clay PR RF 40 mm	
						PHYLLITE: Dark green grey, pale grey, indistinct to distinct bedding at 20°.	SW			9.53 JT 20° UN RF 9.62 JT 50° PR RF 9.67 JT 40° IR RF 9.73 SS 30° GC ST RF 280 mm	
		10.00		294.2	10.0						
		50% TCR 11% RQD				CORE LOSS 0.50m (10.00-10.50)					
						PHYLLITE: Green grey, orange brown, brown, indistinct bedding.	SW			10.50 SS 30° GC ST RF 30 mm 10.55 JT 10° CU RF 10.62 JT 70° UN RF 10.73 JT 20° CU RF 10.79 JT 30° CU RF 10.83 SS 60° UN RF 20 mm 10.89 JT 60° PR RF 10.93 JT 70° PR RF	
		11.00		293.2	11.0						
		60% TCR 0% RQD				CORE LOSS 0.50m (11.00-11.50)					
						PHYLLITE: Green grey, orange brown, indistinct bedding.	SW			11.59 JT 10° Clay CU RF 90 mm 11.68 JT 20° CU RF 11.72 JT 30° Clay UN RF 70 mm 11.79 SS 40° IR RF	
			292.2	12.0							

DRILLING				SAMPLES & FIELD TESTS				DEFECT ABBREVIATIONS				ROCK STRENGTH (Is50 MPa)			
NMLC	NMLC Coring	HQ	HQ Coring	D	Disturbed Sample	ES	Env Soil Sample	CS	Crushed Seam	CN	Clean	Cu	Curved	0-0.03	Extremely Low
NQ	NQ Coring	PQ	PQ Coring	W	Water Sample	EW	Env Water Sample	CZ	Crushed Zone	CT	Coating	IR	Irregular	0.03-0.1	Very Low
				SPT	SPT Sample			DB	Drill Break	SN	Stain	PR	Planar	0.1-0.3	Low
				U	Undisturbed Tube Sample			FZ	Fractured Zone	VR	Veneer	ST	Stepped	0.3-1.0	Medium
								JT	Joint			Un	Undulated	1.0-3.0	High
								IS	Infilled Seam	POL	Polished			3.0-10	Very High
								SZ	Shear Zone	RF	Rough				
								VN	Vein	S	Smooth				
										SL	Slickensided				
GROUNDWATER SYMBOLS															
															
= Water level (static)															
															
= Water level (during drilling)															

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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				DEFECT SPACING (mm)	Description of joints, seams, defects, additional observations and comments	GENERAL
NM/LC ↓			292.2	12.0		PHYLLITE: Green grey, orange brown, indistinct bedding. <i>(continued)</i>	SW	EL VI L L M H VH EH	-0.03 -0.1 -0.3 1 3 10		30 60 90 120 150 180 210 240 270 300 330 360 390 420 450 480 510 540 570 600 630 660 690 720 750 780 810 840 870 900 930 960 990 1020 1050 1080 1110 1140 1170 1200 1230 1260 1290 1320 1350 1380 1410 1440 1470 1500 1530 1560 1590 1620 1650 1680 1710 1740 1770 1800 1830 1860 1890 1920 1950 1980 2010 2040 2070 2100 2130 2160 2190 2220 2250 2280 2310 2340 2370 2400 2430 2460 2490 2520 2550 2580 2610 2640 2670 2700 2730 2760 2790 2820 2850 2880 2910 2940 2970 3000 3030 3060 3090 3120 3150 3180 3210 3240 3270 3300 3330 3360 3390 3420 3450 3480 3510 3540 3570 3600 3630 3660 3690 3720 3750 3780 3810 3840 3870 3900 3930 3960 3990 4020 4050 4080 4110 4140 4170 4200 4230 4260 4290 4320 4350 4380 4410 4440 4470 4500 4530 4560 4590 4620 4650 4680 4710 4740 4770 4800 4830 4860 4890 4920 4950 4980 5010 5040 5070 5100 5130 5160 5190 5220 5250 5280 5310 5340 5370 5400 5430 5460 5490 5520 5550 5580 5610 5640 5670 5700 5730 5760 5790 5820 5850 5880 5910 5940 5970 6000 6030 6060 6090 6120 6150 6180 6210 6240 6270 6300 6330 6360 6390 6420 6450 6480 6510 6540 6570 6600 6630 6660 6690 6720 6750 6780 6810 6840 6870 6900 6930 6960 6990 7020 7050 7080 7110 7140 7170 7200 7230 7260 7290 7320 7350 7380 7410 7440 7470 7500 7530 7560 7590 7620 7650 7680 7710 7740 7770 7800 7830 7860 7890 7920 7950 7980 8010 8040 8070 8100 8130 8160 8190 8220 8250 8280 8310 8340 8370 8400 8430 8460 8490 8520 8550 8580 8610 8640 8670 8700 8730 8760 8790 8820 8850 8880 8910 8940 8970 9000 9030 9060 9090 9120 9150 9180 9210 9240 9270 9300 9330 9360 9390 9420 9450 9480 9510 9540 9570 9600 9630 9660 9690 9720 9750 9780 9810 9840 9870 9900 9930 9960 9990 10020 10050 10080 10110 10140 10170 10200 10230 10260 10290 10320 10350 10380 10410 10440 10470 10500 10530 10560 10590 10620 10650 10680 10710 10740 10770 10800 10830 10860 10890 10920 10950 10980 11010 11040 11070 11100 11130 11160 11190 11220 11250 11280 11310 11340 11370 11400 11430 11460 11490 11520 11550 11580 11610 11640 11670 11700 11730 11760 11790 11820 11850 11880 11910 11940 11970 12000 12030 12060 12090 12120 12150 12180 12210 12240 12270 12300 12330 12360 12390 12420 12450 12480 12510 12540 12570 12600 12630 12660 12690 12720 12750 12780 12810 12840 12870 12900 12930 12960 12990 13020 13050 13080 13110 13140 13170 13200 13230 13260 13290 13320 13350 13380 13410 13440 13470 13500 13530 13560 13590 13620 13650 13680 13710 13740 13770 13800 13830 13860 13890 13920 13950 13980 14010 14040 14070 14100 14130 14160 14190 14220 14250 14280 14310 14340 14370 14400 14430 14460 14490 14520 14550 14580 14610 14640 14670 14700 14730 14760 14790 14820 14850 14880 14910 14940 14970 15000 15030 15060 15090 15120 15150 15180 15210 15240 15270 15300 15330 15360 15390 15420 15450 15480 15510 15540 15570 15600 15630 15660 15690 15720 15750 15780 15810 15840 15870 15900 15930 15960 15990 16020 16050 16080 16110 16140 16170 16200 16230 16260 16290 16320 16350 16380 16410 16440 16470 16500 16530 16560 16590 16620 16650 16680 16710 16740 16770 16800 16830 16860 16890 16920 16950 16980 17010 17040 17070 17100 17130 17160 17190 17220 17250 17280 17310 17340 17370 17400 17430 17460 17490 17520 17550 17580 17610 17640 17670 17700 17730 17760 17790 17820 17850 17880 17910 17940 17970 18000 18030 18060 18090 18120 18150 18180 18210 18240 18270 18300 18330 18360 18390 18420 18450 18480 18510 18540 18570 18600 18630 18660 18690 18720 18750 18780 18810 18840 18870 18900 18930 18960 18990 19020 19050 19080 19110 19140 19170 19200 19230 19260 19290 19320 19350 19380 19410 19440 19470 19500 19530 19560 19590 19620 19650 19680 19710 19740 19770 19800 19830 19860 19890 19920 19950 19980 20010 20040 20070 20100 20130 20160 20190 20220 20250 20280 20310 20340 20370 20400 20430 20460 20490 20520 20550 20580 20610 20640 20670 20700 20730 20760 20790 20820 20850 20880 20910 20940 20970 21000 21030 21060 21090 21120 21150 21180 21210 21240 21270 21300 21330 21360 21390 21420 21450 21480 21510 21540 21570 21600 21630 21660 21690 21720 21750 21780 21810 21840 21870 21900 21930 21960 21990 22020 22050 22080 22110 22140 22170 22200 22230 22260 22290 22320 22350 22380 22410 22440 22470 22500 22530 22560 22590 22620 22650 22680 22710 22740 22770 22800 22830 22860 22890 22920 22950 22980 23010 23040 23070 23100 23130 23160 23190 23220 23250 23280 23310 23340 23370 23400 23430 23460 23490 23520 23550 23580 23610 23640 23670 23700 23730 23760 23790 23820 23850 23880 23910 23940 23970 24000 24030 24060 24090 24120 24150 24180 24210 24240 24270 24300 24330 24360 24390 24420 24450 24480 24510 24540 24570 24600 24630 24660 24690 24720 24750 24780 24810 24840 24870 24900 24930 24960 24990 25020 25050 25080 25110 25140 25170 25200 25230 25260 25290 25320 25350 25380 25410 25440 25470 25500 25530 25560 25590 25620 25650 25680 25710 25740 25770 25800 25830 25860 25890 25920 25950 25980 26010 26040 26070 26100 26130 26160 26190 26220 26250 26280 26310 26340 26370 26400 26430 26460 26490 26520 26550 26580 26610 26640 26670 26700 26730 26760 26790 26820 26850 26880 26910 26940 26970 27000 27030 27060 27090 27120 27150 27180 27210 27240 27270 27300 27330 27360 27390 27420 27450 27480 27510 27540 27570 27600 27630 27660 27690 27720 27750 27780 27810 27840 27870 27900 27930 27960 27990 28020 28050 28080 28110 28140 28170 28200 28230 28260 28290 28320 28350 28380 28410 28440 28470 28500 28530 28560 28590 28620 28650 28680 28710 28740 28770 28800 28830 28860 28890 28920 28950 28980 29010 29040 29070 29100 29130 29160 29190 29220 29250 29280 29310 29340 29370 29400 29430 29460 29490 29520 29550 29580 29610 29640 29670 29700 29730 29760 29790 29820 29850 29880 29910 29940 29970 30000	11.83 JT 60° ST RF 11.89 JT 70° ST RF 11.92 JT 30° IR RF 11.96 JT 60° PR RF 12.00 SS 60° ST RF 250 mm		
			12.25			X	CORE LOSS 0.20m (12.25-12.45)	X					12.56 SS 60° ST RF 30 mm 12.65 JT 50° ST RF 12.71 CS 30° CU RF 10 mm 12.83 SS 60° ST RF 12.91 JT 50° PR RF 12.98 JT 40° IR RF 13.10 SS 40° IR RF 60 mm 13.22 SS 40° IR RF 60 mm 13.32 JT 20° CU RF	
			82% TCR 0% RQD		291.2	13.0		PHYLLITE: Green grey	SW					
		13.35				Cored Drill Hole Terminated at 13.35 m.								
			290.2	14.0										
			289.2	15.0										
			288.2	16.0										
			287.2	17.0										
			286.2	18.0										

<p>DRILLING</p> <p>NMLC NMLC Coring HQ HQ Coring NQ NQ Coring PQ PQ Coring</p> <p>TCR % core run recovered RQD % core run > 100mm long (rock fraction only measured)</p> <p>GROUNDWATER SYMBOLS = Water level (static) = Water level (during drilling)</p>						<p>SAMPLES & FIELD TESTS</p> <p>D Disturbed Sample ES Env Soil Sample W Water Sample EW Env Water Sample SPT SPT Sample U Undisturbed Tube Sample</p>						<p>DEFECT ABBREVIATIONS</p> <p>CS Crushed Seam CN Clean Cu Curved CZ Crushed Zone CT Coating IR Irregular DB Drill Break SN Stain PR Planar FZ Fractured Zone VR Veneer ST Stepped JT Joint Un Undulated</p> <p>IS Infilled Seam POL Polished SZ Shear Zone RF Rough VN Vein S Smooth SL Slickensided</p>						<p>ROCK STRENGTH (Is50 MPa)</p> <p>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</p>					
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		Client: Transport and Main Roads	
		Project: Transport Network Reconstruction Program	
drawn	KMF	Core Photograph – GE057M_BH01	
date	8/11/2012	Project no. CB27000	
scale	NTS	Photo No: GE057M_BH01 1 of 1	