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Queensland

GEOTECHNICAL BOREHOLE LOG

FINAL 02/03/2018 BOREHOLE No CRR711

Sheet 1 of 5

		1%.	8	GU	Vt	emment	SY		REFER FORM F:GE			REFERENCE No	H:	12937
PROJE	СТ		ross	River	Rail	CRR2017 - Additional Geotechnic	al Inves	tigatio	on					
LOCAT	ION	Т	he (Cliffs Bo	ard	walk						coordinates 503401.	6 E; 69606	78.9 N
PROJE	CT No	_	G6	470		SURFACE RL 2.26m	PLU	INGE S	0°	DATE STAF	RTED 07/11/2017	7 GRID DATUM	MGA94	
JOB N	o .	_				HEIGHT DATUM AHD	BEA	RING _		DATE COMPLE	ETED 10/11/2017	7 DRILLER	Geodrill	
DEPTH (m)	R.L. (m)	AUGER	WASH BORING SORE DRILLING	RQD ()% CORE REC%	SAMPLE	MATERIAL DESCRIPTION	ГІТНОГОБУ	USCS WEATHERING	INTACT STRENGTH	DEFECT SPACING		ADDITIONAL DATA AND TEST RESULTS		SAMPLES TESTS
	2.06 0.76			(79) 100 (63)	В	Silty SAND (Topsoil) Dark brown, moist. Fine to media grained sand, sub angular. Low plasticity fines. Clayey SAND with Gravel (Fill) Pale brown, moist, medium dens Fine to coarse grained sand, angul Low plasticity clay. Fine to coarse grained gravel, angular. Trace cobbles and boulders. Silty Sandy GRAVEL (Fill) Brown and dark grey, moist, loos to medium dense. Fine to medium grained gravel, angular. Fine to coarse grained sa angular. TUFF (Rif) SW: Pink and pale brown, fine to coarse grained sa angular. With some iron stainingJs: 0°-30° (1-2/m), Un/Ro, OP, Cn FeSt -Js: 60°-65° (1/m), Un/Ro, OP, Cn FeSt -Gontinued on next sheet.	se. ular. e se and,	(SC)	VH	c w	7.86m-8.43m: -J: 50 Ro, OP-TI, Vr	! ! !*-90°, Un/Sm-	4, 4, 4, 5 N=9 5, 4, 7 N=11 4, 4, 4 N=8 L=28% PI= 11% MC=12-6% <75μm= 26% s(50)=4.50 MPa s(50)=4.90 MPa s(50)=4.00 MPa	SPT SPT D (5.87m) - A (5.89m) - A (7.46m)
DI	- N / N D	Kc.	Г	in ^	cnl	Continued on next sheet ey Formation. Rif - Brisbane	Tuff							A (9.96m)
KI	IVIAK	\N):	۲	up - A	shi	ey Formation, kii - Brisbane	iuii.					LOGGED BY		WED BY
							TMR GEOTFO	HNICAL B	OREHOLE LOG - CREATED V	VITH HOLEBASE SI		SB	5.	Foley

GEOTECHNICAL BOREHOLE LOG

FINAL 02/03/2018

BOREHOLE No CRR711

Sheet 2 of 5

			GC)V(ernment	SY		GEOTECHNICAL T REFER FORM F:GI			REFERENCE No	Н	12937
ROJECT		Cro	ss River	Rail	CRR2017 - Additional Geotechnical	Inves	stigati	on					
OCATION	•	The	: Cliffs B	oard	dwalk						COORDINATES 503401.6	E; 69606	78.9 N
ROJECT No		FG	6470		SURFACE RL 2.26m	PLI	UNGE S	90°	DATE STAI	RTED 07/11/2017	7 GRID DATUM N	ЛGA94	
OB No					height datum AHD	BEA	ARING_		DATE COMPL	ETED 10/11/2017	7 DRILLER G	Geodrill	
(m) DEPTH (m)	AUGER	CASING WASH BORING	RQD ()% CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USCS WEATHERING	INTACT STRENGTH	DEFECT SPACING		ADDITIONAL DATA AND TEST RESULTS		SAMPLES TESTS
-8.5: - 11 - 12 - 13 - 14 - 15 - 16 - 17 - 18		M 01	100 (100) (100)		TUFF (Rif) HW: Orange and brown, fine to coarse grained gravel size clasts within fine grained matrix, mediun strength. Iron stained throughout. TUFF (Rif) FR: Grey and pale purple, fine to coarse grained gravel size clasts within fine grained matrix, massive high to very high strengthJs: 0°-15° (0-1/m), Un/Ro, OP, Cn			н	c	10.30m-10.78m: W	Is (5	(a)=3.50 MPa (b)=3.20 MPa (c)=3.20 MPa (c)=2.10 MPa (c)=2.10 MPa (c)=4.70 MPa (c)=3.10 MPa (c)=4.60 MPa (c)=4.60 MPa (c)=2.30 MPa (c)=2.30 MPa (c)=2.30 MPa	D (11.65m) A (11.67m) D (12.05m) A (12.07m) A (12.07m) A (13.50m) A (13.50m) A (14.95m) A (14.96m) D (17.20m) A (17.21m) A (17.21m)
-17.7	4						e e						_
REMA	RKS	 S:	Rip - A	spl	Continued on next sheet ey Formation. Rif - Brisbane T	uff.					LOGGED BY	REVII	EWED BY
											SB	S.	Foley
											•		

GEOTECHNICAL BOREHOLE LOG

FOR GEOTECHNICAL TERMS AND

FINAL 02/03/2018

CRR711

Sheet 3 of 5

BOREHOLE No

AUGAS AT	1101115	3011			SYMBOLS	REFER FORM F:GE	OT 017/8-2014		REFERENCE No	H:	12937
PROJECT	Cross R	iver Rail	CRR2017 - Additional	Geotechnica	al Investigatio	on					
LOCATION	The Clif	fs Board	lwalk						COORDINATES 503401.6	E; 69606	78.9 N
PROJECT No	FG6470)	SURFACE RL	2.26m	PLUNGE S	90°	DATE STAR	TED 07/11/201	7 GRID DATUM	MGA94	
JOB No			HEIGHT DATUM	AHD	BEARING _		DATE COMPLE	TED 10/11/201	7 DRILLER	Geodrill	
DEPTH (m) (m)	ORING RILLING	ORE EC %	MATERIAL DES	CRIPTION	LITHOLOGY USCS WEATHERING	INTACT STRENGTH 프, 독, 포, 그, 국, 교	DEFECT SPACING		ADDITIONAL DATA AND TEST RESULTS		SAMPLES TESTS
		(00 (00) (00) (00) (00) (00) (00)	TUFF (Rif) FR: Cont'd.			H-/H	M W		Is(Is(50)=3.70 MPa 50)=5.10 MPa 50)=4.10 MPa 50)=6.70 MPa 50)=0.87 MPa 50)=5.10 MPa	D (21.65m) A (21.66m) D (23.70m) A (23.72m) A (25.95m) A (25.96m)
		100	TUFF (Rif) SW: Grey, fine to coa gravel sized clasts wi	thin fine			M M	28.67m-28.83m: Cr 		50)=3.80 MPa 50)=3.00 MPa 50)=3.00 MPa 50)=3.70 MPa 55=57.40 MPa E=20 GPa E=20 GPa F=0.044 50)=6.00 MPa 50)=6.00 MPa 50)=6.00 MPa	D (27.42m) A (27.44m) D (28.87m) A (28.88m) (29.12m) D (29.28m) A (29.29m) D (29.72m) A (29.73m)
			Continued on n					30.00m-30.19m: C			
REMARI	KS: Rip	- Aspl	ey Formation. Rif	- Brisbane	Tuff.				LOGGED BY		WED BY
									SB	S.	Foley
					TA AD CEOTECUNICAL D		WITH HOLEDAGE CI				

GEOTECHNICAL BOREHOLE LOG

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/8-2014

FINAL 02/03/2018

BOREHOLE No CRR711

Sheet 4 of 5

EFERENCE No **H12937**

SW. Dark grap, fine grained, laminated to very thinly bedded, medium strength. SANDSTONE (Rip) FR. Pale gray and grey, fine grained, laminated to thinly bedded, medium strength. SANDSTONE (Rip) SW. Grey, fine to coarse grained graved size clasts within fine grained matrix, thickly bedded, mainly coarse in the coarse grained graved size clasts within fine grained matrix, thickly bedded, mainly coarse in the coarse grained matrix, thickly bedded, mainly coarse in the coarse grained matrix, thickly bedded, mainly coarse in the coarse grained graved size clasts within fine grained matrix, thickly bedded, mainly coarse in the coarse grained graved size clasts within fine grained matrix, thickly bedded, mainly coarse in the coarse grained graved size clasts within fine grained graved		AUTORS A	FIDELIS					SYI	MBOLS	REFER FO	ORM F:GE	OT 017/8-	2014		REFERENCE NO) <u> </u>	12337
### PRINCE NO.	PROJE	CT	Cro	oss River	Rail	CRR2017 - Additional	Geotechnical Ir	nvest	tigatio	on							
### STATE OF THE PROPERTY OF T	LOCAT	ION	Th	e Cliffs Bo	ard	walk									COORDINATES 5034	01.6 E; 69606	78.9 N
Record Section Secti	PROJE	CT No	FC	6470		SURFACE RL	2.26m	PLU	INGE 9	0°	_	D	ATE STAR	RTED 07/11/201	.7 GRID DAT	тим <u>М</u> GA94	
27.35 Sample Sam	JOB N	0	_			HEIGHT DATUM	AHD	BEA	RING _			DATE	COMPLE	TED 10/11/201	.7 DRIL	LER Geodrill	
27 88	DEPTH (m)		AUGER CASING WASH BORING	()% CORE	SAMPLE	MATERIAL DESC	CRIPTION			STRE	ENGTH	SPAC	CING		AND		SAMPLES TESTS
OP, Cn Sis(50)=0.14 MPa D (39.50 1.650)=0.60 MPa D (39.51 1.650	- 31	-29.03 -29.66		(100)		Very high strength. SILTSTONE (Rip) SW: Dark grey, fine glaminated to very thi medium strength. SANDSTONE (Rip) FR: Pale grey and gre laminated to thinly by medium strength. CONGLOMERATE (Rip) SW: Grey, fine to coagravel size clasts with matrix, thickly bedde medium strength. Gravel is sub rounder-Js: 0°-30° (1.5/m), Pl OP, Cn SANDSTONE (Rip) SW: Grey and dark grigarined, laminated to grained, laminated to grained, laminated to conglomerate (Rip) SW: Grey, fine to coagravel size clasts with	rained, nly bedded, y, fine grained, edded, o) rse grained in fine grained id, mainly dUn-Stp/Ro, rey, fine o thinly bedded, high strength. o) rse grained oin fine grained	**************************************	FR SW		M H	C W		31.41m-31.57m: C 31.80m-31.86m: H 32.00m-32.15m: S Index Test 33.02m-33.18m: C 34.17m-35.99m: J OP, Ct. HFZ.	EAI=0.48 HW Iake Durability EAI=1.66	Is(50)=0.41 MPa Is(50)=0.06 MPa Is(50)=0.75 MPa Is(50)=0.02 MPa Is(50)=0.61 MPa Is(50)=0.85 MPa Is(50)=0.82 MPa Is(50)=0.82 MPa Is(50)=0.82 MPa Is(50)=0.84 MPa Is(50)=0.42 MPa Is(50)=0.42 MPa Is(50)=0.42 MPa Is(50)=0.42 MPa	A (31.21m)— D (31.40m)— A (31.41m)— D (31.40m)— A (31.41m)— D (32.40m)— A (32.41m)— D (32.60m)— A (32.61m)— (32.76m)— D (32.94m)— A (32.96m)— D (33.96m)— D (35.74m)— A (35.75m)— D (37.30m)— A (37.31m)— A (37.31m)—
REMARKS: Rip - Aspley Formation. Rif - Brisbane Tuff. LOGGED BY REVIEWED E	— 39 -	-37.74				Grave ^I is subrounded -Js: 0°-30° (1.5/m), Pl OP, Cn	-Un-Stp/Ro,				М						D (39.50m) A (39.51m)
SB S. Foley	R	EMAR	KS:	Rip - A	spl	ey Formation. Rif -	- Brisbane Tu	ff.							LOGGED B	Y REVI	EWED BY
															SB	S.	Foley

GEOTECHNICAL BOREHOLE LOG

FOR GEOTECHNICAL TERMS AND

FINAL 02/03/2018

BOREHOLE No CRR711

Sheet 5 of 5

AUGAS AT	1101115		SYN	MBOLS	REFER FORM	:GEOT 017/8-2014		REFERENCE No	— Н	12937
PROJECT	Cross River Rail	CRR2017 - Additional Geote	echnical Invest	igatio	on					
LOCATION	The Cliffs Board	walk						OORDINATES <u>503401.6</u>	E; 69606	78.9 N
PROJECT No	FG6470	SURFACE RL 2.26r	n PLU	NGE S	90°	DATE STA	RTED 07/11/2017	GRID DATUM N	ЛGA94	
JOB No		HEIGHT DATUM AHD	BEAF	RING _		DATE COMPL	ETED 10/11/2017	DRILLER C	Geodrill	
DEPTH (m)	AUGERA () % () % () % () % () % () % () % () %	MATERIAL DESCRIPTIO	NO	USCS WEATHERING	INTACT STRENGTI H H H H H H H H H H H H H H H H H H H	DEFECT SPACING		ADDITIONAL DATA AND TEST RESULTS		SAMPLES TESTS
	100 (100)	SANDSTONE (Rip) SW: Grey and dark grey, fir grained, thinly bedded, me high strength. CONGLOMERATE (Rip) SW: Grey and dark grey, fir grained, medium bedded, medium to high strength. Borehole completed at 43	ne generally	sw	MH			Is(5 Is(5	iO)=0.87 MPa 0O)=0.79 MPa iO)=0.55 MPa iO)=2.00 MPa	A (40.81m)
REMARI	KS: Rip - Aspl	ey Formation. Rif - Bris	bane Tuff.				-	LOGGED BY		EWED BY Foley
			TAID OF OTTO	INICAL	00511015100 0051	TED WITH HOLEDACE C.			1	•



Project Name	me Cross River Rail CRR2017 - Geotechnical Investigation									
Project No.	FG6470	Date	10/11/2017							
Borehole No.	CRR711	Reference No.	H12937							
Location	Kangaroo Cliffs Boardwalk	Start Depth (m)	5.60							
Submitted By	M. de Gee	Finish Depth (m)	43.16							



1

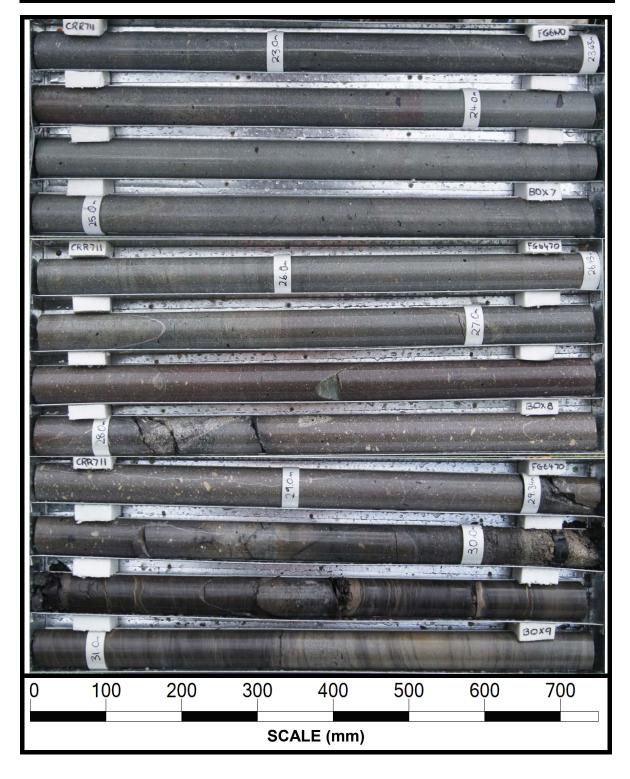


Project Name	me Cross River Rail CRR2017 - Geotechnical Investigation									
Project No.	FG6470	Date	10/11/2017							
Borehole No.	CRR711	Reference No.	H12937							
Location	Kangaroo Cliffs Boardwalk	Start Depth (m)	5.60							
Submitted By	M. de Gee	Finish Depth (m)	43.16							



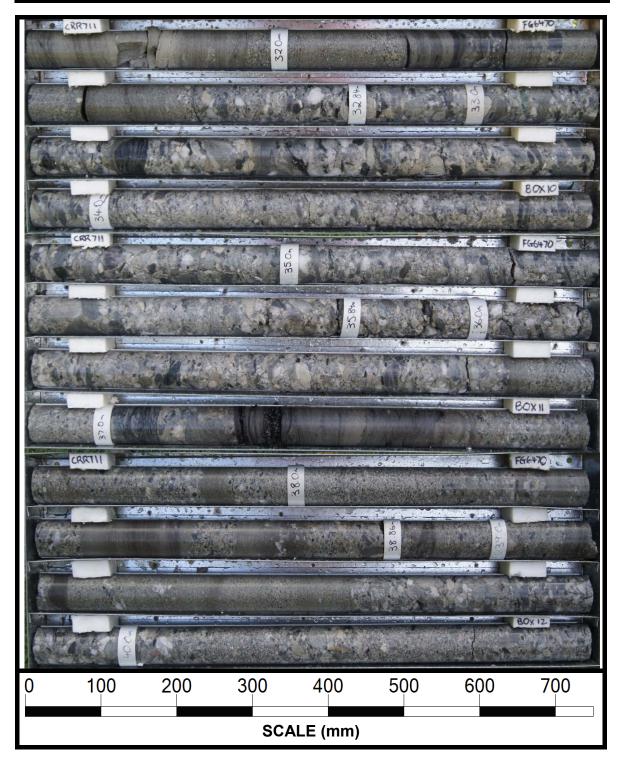


Project Name	Cross River Rail CRR2017	Cross River Rail CRR2017 – Geotechnical Investigation								
Project No.	FG6470	Date	10/11/2017							
Borehole No.	CRR711	Reference No.	H12937							
Location	Kangaroo Cliffs Boardwalk	Start Depth (m)	5.60							
Submitted By	M. de Gee	Finish Depth (m)	43.16							



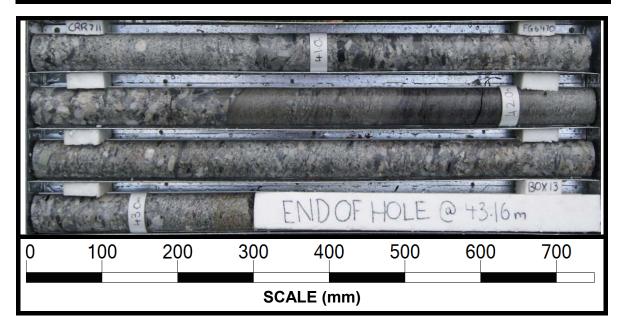


Project Name	Cross River Rail CRR2017	– Geotechnical Inve	stigation
Project No.	FG6470	Date	10/11/2017
Borehole No.	CRR711	Reference No.	H12937
Location	Kangaroo Cliffs Boardwalk	Start Depth (m)	5.60
Submitted By	M. de Gee	Finish Depth (m)	43.16





Project Name	Cross River Rail CRR2017	– Geotechnical Inve	stigation
Project No.	FG6470	Date	10/11/2017
Borehole No.	CRR711	Reference No.	H12937
Location	Kangaroo Cliffs Boardwalk	Start Depth (m)	5.60
Submitted By	M. de Gee	Finish Depth (m)	43.16



Detailed Discontinuity Description Log



This form is intended for the detailed description of discontinuities and defects as measured in outcrop by line mapping, or as they occur downhole in drilled rock core. The descriptions and abbreviations used shall be in accordance with Australian Standard AS1726-1993 Geotechnical site investigations and TMR Geotechnical Terms and Symbols Form F:GEOT017/8.

Project Nan	ne	Cross Rive	r Rail			Project No	FG6470		
Site ID / Bo	rehole No.	CRR711				Surface RL	2.23		
Geologist		S.B.				Date	7/11/2017		
						Page	1	of	3
Traverse	Туре	Dip ° / Dip	Planarity	Roughness	Roughness	Aperture	Infilling	Zones ¹	Other
Chainage;		Direction °;			Class				
or	LP /	or				CD/	Cn /	SZ/	
Down hole	BP/	Angle ° from	Stp /	Ro /	I to IX	OP/	St /	CZ /	
depth	FP/	horizontal	Un /	Sm /		FL/	Vr /	HFZ/	
(rock core)	J etc.	(rock core)	PI	SI		TI	Ct 1	AZ	
5.63	J	5	Un	Ro	IV	OP	Cn		
5.71	J	60	Un	Ro	IV	OP	Cn		Int
5.71	J	60	Un	Ro	IV	OP	Cn		Int
5.76-5.77	J	0	Un	Ro	IV	OP	Cn	CZ	
5.96	J	30	Un	Ro	IV	OP	Cn		
6.14	J	20	Un	Ro	IV	OP	Cn		
7.60-7.72	J	60	Un	Ro	IV	OP	Cn		
7.70-7.86	J	65	Un	Ro	IV	OP	St		
7.86-8.43	J	50-90	Un	Sm - Ro	IV - V	OP - TI	Vr		
8.37	J	5	Un	Ro	IV	OP	Vr		
8.40	J	0	Un	Ro	IV	OP	Cn		
8.42	J	0	Un	Ro	IV	OP	Cn		
10.30-10.60	J	70	Un	Ro	IV	OP	Cn	CZ	
10.69-10.73	J	15	Un	Ro	IV	OP		HFZ	
13.55	J	10	Un	Ro	IV	OP	Cn		
14.15	DI								
14.39	J	10	PI	Ro	VII	OP	Cn		
14.65	J	0	Un	Ro	IV	OP	Cn		
18.66	DI								
19.68	J	15	PI	Ro	IV	OP	Cn		
20.28	J	5	Un	Ro	IV	OP	Ct	CZ	
20.38	J	5	Un	Ro	IV	OP	Cn		
21.29	J	10	Un	Ro	IV	OP	Cn		
21.56	J	0	PI	Ro	VII	OP	Cn		
26.92-26.99	J	60	Stp	Ro	I	OP	Cn		
27.60	J	60	PI	Ro	VII	OP	Cn		
28.06	J	30	Un	Ro	IV	OP	Cn		
28.10	J	0	Un	Ro	IV	OP	Cn		
28.21	J	10	Un	Ro	IV	OP	Cn		
29.37	J	65	Un	Ro	IV	OP	Cn		
29.57	J	30	Stp	Ro	I	OP	Cn		

Note: 1. Describe zones and coatings in terms of composition and thickness (mm)

F:GEOT 533/9 – 2014

Detailed Discontinuity Description Log



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Site ID / Bore						Project No. FG6470				
,	ehole No.	CRR711				Surface RL	2.23			
Geologist		S.B.				Date	7/11/2017			
						Page	2	of	3	
Traverse	Туре	Dip ° / Dip	Planarity	Roughness	Roughness	Aperture	Infilling	Zones ¹	Other	
Chainage;		Direction °;			Class					
or	LP/	or				CD/	Cn /	SZ/		
Down hole	BP/	Angle ° from	Stp /	Ro /	I to IX	OP /	St /	CZ /		
depth	FP/	horizontal	Un /	Sm /		FL/	Vr /	HFZ/		
(rock core)	J etc.	(rock core)	PI	SI		TI	Ct 1	AZ		
29.91	J	0	PI	Ro	VII	CD				
30.19-30.22								HFZ		
30.22	J	15	Un	Ro	IV	OP	Cn			
30.22-30.29	J	80	Un	Ro	IV	TI	Vr	AZ		
30.49	FP	60	Un	Ro	IV	OP	Cn			
30.52	J	60	Un	Ro	IV	OP	Cn			
30.59-30.60	J	0	Un	Ro	IV	OP	Ct	HFZ		
30.77	J	0	Un	Ro	IV	OP	Ct	CZ		
31.26	J	0	Stp	Ro	1	OP	Cn			
31.80	J	10	Un	Ro	IV	OP	Cn			
31.80-31.84								HFZ		
31.84	J	10	PI	Ro	VII	OP	Cn			
31.87	J	10	PI	Ro	VII	OP	Cn			
32.17	J	10	Un	Ro	IV	OP	Cn			
32.30	J	0	Un	Ro	IV	OP	Cn			
32.50	J	0	Un	Ro	IV	OP	Cn			
32.64	J	10				CD				
33.29	J	30	Un	Ro	IV	OP	Cn			
33.73	J	15	Stp	Ro	I	OP	Cn			
34.17-34.81	J	90	Un	Ro	IV	OP	Ct	HFZ		
34.81-34.96	J	90	Un	Ro	IV	CD				
35.04-35.39	J	90	Un	Ro	IV	OP	Ct	HFZ		
25.30	J	0	Un	Ro	IV	OP	Cn			
35.74	J	0	Un	Ro	IV	OP	Cn			
35.94	J	90	Un	Ro	IV	OP	Ct	HFZ		
35.84-35.99	J	90	Un	Ro	IV	OP	Ct	HFZ		
36.15									Packing break	
36.75	J	10	Un	Ro	IV	OP	Cn			
37.19-37.25									Coal seam	
40.47	J	0	Un	Ro	IV	OP	Cn			
41.57	J	10	Un	Ro	IV	OP	Cn			

Note: 1. Describe zones and coatings in terms of composition and thickness (mm)

F:GEOT 533/9 – 2014

Detailed Discontinuity Description Log



This form is intended for the detailed description of discontinuities and defects as measured in outcrop by line mapping, or as they occur downhole in drilled rock core. The descriptions and abbreviations used shall be in accordance with Australian Standard AS1726-1993 Geotechnical site investigations and TMR Geotechnical Terms and Symbols Form F:GEOT017/8.

Geoteenine	ar remis a	ina Symbols	1 0111111.01	0101770.					
Project Name		Cross River Rail				Project No. FG6470			
Site ID / Borehole No.		CRR711				Surface RL 2.23			
Geologist		S.B.				Date	7/11/2017		
						Page	3	of	3
Traverse	Туре	Dip ° / Dip	Planarity	Roughness	Roughness	Aperture	Infilling	Zones ¹	Other
Chainage;		Direction °;			Class				
or	LP/	or				CD/	Cn /	SZ/	
Down hole	BP/	Angle ° from	Stp /	Ro /	I to IX	OP/	St /	CZ /	
depth	FP/	horizontal	Un /	Sm /		FL/	Vr /	HFZ /	
(rock core)	J etc.	(rock core)	PI	SI		TI	Ct 1	AZ	
41.98	J	10	Un	Ro	IV	OP	Cn		

Note: 1. Describe zones and coatings in terms of composition and thickness (mm) $F:GEOT\ 533/9-2014$