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ENGINEERING BOREHOLE LOG

FOR GEOTECHNICAL TERMS AND
SYMBOLS REFER FORM F:GEOT 017/5-2009

BOREHOLE No BH032
SHEET 1 of 3
REFERENCE No H10604

PROJECT BRUCE HIGHWAY (COOROY - CURRA) SECTION A GEOTECHNICAL INVESTIGATION
LOCATION Cut 12 COORDINATES 485073.6 E; 7081106.7 N
PROJECT No FG5825 SURFACE R.L. 175.95m PLUNGE DATE STARTED 6/8/09 GRID DATUM MGA94
JOB No 128/10A/901 HEIGHT DATUM AHD BEARING DATE COMPLETED 10/8/09 DRILLER R & D Drilling

DEPTH (m)	R.L. (m)	AUGER CASING WASH BORING CORE DRILLING	RQD (%)	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC WEATHERING	INTACT STRENGTH	DEFECT SPACING (mm)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES TESTS
0	175.95		CORE REC %									
1				A	Clayey SILT Pale brown to pale grey, moist, stiff. Rock foliations preserved in parts; traces of organics.		(ML)					3,4,5 N=9 SPT
2	174.45			B	PHYLLITE (XW): Generally exhibits the engineering properties of moist, hard, clayey Silt. Rock foliation preserved throughout.		XW					14,19,21 N=40 SPT
3	173.45			C	PHYLLITE (HW): As above.		HW					14,30,30/100 N>50 SPT
4	172.95		(0)		PHYLLITE (MW): Pale brown, fine grained, foliated. Foliations vary in dip from 10° to 70°. Defects are generally close to medium spaced. Prominent defect set parallel to foliation.		MW				Crushed zone Broken zone Broken zone Broken zone	Is(50) = 0.03MPa Is(50) = 0.00MPa x o
5			100 (40)		Defect surfaces are typically clay infilled or iron stained.							
6	169.93		100 (37)		Occasional quartz veins up to 30mm thick. Detailed defect descriptions are shown on Form GEOT533/8 attached.							Is(50) = 0.84MPa Is(50) = 0.43MPa x o
7					PHYLLITE (MW - SW): Pale grey to slightly green, fine grained, foliated. Foliations vary in dip from 10° to 70° and are deformed. Defects are generally medium spaced. Prominent defect set parallel to foliation.		MW-SW					Is(50) = 0.18MPa Is(50) = 0.20MPa o x
8			100 (42)		Defect surfaces are typically iron stained or thinly clay infilled.							
9			100 (58)									Is(50) = 0.07MPa Is(50) = 0.09MPa x o
10												

REMARKS Detailed defect descriptions are shown on Form GEOT533/8 attached. Piezometer installed at base.

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ENGINEERING BOREHOLE LOG

FOR GEOTECHNICAL TERMS AND
SYMBOLS REFER FORM F:GEOT 017/5-2009

BOREHOLE No BH032
SHEET 2 of 3
REFERENCE No H10604

PROJECT BRUCE HIGHWAY (COOROY - CURRA) SECTION A GEOTECHNICAL INVESTIGATION
LOCATION Cut 12 COORDINATES 485073.6 E; 7081106.7 N
PROJECT No FG5825 SURFACE R.L. 175.95m PLUNGE _____ DATE STARTED 6/8/09 GRID DATUM MGA94
JOB No 128/10A/901 HEIGHT DATUM AHD BEARING _____ DATE COMPLETED 10/8/09 DRILLER R & D Drilling

DEPTH (m)	R.L. (m)	AUGER CASING WASH BORE DRILLING CORE DRILLING	RQD (%)	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH	DEFECT SPACING (mm)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES TESTS
10	165.95				PHYLLITE (MW - SW): (Cont'd)								
11			100 (27)									Brecciated zone	
12			100 (16)		Detailed defect descriptions are shown on Form GEOT533/8 attached							Is(50) = 0.24MPa Is(50) = 0.17MPa	x o
13					13.0 - 13.7m: Vertical, very high strength, highly fractured quartz vein.							Crushed zone Quartz vein Quartz vein	
14			100 (20)									Vertical quartz vein	
15			100 (58)									7/10/09 Is(50) = 0.39MPa Is(50) = 0.49MPa	o x
16			100 (63)		15.9 - 16.4m: Prominent quartz veining and clayey zones.								
17	159.19				PHYLLITE (SW): Pale grey to slightly green, fine grained, foliated. Foliation is distinct and dipping at 45°. Prominent defect set parallel to foliation. Defect surfaces typically have a thin clay infilling.							Quartz vein Is(50) = 0.03MPa Is(50) = 0.04MPa	x o
18			100 (68)										
19			100 (64)									Is(50) = 0.51MPa Is(50) = 0.09MPa	x o
20													

REMARKS Detailed defect descriptions are shown on Form GEOT533/8 attached. Piezometer installed at base.

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ENGINEERING BOREHOLE LOG

FOR GEOTECHNICAL TERMS AND
SYMBOLS REFER FORM F:GEOT 017/5-2009

BOREHOLE No BH032
SHEET 3 of 3
REFERENCE No H10604

PROJECT BRUCE HIGHWAY (COOROY - CURRA) SECTION A GEOTECHNICAL INVESTIGATION
LOCATION Cut 12 COORDINATES 485073.6 E; 7081106.7 N
PROJECT No FG5825 SURFACE R.L. 175.95m PLUNGE _____ DATE STARTED 6/8/09 GRID DATUM MGA94
JOB No 128/10A/901 HEIGHT DATUM AHD BEARING _____ DATE COMPLETED 10/8/09 DRILLER R & D Drilling

DEPTH (m)	R.L. (m)	AUGER CASING WASH BORING CORE DRILLING	RQD () %	CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC WEATHERING	INTACT STRENGTH	DEFECT SPACING (mm)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES TESTS
20	155.95					PHYLLITE (SW): (Cont'd)						Is(50) = 1.23MPa Is(50) = 0.40MPa	o x
21			100 (71)			Detailed defect descriptions are shown on Form GEOT533/8 attached.	SW						
22	153.45					Borehole terminated at 22.5m						Is(50) = 1.07MPa Is(50) = 0.51MPa	x o
23													
24													
25													
26													
27			100										
28													
29													
30													

REMARKS Detailed defect descriptions are shown on Form GEOT533/8 attached. Piezometer installed at base.

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Project: **Bruce Highway Upgrade (Cooroy – Curra) Section A**
Borehole No: **BH32**
Start Depth: 3.00m
Finish Depth: 22.50m
Project No: FG5825
H No: 10604



SCALE 1:5

F:GEOT043/1

Project: **Bruce Highway Upgrade (Cooroy – Curra) Section A**
Borehole No: **BH32**
Start Depth: 3.00m
Finish Depth: 22.50m
Project No: FG5825
H No: 10604



SCALE 1:5

F:GEOT043/1

Project: **Bruce Highway Upgrade (Cooroy – Curra) Section A**
Borehole No: **BH32**
Start Depth: 3.00m
Finish Depth: 22.50m
Project No: FG5825
H No: 10604



SCALE 1:5

F:GEOT043/1

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

[CHARACTERISATION OF DEFECTS ARE IN ACCORDANCE WITH
GEOTECHNICAL TERMS AND SYMBOLS – FORM : GEOT 017/5 – 2009]

BOREHOLE NO.:	BH 32
SHEET:	1 of 4
REFERENCE NO.:	H10604

PROJECT:	Bruce Highway (Cooroy – Curra) Section A Geotechnical Investigation					
LOCATION:	Cut 12					
PROJECT NO.:	FG5825	SURFACE R.L.:	175.95	DRILLER:	R & D Drilling	
JOB NO.:	128/10/A/901	DATUM:	MGA94	DATE DRILLED:	06/08/2009	

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
3.00-19.70	DISTURBED FOLIATIONS – JOINTED, FRACTURED						
3.16	J	55	Un	R	O	MnSt, FeSt, W	
3.20	J	75	Pl	S	C	MnSt, FeSt, W	
3.22	J	85	Un	S	O	W, FeSt	
3.28	J	0	St	R	O	MnSt, FeSt	
3.37-3.39	Cz	5	St	S	O		
3.47-3.55	Bz	0					Cl, Qz gravels
3.58	J	40	Pl		O		
3.62	J	25	Un-Pl	S	C	FeSt	Clay veneer
3.76	J	30	Pl	S	C	FeSt	
3.88	FP	85	Pl	S	C	FeSt	
3.89	FP	85	Pl	S	C	FeSt	
3.99	J	10	St	R	C		
4.03	J	40	Pl		C		
4.17	J	50-55	Pl		C		Cl, 8mm remnant joint
4.26-4.42	FPx8	15-20	Un	S	C	FeSt, W	IN
4.31	J	85	St	SR	C	MnSt, FeSt	
4.33	Sz	60	Pl		C		Sz 6mm wide

Abbreviations (as per F: GEOT 017/5 – 2009)

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J, Js	Joint, Joints	Cl	Clay Infill
Sr	Slightly Rough	W	Weathered	B	Bedding	CLy	Clayey
S	Smooth	Smn	Secondary Mineralisation	BP	Bedding Parting	Co	Coal Seam
SL	Slickensided	Cn	Clean	FP	Foliation Parting	Carb	Carbonaceous
PO	Polished	MnSt	Manganese Stained	LP	Lamination Parting	SI	Sand Infill
PLANARITY		APERTURE		CLV	Cleavage	QZ	Quartz
Pl	Planar	C	Closed	Fr	Fracture	CA	Calcite
St	Stepped	O	Open	SZ	Sheared Zone	Chl	Chlorite
Un	Undulating	F	Filled	CZ	Crushed Zone	In	Incipient
Cu	Curved	T	Tight	BZ	Broken Zone	Int	Intersecting
Ir	Irregular			HFZ	Highly Fractured Zone	Lam (s)	Lamination (s)
				WS	Weathered Seam	Di	Drilling Induced
				Vn	Vein	H	Horizontal
						V	Vertical

NOTE: This sheet should be read in conjunction with appropriate Engineering Borelog. Defect angles were measured with respect to horizontal plane.

BOREHOLE NO.:	BH 32
SHEET:	2 of 4
REFERENCE NO.:	H10604

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
3.80-4.24	Cz				Some foliation partings and fracturing		
4.50	J	10	Pl	S	C	W	2mm crushed rock infill 1mm IC
4.56	FP	10	St-Un	S	C		Cl 1mm
4.56-4.60	Bz	10-15			C		
4.65	J	40	Pl		C		Cl, 2mm
4.75	FP	10	Un	S	C		
4.78	J	60	Pl	S	C	MnSt, FeSt	Cl, 2mm
5.00-5.34	FPx4	55	Un		C		Cl, in one FP, 10mm
5.13	J	65			C		Trace clay
5.36	J	30	Un	Sr		FeSt	
5.40	J	45	Un	Sr		FeSt	
5.45	J	40	Un	Sr		FeSt	
5.53	J	45	Un	Sr		FeSt	
5.67	DI						
5.75	DI						
6.00	DI						
6.22	J	30	Un		C		
6.40	J	35	Pl		C		
6.50	J	45	Pl		C		
7.12	J	50	Pl		C	Smn	
7.10-7.90						Smn, closely spaced fracturing	
8.32	J	50	Pl		C		
8.44	J	35	St		C		
8.64	J	65	St	Sr	C		
8.75	J	15	St	Sr	C		
8.90	J	30	Pl		C	Smn	
9.05	J	55	St	R	O		
9.09	J	10	St		C		
9.34	J	10	St		C		
9.44	J	90	St		C		
9.57	J	0	Un		O		
9.69	J	20	Pl		C		
9.96	J	20	Un	S	C		
10.0	J	85	Un			Rehealed	
10.26	J	25	Un	S	C		
10.45-10.61	Jx6	35	Un	S-Sr	C	FeSt	Cl in one joint, 2mm
10.61-10.80	BRECCIATED ZONE						
10.86	Cz	35	Un	C			Cz – 3mm wide
10.97	J	40	Un	S	C	FeSt	
11.11	J	5	Un	S	C	W, FeSt	
11.24	J	40	Pl		C	Smn	
11.30	J	85	Un		C	Smn	
11.37	J	45	St		C		Crushed/weathered rock 3mm
11.57	J	40	Un	Sr	C		
11.87	J	60	St	S	C		
11.91	J	20	Pl	S	O		Cn
11.93	J	40	Pl	S	O		Cl
11.94-12.0	Cz						Crushed qz & clay
12.13	J	40	Un	SR	O	FeSt	
12.16	J	30	Pl		C	FeSt	Qz vein 3mm wide
12.23	J	60	Pl		C	FeSt	
12.27	J	60	Pl		C	FeSt	
12.30	J	10	Pl		C		
12.41	Qz	40	Pl		C		Cl, 5mm wide
12.48	Qz	40	Pl,		C		Cl, 10mm wide

BOREHOLE NO.:	BH 32
SHEET:	3 of 4
REFERENCE NO.:	H10604

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
12.65	J	10	U	R	O	FeSt	Mg
12.69	J	85	St		C	FeSt	120mm long
12.81	J	10	Pl		C	FeSt	
12.9	J	50	Pl	S	O	FeSt	
12.96	J	20	Pl	R	O	FeSt	
13.02-13.72	QZ	85	lr	R	C		Cl, heavily fractured
13.34	J	20	lr	R	O	FeSt	Cl
13.68	J	60	Pl	SR	O		Cl
13.75	J	60	Pl		C		2mm Cl
13.87	J	55	Pl		C	FeSt	
13.9	J	85	Un	R	O		Cl, 220mm clay
14.13	J	10	Pl	SR	O		Cl
14.16	J	35	Pl	R	O	Cn	
14.23	J	50	Pl		C		
14.41	J	35	Pl	S	O	FeSt	
14.48	J	30	Pl	S	O	FeSt	
14.78	J	60	Pl	S??		FeSt	
14.96	J	40	Pl	S	O	Cn	
15.1	J	25	Pl	SR	O	Cn	
15.78	J	10	Pl	SR	O	Cn	
15.85-16.12	WS						QZ seams throughout
16.15-16.19	QZ	30	Pl				
16.25-16.26	QZ	10					
16.31-16.35	QZ	10					
16.39-16.51	BZ						QZ seams throughout
16.66	J	20	lr	R	O	Cn	
16.66-16.76	QZ	20	Pl		C		
16.76	J	40	Pl		C		
16.79	J	40	Pl		C		
16.84	J	40	pl	S	O	Cn	
16.88	J	40	Pl	S	O	Cn	
16.95	J	30	Pl	S	O	Cn	
17.03	J	55	Pl	S	O	Cn	
17.09	J	50	Pl	S	O	Cn	
17.36	J	10	Pl		C		
17.42	J	10	lr		C		
17.43	J	40	Pl		C		
17.51	J	40	Pl		C		Cl
17.56	J	40	Pl		C		
17.65	J	45	Pl		C		
17.88	J	55	Pl	S	O	Cn	
17.96	J	20	Pl	SR	O	Cn	
18.02	J	60	Pl	S	O	Cn	
18.07	J	60	Pl	S	O	Cn	
18.19	J	60	Pl	S	O	Cn	
18.27	J	60	Pl	S	O		Cl
18.31	J	60	Pl	S	O	FeSt	
18.94	J	65	St		C		
19.1	J	30	lr		C		
19.2	J	35	Pl		C		
19.4	J	70	Pl	S	O	FeSt	
19.5	J	30	Pl	SR	O	Cn	
19.69	J	50	Pl		C	FeSt	
19.74	J	50	Pl		C		10mm Cl
19.82	J	20	Pl		C		
20.07	J	30	Pl		C		
20.11	J	25	Pl		C		

BOREHOLE NO.:	BH 32
SHEET:	4 of 4
REFERENCE NO.:	H10604

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
20.16	J	30	Ir	SR	O	Cn	
20.36	J	30	Pl	R	O	FeSt	
20.42	J	50	Pl	S	O	Cn	
20.69	J	45	Pl	S	O	Cn	
20.95	J	30	Ir	R	O	Cn	
21.11	J	30	Un	SR	O	Cn	
21.12	J	65	Pl	S	O	Cn	
21.13	J	65	Pl	S	O	Cn	
21.17	J	65	Pl	S	O		CI
21.41	J	40	Pl	SR	O	Cn	
21.65	J	50	Pl	S	O	Cn	
21.86	J	50	Pl	S	O		CI
21.95	J	50	Pl	S	O	Cn	
22.31	J	60	Pl	S	O	Cn	