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**Queensland
Government**

Department of
Main Roads

ENGINEERING BOREHOLE LOG

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

BOREHOLE No BH040

SHEET 1 of 4

REFERENCE No H10586

PROJECT BRUCE HIGHWAY (COOROY - CURRA) SECTION A GEOTECHNICAL INVESTIGATION

LOCATION Cut 14

COORDINATES 484383.0 E; 7081208.1 N

PROJECT No FG5825

SURFACE R.L. 163.04m

PLUNGE

DATE STARTED 30/7/09

GRID DATUM MGA94

JOB No 128/10A/901

HEIGHT DATUM AHD

BEARING

DATE COMPLETED 31/7/09

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
0	163.04					Clayey SILT (RESIDUAL) Brown.								
1	162.39				A	PHYLLITE (XW): Grey with brown mottling, clay cemented.							Soil descriptions based on driller's log only (missing SPT samples).	2,4,4 N=8 SPT
2					B				XW				8,12,30 N=42	SPT
3	160.04				C								30/90 N>50	SPT
4			(38)			PHYLLITE (MW - SW): Pale grey, fine grained, foliated. Foliations vary in parts, typically 50° Defects medium to widely spaced. Prominent defect sets dip parallel to foliation, at 30° and 70°.							Is(50) = 0.58MPa Is(50) = 0.86MPa	x o
5			100 (59)			Defect surfaces often thinly clay infilled. 4.2 - 4.32m: Dark green-grey fractured zone. 5.1 - 5.25m: Dark green-grey.							Shear zone 50° Disturbed foliation Is(50) = 0.77MPa Is(50) = 0.50MPa	x o
6			100 (88)						MW-SW				Is(50) = 0.52MPa Is(50) = 1.23MPa	o x
7														
8			100 (26)			7.6 - 7.75m: Secondary mineralisation-calcite veining, alteration, brecciated, clay lined.							Shear zone Clay infill / seam 45°	
9													Subvertical, subparallel clay lined continuous joints	
10			100			Detailed defect descriptions are shown on Form GEOT533/8 (See over)							Brecciated zone	

REMARKS Detailed defect descriptions are shown on Form GEOT533/8 attached. Standpipe piezometer installed at bottom of hole.

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ENGINEERING BOREHOLE LOG

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

BOREHOLE No BH040
SHEET 2 of 4
REFERENCE No H10586

PROJECT BRUCE HIGHWAY (COOROY - CURRA) SECTION A GEOTECHNICAL INVESTIGATION
LOCATION Cut 14 COORDINATES 484383.0 E: 7081208.1 N
PROJECT No FG5825 SURFACE R.L. 163.04m PLUNGE _____ DATE STARTED 30/7/09 GRID DATUM MGA94
JOB No 128/10A/901 HEIGHT DATUM AHD BEARING _____ DATE COMPLETED 31/7/09 DRILLER R & D Drilling

DEPTH (m)	R.L. (m)	AUGER CASING WASH BORING CORE DRILLING	RQD () %	CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	EH	VH	I	S	J	VL	UL	INTACT STRENGTH	DEFECT SPACING (mm)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES	TESTS
10	153.04																					
						PHYLLITE (MW - SW): (Cont'd)														Subvertical rehealed brecciated zone Disturbed foliation, shear zone		
11																				Is(50) = 1.04MPa Is(50) = 0.74MPa	x o	
12				100 (54)																FZ Is(50) = 1.41MPa Is(50) = 0.41MPa	x o	
13				100 (80)																		
14																				Water loss from 13.8m to end of hole		
15				100 (57)																Is(50) = 1.86MPa Is(50) = 0.76MPa	x o	
16						16.20 - 16.98m: Zone of open defects with clay infill.														Is(50) = 0.15MPa Is(50) = 0.41MPa	x o	
17				100 (73)																Quartz vein Is(50) = 0.54MPa Is(50) = 0.68MPa	o x	
18				100 (54)		18.18 - 18.71m: Zone of clay altered bands.														Occasional quartz inclusions >25mm, angular (faulted veining)		
19																				Is(50) = 1.03MPa Is(50) = 0.19MPa	x o	
20						(See over)																

REMARKS Detailed defect descriptions are shown on Form GEOT533/8 attached. Standpipe piezometer installed at bottom of hole.

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SYMBOLS REFER FORM F:GEOT 017/5-2009

BOREHOLE No BH040
SHEET 3 of 4
REFERENCE No H10586

PROJECT BRUCE HIGHWAY (COOROY - CURRA) SECTION A GEOTECHNICAL INVESTIGATION
LOCATION Cut 14 COORDINATES 484383.0 E; 7081208.1 N
PROJECT No FG5825 SURFACE R.L. 163.04m PLUNGE _____ DATE STARTED 30/7/09 GRID DATUM MGA94
JOB No 128/10A/901 HEIGHT DATUM AHD BEARING _____ DATE COMPLETED 31/7/09 DRILLER R & D Drilling

DEPTH (m)	R.L. (m)	AUGER CASING WASH BORING CORE DRILLING	RQD (%)	CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	EH	VH	HM	VL	EL	INTACT STRENGTH	DEFECT SPACING (mm)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES	TESTS
20	143.04																			
21	141.74		100 (54)			PHYLLITE (MW - SW): (Cont'd)												Multiple rehealed FP & Jts (X Foliation)		
																		Is(50) = 1.46MPa Is(50) = 0.81MPa	x	o
22			100 (37)			PHYLLITE (MW): Pale grey with distinct dark grey mottling, fine grained.														
						Contains prominent clayey weathered zones.												Clay seam		
						Foliations typically 30°.												Rehealed FZ Multiple rehealed FP & joints Quartz veining, faulted / offset Quartz vein		
23			100 (81)			23.15 - 23.55m: Clayey weathered zone.												Fractured, brecciated zone with deformed quartz veining		
24			100 (63)			24.10 - 24.50m: Clayey weathered zone.												Rehealed FZ Is(50) = 0.29MPa Is(50) = 0.35MPa	x	o
																		Fractured, brecciated zone with deformed quartz veining		
																		Is(50) = 0.23MPa Is(50) = 0.10MPa	x	o
25			100 (14)			25.39 - 25.60m: Quartz inclusions and veining.												Rehealed FZ		
26			100 (38)															FZ - deformed foliation & quartz veining		
27			100 (48)			28.58 - 28.68m: Weathered seam (HW).														
																		Is(50) = 0.46MPa Is(50) = 0.30MPa	x	o
28																		FPs & rehealed jts Is(50) = 0.06MPa Is(50) = 0.27MPa	x	o
29																		Disturbed zone FZ with clay infill Is(50) = 1.74MPa Is(50) = 0.96MPa	x	o
30						Detailed defect descriptions are shown on Form GEOT533/8												Shear zone - joints & deformed foliation. Is(50) = 0.29MPa Is(50) = 0.15MPa	x	o

REMARKS Detailed defect descriptions are shown on Form GEOT533/8 attached. Standpipe piezometer installed at bottom of hole.

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ENGINEERING BOREHOLE LOG

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

BOREHOLE No BH040
SHEET 4 of 4
REFERENCE No H10586

PROJECT BRUCE HIGHWAY (COOROY - CURRA) SECTION A GEOTECHNICAL INVESTIGATION
LOCATION Cut 14 COORDINATES 484383.0 E; 7081208.1 N
PROJECT No FG5825 SURFACE R.L. 163.04m PLUNGE _____ DATE STARTED 30/7/09 GRID DATUM MGA94
JOB No 128/10A/901 HEIGHT DATUM AHD BEARING _____ DATE COMPLETED 31/7/09 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
30	133.04					PHYLLITE (MW) (Cont'd)							SZ - deformed foliation SZ - deformed foliation Variable foliation angles Is(50) = 0.73MPa Is(50) = 0.23MPa Is(50) = 0.26MPa Is(50) = 0.77MPa Deformed foliation FZ with quartz gravels	x o x o
31			100 (36)						MW					
32	131.36		100			Borehole terminated at 31.68m							Water loss throughout hole	
33														
34														
35														
36														
37														
38														
39														
40														

REMARKS Detailed defect descriptions are shown on Form GEOT533/8 attached. Standpipe piezometer installed at bottom of hole.

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Project: **Bruce Highway Upgrade (Cooroy – Curra) Section A**
 Borehole No: **BH40 Cut 14**
 Start Depth: 3.00m
 Finish Depth: 31.70m
 Project No: FG5825
 H No: 10586

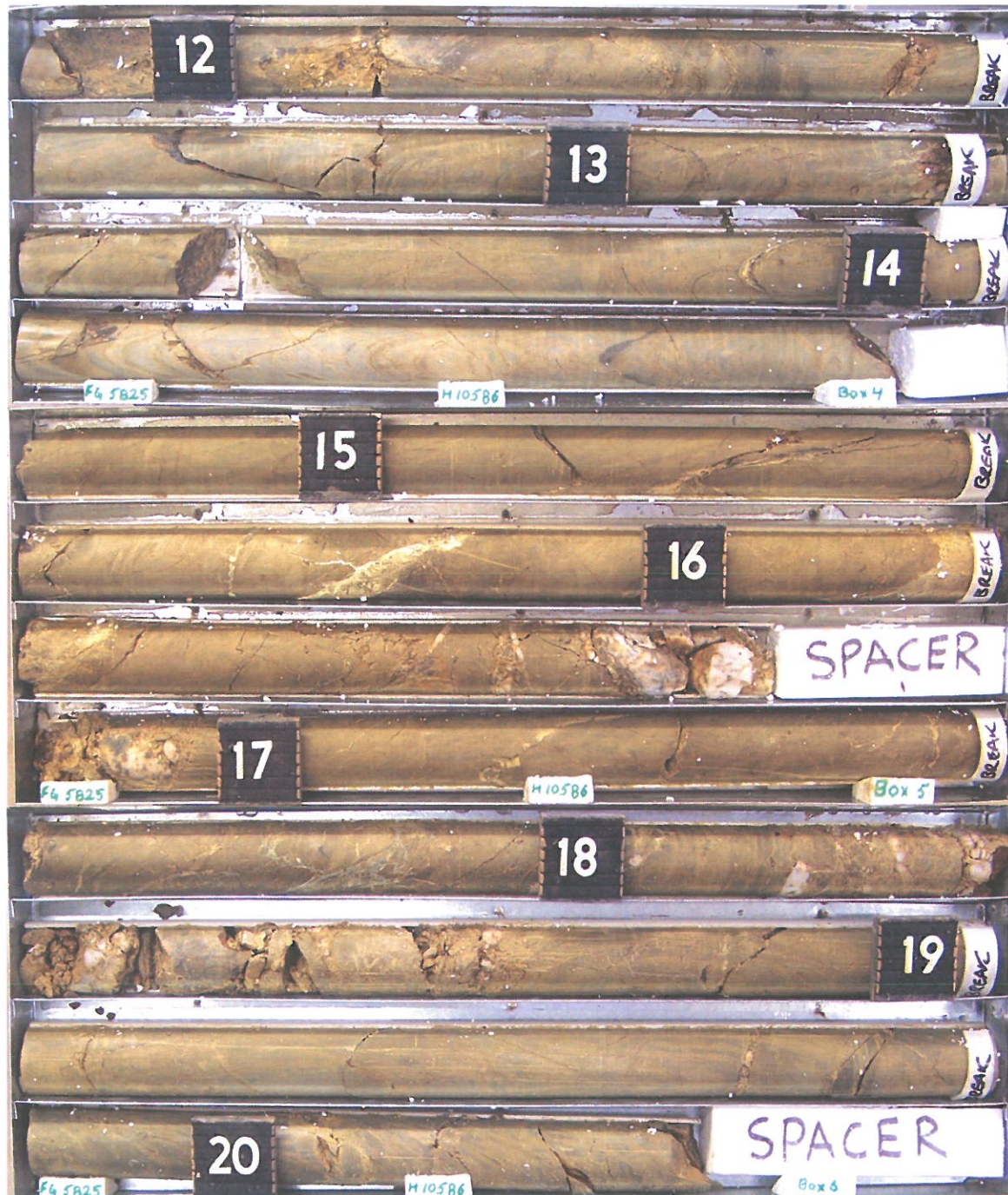


0 100 200 300 400 500 600mm

SCALE 1:5

F:GEOT043/1

Project: **Bruce Highway Upgrade (Cooroy – Curra) Section A**
Borehole No: **BH40 Cut 14**
Start Depth: 3.00m
Finish Depth: 31.70m
Project No: FG5825
H No: 10586



SCALE 1:5

F:GEOT043/1

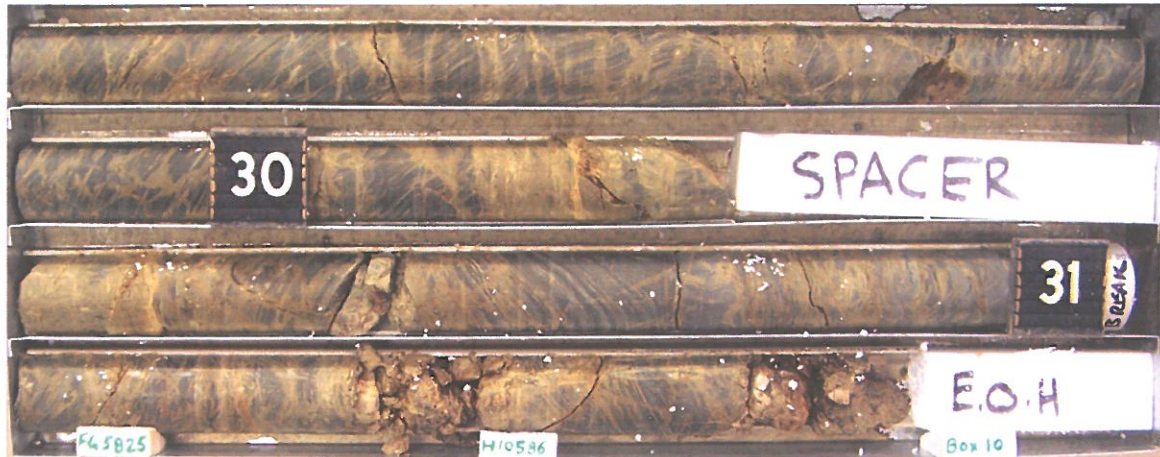
Project: **Bruce Highway Upgrade (Cooroy – Curra) Section A**
Borehole No: **BH40 Cut 14**
Start Depth: 3.00m
Finish Depth: 31.70m
Project No: FG5825
H No: 10586



SCALE 1:5

F:GEOT043/1

Project: **Bruce Highway Upgrade (Cooroy – Curra) Section A**
Borehole No: **BH40 Cut 14**
Start Depth: 3.00m
Finish Depth: 31.70m
Project No: FG5825
H No: 10586



SCALE 1:5

F:GEOT043/1

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

[CHARACTERISATION OF DEFECTS ARE IN ACCORDANCE WITH
ISRM SUGGESTED METHODS (1981)]

BOREHOLE NO.:	BH40
SHEET:	1 of 3
REFERENCE NO.:	H10586

PROJECT:	Bruce Highway (Cooroy – Curra) Section A Geotechnical Investigation					
LOCATION:	Cut 14					
PROJECT NO.:	FG5825	SURFACE R.L.:	163.03	DRILLER:	R & D Drilling	
JOB NO.:	128/10A/901	DATUM:	MGA94	DATE DRILLED:	30/7/09	

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
3.02	J	60°	PI		C		
3.08	J	40°	PI	SR	O	FeSt	
3.18	J	45°	PI	SR	O	FeSt	
3.22	J	40°	PI		C		SM
3.28	J	35°	Un	R	O	FeSt	CI
3.33	J	10°	PI	SR	O		Mn, CI
3.55	J	45°	PI	SR	O		SM
3.70	J	50°	PI	SR	O		SM, CI
3.80	J / FP	50°	PI	S	O		SM, Cn
4.10	BZ						
4.50	J	55°	Un	SR	O	FeSt	SM
4.61	FP	45°	Un	SR	O		SM, CI
4.90	SZ				C		Rehealed
5.00	SZ	50°	PI				CI
5.15	FP	65°			C		
5.30	J	0°	St	R	O		Mn
5.70	J	90°	Undulating – Subvertical	R	O		SM, Mn
6.25	J	10°	Cu	SR	O		CI

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

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J, Js	Joint, Joints	CI	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
PI	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.:	BH40
SHEET:	2 of 3
REFERENCE NO.:	H10586

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
6.29	Int J	45° - 10°	Pl	SR			CI
6.32	J / FP	80°	Pl		C		SM
6.79	J	5°	Pl	S	O		CI
6.78	J / FP	80°	Pl		C		SM
6.95	J	40°	Pl		C		
7.10	J	60°	Pl		O	FeSt	SM, CI
7.50	Int FZ						
7.63	FP	5 – 40°	Cu			FeSt	Mn
7.69	Brecciated Zone						
7.69	BZ						
7.95	J	45°	Pl	S / SR	O		CI
8.06	FP	55°	Pl	SR	C	FeSt	CI / SI
8.10	J	45°	Pl	SR	C		CI
8.12	J	45°	Pl	SR	C		CI
8.30	J	10°	St	R	O	FeSt	
8.30	FP	50°	Pl		C		SM, CI
8.45	J	50°	Ir	R	O	FeSt	Mn
8.63	FP	60°	Pl	R	O		Mn
8.65	J	30°	Ir	R	O		CI
8.71	FP	75°	St		C		
8.95	J	90°	Un	R	O		CI
8.98	J (Splay)	90°	Un	R	O		CI
9.53	FP	50°	Pl		C		CI
9.60	J	35°	Ir	R	O		Mn
9.70	Brecciated Zone	80°	Un	R	O		Mn
9.95	Fr	85°	St		C		
10.20	FP	55°	Ir	SR	O		CI
10.50	J	75°	Ir	SR	O		Trace of CI
10.88	J	45°	Pl		C		Trace of CI
10.90	J	45°	Pl		C		Trace of CI
11.16	J	70°	Un		C	Trace of FeSt	
11.30	J / FP	70°	Un	SR	O		Mn
11.44	J	80°	Ir		C		CI
11.73	Fr						
11.86	J	85°	Ir	SR	O		Mn
12.12	SM	5°					CI
12.05	SZ / FP				C		
12.52	J	30°	Ir	R	O	FeSt	CI
12.60	FP	55°			C		
12.65	J		St	SR		FeSt	Mn
12.76	J	5°	Ir	R	O		Mn
12.77	FP	60°	Pl	S	O	FeSt	Mn
13.00	FP	75°	Pl	S	O	FeSt	Mn
13.00	J	90°	Cu	SR	O	FeSt	Mn
13.08	J	30°	Ir	R	O	FeSt	Mn
13.10	FP	70°			C		Rehealed
13.25	FP	85°	Pl			FeSt	Mn
13.30	FZ					FeSt	Mn
13.45	J	50°	Pl	SR	O		Mn, CI
13.93	J	60°	Pl	SR	O		CI
13.98	J / FP?	70°	Cu	SR	O		Mn, Trace of Clay
14.00	FZ						Multiple FP
14.10	FP	85°	Pl	S	C		Mn, Trace of Clay
14.26	SM	40°			O		CI
14.64	Fr (X Foliation)	20°	Ir	R	O		Mn
14.70	J	45°	Un	SR	O		Mn

BOREHOLE NO.: BH40

SHEET: 3 of 3

REFERENCE NO.: H10586

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
14.75	Fr & X Foliation Jts				C		
15.17	J	45°	PI	SR	O		SM, CI
15.17	FP	75°	PI	S	O / C		Mn
15.25	FP	80°	PI	S	O		CI
15.55	FZ						
15.72*	Jt / Fault Zone	70°	PI		O (10mm)		CI - Fault Gauge (Gravel inclusions)
15.82	Disturbed Foliation						
16.15*	Fault Zone	50°					CI (Gauge) & Rounded gravels
16.25	FZ						
17.15	FZ	5°	PI	SR	O	FeSt	
17.20	J	60°	Ir	R	C		
17.34	J	5°	PI		C		CI
17.65*	Fault Zone / HFZ	60°					CI
18.20	FZ						
18.80	J	70°	St	R	C		CI
19.00	J	60°	PI / St	S	C	FeSt	Mn
19.05	J	70°	PI	S	C		CI
19.36	J	40°	PI	SR	O	FeSt	Mn
19.66	J	10°	PI		C		SM
19.74	J	50°	PI	SR	O	FeSt	CI
20.00	FP	65°	PI		C		CI
20.15	FZ					FeSt	Mn
20.85	J	45°	PI	S	O	FeSt	CI, Mn
21.24*	FP	45 - 80°	Cu		C		CI
21.35	SM						CI & Gravel
21.35	FZ						
21.83	J	5 - 10°	Cu		O		CI
22.14	J	5°	PI	SR	O		CI, Mn
22.20	SM	0°					CI & Gravel
25.05	J (X Foliation)	5°	PI	R	O	FeSt	
26.75	FP	50°	PI	S	O		Polished Surfaces,
26.80	FP	50°	PI	S	O		Polished Surfaces
26.98	FP	50°	PI	SR	O		CI
27.17	FZ						
27.17	J (X Foliation)	60°	PI	S	O	FeSt	CI
27.30	SZ						
27.50	FZ						
27.90	J	75 - 80°	PI		C		Gravel / Breccia & CI
28.08	J	80°	PI		C		Gravel / Breccia & CI
28.75	J	25°	PI	SR	O		CI, Mn
28.90	J	30°	PI	R	O	FeSt	
28.95	J	50°	PI	SR	O		CI, Mn
29.16	FP	45°	PI / Cu	S / R	O		Polished Surfaces
29.22	FP	45°	PI / Cu	S	O		CI
29.37	J	10°	PI	R	O		Mn
31.10	J	35°	PI		C		
31.42	J	40°	Cu	SR	O	FeSt	
31.60	Int. J						Mn