Queensland Government
Department of Main Roads

ENGINEERING BOREHOLE

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/2-2004

BOREHOLE No BH12
SHEET 1 of 8
REFERENCE No H9561

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 6 - CENTRE OF THE PILE CAP COORDINATES 10324.8 E; 167708.4 N
PROJECT No FG5388 SURFACE R.L. -5.48 DATE STARTED 30/3/05 DATUM SETP
JOB No DATUM AHD DATE COMPLETED 31/3/05 DRILLER CAIRNS DRILLING

DEPTH (m)	R.L. (m)	CASING / WASH BORING / CORE DRILLING	RQD ( )% CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH (EH VH H M L VL EL)	DEFECT SPACING (mm) (20 60 200 600 2000)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES / TESTS
0	-5.48				**ESTUARINE SILTY CLAY** Grey, wet, very soft. Contains some shell fragments throughout.		OH					RW N<1	SPT
-8.18					**SAND AND GRAVEL - ALLUVIUM** Grey, wet, mainly loose to medium dense. Contains gravel up to 25mm size and trace of clay.		GP-GM					5,3,7 N=10	SPT
-9.58					**LOW GRADE COAL** **FINE GRAINED MAINLY DULL TO VITREOUS THINLY LAMINATED FRAGILE CARBONACEOUS SEDIMENTARY ROCK** XW : Generally exhibits engineering properties of dark grey to black, dry, medium dense silty gravel.		XW					9,9,15 N=24	SPT
-10.48													

BOREHOLE WITH LITHOLOGY MEERA PIER 6 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09_04.GDT 31/8/05

REMARKS This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles have been measured with respect to a horizontal plane.

LOGGED BY J. LESTER & A. DISSANAYAKE (DIS

Queensland Government
Department of Main Roads

ENGINEERING BOREHOLE

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/2-2004

BOREHOLE No BH12
SHEET 2 of 8
REFERENCE No H9561

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 6 - CENTRE OF THE PILE CAP COORDINATES 10324.8 E; 167708.4 N
PROJECT No FG5388 SURFACE R.L. -5.48 DATE STARTED 30/3/05 DATUM SETP
JOB No DATUM AHD DATE COMPLETED 31/3/05 DRILLER CAIRNS DRILLING

DEPTH (m)	R.L (m)	CASING / WASH BORING / CORE DRILLING	RQD ( )% CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH (EH VH H M L VL EL)	DEFECT SPACING (mm) (20 60 200 600 2000)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES / TESTS
5	-10.48				**LOW GRADE COAL** XW : (As Above)		XW						
	-10.98				HW: Dark grey to black, dry, very dense silty gravel rapidly grading into very low to low strength rock with depth.								
6												50/110 mm N>50	SPT
7							HW					18,30/75 mm N>50	SPT
8			(15)									Coreloss Broken / crushed seam.	
	-13.80				MW: Dark grey to black, fine grained, thinly laminated and interbedded, very low to mainly low strength. Minor grey siltstone and dark grey carbonaceous interbeds up to 150mm thick. Defects : - Lamination & bedding partings 5°-15° (3-4/m) - Occasional joints @ 60° (1-2/m) - Occasional joints @ 80° (1/m) - Some broken & weathered seams <200mm.							Is(50)=0.12 MPa Is(50)=0.12 MPa	x o
9							MW					Is(50)=0.15 MPa Is(50)=0.15 MPa Is(50)=0.10 MPa Is(50)=0.24 MPa	o x o x
10	-15.48											Is(50)=0.16 MPa Is(50)=0.20 MPa	x o

BOREHOLE WITH LITHOLOGY MEERA PIER 6 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09_04.GDT 31/8/05

REMARKS This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles have been measured with respect to a horizontal plane.

LOGGED BY
J. LESTER & A. DISSANAYAKE (DIS

Queensland Government
Department of Main Roads

ENGINEERING BOREHOLE

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/2-2004

BOREHOLE No BH12
SHEET 3 of 8
REFERENCE No H9561

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 6 - CENTRE OF THE PILE CAP
COORDINATES 10324.8 E; 167708.4 N
PROJECT No FG5388
SURFACE R.L. -5.48
DATE STARTED 30/3/05
DATUM SETP
JOB No
DATUM AHD
DATE COMPLETED 31/3/05
DRILLER CAIRNS DRILLING

BOREHOLE WITH LITHOLOGY MEERA PIER 6 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09_04.GDT 31/8/05

DEPTH (m)	R.L. (m)	CASING / WASH BORING / CORE DRILLING	RQD ( )% CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH (EH VH H M L VL EL)	DEFECT SPACING (mm) (20 60 200 600 2000)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES	TESTS
10	-15.48				**LOW GRADE COAL** MW : (As above). Becoming low to medium strength with depth. Defects: - Bedding & lamination partings <10° (3-4/m) - Joints @ 15° & 90° (4-5/m)							Is(50)=0.04 MPa		x
												Is(50)=0.07 MPa		o
												Is(50)=0.28 MPa		o
												Is(50)=0.38 MPa		x
			86 (14)									Is(50)=0.05 MPa		o
												Is(50)=0.09 MPa		x
					Defects are generally planar, smooth and mainly clean with some weathered & altered seams.							Is(50)=0.07 MPa		o
												Is(50)=0.12 MPa		x
11								MW						
												Is(50)=0.43 MPa		o
												Is(50)=0.25 MPa		x
												Is(50)=0.64 MPa		o
												Is(50)=0.17 MPa		x
12	-17.53				**SILTSTONE** MW : Pale grey, fine grained, mainly low to medium strength. Minor thin coal laminations dipping 5-10° throughout.			MW					Is(50)=0.50 MPa		x
												Is(50)=0.41 MPa		o
												UCS =10.2 Mpa MC=8.6% WD=2424N/m²		
	-18.03											Is(50)=0.22 MPa		x
												Is(50)=0.21 MPa		o
					LOW GRADE COAL MW : Dark grey to black, fine grained, thinly laminated & interbedded, low to medium strength. Defects : - Lamination partings <10° (7/m) - Occasional joints @ 80° (1/m)							Is(50)=0.14 MPa		x
13												Is(50)=0.46 MPa		o
								MW						
					Highly fractured in parts with intersecting bedding plane partings and subvertical joints. Minor crushed or broken zones throughout.									
	-19.13		96 (20)									Coreloss		
					SANDSTONE SW : Grey, fine grained, laminated, low to mainly medium strength.							Siltstone band grading to Sandstone with depth. UCS =28.6 Mpa MC=2.6% WD=2401N/m²	Is(50)=0.94 MPa	o
													Is(50)=0.79 MPa	x
14					Defects : - Numerous thin carbonaceous laminations <10-15°. -Occasional joints @ 70°-80° (1/m).			SW						
												Is(50)=0.57 MPa		o
												Is(50)=0.14 MPa		x
	-20.04											Is(50)=0.80 MPa		o
												Is(50)=0.27 MPa		x
					LOW GRADE COAL MW: See next page									
15	-20.48							MW				Is(50)=0.88 MPa		o

REMARKS This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles have been measured with respect to a horizontal plane.

LOGGED BY J. LESTER & A. DISSANAYAKE (DIS

Queensland Government
Department of Main Roads

ENGINEERING BOREHOLE

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/2-2004

BOREHOLE No BH12
SHEET 4 of 8
REFERENCE No H9561

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 6 - CENTRE OF THE PILE CAP COORDINATES 10324.8 E; 167708.4 N
PROJECT No FG5388 SURFACE R.L. -5.48 DATE STARTED 30/3/05 DATUM SETP
JOB No DATUM AHD DATE COMPLETED 31/3/05 DRILLER CAIRNS DRILLING

DEPTH (m)	R.L. (m)	CASING / WASH BORING / CORE DRILLING	RQD ( )% CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH (EH VH H M L VL EL)	DEFECT SPACING (mm) (20 60 200 600 2000)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES	TESTS
15	-20.48				**LOW GRADE COAL** MW: Dark grey to black, fine grained, thinly laminated and interbedded, mainly low to medium strength. Minor grey siltstone and dark grey carbonaceous interbeds up to 50mm thick. Defects: - Lamination/bedding partings <10° (6/m) - Joints @ 60°-90°. Defects are generally planar, smooth, mainly clean with some weathered and altered seams.		MW					Is(50)=0.19 MPa		x
16	-21.43		94 (43)		**INTERBEDDED SILTSTONE & MUDSTONE** **FINE GRAINED THINLY LAMINATED SEDIMENTARY ROCK** SW: Dark grey and black, minor coal bands and thin carbonaceous laminations in parts, low to medium strength with occasional high strength bands. Frequent HW to MW seams. Defects: - Bedding/lamination partings <10° (1-4/m) - Joints @ 60° and 80° (6/m) Defects are generally planar, smooth with thin clay infills or undulating with thin clayey films.		MW HW SW				Crushed seam. Coreloss		
17												Is(50)=0.52 MPa Is(50)=0.64 MPa Coal interbed. Is(50)=0.42 MPa Is(50)=1.07 MPa	x o x o
18							MW SW				Broken zone.	Is(50)=0.27 MPa Is(50)=0.27 MPa UCS =11.9 Mpa MC=4.6% WD=2391N/m² **Pressuremeter Test 4 @ 18.0m** MW band. Is(50)=0.28 MPa Is(50)=0.11 MPa	x o x o
19			100 (57)				MW SW				Broken zone. MW band.	**Pressuremeter Test 3 @ 19.80m**		
20	-25.48													

REMARKS This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles have been measured with respect to a horizontal plane.

LOGGED BY J. LESTER & A. DISSANAYAKE (DIS

BOREHOLE WITH LITHOLOGY MEERA PIER 6 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09_04.GDT 31/8/05

Queensland Government
Department of Main Roads

ENGINEERING BOREHOLE

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/2-2004

BOREHOLE No BH12
SHEET 5 of 8
REFERENCE No H9561

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 6 - CENTRE OF THE PILE CAP COORDINATES 10324.8 E; 167708.4 N
PROJECT No FG5388 SURFACE R.L. -5.48 DATE STARTED 30/3/05 DATUM SETP
JOB No DATUM AHD DATE COMPLETED 31/3/05 DRILLER CAIRNS DRILLING

DEPTH (m)	R.L. (m)	CASING / WASH BORING / CORE DRILLING	RQD ( )% CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH (EH VH H M L VL EL)	DEFECT SPACING (mm) (20 60 200 600 2000)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES	TESTS
20	-25.48				**INTERBEDDED SILTSTONE & MUDSTONE** SW : (As above)		SW					Is(50)=0.54 MPa Is(50)=0.34 MPa	o x	
	-26.38											**Pressuremeter Test 2 @ 20.6m** UCS =101.7 Mpa MC=2.6% WD=2843N/m²		Is(50)=0.26 MPa Is(50)=0.78 MPa
21					**SANDSTONE** SW : Pale grey, fine-medium grained, laminated to slightly massive, mainly medium becoming high strength with depth. Minor thin carbonaceous laminations throughout. Defects : Lamination partings <20° (2-3/m).									
							SW					Is(50)=0.85 MPa Is(50)=0.48 MPa	o x	
												Pressuremeter Test 1 @ 21.3m UCS =23.4 Mpa MC=3.2% WD=2411N/m²		Is(50)=0.58 MPa Is(50)=0.84 MPa
22					Defects : - Lamination partings <10°. - Occasional joints @ 20°, 60° or 80°. - Occasional clay seams <5mm. Defects are generally planar, smooth and clean with clayey film or thin infillings.									
												Is(50)=0.87 MPa Is(50)=0.83 MPa	o x	
												Is(50)=1.34 MPa Is(50)=0.51 MPa	o x	
												Coal seam, 20mm thick, dip 20°.		
			100 (79)									Is(50)=1.58 MPa Is(50)=0.67 MPa	o x	
												UCS =40.0 Mpa MC=2.4% WD=2541N/m²		Is(50)=1.76 MPa Is(50)=1.26 MPa Is(50)=0.26 MPa Is(50)=2.00 MPa
23														
	-28.89				**MUDSTONE** SW : Dark grey to black, fine grained, thinly laminated, medium to mainly high strength. Occasionally varies to sandstone interbands up to 5mm thick. Defects : Generally rare. Occasional drilling induced lamination partings <10° (3/m).								Is(50)=0.46 MPa Is(50)=1.92 MPa	x o	
												UCS =37.7 Mpa MC=3.6% WD=2405N/m²		Is(50)=0.60 MPa Is(50)=1.01 MPa Is(50)=0.42 MPa Is(50)=1.99 MPa Is(50)=1.58 MPa Is(50)=0.32 MPa
24							SW							
	-30.16													
					MUDSTONE - SHEARED MW : See next page		SW							
25	-30.48													

BOREHOLE WITH LITHOLOGY MEERA PIER 6 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09_04.GDT 31/8/05

REMARKS This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles have been measured with respect to a horizontal plane.

LOGGED BY J. LESTER & A. DISSANAYAKE (D

Queensland Government
Department of Main Roads

ENGINEERING BOREHOLE

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/2-2004

BOREHOLE No BH12
SHEET 6 of 8
REFERENCE No H9561

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 6 - CENTRE OF THE PILE CAP
COORDINATES 10324.8 E; 167708.4 N
PROJECT No FG5388
SURFACE R.L. -5.48
DATE STARTED 30/3/05
DATUM SETP
JOB No
DATUM AHD
DATE COMPLETED 31/3/05
DRILLER CAIRNS DRILLING

DEPTH (m)	R.L. (m)	CASING / WASH BORING / CORE DRILLING	RQD ( )% CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH (EH VH H M L VL EL)	DEFECT SPACING (mm) (20 60 200 600 2000)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES	TESTS
25	-30.48													
			94 (76)		**MUDSTONE - SHEARED** MW: Dark grey to black, faulted, contorted, sheared and healed at some places, low to medium strength. Pale grey firm to stiff clay interbands.			MW				LL=39%; PI=17.6%; LS=11% Coreloss			
	-31.08				**SANDSTONE** SW: Pale grey, fine to medium grained, laminated to slightly massive, medium to mainly high strength. Minor dark grey mudstone interbeds and thin carbonaceous interlaminations throughout. Defects: - Lamination/bedding partings~10° - Joints @ 60°, 70° and 80° (5/m). Numerous closed or tight joints dipping 60°, 70° or 80°, PL, SM-SR with thin clay infill or coat below 26.7m.							UCS =60.9 Mpa MC=1.8% WD=2468N/m²	Is(50)=1.47 MPa Is(50)=2.96 MPa Is(50)=1.31 MPa Is(50)=2.54 MPa Is(50)=1.53 MPa Is(50)=1.01 MPa Is(50)=0.93 MPa Is(50)=1.70 MPa	x o x o o x x o
26														
27								SW						
28														
			100 (74)									Numerous mudstone rip-up clasts ~10°. UCS =35.3 Mpa MC=2.4% WD=2464N/m²	Is(50)=1.83 MPa Is(50)=1.56 MPa	o x
	-34.18				**INTERBEDDED SILTSTONE/MUDSTONE & SANDSTONE. MUDSTONE DOMINANT** SW : Grey and black, fine grained, thinly laminated and interbedded, medium to mainly high strength. Defects : - Lamination/bedding partings~10° (1-3/m). - Subvertical joints -60°-70° (7-10/m).										
29								SW						
30	-35.48													

BOREHOLE WITH LITHOLOGY MEERA PIER 6 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09_04.GDT 31/8/05

REMARKS This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles have been measured with respect to a horizontal plane.

LOGGED BY J. LESTER & A. DISSANAYAKE (DIS

Queensland Government
Department of Main Roads

ENGINEERING BOREHOLE

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/2-2004

BOREHOLE No BH12
SHEET 7 of 8
REFERENCE No H9561

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 6 - CENTRE OF THE PILE CAP
COORDINATES 10324.8 E; 167708.4 N
PROJECT No FG5388
SURFACE R.L. -5.48
DATE STARTED 30/3/05
DATUM SETP
JOB No
DATUM AHD
DATE COMPLETED 31/3/05
DRILLER CAIRNS DRILLING

DEPTH (m)	R.L. (m)	CASING / WASH BORING / CORE DRILLING	RQD ( )% CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH (EH VH H M L VL EL)	DEFECT SPACING (mm) (20 60 200 600 2000)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES	TESTS
30	-35.48				**INTERBEDDED SILTSTONE/MUDSTONE & SANDSTONE. MUDSTONE DOMINANT** SW : (As above). Mudstone beds becoming thicker and more prominant below 30.55m. Defects: - Drilling induced lamination/bedding partings - Occasional joints @ 60°, 70° or 80°. Defects are generally planar, smooth and mainly clean with occasional clay infillings up to 10mm thick.			SW				Is(50)=0.62 MPa Is(50)=0.20 MPa	x o	
												Is(50)=0.87 MPa Is(50)=0.79 MPa	o x	
31												Is(50)=1.03 MPa Is(50)=1.69 MPa	x o	
												UCS =44.1 Mpa MC=3.0% WD=2384N/m^2		
												Is(50)=0.89 MPa Is(50)=2.45 MPa Is(50)=1.71 MPa Is(50)=0.97 MPa	x o o x	
			100 (37)											
	-37.23				**MUDSTONE** SW: Dark grey to black, fine grained, thinly laminated, medium to mainly high strength. Occasional thin interlaminations of siltstone and sandstone. Defects : - Lamination partings <10° - Occasional steeply dipping joints - Clay seams up to 15mm thick. Mudstone appears to be generally massive below 32.85m. Occasional thin sandstone laminations in parts.							Is(50)=0.64 MPa Is(50)=2.50 MPa Is(50)=3.05 MPa Is(50)=1.02 MPa Is(50)=1.76 MPa Is(50)=0.92 MPa	x o o x o x	
32														
												Is(50)=0.62 MPa Is(50)=1.43 MPa	x o	
33								SW						
												Is(50)=0.72 MPa Is(50)=1.89 MPa	x o	
34														
			100 (70)											
35	-40.48													

REMARKS This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles have been measured with respect to a horizontal plane.

LOGGED BY J. LESTER & A. DISSANAYAKE (D

BOREHOLE WITH LITHOLOGY MEERA PIER 6 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09_04.GDT 31/8/05

Queensland Government
Department of Main Roads

ENGINEERING BOREHOLE

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/2-2004

BOREHOLE No BH12
SHEET 8 of 8
REFERENCE No H9561

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 6 - CENTRE OF THE PILE CAP
COORDINATES 10324.8 E; 167708.4 N
PROJECT No FG5388
SURFACE R.L. -5.48
DATE STARTED 30/3/05
DATUM SETP
JOB No
DATUM AHD
DATE COMPLETED 31/3/05
DRILLER CAIRNS DRILLING

DEPTH (m)	R.L. (m)	CASING / WASH BORING / CORE DRILLING	RQD ( )% CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH (EH VH H M L VL EL)	DEFECT SPACING (mm) (20 60 200 600 2000)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES	TESTS
35	-40.48				**MUDSTONE** SW: (As above)									
												Is(50)=0.99 MPa		x
												Is(50)=1.83 MPa		o
36												Is(50)=2.09 MPa		o
								SW				Is(50)=1.10 MPa		x
37	-42.66		100									Is(50)=2.10 MPa		o
					Borehole terminated at 37.18m							Is(50)=0.98 MPa		x
38														
39														
40														

BOREHOLE WITH LITHOLOGY MEERA PIER 6 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09_04.GDT 31/8/05

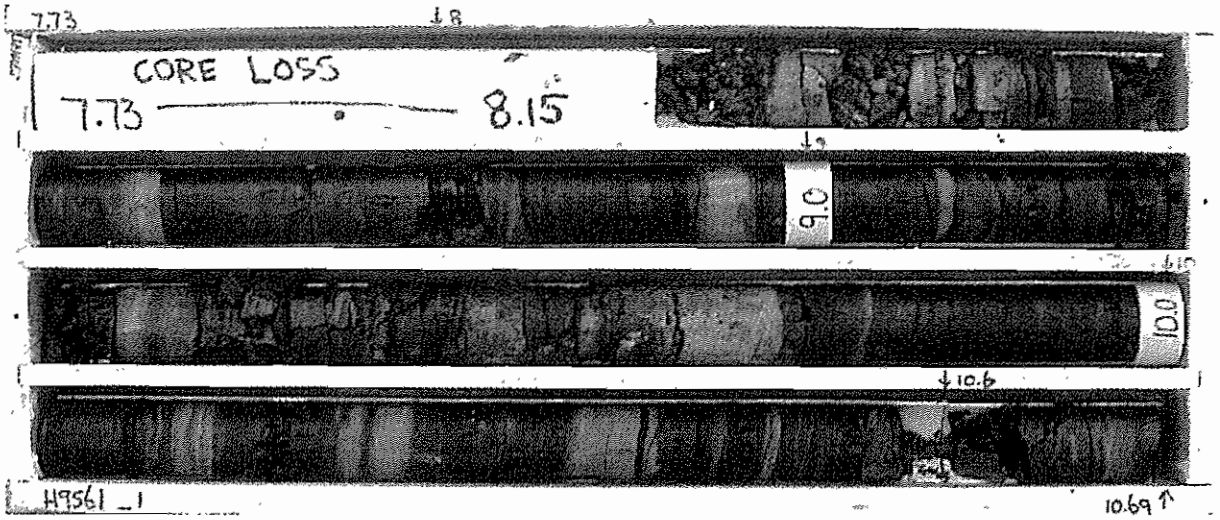
REMARKS This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles have been measured with respect to a horizontal plane.

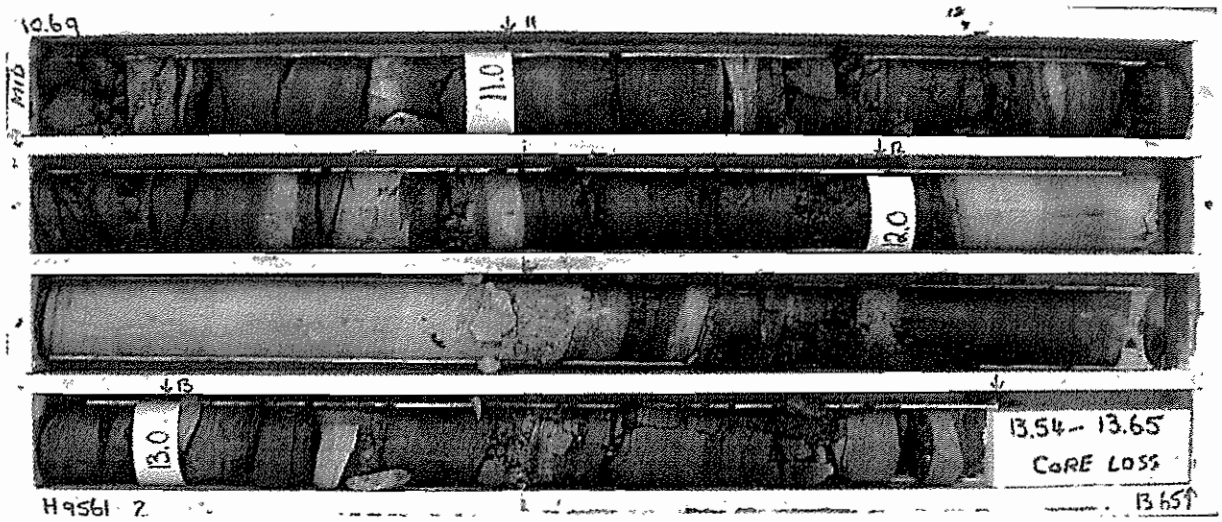
LOGGED BY
J. LESTER & A. DISSANAYAKE (DIS

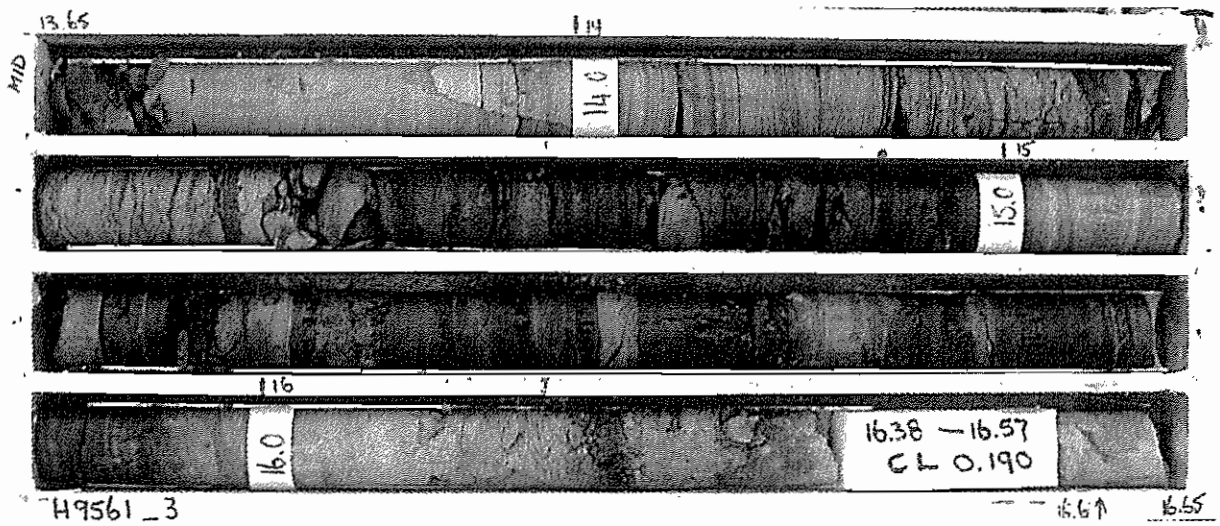
Project: **Gateway Upgrade Project - Gateway Bridge**

Borehole No: **BH 12**

Start Depth: 7.73
Finish Depth: 37.18
Project No: FG 5388
H No: 9561







Project: **Gateway Upgrade Project - Gateway Bridge**

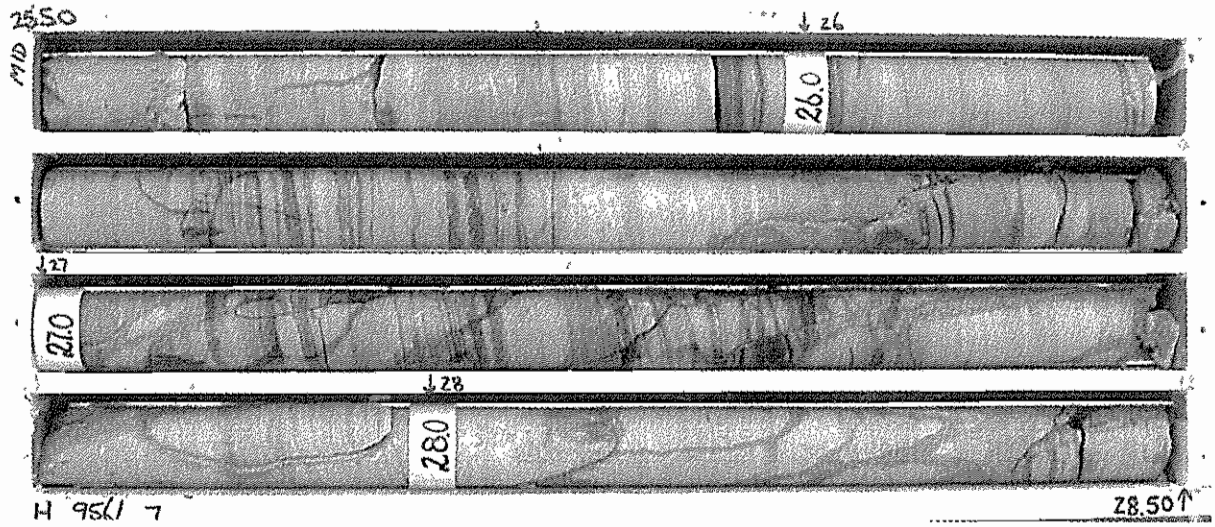
Borehole No: **BH 12**

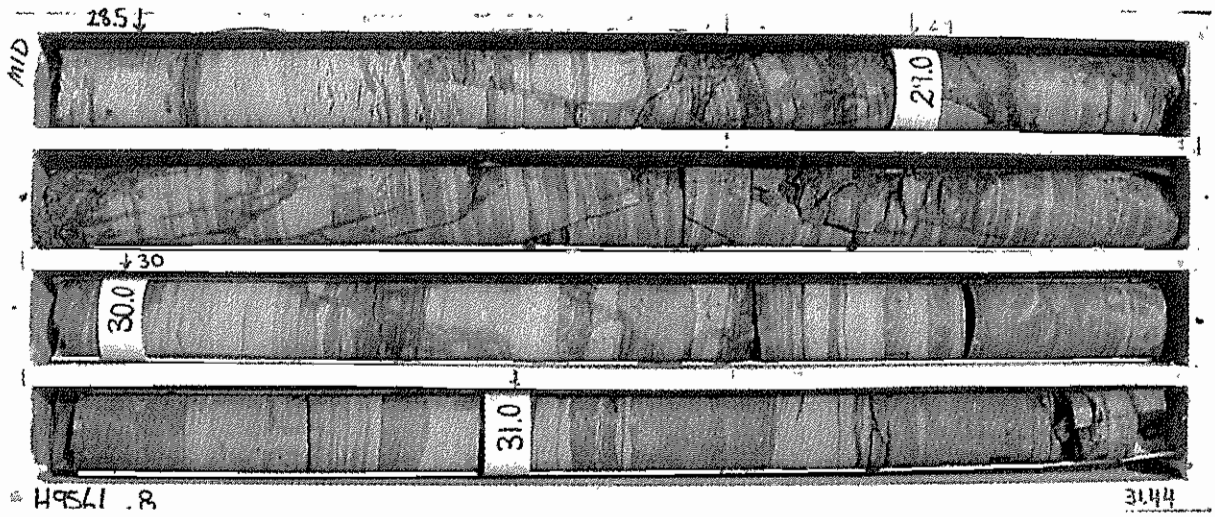
Start Depth: 7.73
Finish Depth: 37.18
Project No: FG 5388
H No: 9561

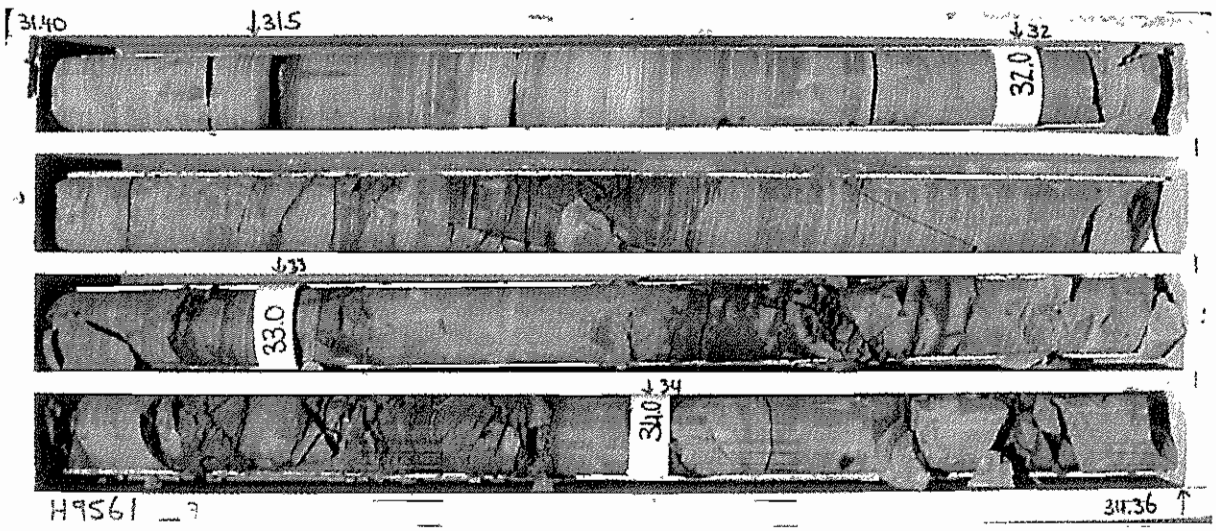
Project: **Gateway Upgrade Project - Gateway Bridge**

Borehole No: **BH 12**

Start Depth: 7.73
Finish Depth: 37.18
Project No: FG 5388
H No: 9561



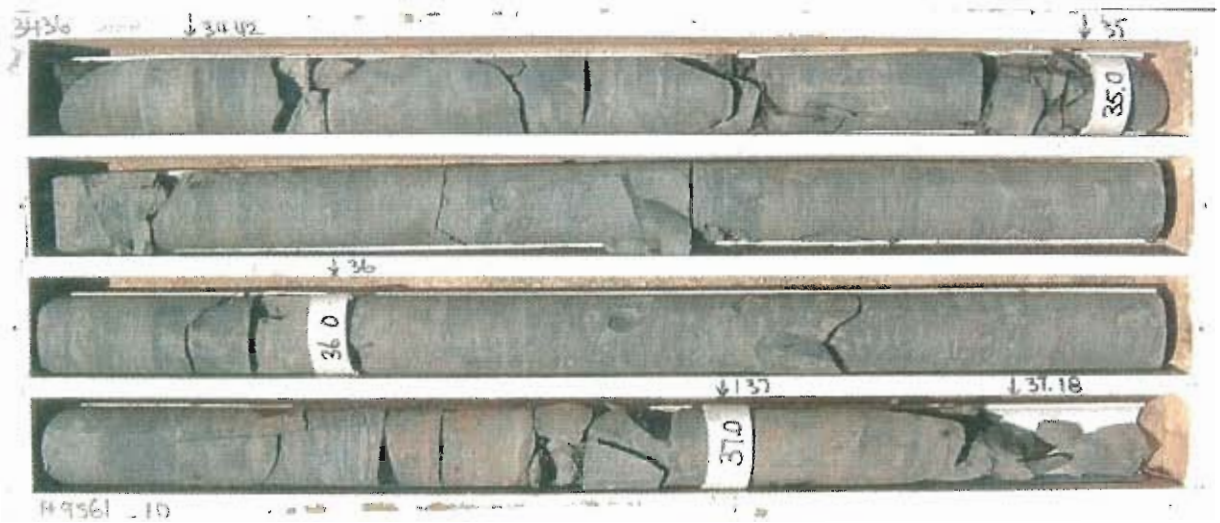




Project: **Gateway Upgrade Project - Gateway Bridge**

Borehole No: **BH 12**

Start Depth: 7.73
Finish Depth: 37.18
Project No: FG 5388
H No: 9561



ROAD SYSTEM AND ENGINEERING
Geotechnical Branch
35 Butterfield Street HERSTON Q 4006
Phone: (07) 38343035 Fax: (07) 38343011

Queensland Government
Department of Main Roads

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO	BH12
SHEET	1 of 12
REFERENCE NO	H9561

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 6 – CENTRE OF THE PILE CAP

PROJECT NO : FG5388 SURFACE R.L : -5.48 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 30 – 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
7.73-8.15	-	-	-	-	-	-	Coreloss
8.15-8.31	BZ/WS	-	-	-	-	W	DI
8.32	LP	10°	P	S	C	-	CI, 1mm
8.33	LP	10°	P	S	O	Cn	DI
8.38-8.4	BZ/WS	-	-	-	-	W	-
8.44-8.48	BZ	-	-	-	-	Cn	DI
8.48-8.53	J	90°	P	S/R	C	Cn	-
8.53	LP	10°	P	S	C	Cn	-
8.54	LP	10°	P	S	C	Cn	-
8.57	LP	10°	P	S	C	Cn	-
8.58-8.69	J	60°	P	R	C	FeSt	-
8.6	LP	10°	P	S	C	Cn	-
8.64-8.68	BZ	-	-	-	-	Cn	-
8.87	LP	10°	P	S	C	Cn	-
8.97	BP/LP	10°	-	-	-	Cn	-
8.98	LP	10°	P	S	C	Cn	-
9.06	J	20°	P	S	O	-	CI
9.08	LP	10°	P	S	C	Cn	-
9.08-9.17	J	80°	P/Ir	S/R	C	Cn	-
9.11	LP	10°	P	S	C	Cn	-
9.14	LP	10°	P	S	C	Cn	-
9.18	LP	10°	P	S	C	Cn	-

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		APERTURE		LP	Lamination Parting	SI	Sand Infill
P	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture		

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

ROAD SYSTEM AND ENGINEERING
Geotechnical Branch
35 Butterfield Street HERSTON Q 4006
Phone: (07) 38343035 Fax: (07) 38343011

Queensland Government
Department of Main Roads

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO	:	BH12
SHEET	:	2 of 12
REFERENCE NO	:	H9561

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 6 – CENTRE OF THE PILE CAP

PROJECT NO : FG5388 SURFACE R.L : -5.48 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 30 – 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
9.2-9.29	BZ	-	-	-	O	Cn	-
9.29	LP	10°	P	S	O	Cn	-
9.35-9.6	BZ	-	-	-	-	Cn	-
9.45-9.46	WS	10°	-	-	-	W	CI
9.52-9.59	WS	10°	-	-	-	W	CI
9.65-9.66	WS	10°	-	-	-	W	CI
9.6-9.72	J	60°	P	-	T	-	CI
9.72	LP	<10°	Un	-	T	Cn	-
9.75	LP	10°	St	S	C	Cn	-
9.82	LP	10°	P	S	C	Cn	-
9.88	LP	10°	P	-	T	Cn	-
9.96	LP	15°	P	-	T	Cn	-
10.12-10.13	WS	10°	-	-	-	-	CI
10.07-10.08	SZ	10°	-	-	-	W	-
10.17-10.18	BZ	-	-	-	O	Cn	-
10.32	J	20°	Cu	S	O	Cn	Cv
10.47	LP	10°	P	S	C	Cn	-
10.49	LP	10°	P	S	C	Cn	-
10.58	LP	10°	P	S	O	Cn	Cv
10.59-10.67	BZ/WS	-	-	-	O	W	-
10.69-10.74	BZ/WS	-	-	-	O	W	BR

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		**APERTURE**		LP	Lamination Parting	SI	Sand Infill
P	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture	Cv	Calcite Vein

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

F:GEOT533/4

ROAD SYSTEM AND ENGINEERING
Geotechnical Branch
35 Butterfield Street HERSTON Q 4006
Phone: (07) 38343035 Fax: (07) 38343011

Queensland Government
Department of Main Roads

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO	BH12
SHEET	3 of 12
REFERENCE NO	H9561

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 6 – CENTRE OF THE PILE CAP

PROJECT NO : FG5388 SURFACE R.L : -5.48 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 30 – 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
10.74-10.77	SZ	<5°	P	-	O	Cn	5mm
10.8	J	<20°	Un	IR	O	-	Cl, 5-10mm
10.85	J	<20°	P	S	O	Cn	2mm
10.91	J	<5°	P	S	C	Cn	-
10.91-10.95	J	90°	Un	S	C	Cn	-
10.95	J	15°	P	S	O	Cn	1mm
10.95-11	J	60°	Ir	S	O	Cn	1mm
11.07	J	5-10°	P	S	O	Cn	2mm
11.14	J	10°	P	S	O	Cn	1mm
11.18	J	5°	P	S	O	Cn	2mm
11.18-11.22	J	90°	P	S	C	-	Cl, 5mm
11.22-11.25	BZ/WS	10°	-	-	-	W	-
11.29-11.33	BZ/WS	-	-	-	-	W	-
11.4-11.41	BZ/WS	-	-	-	-	W	-
11.45	LP	5°	P	S	C	Cn	-
11.45-11.49	CZ/SZ	20°	-	-	-	W	-
11.53	LP	5°	P	S	O	Cn	-
11.55	J	20°	P	S	O	Cn	-
11.59	J	60°	P	-	T	Cn	-
11.64	LP	10°	P	S	O	-	Co
11.71-11.73	BZ	-	-	-	-	Cn	-
11.77	LP	15°	P	S	T	Cn	-

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	Dl	Drilling Induced
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		APERTURE		LP	Lamination Parting	SI	Sand Infill
P	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture	Cv	Calcite Vein

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

F:GEOT533/4

ROAD SYSTEM AND ENGINEERING
Geotechnical Branch
35 Butterfield Street HERSTON Q 4006
Phone: (07) 38343035 Fax: (07) 38343011

Queensland Government
Department of Main Roads

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO	BH12
SHEET	4 of 12
REFERENCE NO	H9561

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 6 – CENTRE OF THE PILE CAP

PROJECT NO : FG5388 SURFACE R.L : -5.48 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 30 – 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
11.8-11.81	SZ	10°	-	-	-	W	-
11.88	SZ	10°	-	-	O	W	-
12.2	LP	10°	P	S	O	Cn	Co
12.28	J	55°	St	-	T	Cn	-
12.48-12.53	WS	10°	-	-	C	W	Cl
12.63-12.76	BZ/WS	-	-	-	-	W	-
12.88	LP	5°	P	S	C	Cn	Cn
12.92	J	20°	St	-	-	Cn	Cn
12.98-13.12	BZ	80°	P	S/R	O	Cn	Parallel to LP
13	LP	10°	P	R	O	Cn	-
13.02	LP	10°	P	R	O	Cn	-
13.05	LP	10°	P	S	O	Cn	-
13.08	LP	10°	P	S	O	Cn	-
13.1	LP	10°	P	S	O	Cn	-
13.17	LP	15°	P	-	T	Cn	-
13.2	J	45°	P	S	C	Cn	-
13.2-13.28	BZ/WS	-	-	-	O	W	-
13.22-13.42	J	80°	Un	S/R	O	Cn	-
13.35	LP	10°	P	S	C	Cn	-
13.37	LP	10°	P	S	O	Cn	-
13.39	LP	10°	P	S	O	Cn	-
13.42	J	30°	Cu	S/R	O	-	Cl, 5mm

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		APERTURE		LP	Lamination Parting	SI	Sand Infill
P	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	Cl	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture		

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

F:GEOT533/4

ROAD SYSTEM AND ENGINEERING
Geotechnical Branch
35 Butterfield Street HERSTON Q 4006
Phone: (07) 38343035 Fax: (07) 38343011

Queensland Government
Department of Main Roads

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO	BH12
SHEET	5 of 12
REFERENCE NO	H9561

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 6 – CENTRE OF THE PILE CAP

PROJECT NO : FG5388 SURFACE R.L : -5.48 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 30 – 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
13.47	LP	5°	P	S	O	Cn	5-10mm Co
13.64-13.67	-	30mm	-	-	-	-	Cl
13.47-13.54	J	70-80°	U	S/R	C	Cn	Co
13.54-13.65	-	-	-	-	-	-	Coreloss
13.65-13.73	BZ/WS	-	-	-	O	W	-
13.91-14.05	J	70°	P	R	O	Cn	-
13.96	LP	10°	P	S	O	Cn	-
14.07	LP	10°	P	S	O	Cn	-
14.11-14.16	LP	0°	-	-	-	-	Cl
14.21	LP	10°	Un	S	O	Cn	-
14.21-14.34	J	80°	P/IR	-	C/T	Cn	-
14.48	LP	10°	P	S	C	Cn	-
14.53-14.59	BZ/WS	-	-	-	-	W	-
14.66	LP	10°	P	S	O	Cn	-
14.67	LP	10°	P	S	C	-	Cl, 2mm
14.8	J	20°	P		C	-	Cl, 2mm
14.82-14.83	LP	10°	P	S	O	Cn	-
14.85	LP	10°	P	-	O	-	Cl, 2.5mm
14.89	LP	10°	-	-	O	Cn	-
14.97	LP	10°	-	-	O	Cn	-
15.17	LP	10°	P	S	O	-	Cl
15.19	LP	10°	P	S	C	Cn	-

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		APERTURE		LP	Lamination Parting	SI	Sand Infill
P	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	Cl	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture		

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

ROAD SYSTEM AND ENGINEERING
Geotechnical Branch
35 Butterfield Street HERSTON Q 4006
Phone: (07) 38343035 Fax: (07) 38343011

Queensland Government
Department of Main Roads

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO	BH12
SHEET	6 of 12
REFERENCE NO	H9561

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 6 – CENTRE OF THE PILE CAP

PROJECT NO : FG5388 SURFACE R.L : -5.48 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 30 – 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
15.22-15.24	BZ	-	-	-	O	-	-
15.26	CS	10°	-	-	-	-	5mm thick
15.3-15.35	CS	10°	-	-	-	-	50mm thick
15.52	CS	10°	-	-	-	-	2mm
15.59	LP	10°	P	S	C	-	CI
15.7	LP	10-20°	Un	S	C	Cn	-
15.72	LP	20°	P	S	C	Cn	-
15.75	LP	15°	-	-		Cn	-
15.89	LP	10°	P	S	O	Cn	-
15.93	LP	10°	P	-	C	Cn	-
16.14-16.31	WS	-	SZ	-	-	W	CI
16.24-16.29	CS	-	-	-	C	-	CI
16.17	J	80°	Un	R	C	-	CI
16.20	J	60°	P	S	C	Cn	-
16.25	J	60°	P	-	C	Cn	-
16.22-16.23	Co	20°	-	-	-	Cn	-
16.27-16.34	J	60°	P	S	C	-	CI
16.32-16.38	J	90°	P	-	T	Cn	-
16.38-16.57	-	-	-	-	-	-	Coreloss
16.65-16.69	BZ	-	-	-	-	Cn	DI
16.69-16.79	J	80°	P	S	T	-	CI
16.75	Fr	-	-	-	-	Cn	DI
16.8	J	20°	Un	St/SM	O	-	CI

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		APERTURE		LP	Lamination Parting	SI	Sand Infill
P	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture		

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

F:GEOT533/4

ROAD SYSTEM AND ENGINEERING
Geotechnical Branch
35 Butterfield Street HERSTON Q 4006
Phone: (07) 38343035 Fax: (07) 38343011

Queensland Government
Department of Main Roads

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO	: BH12
SHEET	: 7 of 12
REFERENCE NO	: H9561

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 6 – CENTRE OF THE PILE CAP

PROJECT NO	: FG5388	SURFACE R.L	: -5.48	DRILLER	: CAIRNS DRILLING PTY LTD
JOB NO	:	DATUM	: AHD	DATE DRILLED	: 30 – 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
16.96	J	20°	Un	S	C	Cn	-
17.00	LP	10°	P	S	C	Cn	-
17.13	LP	10°	St	S	C	Cn	-
17.10-17.19	J	80°	P	S	C	Cn	-
17.19	LP	10°	P	S	C	Cn	-
17.26	LP	10°	P	S	C	-	CI, 2mm
17.3	J	35°	P	R	C	Cn	-
17.35	J	80°	P	S	C	Cn	-
17.52-17.61	WS	60°	-	-	-	W	CI
17.53	J	60°	P	S	C	-	CI, 10 mm
17.56	J	60°	P	S	C	-	CI, 25mm
17.6	J	30°	P	S	C/T	Cn	-
18.11	J	20°	P	S	C	-	CI, 10mm
18.14-18.21	HFZ	-	-	-	C	-	CI, 2-5mm
18.21-18.45	J	80°	-	-	-	Cn	-
18.45	LP	10°	P	S	C	Cn	-
18.55-18.79	J	80°	P	S	C	-	CI
18.68	J	20°	P	-	C/T	-	CI
18.78	J	55°	P	S	C	-	CI, 1mm
18.93 - 19.02	J	80 °	Un	S	C	Cn	-
18.98 - 19.14	I	80°	Un	S/R	C/T	Cn	-

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		APERTURE		LP	Lamination Parting	SI	Sand Infill
P	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture		

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

F:GEOT533/4

ROAD SYSTEM AND ENGINEERING
Geotechnical Branch
35 Butterfield Street HERSTON Q 4006
Phone: (07) 38343035 Fax: (07) 38343011

Queensland Government
Department of Main Roads

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO	BH12
SHEET	8 of 12
REFERENCE NO	H9561

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 6 – CENTRE OF THE PILE CAP

PROJECT NO : FG5388 SURFACE R.L : -5.48 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 30 – 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
19.02	J	25°	P	S/R	C/T	Cn	-
19.14 - 19.25	BZ	-	-	-	O	-	-
19.35 - 19.42	BZ	-	-	-	O	-	-
19.33	J	10°	Un	S	-	-	CI, 20mm
19.32	J	55 °	P	R	C	-	CI, 1mm
19.42 - 19.65	J	80 - 90 °	Un	-	C/T	-	CI, 2mm
19.52	J	60 °	P	-	T	-	CI, 2mm
19.67	J	60 °	St	R	C	-	CI
19.77	Fr	-	-	-	-	Cn	DI
19.8 - 19.92	J	70-80 °	P	-	T	-	CI, 1mm
19.94	LP	10 °	P	S	C	Cn	-
19.9 - 20.03	J	70 °	P	-	T	-	CI
20 - 20.08	J	80 °	Un	S/R	C	Cn	
20.08	LP	10 °	P	S	C	Cn	-
20.08 - 20.15	J	80 °	P	S	C	-	CI
20.15	LP	10°	-	-	-	-	CI, 5mm
20.2	LP/B	20°	P	S	C	Cn	-
20.2 – 20.31	J	70°	P/Un	S	-	-	CI, 2mm
20.25	LP	10°	P	S	C	Cn	-
20.38	LP	10°	P	S	C	Cn	-
20.49	LP	10°	P	S	O	Cn	-
20.8	JT	45°	P	S	C	Cn	-

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		APERTURE		LP	Lamination Parting	SI	Sand Infill
P	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture	DI	Drilling Induced

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

ROAD SYSTEM AND ENGINEERING
Geotechnical Branch
35 Butterfield Street HERSTON Q 4006
Phone: (07) 38343035 Fax: (07) 38343011

Queensland Government
Department of Main Roads

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO	BH12
SHEET	9 of 12
REFERENCE NO	H9561

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 6 – CENTRE OF THE PILE CAP

PROJECT NO : FG5388 SURFACE R.L : -5.48 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 30 – 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
20.84	J	10°	P	SL	C	Cn	-
20.9	LP/B	10°	P	S	C	Cn	-
21.47	LP	10°	P	S	C	Cn	-
21.92	LP	20°	P	S	C	Cn	-
22.06	LP	20°	P	S	C	Cn	-
22.15	Co	-	-	-	-	-	30mm thick
22.17	LP	20°	P	S	C	Cn	-
22.17-22.27	J	70°	Un/P	S/R	O	Cn	-
22.28&22.29	LP	10-20°	P	S	C	Cn	Co
22.31	LP	20°	P/Cu	S	C	Cn	Co
22.57	J	40°	P	R	C	Cn	-
22.9	Fr	-	-	-	-	Cn	DI
23.03	Fr	-	-	-	-	Cn	DI
23.07	Fr	-	-	-	-	Cn	DI
23.42	BP	10°	P	S	C	Cn	-
23.9	LP	10°	P	S	C	Cn	-
24.09	J	15-20°°	Cu/P	S	C	-	CI
24.26-24.56	J	80°	P	S/R	C	-	CI
24.41	LP	10°	P	S	C	Cn	-
24.56	LP	10°	P	S	C	Cn	-
24.58	LP	10°	P	S	C	Cn	-
24.58-24.65	J	90°	P	R	C	Cn	-
24.65	LP	10°	P	S	C	Cn	-

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous laminations
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		APERTURE		LP	Lamination Parting	SI	Sand Infill
P	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture		

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

ROAD SYSTEM AND ENGINEERING
Geotechnical Branch
35 Butterfield Street HERSTON Q 4006
Phone: (07) 38343035 Fax: (07) 38343011

Queensland Government
Department of Main Roads

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO	BH12
SHEET	10 of 12
REFERENCE NO	H9561

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 6 – CENTRE OF THE PILE CAP

PROJECT NO : FG5388 SURFACE R.L : -5.48 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 30 – 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
24.83-24.85	LP	10°	P	S	C	Cn	-
24.86-24.89	CS	10°	-	-	-	Cn	-
24.7-25.2	SZ	-	-	-	O	-	CI, 2-5mm
25.27-25.37	SZ	-	-	-	O	-	CI, 2-5mm
31.67	LP	10°	P	S	C	Cn	-
31.92-32.04	J	60°	Un/P	S/R	C/T	-	CI
Intersects w 32.04-32.16	J	80°	P	S	C	-	CI
32.16	J/LP	10°	C	S	C	Cn	DI
32.24	J	20°	P/Un	R	C	-	CI
32.295	LP	10°	P	S	C	Cn	DI
32.32	J	20°	P/Un	S/R	C	Cn	-
32.37	LP	10°	P	S	C	Cn	DI
32.42	J	20°	Un	S/R	C	-	CI
32.425	LP	10°	P	S	C	-	CI
32.43	J	20°	Cu	S	C	-	CI
32.45	J	50°	P	S	C	-	CI
32.49	J	20°	P	S/R	-	-	-
32.49	J	40°	P	R	-	Cn	-
32.49	J	70°	P	S	-	-	-
32.53	J	80°	P	S	C	Cn	-

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		APERTURE		LP	Lamination Parting	SI	Sand Infill
P	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture		

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

ROAD SYSTEM AND ENGINEERING
Geotechnical Branch
35 Butterfield Street HERSTON Q 4006
Phone: (07) 38343035 Fax: (07) 38343011

Queensland Government
Department of Main Roads

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO	:	BH12
SHEET	:	11 of 12
REFERENCE NO	:	H9561

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 6 – CENTRE OF THE PILE CAP

PROJECT NO : FG5388 SURFACE R.L : -5.48 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 30 – 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
32.13-32.25	2*J parallel 80°	-	P	S	C	-	CI
32.42-32.52	2*J parallel 70°	-	P	S	C	-	CI
32.55	J	70°	P	S	C	Cn	-
33.68-33.93	WS	-	-	-	-	W	CI
33.93	-	-	-	-	-	Cn	-
34.03	J	45°	P	S	C	-	CI
34.05-34.17	J	70-80°	P	S/R	C	-	CI
34.18-34.28	J	70-80°	P	S/R	C	Cn	DI
34.38	J	50°	P	S	C	-	CI
34.62	Fr	-	-	-	T	Cn	DI
34.68	Fr	-	-	-	T	Cn	DI
34.75	Fr	-	-	-	T	Cn	DI
34.78-35.1	J	80°	P to Un-St	S/R	-	-	DI/CI
35.25	J	70°	P to Cu	S/R	C_T	-	CI
35.47	Fr	-	-	-	T	Cn	-
35.75	Fr	-	-	-	T	Cn	-
35.54-35.64	J	90°	P	S	T	-	CI
35.59	J	0°	P	S	C	FeSt	DI
35.85	Fr	-	-	-	T	Cn	DI
35.93	Fr	-	-	-	T	Cn	DI

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		APERTURE		LP	Lamination Parting	SI	Sand Infill
P	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture		

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

ROAD SYSTEM AND ENGINEERING
Geotechnical Branch
35 Butterfield Street HERSTON Q 4006
Phone: (07) 38343035 Fax: (07) 38343011

Queensland Government
Department of Main Roads

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO	:	BH12
SHEET	:	12 of 12
REFERENCE NO	:	H9561

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 6 – CENTRE OF THE PILE CAP

PROJECT NO : FG5388 SURFACE R.L : -5.48 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 30 – 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
35.97	Fr	-	-	-	T	Cn	DI
36.0-36.08	J	80°	P	S	C	Cn	-
36.3	J	70-80°	P	S	T	FeSt	DI
36.44	J	0°	-	-	-	Cn	DI
36.65-36.79	J	80-90°	P	S	T	Cn	-
36.8	J	20°	P	S	C	Cn	-
36.89	J	0°	P	S	C	-	CI
36.95	J	80°	P	S	T	-	CI
36.95-37.1	J	65°	P/Un	S/R	C	FeSt	CI
37.08-37.12	J	80°	St	S	T	FeSt	CI
37.15	J	10°	Un	S	C	FeSt	CI

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		APERTURE		LP	Lamination Parting	SI	Sand Infill
P	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture		

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