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ENGINEERING BOREHOLE LOG

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

BOREHOLE No _____BH029 ____

SHEET ____1__ of ___2__

REFERENCE NO ____H10598 ____

	JECT	1200 07 10			AY (COOROY - CURRA) SECTION A GEOT	ECH	<u>INIC</u>	AL INVESTIGA	TION_				
					SURFACE R.L. <u>166.50m</u> PLUNGE			DATE STAR	- PTED 1			S 485658.7 E; 7080945.	<u> </u>
JOB					HEIGHT DATUM _AHD _ BEARING _							DRILLER R&D Drilling	
										200		DIWLELLY TO DESIGN	
	R.L. (m)	SS	RQD ()%		2000 2000 2000 2000 2000 2000 2000 200		C.		PACING	ഗ	A	DDITIONAL DATA	
DEРТН (m)		SORING			MATERIAL	УS	N a	STRENGTH SP	(mm)	c Log		AND	S
DEP.		SER SEE	CORE	SAMPLE	DESCRIPTION	LITHOLOGY	OH	II 00	888	GRAPHIC	-	TEST RESULTS	SAMPLES
0	166.50	2≸8	REC %	SA		15	USC	M<-ZI<	NØNØ	R.		TEOT NEODETO	SA
					Clayey SILT (Residual) Pale grey with mottled red ironstaining, moist, very stiff.			‡					
F				A	Rock fabric visible in parts; hard iron		1	T				6,10,12	SPT
F.				_	cemented bands throughout.		1	‡				N=22	351
E 1							1	Ŧ	3 4				
-	165.00						1	‡					
3E	100.00			-	SILTSTONE (XW - HW):	X X		±				9,19,27	SPT
-				В	Generally exhibits the engineering properties of pale grey to mottled red,	× × × ×	XW.					N=46	SPI
-2	164.40		(49)		moist, hard clayey Silt.	×				\dashv		Is(50) = 0.12MPa	×
-					Rock fabric visible throughout.	:::						Is(50) = 0.12MPa	
2 3 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5					SANDSTONE (MW): Pale grey to light orange, fine to medium	: : :							
		Ш	100		grained, indistinct bedding.	:::							
-3			(79)		Defects generally medium to wide spacing.		MW						
E						:::							
-					Prominent defect sets dip at 10°.								1
E			100	200	Defect surfaces are typically iron stained.								
-4	162.34		(77)		Becoming medium to coarse grained in							Is(50) = 0.21MPa	×
E					parts; occasional fine grained gravel interbeds.							Is(50) = 0.18MPa	0
-					SANDSTONE (HW):	111							
-				M	Pale grey, fine grained, poorly cemented.			<u> </u>					
-5				\wedge		:::		1 +			Core loss	5	3
-			61			:::	HW						
F			(56)		Detailed defect descriptions are shown on	:::						Is(50) = 0.17MPa	0
F					Form GEOT553/8 attached.				F			Is(50) = 0.19MPa	×
-6						:::		Ч					
-				\bigvee		:::		‡			Core loss		
F	159.95		67	\triangle	CH TOTONE (I BAD.	× >					00.01000		
-			(100)		SILTSTONE (HW): Pale grey, fine grained.	X >	4						
-7	159.30				Defects generally medium to wide spacing.	× × × × × ×							8
 	159.50		100			Y.)				1		Is(50) = 0.24MPa Is(50) = 0.22MPa	0 0
F			(51)		Prominent defect sets dip at 10°.	:::			5				
-					Defect surfaces are typically iron stained. SANDSTONE (MW):	:::	MW		4				
-8	158.40				Pale to dark grey, fine to coarse grained,	: : :					0	Is(50) = 0.05MPa Is(50) = 0.07MPa	X O
-					well graded, thinly bedded.	XX						Is(50) = 0.18MPa	×
-					Carbonaceous lenses and bands throughout.	× × × × × × × × × × ×	MW						8
	457.57		100		SILTSTONE (MW):	× × × × × × × × × × × × × × × × × × ×						Is(50) = 0.16MPa	
9	157.57		(77)		Pale grey, fine grained.	:::			-			13(00) - 0. 10WPa	0
					Defects generally medium to wide spacing.	:::			_				
1					Prominent defect sets dip at 10°.		MW						
Ę I					Defect surfaces are typically iron stained.	:::						Is(50) = 0.31MPa Is(50) = 0.31MPa	×
10	156.50		100			:::					r		0
R	EMARKS	<u>Detail</u>	ed defec	t des	scriptions are shown on Form GEOT533/8 attach	ed.	RAAX	images taken of	borehole.		13	LOGGED BY JA	



ENGINEERING BOREHOLE LOG

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/5-2009 BOREHOLE No __BH029___

SHEET __2_ of __2_

REFERENCE No __H10598___

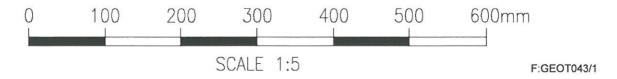
PRO	JECT	_BRU	CE HIG	<u>HW</u>	<u> AY (COOROY - CURRA) SECTION A GEOT</u>	ECH	<u>INIC</u>	<u>AL INVESTI</u>	GATION			
LOC	ATION	<u>Cut</u>	11							COC	ORDINATES <u>485658.7 E; 7080945.2</u>	2 N
PRO	JECT No				SURFACE R.L. 166.50m PLUNGE _							
JOB	No	_128/	10A/901		HEIGHT DATUM <u>AHD</u> BEARING _			DATE COM	MPLETED _	12/8/09	DRILLER R & D Drilling	
DEPTH (m)	R.L. (m)	AUGER WASH BORING CORE DRILLING	RQD ()%	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	INTACT STRENGTH	DEFECT SPACING (mm)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES
also by the bottle for A Environmental Bottle for William Processor Brade HWV COORDY-CHRRA SECTION A BHS GPU DWG35072 CDW Dates CPU Toolgist Control of the	(m) 156.50	AUGER WASH BORING CORE DRILLING	()%	SAMPLE		ПТНОГОСУ	USC WEATHERING	STRENGTH HIT IN	(mm)	GRAPHIC LOG	AND	SAMPLES
											LOOSED DY	-
R	EMARK	S netal	ied detec	r ae	scriptions are shown on Form GEOT533/8 attac	iea.	TV-V-V	illages take	ii oi porenc		LOGGED BY JA	

Project: Bruce Highway Upgrade (Cooroy - Curra) Section A

Borehole No: BH29
Start Depth: 2.00m
Finish Depth: 10.00m
Project No: FG5825

Project No: FG5825 H No: 10598





GEOTECHNICAL BRANCH LABORATORY

Materials Services - Brisbane 35 Butterfield Street, HERSTON Q 4006 Phone: (07) 3115 3035 Fax: (07) 3115 3011



DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO.:	BH29	
SHEET:	1 of 2	
REFERENCE NO .	H10598	

PROJECT: Bruce Highway (Cooroy – Curra) Section A Geotechnical Investigation

LOCATION: Cut 11

PROJECT NO.: FG5825 SURFACE R.L.: 169.50 DRILLER: R & D Drilling

JOB NO.: 128/10A/901 DATUM: MGA94 DATE DRILLED: 12/08/09

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
2.09	J	10°	PI	S	T		Cn
2.14	J	10°	PI	S	0	FeSt	
2.17	J	10°	PI	S	0	FeSt	
2.18	J	10°	PI	S	0	FeSt	
2.33	J	10°	PI		С	FeSt	
2.41	J	10°	PI	S	0	FeSt	
2.55	J	10°	PI	S	0	FeSt	
2.57	J	20°	PI	S	0	FeSt	
2.64	J	10°	PI	SR	0	FeSt	
2.7	J	10°	PI	S	0	FeSt	
3.08	J	10°	PI	S	0		Cn
3.56	J	20°	PI	S	0	FeSt	
3.97	J	10°	PI	S	0	FeSt	
4.50	J	10°	Pl	S	0	FeSt	
4.59	J	10°	Pl	S	0	FeSt	
4.63	J	10°	PI	R	0	FeSt	
5.84	J	10°	PI	SR	0		Cn
6.07	J	10°	PI	SR	0		Cn

Abbreviations

			7 110 101 0	710111011				
	ROUGHNESS		WALL ALTERATIONS		TYPE	OTHER		
R	Rough	FeSt	Iron Stained	J	Joint	Р	Partly	
S	Smooth	W	Weathered	В	Bedding	QZ	Quartz Vein	
SL	Slickensided			BP	Bedding Parting	Со	Coal Seam	
				FP	Foliation Parting	ln	Incipient	
	PLANARITY		APERTURE	SZ	Sheared Zone	SI	Sand Infill	
PI	Planar	С	Closed	ws	Weathered Seam	Н	Horizontal	
St	Stepped	0	Open	CZ	Crushed Zone	V	Vertical	
Un	Undulating	F	Filled	SM	Secondary Mineralisation	CI	Clay Infill	
Cu	Curved	Т	Tight	BZ	Broken Zone	Cn	Clean	
lr	Irregular			HFZ	Highly Fractured Zone			
				Fr	Fracture			

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

 BOREHOLE NO.:
 BH29

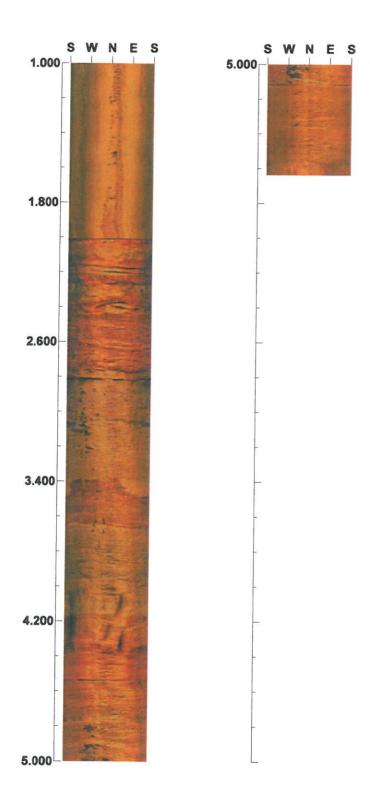
 SHEET:
 2 of 2

 REFERENCE NO.:
 H10598

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
7.23	J	10°	PI	SR	0		Cn
7.33	J	10°	PI	S	0		Cn
7.46	J	20°	lr	R	0		Cn
7.68	J	10°	PI	SR	0		Cn
7.73	J	10°	lr	R	T		CI
7.8	J	30°	lr		С		
7.72	J	10°	PI	S	0		Cn
9.00	J	10°	PI	R	0		Cn
9.27	J	20°	lr	R	0		Cn
9.57	J	20°	PI	R	Т		Cn
9.64	J	10°	PI	S	0		Cn
9.88	J	10°	PI		С		Cn

Inclination: -90

Depth range: 1.000 - 5.635 m



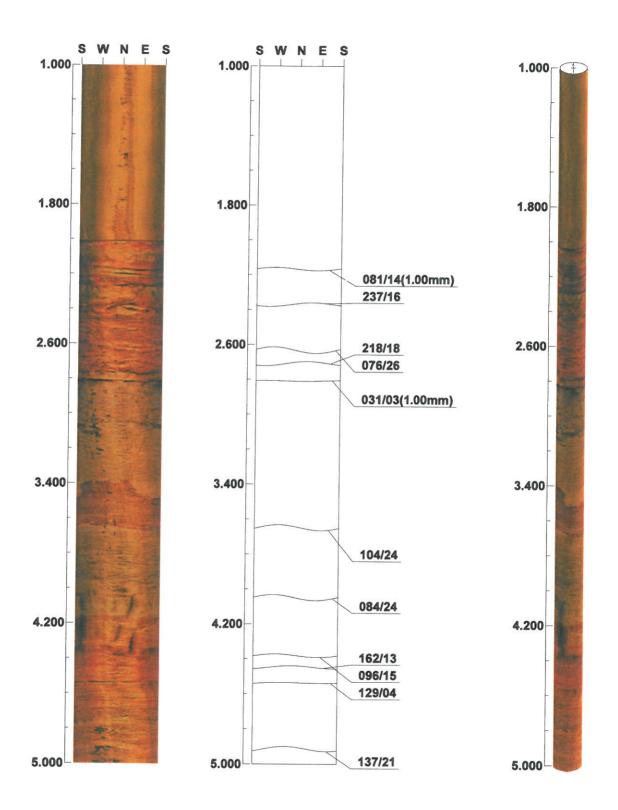
Scale: 1/20 Aspect ratio: 200 %

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH29

Azimuth: 0

Inclination: -90

Depth range: 1.000 - 5.000 m

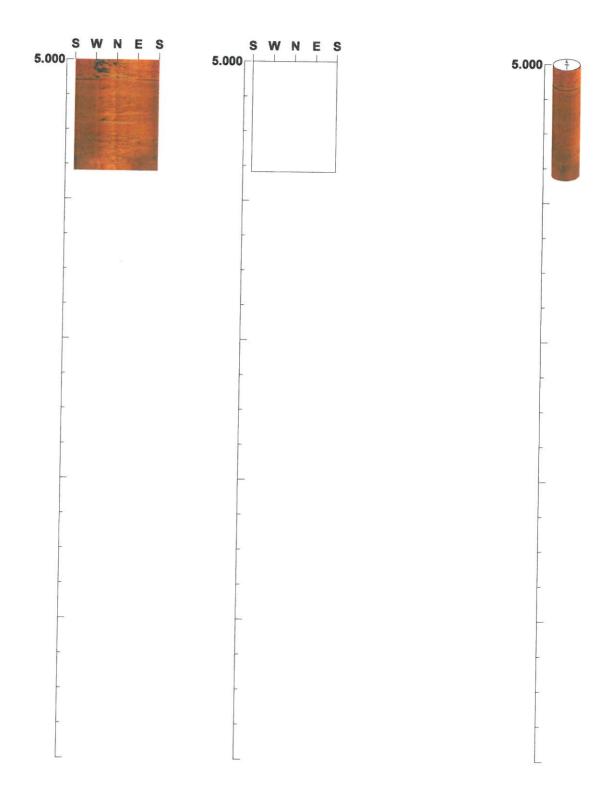


Scale: 1/20 Aspect ratio: 200 %

Project name: BRUCE HIGHWAY UPGRADE
Bore hole No.: BH29 Azimuth: 0

Inclination: -90

Depth range: 5.000 - 5.635 m



Scale: 1/20 Aspect ratio: 200 %

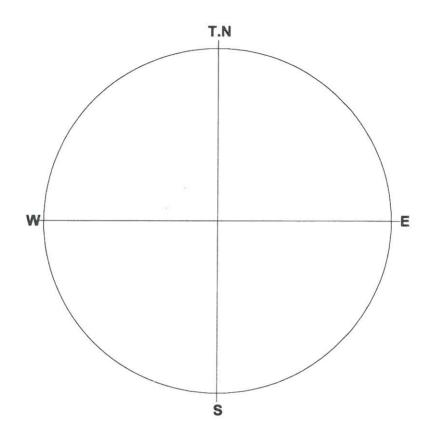
Tab. Table of Discontinuity (1/1)

File name: BH29.STR

[]

No.	Depth (m)	Dir/Dip	Sort	Aperture (mm)	Form	Condition	Remark
1	2.167	081/14	Parting	1.0	Planar	Weathered	Open
2	2.371	237/16	Joint	0.5	Planar	Weathered	Open
3	2.632	076/26	Parting	1.0	Planar	Weathered	Open
4	2.709	218/18	Joint	1.0	Planar	Weathered	Open
5	2.808	031/03	Joint	1.0	Planar	Weathered	Open
6	3.649	104/24	Bed/foliat	0.0	Planar	Rough	Tight
7	4.049	084/24	Parting	0.5	Planar	Weathered	Open
8	4.381	096/15	Parting	0.5	Planar	Weathered	Open
9	4.447	162/13	Parting	0.3	Planar	Weathered	Open
10	4.537	129/04	Joint	1.0	Planar	Weathered	Open/loose
11	4.914	137/21	Bed/foliat	0.0	Planar	Smooth	Tight

BH29.STR <<BEDDING/FOLIATION>>



Number of Data: 2/11

<Legend>

:Bed/foliat -- 2 :Boundary -- 0
:Joint -- 0
:Parting -- 0

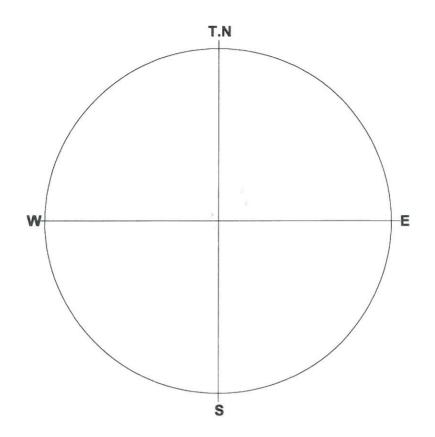
∴:ShearZn -- 0

∵:Fault -- 0

×:Vein -- 0

Schmidt (L.H)

BH29.STR <<JOINT>>



Number of Data: 4/11

<Legend>

:Bed/foliat -- 0 :Boundary -- 0

:Joint -- 4

:Parting -- 0

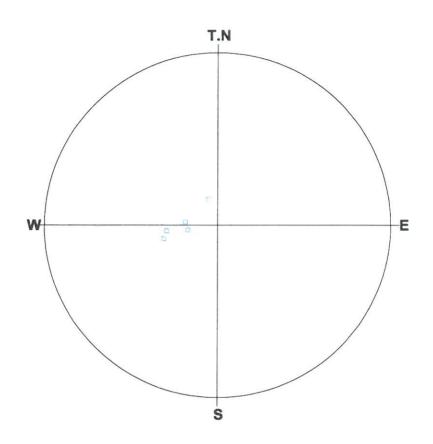
∴ShearZn -- 0

∵Fault -- 0

∴:Vein -- 0

Schmidt (L.H)

BH29.STR <<PARTING>>



Number of Data: 5/11

<Legend>

:Bed/foliat -- 0 :Boundary -- 0

:Joint -- 0
:Parting -- 5

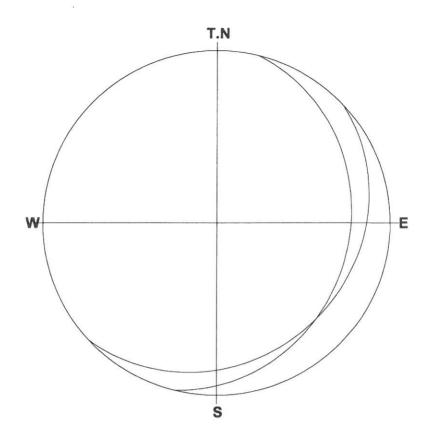
∴:ShearZn -- 0

▽:Fault -- (

×:Vein -- 0

Schmidt (L.H)

BH29.STR <<BEDDING/FOLIATION>>



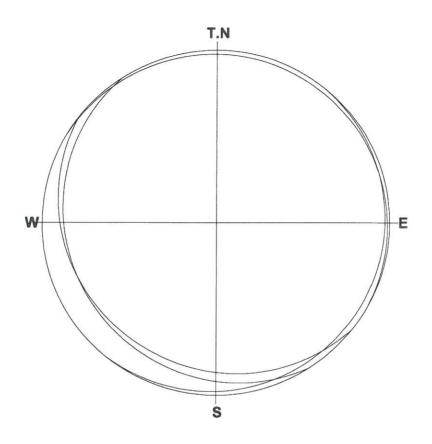
Number of Data:2/11

1:104/24(6)

2:137/21(11)

Schmidt (L.H)

BH29.STR <<JOINT>>



Number of Data:4/11

1:237/16(2)

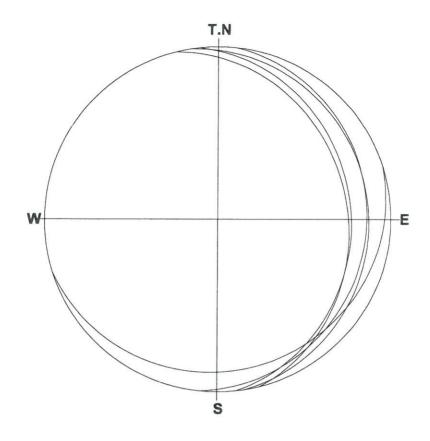
2:218/18(4)

3:031/03(5)

4:129/04(10)

Schmidt (L.H)

BH29.STR <<PARTING>>



Number of Data:5/11

1:081/14(1)

2:076/26(3)

3:084/24(7)

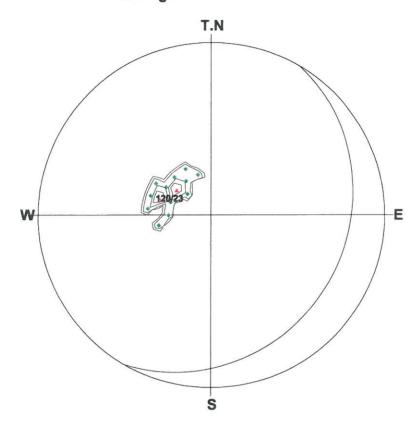
4:096/15(8)

5:162/13(9)

Schmidt (L.H)

BH29.STR <<BEDDING/FOLIATION>>

***** % Diagram *****



Number of Data: 2

<legend> Sym. (%)</legend>	Contour Value (%)
A : 100	Contour 1: 0
V : 80 - 100	Contour 2: 20
V: 80 - 100	Contour 3: 40
: 60 - 80	Contour 4: 60
• : 40 - 60	Contour 5: 80
. 40 - 60	Contour 6: 100
: 20 - 40	

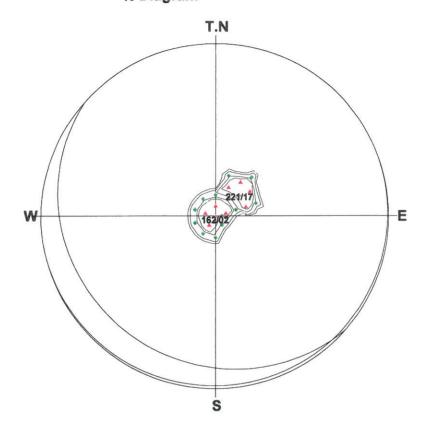
Schmidt (L.H)

Depth: 2.167 - 4.914 m

: 0 - 20

BH29.STR <<JOINT>>

***** % Diagram ******



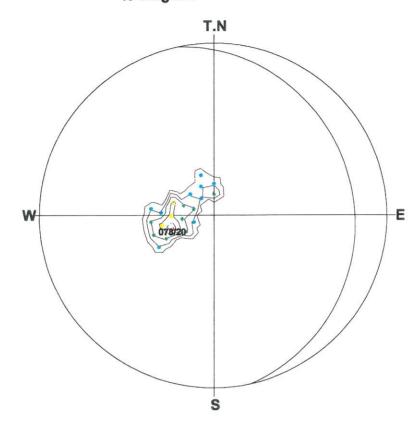
Number of Data: 4

<legend> Sym. (%)</legend>	Contour Value (%)
A : 50	Contour 1: 0
. 40 50	Contour 2: 10
V : 40 - 50	Contour 3 : 20
: 30 - 40	Contour 4: 30
A : 20 20	Contour 5 : 40
* : 20 - 30	Contour 6: 50
: 10 - 20	
: 0 - 10	

Schmidt (L.H)

BH29.STR <<PARTING>>

***** % Diagram *****

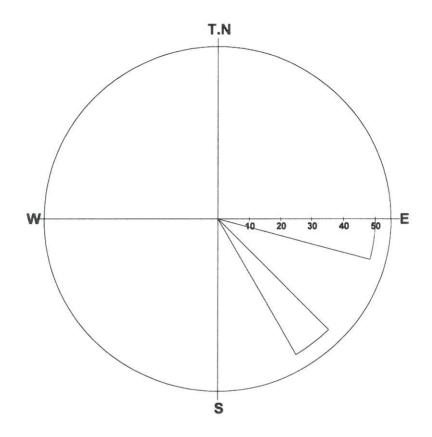


Number of Data: 5

<legend> Sym. (%)</legend>	Contour Value (%)
<u> </u>	Contour 1: 0
W- C4 90	Contour 2: 16
V : 64 - 80	Contour 3: 32
: 48 - 64	Contour 4: 48
A 20 40	Contour 5: 64
• : 32 - 48	Contour 6: 80
: 16 - 32	
: 0 - 16	

Schmidt (L.H)

BH29.STR <<BEDDING/FOLIATION>>

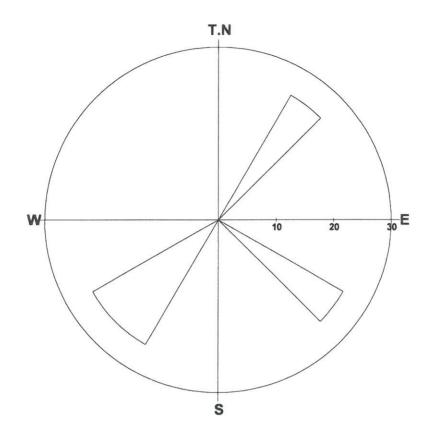


Number of Data: 2/11

Max: 50.0% Grouping Angle: 15 deg

Dir	%	Dir	%	Dir	%
0-	0	135-	50	270-	0
15-	0	150-	0	285-	0
30-	0	165-	0	300-	0
45-	0	180-	0	315-	0
60-	0	195-	0	330-	0
75-	0	210-	0	345-	0
90-	50	225-	0		
105-	0	240-	0		
120-	0	255-	0		

BH29.STR <<JOINT>>

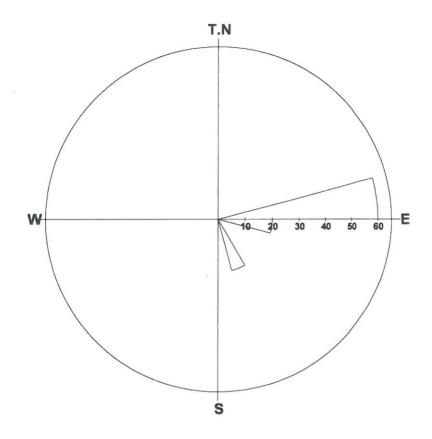


Number of Data: 4/11

Max: 25.0% Grouping Angle: 15 deg

Dir	%	Dir	%	Dir	%
0-	0	135-	0	270-	0
15-	0	150-	0	285-	0
30-	25	165-	0	300-	0
45-	0	180-	0	315-	0
60-	0	195-	0	330-	0
75-	0	210-	25	345-	0
90-	0	225-	25		
105-	0	240-	0		
120-	25	255-	0		

BH29.STR <<PARTING>>



Number of Data: 5/11

Max: 60.0%

Grouping Angle: 15 deg

Dir	%	Dir	%	Dir	%
0-	0	135-	0	270-	0
15-	0	150-	20	285-	0
30-	0	165-	0	300-	0
45-	0	180-	0	315-	0
60-	0	195-	0	330-	0
75-	60	210-	0	345-	0
90-	20	225-	0		
105-	0	240-	0		
120-	0	255-	0		

Title: BH29.STR Comment: JOINT Depth: 2.167 - 4.914 m Aperture: 0.0 - 1.0 mm Sort: 1/7 Form: 8/8 Condition: 11/11 Remark: 11/11 2009/ 9/ 2

Elevation: 0.000m Water Level: 5.120m

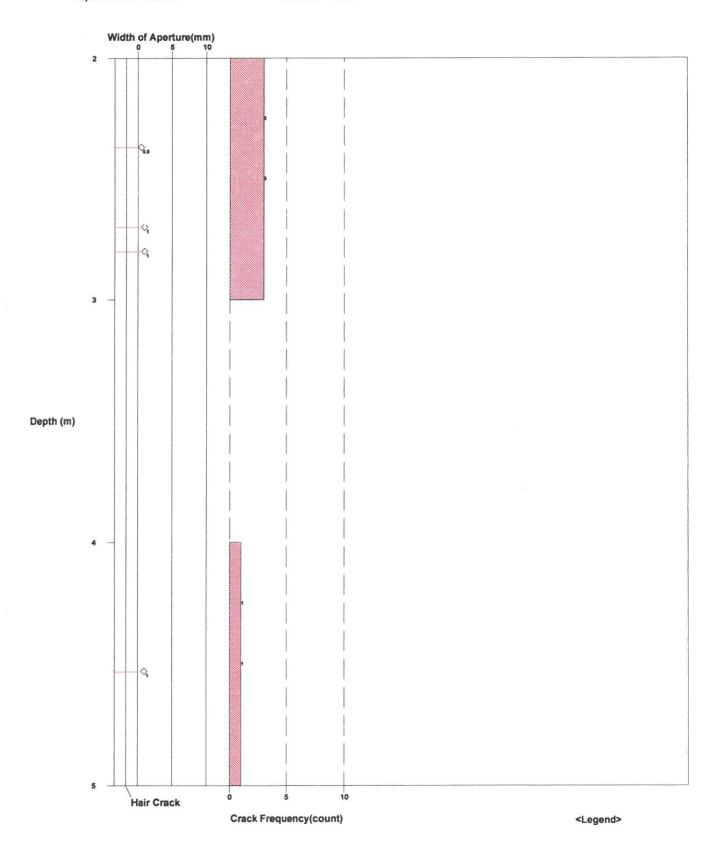


Fig. Rock Mass Condition Graph

All Crack Frequency
Open Crack Frequency

Water Level

Title: BH29.STR Comment: PARTING Depth: 2.167 - 4.914 m Aperture: 0.0 - 1.0 mm Sort: 1/7 Form: 8/8 Condition: 11/11 Remark: 11/11 2009/ 9/ 2

Elevation: 0.000m Water Level: 5.120m

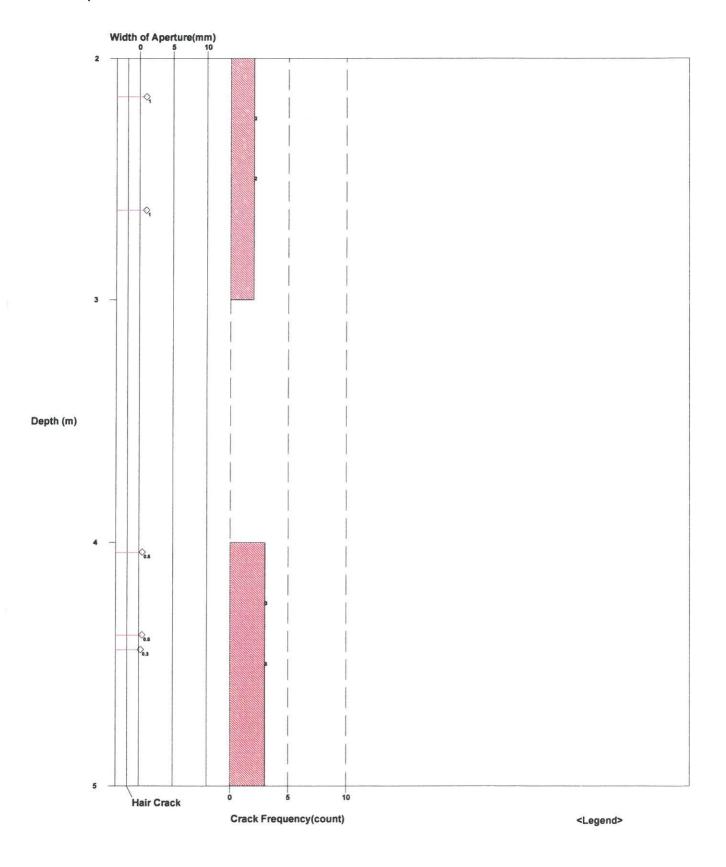


Fig. Rock Mass Condition Graph

All Crack Frequency
Open Crack Frequency
Water Level

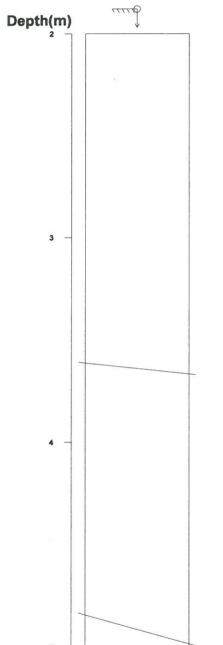
Title: BH29.STR

Comment: BEDDING/FOLIATION

Depth: 2.167 - 4.914 m Aperture: 0.0 - 1.0 mm Sort: 1/7
Form: 8/8

Condition: 11/11 Remark: 11/11

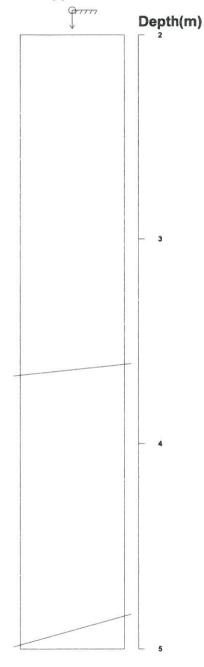
View Point 2 Profile of Apparent Borehole



View Point2 View Point1 Up(+) Up(+) W 21 E

Down(-)

View Point 1
Profile of Apparent Borehole



Direction: 0 deg

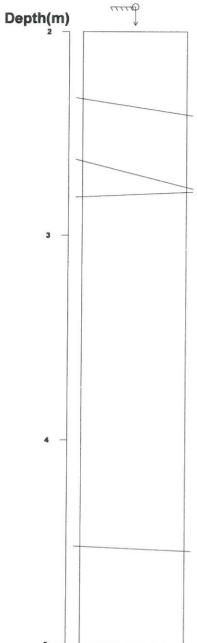
Inclination: Vertical(Down)

<Legend>
Entrance G.L
Bottom

Fig. Apparent Dip

Title: BH29.STR Comment: JOINT Depth: 2.167 - 4.914 m Aperture: 0.0 - 1.0 mm

View Point 2 Profile of Apparent Borehole



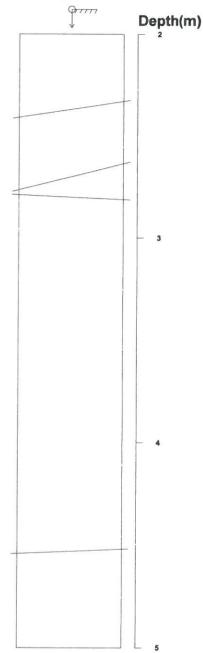
View Point2 View Point1
Up(+)
Up(+)

W
21
E

Down(-)

Sort: 1/7 Form: 8/8 Condition: 11/11 Remark: 11/11

View Point 1 Profile of Apparent Borehole



Direction: 0 deg

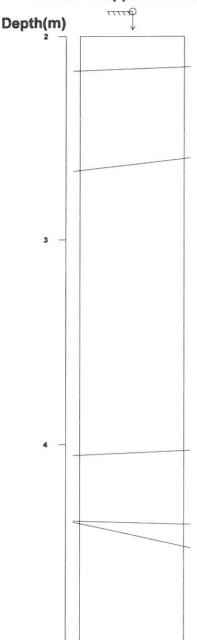
Inclination: Vertical(Down)

<Legend>
Entrance G.L
Bottom

Fig. Apparent Dip

Title: BH29.STR Comment: PARTING Depth: 2.167 - 4.914 m Aperture: 0.0 - 1.0 mm

View Point 2
Profile of Apparent Borehole

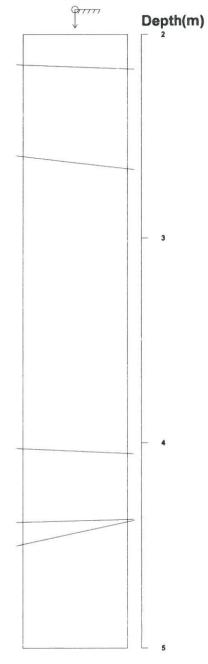


View Point2 View Point1
Up(+)
Up(+)

W
2
1
E
Down(-)
Down(-)

Sort: 1/7
Form: 8/8
Condition: 11/11
Remark: 11/11

View Point 1
Profile of Apparent Borehole



Direction: 0 deg

Inclination: Vertical(Down)

<Legend>
Entrance G.L
Bottom

Fig. Apparent Dip