Queensland Government
Department of Main Roads

ENGINEERING BOREHOLE

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

BOREHOLE No BH14
SHEET 1 of 7
REFERENCE No H9563

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 6 - NORTHERN FACE OF THE PILE CAP
COORDINATES 10307.2 E; 167712.0 N
PROJECT No FG5388
SURFACE R.L. -9.03
DATE STARTED 21/3/05
DATUM SETP
JOB No
DATUM AHD
DATE COMPLETED 23/3/05
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	-9.03				**ESTUARINE SILTY CLAY** Grey to dark grey moist to mainly wet very soft. Partly decomposed plant fragments; high plasticity.		OH					RW,-,- N<1	SPT
	-11.73				**ALLUVIAL SAND** Pale grey to pale brown, wet, very loose. Fine to medium grained sand; some shell fragments.		SM					N<1 No recovery, sand came in under casing	SPT
5	-14.03											1,1,1 N=2	SPT

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
A. DISSANAYAKE (DISS)

Queensland Government
Department of Main Roads

ENGINEERING BOREHOLE

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

BOREHOLE No BH14
SHEET 2 of 7
REFERENCE No H9563

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 6 - NORTHERN FACE OF THE PILE CAP
COORDINATES 10307.2 E; 167712.0 N
PROJECT No FG5388
SURFACE R.L. -9.03
DATE STARTED 21/3/05
DATUM SETP
JOB No
DATUM AHD
DATE COMPLETED 23/3/05
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	-14.03				**ALLUVIAL SAND** As above		SM							
	-14.23				**LOW GRADE COAL** **BLACK MAINLY DULL TO VITREOUS FINE GRAINED THINLY LAMINATED FRAGILE CARBONACEOUS SEDIMENTARY ROCK. MINOR SILTSTONE INTERBEDS.** HW : Black, wet very dense silty gravel rapidly grading into very low to low strength rock with depth. Frequent siltstone carbonaceous interbeds up to 100mm.									
6												26,30/100 N>50		SPT
							HW							
7			(31)									30/110 N>50		SPT
												Coreloss		
8												Weathered and broken seam		
												Siltstone interbed Weathered and broken seam		
	-17.48											Siltstone interbed		
					SILTSTONE **FINE GRAINED THINLY LAMINATED SEDIMENTARY ROCK** MW : Pale grey to green grey, fine grained, thinly laminated mainly medium strength. Defects : Occasional lamination partings<5° (3/0.5m).		MW					Is(50)=0.40 MPa Is(50)=0.42 MPa		x o
9												Is(50)=0.34 MPa Is(50)=0.34 MPa		o x
	-18.16											Is(50)=0.30 MPa Is(50)=0.40 MPa		x o
					LOW GRADE COAL MW : Grey to black, highly fractured, broken, weathered and altered along lamination or bedding partings, mainly low to medium strength. Frequent minor siltstone and carbonaceous interbeds up to 100mm.		MW							
							MW					Broken zone		
10	-19.03													

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

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ENGINEERING BOREHOLE

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

BOREHOLE No BH14
SHEET 3 of 7
REFERENCE No H9563

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 6 - NORTHERN FACE OF THE PILE CAP
COORDINATES 10307.2 E; 167712.0 N
PROJECT No FG5388
SURFACE R.L. -9.03
DATE STARTED 21/3/05
DATUM SETP
JOB No
DATUM AHD
DATE COMPLETED 23/3/05
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
10	-19.03		89 (55)		**LOW GRADE COAL** MW : (As above). Gradually changing into sandstone with depth. Defects : Numerous lamination partings <10° (5/m).			MW				Is(50)=0.24 MPa Is(50)=0.22 MPa	o x	
	-19.50				**SANDSTONE** **FINE GRAINED SLIGHTLY MASSIVE TO MAINLY THNILY LAMINATED SEDIMENTARY ROCK** SW : Pale grey brown fine grained mainly thinly laminated mainly medium to occasionally high strength.			SW				Is(50)=1.00 MPa Is(50)=0.35 MPa UCS=28.5MPa; MC=2.2% WD=2528N/m^2 Is(50)=1.33 MPa Is(50)=0.67 MPa	o x o x	
11	-19.93				**LOW GRADE COAL** MW : Grey to black, highly fractured and weathered along lamination/bedding partings, low to mainly medium strength. Frequent minor siltstone interbeds up to 50mm.			MW				Is(50)=0.38 MPa Is(50)=0.85 MPa Broken and weathered seam	x o	
			87 (33)		Defects : - Frequent broken & weathered seams <600mm. - Lamination partings<5° (1-3/m)							Coreloss Broken and weathered seam		
12	-21.41				**SILTSTONE** **FINE GRAINED THINLY LAMINATED SEDIMENTARY ROCK** SW : grey to dark grey, fine grained, thinly laminated mainly medium to high strength. More carbonaceous in the upper area; rockmass exhibits some sandstone properties below 14.75m.							UCS=13.1MPa; MC=3.6% WD=2360N/m^2 **Pressuremeter Test 3 @ 12.70m** Is(50)=0.26 MPa Is(50)=0.49 MPa	x o	
			100 (98)		Defects : - Mainly drilling induced lamination partings <30° (3-6/m). - Occasional joints @ 65° (1/3m) - Occasional broken zones <30mm.			SW				Is(50)=0.59 MPa Is(50)=0.73 MPa Broken zone. Is(50)=0.27 MPa Is(50)=0.61 MPa Broken zone	x o x o	
13														
14												Is(50)=0.83 MPa Is(50)=0.54 MPa	o x	
15	-24.03											Is(50)=0.57 MPa Is(50)=0.45 MPa **Pressuremeter Test 2 @ 14.45m**	o x	

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

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Department of Main Roads

ENGINEERING BOREHOLE

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

BOREHOLE No BH14
SHEET 4 of 7
REFERENCE No H9563

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 6 - NORTHERN FACE OF THE PILE CAP
COORDINATES 10307.2 E; 167712.0 N
PROJECT No FG5388
SURFACE R.L. -9.03
DATE STARTED 21/3/05
DATUM SETP
JOB No
DATUM AHD
DATE COMPLETED 23/3/05
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	-24.03				**SILTSTONE** SW : (As above)							Is(50)=0.95 MPa Is(50)=0.39 MPa		o x
			100 (93)									UCS=10.7MPa; MC=3.0% WD=2445N/m²		
												Is(50)=1.19 MPa Is(50)=0.44 MPa		o x
16							SW							
												Is(50)=0.41 MPa Is(50)=1.05 MPa		x o
												Is(50)=2.05 MPa Is(50)=0.58 MPa		o x
17	-26.06				**SANDSTONE** **FINE GRAINED SLIGHTLY MASSIVE TO MAINLY THINLY LAMINATED SEDIMENTARY ROCK** SW : Pale grey to grey fine grained mainly thinly laminated mainly medium to high strength. Defects : Mainly drilling induced lamination partings <10° (4/m).							Is(50)=0.17 MPa Is(50)=0.14 MPa		o x
							SW					UCS=20.60MPa; MC=2.2% WD=2441N/m²		
												Is(50)=0.50 MPa Is(50)=0.48 MPa		o x
	-26.88											Broken zone		
18					**INTERBEDDED SANDSTONE AND MUDSTONE. SANDSTONE DOMINANT** SW : Grey to dark grey, fine grained interbedded/laminated, medium to mainly high strength. Defects : - Drilling induced lamination partings<10° (2/m). - Occasional joints @ 50° (1/m).							Is(50)=1.00 MPa Is(50)=1.20 MPa Is(50)=0.34 MPa Is(50)=0.82 MPa		x o x o
							SW					**Pressuremeter Test 1 @ 18.2m**		
												Is(50)=1.27 MPa Is(50)=0.51 MPa		o x
	-27.54											Is(50)=0.31 MPa		x
			100 (87)		**SANDSTONE** **FINE GRAINED SLIGHTLY MAINLY LAMINATED SEDIMENTARY ROCK** SW : Pale grey to white fine grained mainly laminated mainly high strength. Defects : Genrally rare. Occasional drilling induced lamination partings <10° (1-2/m).									
19												Is(50)=0.27 MPa Is(50)=1.31 MPa		x o
												UCS=49.9MPa; MC=2.4% WD=2585N/m²		
												Is(50)=1.84 MPa Is(50)=2.46 MPa Is(50)=2.11 MPa Is(50)=1.35 MPa		x o o x
	-28.88													
20	-29.03				**MUDSTONE** SW : (Next page)		SW					Weathered and broken seam		

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

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ENGINEERING BOREHOLE

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

BOREHOLE No BH14
SHEET 5 of 7
REFERENCE No H9563

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 6 - NORTHERN FACE OF THE PILE CAP
COORDINATES 10307.2 E; 167712.0 N
PROJECT No FG5388
SURFACE R.L. -9.03
DATE STARTED 21/3/05
DATUM SETP
JOB No
DATUM AHD
DATE COMPLETED 23/3/05
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	-29.03				**MUDSTONE FINE GRAINED THINLY LAMINATED SEDIMENTARY ROCK** SW : Grey to black, fine grained, thinly laminated medium to mainly high strength. Defects : - Occasional drilling induced lamination partings <5° (1-2/m). - Broken zones <70mm.		SW					Is(50)=1.22 MPa Is(50)=0.26 MPa UCS=33.0MPa; MC=3.4% WD=2409N/m² Is(50)=0.98 MPa Is(50)=1.34 MPa Broken zone	o x x o	
	-29.94													
21			100 (100)		**INTERBEDDED SANDSTONE AND MUDSTONE. SANDSTONE DOMINANT FINE GRAINED INTERBEDDED/LAMINATED SEDIMENTARY ROCK** SW : Grey to black, fine grained interbedded/ laminated, medium to mainly high strength. Gradually changing into more mudstone with depth. Defects : - Mainly drilling induced lamination partings <15° (1-3/m). - Occasional joints @ 50° (1/2m) - Occasional joints @ 85°-90° (1/2m) Defects are generally drilling induced planar, smooth and closed with no discolouration or infillings.		HW					HW-MW Seam Is(50)=1.35 MPa Is(50)=1.22 MPa Is(50)=1.12 MPa Is(50)=2.07 MPa Is(50)=2.17 MPa Is(50)=1.26 MPa UCS=30.9MPa; MC=3.2% WD=2553N/m² Is(50)=1.03 MPa Is(50)=1.69 MPa	x o x o o x x o	
22														
23							SW					Is(50)=0.74 MPa Is(50)=1.26 MPa	x o	
24			100 (100)									Is(50)=1.28 MPa Is(50)=2.01 MPa Is(50)=0.87 MPa Is(50)=0.57 MPa	x o o x	
25	-34.03											Is(50)=0.61 MPa Is(50)=1.57 MPa	x o	

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

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ENGINEERING BOREHOLE

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

BOREHOLE No BH14
SHEET 6 of 7
REFERENCE No H9563

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 6 - NORTHERN FACE OF THE PILE CAP
COORDINATES 10307.2 E; 167712.0 N
PROJECT No FG5388
SURFACE R.L. -9.03
DATE STARTED 21/3/05
DATUM SETP
JOB No
DATUM AHD
DATE COMPLETED 23/3/05
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	-34.03				**INTERBEDDED SANDSTONE AND MUDSTONE. SANDSTONE DOMINANT** SW : (As above).							Is(50)=1.45 MPa Is(50)=0.42 MPa		o x
												UCS=37.9MPa; MC=3.0% WD=2454N/m²		
												Is(50)=2.36 MPa Is(50)=0.59 MPa		o x
					Gradually grading into mudstone with depth.									
												Is(50)=0.74 MPa		x
26			100 (100)									Is(50)=0.48 MPa Is(50)=2.79 MPa		x o
							SW							
												Is(50)=0.29 MPa Is(50)=0.25 MPa Is(50)=2.00 MPa		o x o
27														
												Is(50)=0.62 MPa Is(50)=1.61 MPa		x o
28														
												Is(50)=3.06 MPa Is(50)=1.19 MPa		o x
												UCS=27.5; MC=3.5% WD=2453N/m²		
	-37.43											Is(50)=0.50 MPa Is(50)=1.60 MPa		x o
					MUDSTONE **FINE GRAINED THINLY LAMINATED SEDIMENTARY ROCK** SW : Dark grey to black, fine grained, thinly laminated medium becoming high strength with depth.									
29												Is(50)=0.32 MPa Is(50)=3.36 MPa		x o
							SW							
			100 (100)									Is(50)=0.71 MPa Is(50)=0.96 MPa		o x
30	-39.03											Is(50)=2.93 MPa Is(50)=1.09 MPa		o x

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

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ENGINEERING BOREHOLE

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

BOREHOLE No BH14
SHEET 7 of 7
REFERENCE No H9563

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 6 - NORTHERN FACE OF THE PILE CAP
COORDINATES 10307.2 E; 167712.0 N
PROJECT No FG5388 SURFACE R.L. -9.03 DATE STARTED 21/3/05 DATUM SETP
JOB No DATUM AHD DATE COMPLETED 23/3/05 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	-39.03				**MUDSTONE** SW : (As above). Defects : Generally rare. - Occasional drilling induced lamination partings <10 ° (1/1-2m). - Occasional joints @ 75° (1/2m) Defects are generally drilling induced plannar, smooth and closed with no discolouration or infillings.							Is(50)=1.27 MPa Is(50)=2.68 MPa	x o	
31							SW					Is(50)=1.05 MPa Is(50)=0.20 MPa UCS=43.90MPa; MC=2.4% WD=2547kN/m^2 Is(50)=1.21 MPa Is(50)=2.39 MPa	x o x o	
32	-41.43		100									Is(50)=3.21 MPa Is(50)=1.09 MPa Is(50)=1.30 MPa Is(50)=3.47 MPa	o x x o	
33					Borehole terminated at 32.4m									
34														
35														

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

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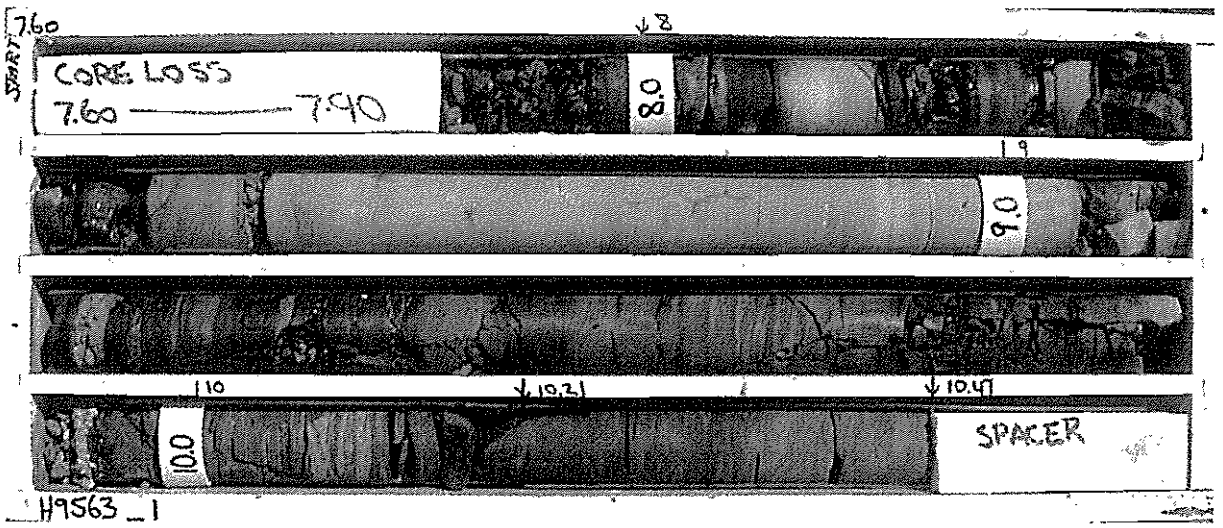
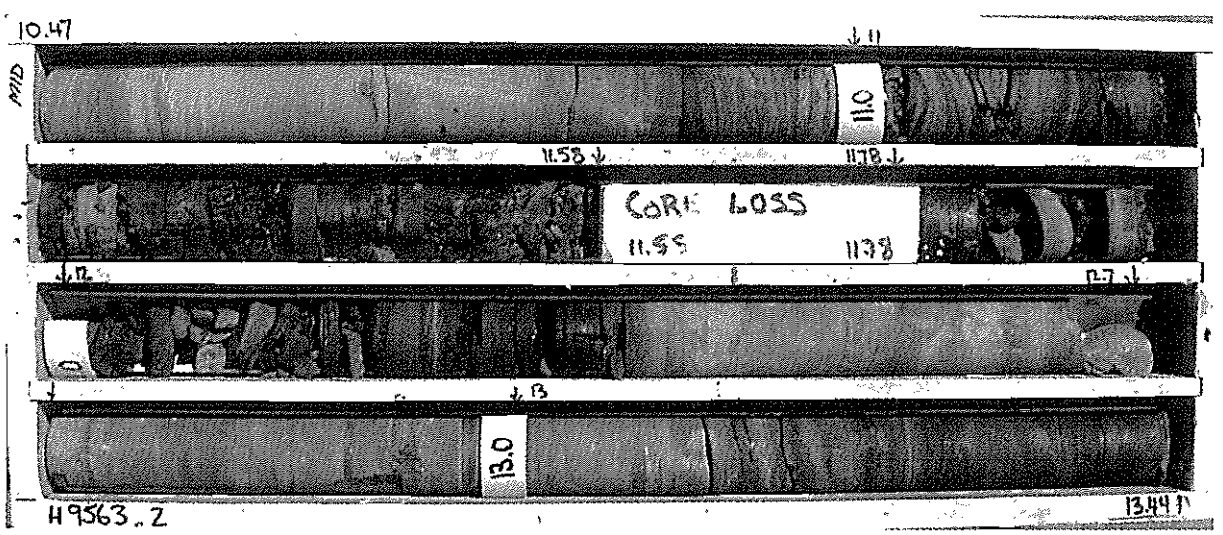
LOGGED BY
A. DISSANAYAKE (DISS)

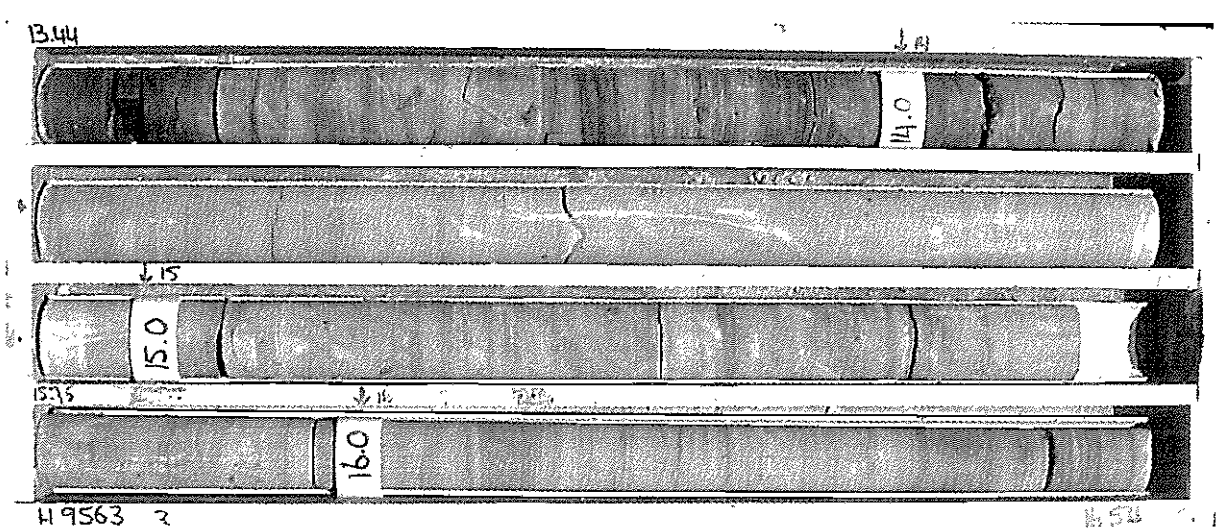
Project: **Gateway Upgrade Project - Gateway Bridge**

Borehole No: **BH 14**

Start Depth: 7.60m
Finish Depth: 32.40m
Project No: FG 5388
H No: 9563







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

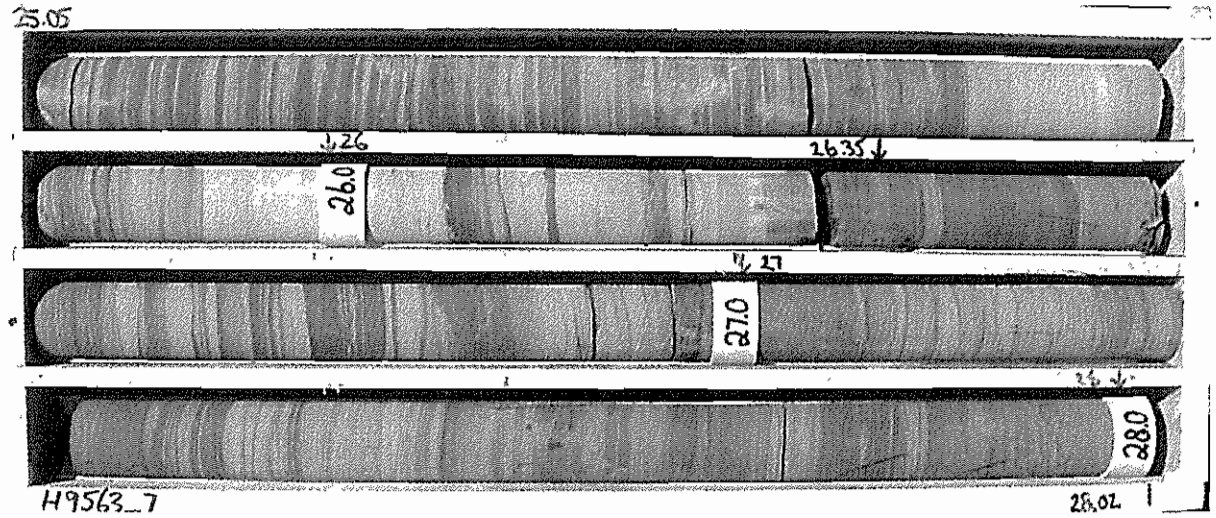
Borehole No: **BH 14**

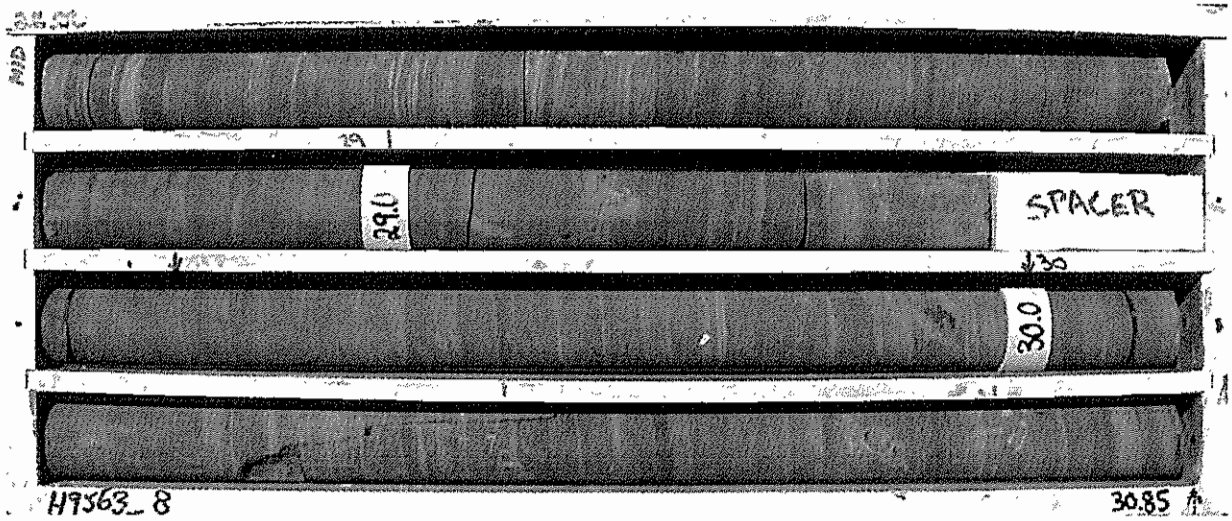
Start Depth: 7.60m
Finish Depth: 32.40m
Project No: FG 5388
H No: 9563

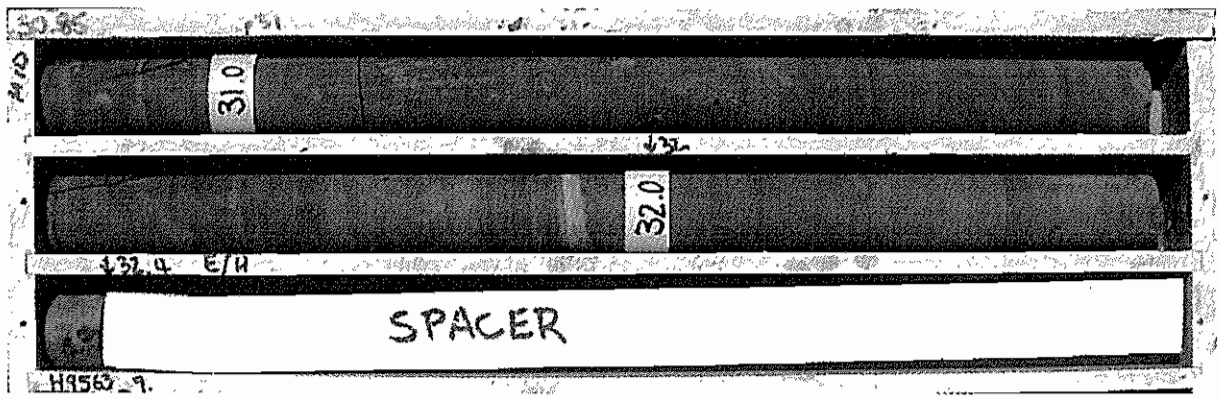
Project: **Gateway Upgrade Project - Gateway Bridge**

Borehole No: **BH 14**

Start Depth: 7.60m
Finish Depth: 32.40m
Project No: FG 5388
H No: 9563







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	:	BH14
SHEET	:	1 of 4
REFERENCE NO	:	H9563

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 6 – NORTHERN FACE OF THE PILE CAP

PROJECT NO : FG5388 SURFACE R.L : -9.03 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 21 - 23/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
7.60-7.90		-	-	-	-	Cn	Core loss
7.90-8.0	WS		-	-	O		Co
8.0-8.10	BZ	-	-	-	-		Parallel to LP
8.15-8.21	WS	-	-	-	-		-
8.21-8.45	BZ	-	-	-	O		-
8.66	LP	<5°	P	S	T	Cn	DI
8.85	LP	<5°	P	S	T	Cn	DI
9.06	LP	<5°	P	S	C	Cn	-
9.06-9.45	WS	-	P	-	O		-
9.70-9.95	BZ	-	-	-	O		Parallel to LP
10.19	BZ	-	-	-	C		-
10.28	LP	<10°	P	S	O	Cn	-
10.42	LP	<10°	Ir	R	O	Cn	-
10.71	LP	10°	P	R	C	Cn	DI ?
10.81	LP	10°	P	R	C	Cn	DI ?
10.89	LP	10°	P	R	C	Cn	-
11.03-11.05	WS	-	P	-	O		Parallel to LP
11.30-11.58	WS	-	-	-	O		Parallel to LP, CI
11.55-11.78	-	-	-	-	-	-	Coreloss
11.78-12.38	BZ	-	-	-	O		Parallel to LP
12.85	LP	<5°	P	-	T	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	:	BH14
SHEET	:	2 of 4
REFERENCE NO	:	H9563

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 6 – NORTHERN FACE OF THE PILE CAP

PROJECT NO : FG5388 SURFACE R.L : -9.03 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 21 - 23/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
13.14-13.21	BZ	-	Ir	S	O		Parallel to LP
13.40	LP	<5°	P	S	C	Cn	-
13.44-13.56	BZ	-	P	-	C		Parallel to LP
13.70-14.90	Fr	60°-90°	Cu	-	C	Cn	-
13.94	LP	10°	P	S	C	Cn	-
14.06	LP	<10°	Ir	R	O	Cn	CL
14.10	LP	<10°	Cu	R	C	Cn	CL
14.13	LP	<10°	P	S	C	Cn	DI ?
14.55	Fr	-	St	R	C	Cn	DI ?
15.04	LP	30°	St	-	O	Cn	-
15.05	LP	10°	P	S	C	Cn	DI ?
15.06	LP	30°	P	S	C	Cn	-
15.33	LP	<10°	P	S	C	Cn	DI
15.50	LP	<10°	P	S	C	Cn	DI
15.97	LP	0°	P	S	C	Cn	DI
16.44	LP	<10°	P	S	C	Cn	-
16.59	LP	0°	P	S	C	Cn	DI ?
16.69	LP	0°	P	S	C	Cn	-
16.76	LP	0°	P	S	O	Cn	-
16.90	LP	0°	P	S	C	Cn	-
16.95	J	65°	P	R	C	Cn	-

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
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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	DI	Drilling Induced

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

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DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO	BH14
SHEET	3 of 4
REFERENCE NO	H9563

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 6 – NORTHERN FACE OF THE PILE CAP

PROJECT NO : FG5388 SURFACE R.L : -9.03 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 21-23/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
17.03	BP	0°	P	S	C	Cn	BP
17.30	LP	10°	P	R	C	Cn	DI
17.38	LP	10°	Ir	R	C	Cn	DI
17.56	LP	0°	Ir	R	C	Cn	DI
17.75-17.78	BZ	-	-	R	O		CL
17.95	LP	10°	P	S	C	Cn	CL
18.20	LP	0°	P	R	C	Cn	CL
18.32	J	50°	P	S	T	Cn	DI
19.05	LP	<10°	Ir	R	C	Cn	DI ?
19.10	LP	<10°	Ir	R	C	Cn	DI ?
19.61	LP	25°	P	S	C	Cn	CL
19.85-19.88	BZ	<10°	P	R	O	Cn	Parallel to LP
20.08	LP	<5°	P	S	C	Cn	-
20.44-20.51	BZ	15°	Ir	R	O	Cn	Parallel to LP
20.83	LP	<5°	P	R	C	Cn	-
20.92-21.14	WS	-	-	-	W	-	High plastic CI
21.22	LP	<5°	P	R	C	Cn	CI
21.75	LP	10°	Ir	R	C	Cn	CL
22.12	LP	10°	Ir	R	C	Cn	-
22.70	LP	10°	P	S	C	Cn	DI
22.70-23.60	J	85°-90°	Cu	-	T	Cn	CV
23.70	LP	15°	P	S	C	Cn	DI

Abbreviations

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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	Cv	Calcite Vein
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

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Geotechnical Branch
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DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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BOREHOLE NO	BH14
SHEET	4 of 4
REFERENCE NO	H9563

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 6 – NORTHERN FACE OF THE PILE CAP

PROJECT NO : FG5388 SURFACE R.L : -9.03 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 21 - 23/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
24.67	LP	<10°	P	S	C	Cn	DI
24.60-24.85	J	85°-90°	Cu	R	T	Cn	-
25.30	LP	<10°	P	S	C	Cn	DI
25.55	LP	<10°	P	S	C	Cn	DI
25.85	LP	<10°	P	S	C	Cn	-
26.22	LP	10°	P	S	C	Cn	DI
26.33	LP	10°	P	S	C	Cn	DI
26.90	LP	10°	P	S	C	Cn	DI
26.95	LP	10°	P	S	C	Cn	DI
27.78	LP	10°	P	S	C	Cn	DI
27.82	J	50°	P	-	T	Cn	-
27.92	J	50°	P	-	T	Cn	-
28.06	LP	<10°	P	S	C	Cn	DI
28.33	LP	<10°	P	S	C	Cn	DI
28.67	LP	<10°	P	S	T	Cn	DI
29.0	J	50°	P	-	T	Cn	-
29.05	LP	15°	P	S	C	Cn	DI
29.27	LP	<10°	P	S	C	Cn	DI
30.07	LP	<10°	P	S	C	Cn	DI
30.25-30.45	J	75°	St	R	C	Cn	-
31.07	LP	<10°	P	S	C	Cn	DI

Abbreviations

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PLANARITY		APERTURE		LP	Lamination Parting	SI	Sand Infill
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St	Stepped	O	Open	CZ	Crushed Zone	CV	Calcite Vein
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

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