Soil Surveys Engineering Pty. Limited
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BOREHOLE RECORD SHEET

Location Number: BH 319

Project Number: 110-12936
Project Name: Cross River Rail
Location: Brisbane
Client: AECOM
Date: 09/02/2012

Easting: 501895 Northing: 6956514 RL: 9.82 m
Logger: BM/DT Operator: Phil Machine: MC450

Depth	Graphic	Description	Weathering	Strength (Estimated)	Defect Spacing	Rec (%)	RQD	Samples and Remarks
0.05		BITUMEN						
0.20		Road Base						
0.80		FILL Gravelly Clayey SAND (SC) Medium dense, fine to coarse grained, yellow brown, high plasticity fines, fine to medium size gravel, moist.						
1.10		FILL Gravelly SAND (SP) Medium dense, fine to medium grained, yellow brown, fine size gravel, moist.						
1.30		NATURAL Clayey SAND (SC) Medium dense, fine to medium grained, yellow brown, high plasticity fines, moist.						SPT 30/120mm N=R
1.40		Sandy CLAY (CH) Very stiff, high plasticity, yellow brown, fine to medium grained sand, moist.						
3.10		SANDSTONE (XW-DW) Very weak, yellow brown and light grey mottled, medium grained sand.						SPT 30/75mm N=R
3.41		SANDSTONE, fine grained, pale grey stained orange, granular, medium bedded, closely spaced fractures.	DW			75	38	3.25 m; B, **11°,** P, S, O, Z
3.58		SANDSTONE, medium grained, pale grey stained orange, granular, very thinly bedded, extremely closely spaced fractures, with some fine to coarse gravel clasts.						
3.70		SANDSTONE, fine grained, pale grey, granular, very thinly bedded, extremely closely spaced fractures.	DW			100	56	4.11 m; DI, **4°,** S, R, O, W 4.22 m; B, **9°,** P, S, O, Z 4.50 m; J, **45°,** S, R, O, Z 4.61 m; DI, **25°,** S, R, O, Z
3.90		CORE LOSS 0.20m (3.70-3.90)						
4.56		SANDSTONE, fine grained, pale grey stained orange, granular, medium bedded, very closely spaced to moderately widely spaced fractures, trace of medium size gravel.						4.81 m; B, **6°,** P, S, O, Z
4.80		SANDSTONE, medium grained, pale grey stained orange, granular, very thinly bedded, very closely spaced fractures, with some fine to coarse gravel clasts.	SW			100	88	5.24 m; DI, **5°,** P, R, O, W
5.53		SANDSTONE, fine grained, pale grey stained orange, granular, medium bedded, very closely spaced to moderately widely spaced fractures, trace of medium size gravel.	SW - FR					
6.30		SANDSTONE, fine grained, pale grey and banded dark grey and black, granular, laminated, moderately widely spaced fractures, coal stringers and trace of siltstone.	DW SW - FR			100	90	
7.71		SANDSTONE, coarse grained, pale grey banded dark grey and black, granular, thinly bedded, closely spaced to moderately widely spaced fractures. Trace of medium gravels, coal stringers and siltstone laminae.						
8.75		SANDSTONE, fine grained, pale grey and banded dark grey and black, granular, laminated, closely to widely spaced fractures, coal stringers and trace of siltstone.						
9.18		CONGLOMERATE, coarse grained, pale grey speckled grey, granular, widely spaced fractures. Clasts are medium to coarse grained, sub-rounded sandstone, siltstone and tuff.				100	95	
10.0								

Drilling Method: TC, WB, RR, NMLC, Casing

Comments:
1) Groundwater not observed. 2) ATV survey carried out.
3) Monitoring well installed to 28.5m on completion.

Water First Noted Water Steady Level

Defects - 1.54m : F,60°,P,R,O,C

Depth (m) | Type: B - Bedding, C - Clay seam, F - Foliation, H - Schistosity, J - Joint, L - Cleavage, R - Fracture, S - Shear zone, T - Contact, V - Vein, Z - Decomposed Zone, DI - Drilling Induced break | Dip (deg) | Planarity: C - Curvilinear, D - Discontinuous, P - Planar, S - Subplanar, T - Stepped, U - Undulating | Roughness: L - Slickensides, P - Polished, R - Rough, S - Smooth, V - Very rough | Aperature: C - Closed, F - Filled, N - Clean, O - Open, S - Stain | Infill: C - Clay, F - Iron Oxide, K - Calcite, L - Limonite, Q - Quartz, S- Secondary mineral, U - Unidentified mineral, W - Weathered rock, X - Carbonaceous, Z - Clean

Weathering Grades
RS - Residual Soil
XW - Extremely weathered
DW - Distinctly weathered
SW - Slightly weathered
FR - Fresh

Rock Strength
VW - Very weak
W - Weak
MS - Medium strong
S - Strong
VS - Very strong
ES - Extremely strong

Samples
U50
SPT
Disturbed Sample

Approved:
Date:

SOIL SURVEYS 00 LIBRARY 2012-05.GLB Log SOIL SURVEY BOREHOLE LOG 111-12936 NEW.GPJ <<DrawingFile>> 21/05/2012 14:33 8.30.002 Developed by Datgel

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BOREHOLE RECORD SHEET

Location Number: BH 319

Project Number: 110-12936
Project Name: Cross River Rail
Location: Brisbane
Client: AECOM
Date: 09/02/2012

Easting: 501895 Northing: 6956514 RL: 9.82 m
Logger: BM/DT Operator: Phil Machine: MC450

Drilling Method (TC / WB / RR / NMLC / Casing)	Depth	Graphic	Description	Weathering	Strength (Estimated)	Defect Spacing	Rec (%)	RQD	Samples and Remarks
NMLC	11.0		SANDSTONE, fine grained, pale grey, granular, laminated to very thinly bedded, closely to widely spaced fractures. *(continued)*	SW - FR	RS XW W MS S VS ES	20 60 200 600	100	95	5.65-15.18 m; DI, **5 - 11°,** P, R, O, Z
	12.0						96	96	
	13.0								
	13.04		SANDSTONE, coarse grained, pale grey, granular, thickly bedded, very closely to widely spaced fractures. Lenses of fine sandstone with some coal stringers.				100	97	
	14.0								
	15.0								
	15.26		CONGLOMERATE, coarse grained, pale grey speckled dark grey, granular, widely spaced fractures. Clasts are medium to coarse grained, sub-rounded sandstone, siltstone and tuff.						15.58 m; DI, **13°,** P, R, O, Z
	15.90		SANDSTONE, coarse grained, pale grey, granular, thickly bedded, widely spaced fractures. Lenses of fine sandstone with some coal stringers.						
	16.0								
	16.45		SANDSTONE, medium grained, pale grey, granular, thickly bedded, widely spaced fractures. Lenses of fine sandstone with some coal stringers.				100	93	16.42 m; DI, **22°,** S, R, O, Z
	17.0								
									17.48 m; B, **6°,** P, S, O, Z
	18.0								
	18.00		SANDSTONE, coarse grained, pale grey, granular, thickly bedded, closely spaced fractures. Lenses of fine sandstone.						18.12 m; DI, **11°,** S, R, O, Z 18.24 m; DI, **10°,** P, R, O, Z
	18.60		SANDSTONE, medium grained, pale grey, granular, thinly to medium bedded, widely spaced fractures. Lenses of fine gravel conglomerate.						18.50 m; DI, **1°,** P, S, O, Z
	19.0						100	80	18.89 m; V, **15°,** D, R, O, X
									19.37 m; DI, **24°,** P, S, O, Z 19.52 m; V, **30°,** P, R, O, X
	20.0								19.91 m; DI, **27°,** S, S, O, Z

Comments:
1) Groundwater not observed. 2) ATV survey carried out.
3) Monitoring well installed to 28.5m on completion.

Water First Noted Water Steady Level

Defects - 1.54m : F,60°,P,R,O,C

Depth (m) | Type | Dip (deg) | Planarity | Roughness | Aperature | Infill

Type: B - Bedding; C - Clay seam; F - Foliation; H - Schistosity; J - Joint; L - Cleavage; R - Fracture; S - Shear zone; T - Contact; V - Vein; Z - Decomposed Zone; DI - Drilling Induced break

Planarity: C - Curvilinear; D - Discontinuous; P - Planar; S - Subplanar; T - Stepped; U - Undulating

Roughness: L - Slickensides; P - Polished; R - Rough; S - Smooth; V - Very rough

Aperature: C - Closed; F - Filled; N - Clean; O - Open; S - Stain

Infill: C - Clay; F - Iron Oxide; K - Calcite; L - Limonite; Q - Quartz; S- Secondary mineral; U - Unidentified mineral; W - Weathered rock; X - Carbonaceous; Z - Clean

Weathering Grades
RS - Residual Soil
XW - Extremely weathered
DW - Distinctly weathered
SW - Slightly weathered
FR - Fresh

Rock Strength
VW - Very weak
W - Weak
MS - Medium strong
S - Strong
VS - Very strong
ES - Extremely strong

Samples
U50
SPT
Disturbed Sample

Approved:
Date:

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BOREHOLE RECORD SHEET

Location Number: BH 319

Project Number: 110-12936
Project Name: Cross River Rail
Location: Brisbane
Client: AECOM
Date: 09/02/2012

Easting: 501895 Northing: 6956514 RL: 9.82 m
Logger: BM/DT Operator: Phil Machine: MC450

Depth	Graphic	Description	Weathering	Strength (Estimated)	Defect Spacing	Rec (%)	RQD	Samples and Remarks
			SW - FR					20.09 m; V, **40°,** P, R, O, X 20.12 m; V, **28°,** P, S, O, X
20.37								
20.70		Interbedded SILTSTONE and SANDSTONE, fine grained, pale grey banded grey, granular, thinly bedded to laminated, closely spaced fractures. Trace of coal.				100	80	20.41 m; B, **14°,** P, S, O, Z 20.47 m; DI, **43°,** S, R, O, Z 20.53 m; B, **26°,** P, S, O, Z 20.63 m; B, **8°,** P, S, O, Z 20.71 m; DI, **16°,** C, R, O, Z 20.82 m; DI, **4°,** P, S, O, Z
21.0		SANDSTONE, medium grained, pale grey, granular, thickly bedded, widely spaced fractures. Lenses of fine sandstone with some coal stringers.						
22.0						100	91	
22.96		SANDSTONE, medium grained, pale grey, granular, thinly to medium bedded, widely spaced fractures. Lenses of fine gravel conglomerate.						
23.0								
23.80		Interbedded SILTSTONE and SANDSTONE, fine grained, alternating pale grey and dark grey, granular, thinly laminated, closely to widely spaced fractures.						
24.0								
25.0								
25.33		SANDSTONE, medium grained, pale grey, granular, thickly bedded, widely spaced fractures. Lenses of fine sandstone with some coal stringers.				115	84	
26.0								
26.65								
26.89		CONGLOMERATE, coarse grained, pale grey speckled dark grey, granular, widely spaced fractures. Clasts ared medium to coarse grained, sub-rounded sandstone, siltstone and tuff.						
27.0		SANDSTONE, medium grained, pale grey, granular, thickly bedded, widely spaced fractures. Lenses of fine sandstone with some coal stringers.						21.61-32.90 m; DI, **3 - 11°,** P, S, O, Z 27.48 m; B, **4°,** P, S, O, X
28.0						100	100	
29.0								29.19 m; B, **22°,** P, S, O, X
29.81						100	100	29.81 m; B, **8°,** P, S, O, X
30.0								

Drilling Method: TC, WB, RR, NMLC, Casing

Comments:
1) Groundwater not observed. 2) ATV survey carried out.
3) Monitoring well installed to 28.5m on completion.

Water First Noted Water Steady Level

Defects - 1.54m : F,60°,P,R,O,C

Depth (m) | Type: B - Bedding, C - Clay seam, F - Foliation, H - Schistosity, J - Joint, L - Cleavage, R - Fracture, S - Shear zone, T - Contact, V - Vein, Z - Decomposed Zone, DI - Drilling Induced break | Dip (deg) | Planarity: C - Curvilinear, D - Discontinuous, P - Planar, S - Subplanar, T - Stepped, U - Undulating | Roughness: L - Slickensides, P - Polished, R - Rough, S - Smooth, V - Very rough | Aperature: C - Closed, F - Filled, N - Clean, O - Open, S - Stain | Infill: C - Clay, F - Iron Oxide, K - Calcite, L - Limonite, Q - Quartz, S- Secondary mineral, U - Unidentified mineral, W - Weathered rock, X - Carbonaceous, Z - Clean

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Samples
U50
SPT
Disturbed Sample

Approved:
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BOREHOLE RECORD SHEET

Location Number: BH 319

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Project Name: Cross River Rail
Location: Brisbane
Client: AECOM
Date: 09/02/2012

Easting: 501895 Northing: 6956514 RL: 9.82 m
Logger: BM/DT Operator: Phil Machine: MC450

Depth	Graphic	Description	Weathering	Strength (Estimated)	Defect Spacing	Rec (%)	RQD	Samples and Remarks
		Interbedded SANDSTONE and CONGLOMERATE, fine to medium grained, pale grey speckled dark grey, granular, medium bedded, closely to widely spaced fractures. *(continued)*	SW - FR			100	100	31.80 m; J, **75°,** P, R, O, Z 31.95 m; J, **75°,** P, R, O, Z
32.32		Interbedded SILTSTONE and SANDSTONE, fine grained, alternating pale grey and dark grey, granular, thinly laminated, closely to widely spaced fractures.						32.56 m; J, **50°,** D, S, O, Z 32.60 m; J, **86°,** P, S, O, Z
32.66		Interbedded SANDSTONE and CONGLOMERATE, fine to medium grained, pale grey speckled dark grey, granular, medium bedded, closely to widely spaced fractures.						33.16 m; DI, **10°,** U, V, O, Z
33.56		Interlaminated SILTSTONE and MUDSTONE, fine grained, alternating light grey and dark grey, thinly bedded, closely spaced fractures, with trace thin sandstone laminae.				100	38	33.48 m; J, **30°,** S, R, O, Z
35.60		Interlaminated SILTSTONE and MUDSTONE, fine grained, alternating light grey and dark grey, medium to thickly bedded, with moderately widely spaced fractures, with trace thin sandstone laminae.				100	61	33.64-40.00 m; DI, **5°,** P, S, O, Z
40.00						100	59	

Drilling Method: TC, WB, RR, NMLC, Casing

Comments:
1) Groundwater not observed. 2) ATV survey carried out.
3) Monitoring well installed to 28.5m on completion.

BOREHOLE BH 319 TERMINATED AT 40.00m

Water First Noted Water Steady Level

Depth (m) | Type: B - Bedding, C - Clay seam, F - Foliation, H - Schistosity, J - Joint, L - Cleavage, R - Fracture, S - Shear zone, T - Contact, V - Vein, Z - Decomposed Zone, DI - Drilling Induced break | Dip (deg) | Planarity: C - Curvilinear, D - Discontinuous, P - Planar, S - Subplanar, T - Stepped, U - Undulating | Roughness: L - Slickensides, P - Polished, R - Rough, S - Smooth, V - Very rough | Aperature: C - Closed, F - Filled, N - Clean, O - Open, S - Stain | Infill: C - Clay, F - Iron Oxide, K - Calcite, L - Limonite, Q - Quartz, S- Secondary mineral, U - Unidentified mineral, W - Weathered rock, X - Carbonaceous, Z - Clean

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MS - Medium strong
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Samples
U50
SPT
Disturbed Sample

Approved:
Date:

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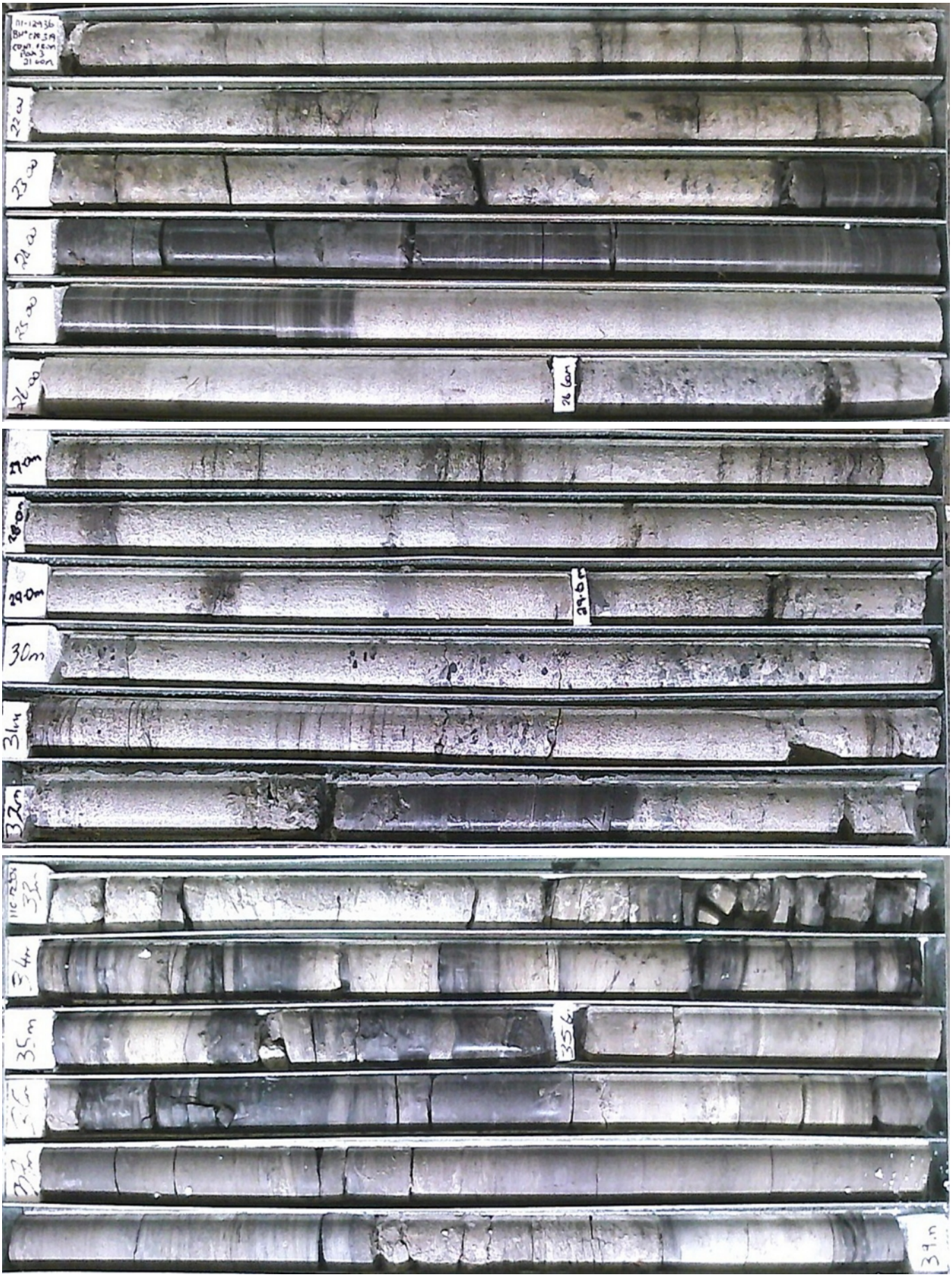
SOIL SURVEYS

TITLE	AECOM Brisbane Cross River Rail Core Photo - BH 319	DRAWN: DT	DATE: 26/04/2012
		CHECKED: CB	DATE: 26/04/2012
		SCALE: Not To Scale	A4
		PROJECT No: 110-12936	FIGURE No: 1/2

SOIL_SURVEYS_00 LIBRARY.GLB GrfcTbl DG PHOTO CORE PHOTO 4 PER PAGE 111-12936 NEW.GPJ <<DrawingFile>> 26/04/2012 14:47 8.2.856 Developed by Datgel



SOIL SURVEYS

TITLE

AECOM
Brisbane
Cross River Rail
Core Photo - BH 319

DRAWN	DT	DATE	26/04/2012
CHECKED	CB	DATE	26/04/2012
SCALE	Not To Scale		A4
PROJECT No	110-12936	FIGURE No	2/2

SOIL_SURVEYS_00 LIBRARY.GLB GrfcTbl DG PHOTO CORE PHOTO 4 PER PAGE 111-12936 NEW.GPJ <<DrawingFile>> 26/04/2012 14:47 8.2.856 Developed by Datgel

COMPOSITE LOG

BOREHOLE TELEVIEWER LOGS AND STRUCTURES

Hole Name	CRR319	**Drill Depth**	40m	**Grid Name**	N/A	**Logging Unit**	SV031
Field	Brisbane City	**Bit Size**	76cm	**Collar Easting**	N/A	**Engineer**	J.Mackay
Log Date	8th Mar, 2012	**Casing Type**	N/A	**Collar Northing**	N/A	**Client Represent**	Julian Irons
Location	QLD	**Casing Depth**	N/A	**Reduced Level**	N/A	**Service Type**	Televiewer

TELEVIEWER LOGS

MF	Mag Field
GR	Gamma
INC	Tool Inclination (0 = Vertical Down)
AZIM	Tool Azimuth
TT	Travel Time Image
AMP	Amplitude Image
AMP - DYN1	Amplitude Image Dynamic 1

STRUCTURAL LOGS

DIPA	Structures Apparent (Sinusoid Presentation)
DIPT	Structures True (Tadpole Presentation)
PP - DIP	Polar Projection Dip (Schmidt)
RD - AZIM	Rose Diagram - Azimuth
CS	Cross Section

PROCESSED LOGS

CALI - ATV	Calliper Average from ATV	**RHI**	Rock Hardness Index

TADPOLES

- **Partially Open Fracture**
- **Closed Fracture**
- **Foliation/Banding/Bedding**

COMMENTS

Image data and the Azimuth are oriented to True North.

Magnetic Declination = 10.97 deg.

Cross Sections are plotted at 2m intervals: White : Tool Position, Light Blue : Nominal Hole Size and Blue : Actual Hole Size

IMPORTANT NOTE

The following interpretations are opinions based upon inferences from borehole logs,
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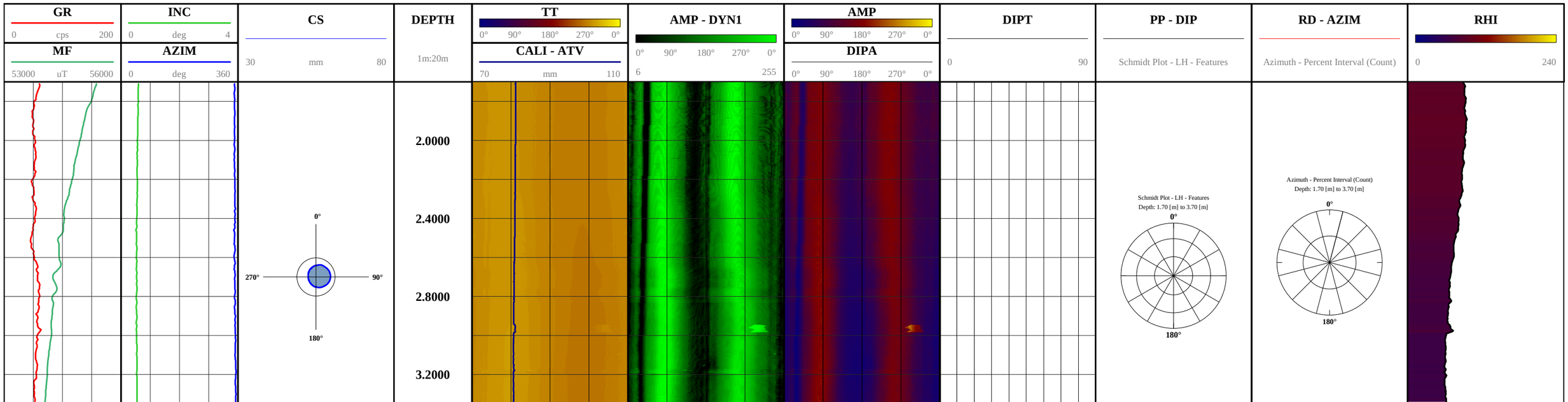
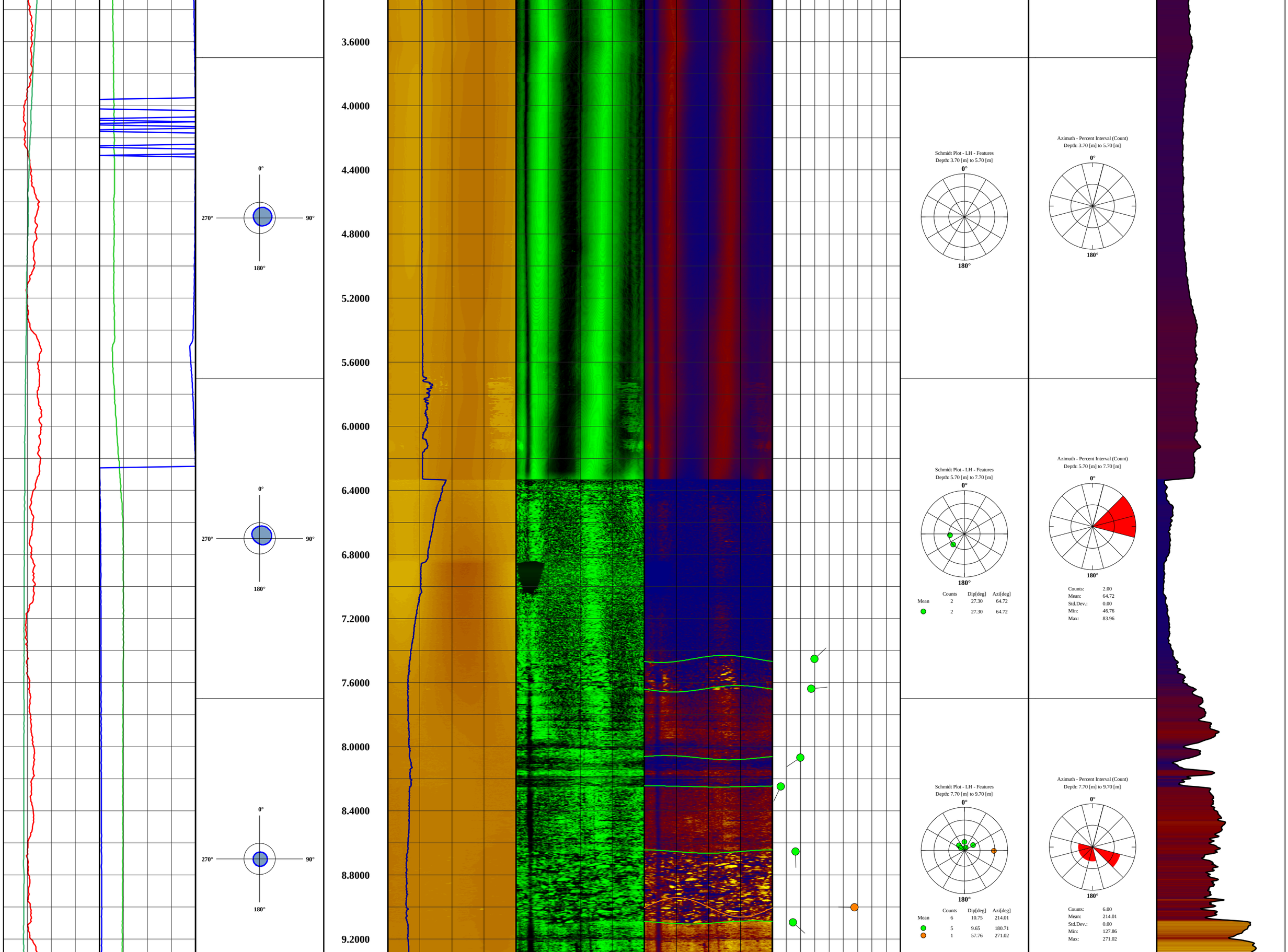
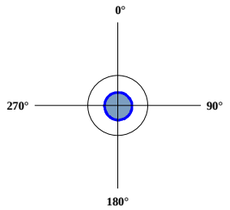
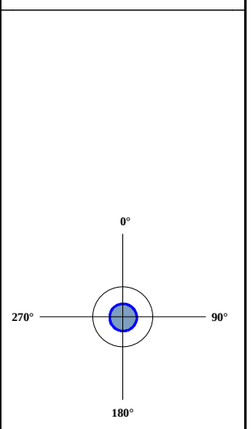
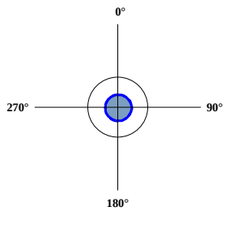
Therefore Surtron Technologies (Australia) Pty Ltd shall not be liable or responsible for any loss, damage, cost or expense incurred or sustained by anyone resulting from any interpretations.



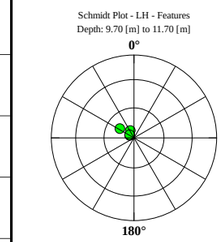




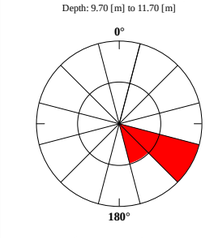




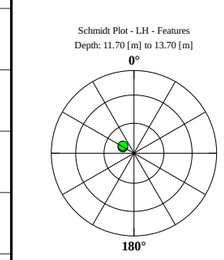
9.6000
10.0000
10.4000
10.8000
11.2000
11.6000
12.0000
12.4000
12.8000
13.2000
13.6000
14.0000
14.4000
14.8000
15.2000



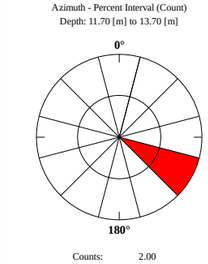
	Counts	Dip[deg]	Azi[deg]
Mean	4	8.90	130.52
	4	8.90	130.52



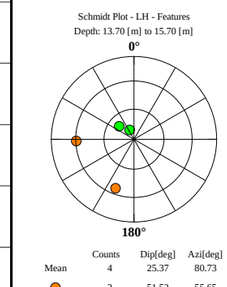
Counts:	4.00
Mean:	130.52
Std.Dev.:	0.00
Min:	123.07
Max:	151.70



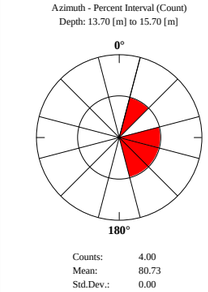
	Counts	Dip[deg]	Azi[deg]
Mean	2	13.13	122.03
	2	13.13	122.03



Counts:	2.00
Mean:	122.03
Std.Dev.:	0.00
Min:	120.85
Max:	123.13

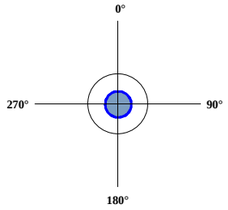


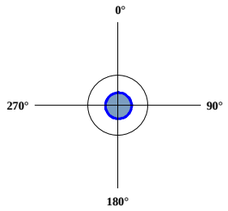
	Counts	Dip[deg]	Azi[deg]
Mean	4	25.37	80.73
	2	51.52	55.65
	2	14.91	138.93

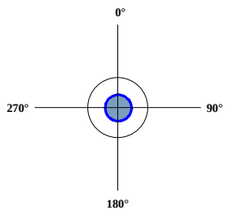


Counts:	4.00
Mean:	80.73
Std.Dev.:	0.00
Min:	20.85
Max:	153.76

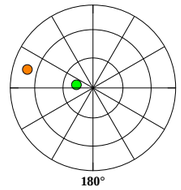
15.6000
16.0000
16.4000
16.8000
17.2000
17.6000
18.0000
18.4000
18.8000
19.2000
19.6000
20.0000
20.4000
20.8000





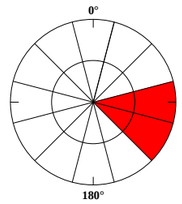


Schmidt Plot - LH - Features
Depth: 15.70 [m] to 17.70 [m]



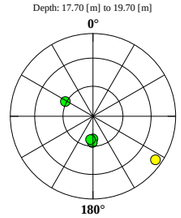
	Counts	Dip[deg]	Azi[deg]
Mean	2	44.31	104.75
	1	71.89	105.84
	1	16.76	101.13

Azimuth - Percent Interval (Count)
Depth: 15.70 [m] to 17.70 [m]



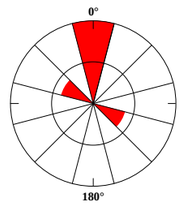
Counts:	2.00
Mean:	104.75
Std.Dev.:	0.00
Min:	101.13
Max:	105.84

Schmidt Plot - LH - Features
Depth: 17.70 [m] to 19.70 [m]



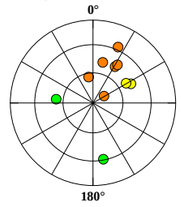
	Counts	Dip[deg]	Azi[deg]
Mean	5	19.52	8.11
	4	17.92	22.93
	1	81.71	305.13

Azimuth - Percent Interval (Count)
Depth: 17.70 [m] to 19.70 [m]



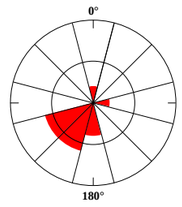
Counts:	5.00
Mean:	8.11
Std.Dev.:	0.00
Min:	0.65
Max:	305.13

Schmidt Plot - LH - Features
Depth: 19.70 [m] to 21.70 [m]

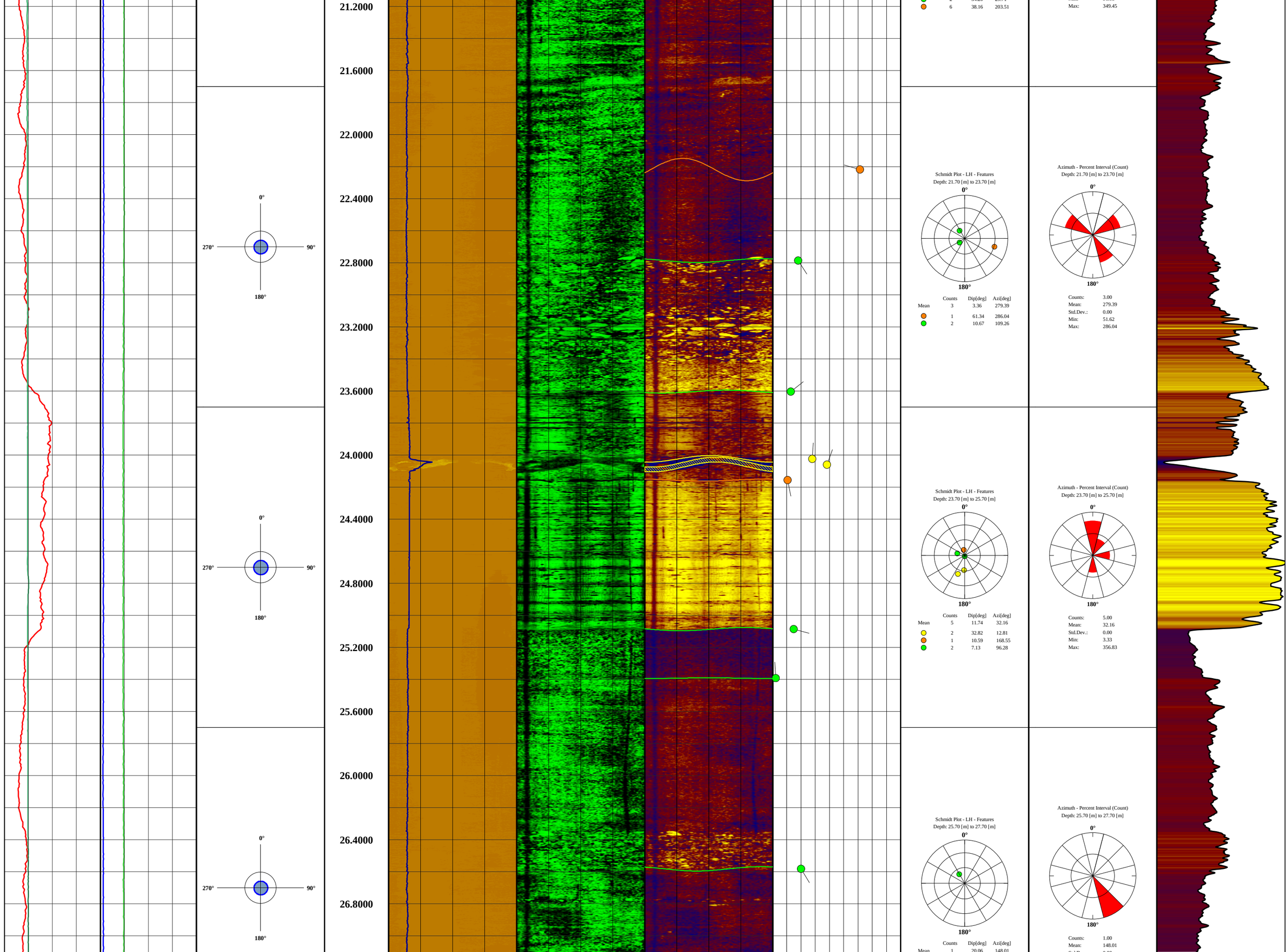


	Counts	Dip[deg]	Azi[deg]
Mean	10	34.20	210.12
	2	40.78	240.81
	2	34.20	29.71

Azimuth - Percent Interval (Count)
Depth: 19.70 [m] to 21.70 [m]



Counts:	10.00
Mean:	210.12
Std.Dev.:	0.00
Min:	96.08



MF	**AZIM**	**CS**	**DEPTH**	**CALI - ATV**	**AMP - DYN1**	**DIPA**	**DIPT**	**PP - DIP**	**RD - AZIM**	**RHI**
53000 uT 56000	0 deg 360			70 mm 110	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°				
GR	**INC**	30 mm 80	1m:20m	**TT**		**AMP**	0 90	Schmidt Plot - LH - Features	Azimuth - Percent Interval (Count)	0 240
0 cps 200	0 deg 4			0° 90° 180° 270° 0°	6 255	0° 90° 180° 270° 0°				

27.2000
27.6000
28.0000
28.4000
28.8000
29.2000
29.6000
30.0000
30.4000
30.8000
31.2000
31.6000

0° 90° 180° 270°

0° 90° 180° 270°

	Counts	Dip[deg]	Azi[deg]
Mean	1	20.06	148.01

Std.Dev.: 0.00
Min: 148.01
Max: 148.01

Schmidt Plot - LH - Features
Depth: 27.70 [m] to 29.70 [m]

0° 180°

	Counts	Dip[deg]	Azi[deg]
Mean	4	40.47	113.41
	3	69.90	108.62
	1	17.47	110.31

Azimuth - Percent Interval (Count)
Depth: 27.70 [m] to 29.70 [m]

0° 180°

Counts: 4.00
Mean: 113.41
Std.Dev.: 0.00
Min: 110.31
Max: 275.28

Schmidt Plot - LH - Features
Depth: 29.70 [m] to 31.70 [m]

0° 180°

	Counts	Dip[deg]	Azi[deg]
Mean	7	58.37	317.84
	1	10.11	167.58
	2	62.83	35.69
	4	67.76	307.04

Azimuth - Percent Interval (Count)
Depth: 29.70 [m] to 31.70 [m]

0° 180°

Counts: 7.00
Mean: 317.84
Std.Dev.: 0.00
Min: 34.14
Max: 317.71

IN-SITU PACKER PERMEABILITY TEST RESULT

PROJECT: CRR
PROJECT No.: 110-12936
BH No.: 319
Test No.: 1
Date: 10/02/2012

Packer type: Double
Packer pressure: 2500kPa
Gauge pressures measured in: kPa
Tested by: CS

Vertical depth to:

Top of test section (m):	33.00
Base of test section (m):	34.50
Centre of test section(m):	33.75
Base of casing (m):	32.00
Ground water (m)	NR

Depth of centre of test section (m)	33.75
Length of test section (m):	1.50

Gauge Height above ground level	0.00
Hole Diameter in test section (mm	75

1st period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	1955.6	1955.6	1955.6	1955.6	Flow (l/min)
200	Water Take	0.00	0.00	0.00	0.00	0.000
2nd period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	1957.3	1957.3	1957.3	1957.3	Flow (l/min)
400	Water Take	0.00	0.00	0.00	0.00	0.000
3rd period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	1958.3	1958.6	1958.9	1959.4	Flow (l/min)
550	Water Take	0.00	0.30	0.30	0.50	0.073
4th period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	1958.9	1958.9	1958.9	1958.9	Flow (l/min)
300	Water Take	0.00	0.00	0.00	0.00	0.000
5th period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading					Flow (l/min)
	Water Take	0.00	0.00	0.00	0.00	0.000

Period	Flow (q) (l/min)	Gauge Press (kPa)	Gauge Press (m of water)	Friction Loss (m)*		Total Head (m)	Lugeon Value	Perm. (m/s)
				Basic	In extra rods			
1st	0.000	200.00	20.440	0.000	0.000	54.190	0.000	0.00E+00
2nd	0.000	400.00	40.880	0.000	0.000	74.630	0.000	0.00E+00
3rd	0.073	550.00	56.210	0.000	0.000	89.960	0.056	5.31E-09
4th	0.000	300.00	30.660	0.000	0.000	64.410	0.000	0.00E+00
5th	0.000	0.00	0.000	0.000	0.000	33.750	0.000	0.00E+00

*Where friction loss is assumed to be negligible.

N.B. Pressure Conversion: 1 bar = 100 kPa = 14.503 psi

Note - zero flow period 4 - test abandoned

SOIL SURVEYS ENGINEERING

IN-SITU PACKER PERMEABILITY TEST RESULT

PROJECT: CRR
PROJECT No.: 110-12936
BH No.: 319
Test No.: 2
Date: 10/02/2012

Packer type: Double
Packer pressure: 2500kPa
Gauge pressures measured in: kPa
Tested by: CS

Vertical depth to:

Top of test section (m):	21.00
Base of test section (m):	22.50
Centre of test section(m):	21.75
Base of casing (m):	20.00
Ground water (m)	NR

Depth of centre of test section (m)	21.75
Length of test section (m):	1.50

Gauge Height above ground level	0.00
Hole Diameter in test section (mm	75

1st period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	1961.5	1966.5	1966.8	1967.0	Flow (l/min)
100	Water Take	0.00	5.00	0.30	0.20	0.367
2nd period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	1967.0	1967.2	1967.4	1967.4	Flow (l/min)
300	Water Take	0.00	0.20	0.20	0.00	0.027
3rd period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	1967.5	1967.9	1968.3	1969.0	Flow (l/min)
400	Water Take	0.00	0.40	0.40	0.70	0.100
4th period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	1967.9	1967.9	1967.9	1967.9	Flow (l/min)
300	Water Take	0.00	0.00	0.00	0.00	0.000
5th period	Time (mins)	0	5	10	15	Average
Gauge Pressure	Flow reading	1967.5	1967.5	1967.5	1967.5	Flow (l/min)
100	Water Take	0.00	0.00	0.00	0.00	0.000

Period	Flow (q) (l/min)	Gauge Press (kPa)	Gauge Press (m of water)	Friction Loss (m)*		Total Head (m)	Lugeon Value	Perm. (m/s)
				Basic	In extra rods			
1st	0.367	100.00	10.220	0.000	0.000	31.970	0.781	7.47E-08
2nd	0.027	300.00	30.660	0.000	0.000	52.410	0.035	3.31E-09
3rd	0.100	400.00	40.880	0.000	0.000	62.630	0.109	1.04E-08
4th	0.000	300.00	30.660	0.000	0.000	52.410	0.000	0.00E+00
5th	0.000	100.00	10.220	0.000	0.000	31.970	0.000	0.00E+00

*Where friction loss is assumed to be negligible.

N.B. Pressure Conversion: 1 bar = 100 kPa = 14.503 psi

SOIL SURVEYS ENGINEERING