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

BOREHOLE No	BH18
SHEET	_ <u>1</u> _ of <u>13</u> _
REFERENCE No	H9567

	JECT	GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION											
	ATION				<u>ERN FACE OF PILE CAP- DOWNSTREAM</u>					C	OORDINATES 10216.9 E; 167963.9 M	4	
PRO	JECT No	_F <u>G</u> 53	<u> </u>		SURFACE R.L3.74		C	DAT	E STARTE	D <u>02/04</u>	/05	DATUM <u>SETP</u>	
JOB	No				DATUM <u>AHD</u>		DAT	ΕC	OMPLETE	D _08/04	<u>/05</u>	DRILLER CAIRNS DRIL	LING_
DEPTH (m)	R.L. (m)	ASING VASH BORING ORE DRILLING	RQD ()%	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	SC EATHERING	S	INTACT TRENGTH	DEFECT SPACING (mm)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES
0	-3.74	0\$0	REC %	ισ	ESTUARINE SILTY CLAY	Į,	<u>"</u> ≥	Γí	i i i	1111	Ö		SA
0	-3.74	WAA WAA	REC %	SAN	ESTUARINE SILTY CLAY Dark grey, moist to mainly wet, very soft to soft. ESTUARINE SANDY SILTY CLAY Grey, moist, very soft to soft. Fine grained sand; minor shell fragments; some clayey sand interlayers.		OSU OH				GRA	RW,-,-	SAMPL TESTS
BOREHOLE WITH LITHOLOGY MEERA PIER 7 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT GPD ENGINEERING BOREHOLE 09 04:GDT	-8.74				\		ОН					RW,-;- N<1 RW,1,- N<1	SPT

REMARKS SPT N values in gravel can overestimate density due to influence of coarser size gravel particles. This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles were measured with respect to a



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

BOREHOLE No	BH18
SHEET	_ <u>2</u> _ of _1 <u>3</u> _
REFERENCE No	H9567

LOCATION				ESN EACE OF BUILD CAR DOWNSTREAM							
PROJECT N				ERN FACE OF PILE CAP- DOWNSTREAM						OORDINATES 10216.9 E; 167963.9 N	
JOB No	0 <u>1-00</u>	<u> </u>					ATE START				
JOB NO				DATUM <u>AHD</u> .		DAT	E COMPLET	ED <u>08/04</u>	1/05	DRILLER CAIRNS DRIL	<u>_ring_</u>
R.L.	ဖစ္ခ	RQD ()%					INTACT STRENGTH	DEFECT SPACING		ADDITIONAL DATA	
DEPTH (m)	VG BORING DRILLING	, ,		MATERIAL	_ }	ERING	Sinchoin	(mm)	GRAPHIC LOG		
DEPT	SES SES SES	CORE	SAMPLE	DESCRIPTION	LITHOLOGY	正			물	AND	PLES S
5 -8.74	CASIN WASH CORE	REC %	SAR		를	USO WE	ŢŢŢŢŢ Ţ≩≖≅¬≧ij	88888	GRA	TEST RESULTS	SAMPLES
-				ESTUARINE SANDY SILTY CLAY Grey, moist, very soft to soft. As above.	XX						
-				Crey, moist, very soit to soit. As above,		011	_	-			
			li			OH	-	-			
-9.24							-				
ļ				ESTUARINE SILTY SAND Brown, wet, very loose to loose.			_	_			-
-	78		ΙI								
†				Fine grained sand; becoming more sandy with depth.			· -	- '		!	
-6				•			-				
-										1	引信品
}-							-	- : <i>•</i>		RW,-	SPT
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-			! !								
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			ļ					- :			
-								_ :]	10.75
-							. : 4	- :		RW,1,2	SPT
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-8								- :			Many.
- 1								_		1	_
}		ļ						- :.			
						l	. ` :-	- :			-
-12.24			[:: 1	1 : 1			-
-				ESTUARINE SANDY SILTY CLAY Grey, moist, soft to firm.			. 7	: :			-
<u> </u>	(•				
				Fine grained sand; minor shell fragments.			.: .				
F 9							:: .	• •		Hole colleged coolea chicaged	
 					***		1	- :		Hole collapsed - casing advanced.	1
}						OH	: . <u>.</u>	- :		2,3,3 N=6	SPT
						OH :		- :		N=6	
								.:		J	
-	1										
-							· -	- [:[
			i					-			
10 -13.7											
REMARKS	SPT	N values i	in gra	evel can overestimate density due to influence of co	arser	size	gravel partick	es. This bo	relog	should LOGGED BY	

SPT N values in gravel can overestimate density due to influence of coarser size gravel particles. This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles were measured with respect to a horizontal plane.

A. DISSANAYAKE (DISS)

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

BOREHOLE No	BH18
SHEET	_3_ of _13_
REFERENCE No	H9567

			<u>IERN FACE OF PILE CAP- DOWNSTREAM</u>					OORDINATES 10216.9 E; 167963.9 N	<u> </u>	
PROJECT No FG	5 <u>388</u>									
JOB No			DATUM <u>AHD</u> .		DAT	E COMPLET	ED <u>08/04</u>	1/05	DRILLER CAIRNS DRIL	LING_
R.L. ((iii) PEPTH (iii) ON SERVING ON SERVIN	RQD ()% CORE REC%	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	INTACT STRENGTH ボチェをコラゴ	DEFECT SPACING (mm)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES
-			ESTUARINE SILTY CLAY (As above).	XX						
-15.24			(AS above).		CI- CH				RW,-,- N<1	SPT
-15.24 -15.24 -15.24			ALLUVIAL SILTY CLAY Pale grey to grey brown, moist, stiff to vey stiff becoming firm with depth. Minor orange yellow incipient lateritic features; trace amount of charcoal and organic fragments.		CI-CH				5,8,11 N=19 4,6,6 N=12	SPT

REMARKS SPT N values in gravel consequence in gravel consequence of coarser size gravel particles. This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles were measured with respect to a horizontal plane.



FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/2-2004 BOREHOLE No <u>BH18</u>

SHEET <u>4</u> of <u>13</u>

REFERENCE No <u>H9567</u>

PROJECT									
LOCATION						ORDINATES 10216.9 E; 167963.9 N			
PROJECT N	lo_F <u>G5388</u>	SURFACE R.L3 <u>.74</u>		D.	ATE STARTI	ED <u>02/04</u>	1/05	DATUM SETP	
JOB No		- DATUM _AHD	(DATE	COMPLETI	ED <u>08/04</u>	/0 <u>5</u>	DRILLER CAIRNS DRIL	LING
R.L. (m)	SAMPLE		LITHOLOGY	USC WEATHERING	INTACT STRENGTH	DEFECT SPACING (mm)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES TESTS
		ALLUVIAL SILTY CLAY Pale grey to grey brown, moist, stiff to vey stiff becoming firm with depth. As above.						0,3,3 N=6	SPI
16									-
17				CL- CH				2,3,4 N=7	SPT
1 18								1,2,7 N=9	148
-19 -22. <i>T</i>		ALLUVIAL CLAYEY SAND Pale brown, wet, medium dense.		SC- SM				6,11,11 N=22	SPT

REMARKS SPT N values in gravel can overestimate density due to influence of coarser size gravel particles. This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles were measured with respect to a



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

PROJECT								
LOCATION	PIER 7 - NORT	HERN FACE OF PILE CAP- DOWNSTREAM	<u>RIGH</u>	<u>T_H</u> 2	ND SIDE		CC	OORDINATES 10216.9 E; 167963.9 N
PROJECT No	_FG5388	_ SURFACE R.L3,74		DA	TE STARTE	ED <u>02/04</u>	/0 <u>5</u>	DATUM SETP
JOB No		_ DATUM _AHD	D	ATE	COMPLETE	ED <u>08/04</u>	/05	
R.L. (m)	CORE DAILING %()) DON ADD ADD ADD ADD ADD ADD ADD ADD ADD AD	MATERIAL DESCRIPTION	LITHOLOGY	FERRIN	INTACT STRENGTH	DEFECT SPACING (mm)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS
-24.24		ALLUVIAL CLAYEY SAND (As above). Fine medium grained sand; some sandy clay interlayers. ALLUVIAL SAND Pale brown to brown, wet, medium to very dense with depth.	s	SC-SM				
-22		Medium to coarse grained with trace clay throughout.		SP				9,12,14 N=26
-27.24								7,22,30/130 N>50
-28.24		ALLUVIAL CLAYEY GRAVELY SAND Pale grey to grey brown, wet, medium dense. Fine to coarse grained sand and gravel sizing up to 50mm. (Sand fraction>Gravel fraction) ALLUVIAL SAND AND GRAVEL Pale brown to grey, moist, wet, very dense. See below) () () () () () () () () () (6P-				20,7,15 N=22
25 -28.74			9		. +	. :		
	SPT N values in a	ravel بين werestimate density due to influence of co	1441 1441		musal conticts	. This ha		should LOCOST SV

SPT N values in gravel Co., Experience density due to influence of coarser size gravel particles. This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles were measured with respect to a horizontal plane.

A. DISSANAYAKE (DISS)



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

BOREHOLE No	BH18
SHEET	6 of <u>13</u>
REFERENCE No	H9567

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION PIER 7 - NORTHERN FACE OF PILE CAP- DOWNSTREAM/RIGHT HAND SIDE LOCATION COORDINATES 10216.9 E; 167963.9 N PROJECT No FG5388 SURFACE R.L. __-3.74 __. DATE STARTED 02/04/05 DATUM SETP ___ JOB No DATUM _AHD _. DATE COMPLETED 08/04/05 DRILLER CAIRNS DRILLING R.L ROD INTACT DEFECT ASING ASH BORING ORE DRILLING (m) ()% STRENGTH SPACING ADDITIONAL DATA 8 DEPTH (m) MATERIAL (mm) LITHOLOGY AND GRAPHIC SAMPLES DESCRIPTION SAMPL CORE WEAT CELL TEST RESULTS REC % 25 ALLUVIAL SAND AND GRAVEL 0.0 Pale brown to grey, moist, wet, very dense. \bigcirc Poorly sorted coarse sand and gravel sizing up to 40mm; trace amount of clay; \mathbb{C} particles sizes increases with depth; large cobble to boulders more towards bottom. 0 (Sand fraction < Gravel fraction) C 14.30/130 SPT N>50 31/08/05 ENGINEERING BOREHOLE 09 04.GDT GM GATEWAY UPGRADE PROJECT GPJ 18.30/110 SPT N>50 Casing could not penetrate gravel to core drill. Casing shoe damaged and lost in hole. The borehole was unable to be advanced and therefore move slightly toward pile cap redrilled a new borehole MEERA PIER 7 BOREHOLES-GATEWAY BRIDGE -Is(50)=9.66 MPa 0 00 MW Granite houlder ls(50)=8.01 MPa 0 SW. Basalt boulder (0)Coreloss 0 (53)-32.74 SILTSTONE MW MW: Grey to dark grey medium strength. ls(50)=0.17 MPa х 0 -32.94Is(50)=0.11 MPa SANDSTONE BOREHOLE WITH LITHOLOGY SW: Pale grey to grey fine grained thinly ls(50)=1.08 MPa la minated medium to high strength. LICS=32.1MPa Is(50)=0.24 MPa IMC=3.4% - laminated partings <5° (7/m) - Occasional Joints 50° - 70° (1/m) W/D=2411N/m² Is(50)=0.60 MPa Is(50)=0.37 MPa SW Siltstone interbed REMARKS SPT N values in gravel can overestimate density due to influence of coarser size gravel particles. This borelog should

be read in conjunction with the appropriate Defect Description Sheets. Defect angles were measured with respect to a



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

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION PROJECT PIER 7 - NORTHERN FACE OF PILE CAP- DOWNSTREAM/RIGHT HAND SIDE LOCATION COORDINATES 10216.9 E; 167963.9 N PROJECT No FG5388 SURFACE R.L. __-3.74 __. DATE STARTED _02/04/05 DATUM SETP _____ JOB No DATUM _ AHD __ DATE COMPLETED 08/04/05 DRILLER CAIRNS DRILLING R.L RQO INTACT DEFECT ()% STRENGTH SPACING ADDITIONAL DATA DEPTH (m) ဗွ MATERIAL AND SAMPLE SAMPLES DESCRIPTION CORE WEAL WEAL See See FK E + + H TEST RESULTS REC % 30 -33.74SANDSTONE SW SW: (As above).
LOW GRADE COAL & SILTSTONE -33.89 ls(50)=0.14 MPa MW: Dark grey to black mainly dull to vitreous, fine grained; thinly laminated and interbedded, mainly low to medium strength with some high strength bands. Highly fractured, weathered and aftered seams and siltstone interbeds throughout; 100 Siltstone interhed (54) gradually grading into siltstone with depth. ENGINEERING BOREHOLE 09_04.GDT 31/08/05 Defects: Occasional weathered seams, 20-30mm. Siltstone interbed - Frequent laminated partings < 15° ls(50)=0.05 MPa (6-10/m) ls(50)=0.05 MPa 0 Occasional broken zones < 150mm thick - Occasional joints <60° Siltstone interbed Is(50)=0.47 MPa Defects: Mainly drilling induced planar, smooth and open to closed with frequent broken zones and weathered seams. UCS=32.5MPa MC=2.8% WD=2411N/m² ls(50)=1.58 MPa Is(50)=1.38 MPa Siltstone interbed Siltstone interbed GATEWAY UPGRADE PROJECT.GPJ ls(50)=5.72 MPa Is(50)=0.43 MPa o Siltstone interbed Is(50)=0.57 MPa REHOLE WITH LITHOLOGY MEERA PIER 7 BOREHOLES-GATEWAY BRIDGE -100 Siltstone interbed (63) Siltstone interbed Is(50)=0.25 MPa 0 Siltstone interbed ls(50)=0.47 MPa 0 Is(50)=0.34 MPa Is(50)=0.18 MPa 0 Is(50)=0.09 MPa Siltstone interbed (75)Siltstone interbed Siltstone interbed Is(50)=0.12 MPa

REMARKS SPT N values in gravel can overestimate density due to influence of coarser size gravel particles. This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles were measured with respect to a



FOR GEOTECHNICAL TERMS AND

__ BH18 __ BOREHOLE No SHEET __8__ of __13__ _H9567_ REFERENCE No

SYMBOLS REFER FORM F:GEOT 017/2-2004 GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION PROJECT PIER 7 - NORTHERN FACE OF PILE CAP- DOWNSTREAM/RIGHT HAND SIDE LOCATION COORDINATES 10216.9 E; 167963.9 N PROJECT No FG5388 _ _ _ SURFACE R.L. __-3.74 __. DATE STARTED 02/04/05 DATUM <u>SETP</u> _____ JOB No DATUM AHD DATE COMPLETED 08/04/05 DRILLER CAIRNS DRILLING R.L RQD INTACT DEFECT VG H BORING DRILLING (m) ()% STRENGTH SPACING ADDITIONAL DATA SUSCENSION STRENGTH SPACING (mm) STRENGTH STRENG $\widehat{\epsilon}$ 000 MATERIAL DEPTH AND SAMPLES DESCRIPTION GRAPHI TESTS CORE TEST RESULTS REC % 35 -38.74 LOW GRADE COAL & SILTSTONE Siltstone interbed MW: (As above). Is(50)=0.18 MPa (s(50)=0.11 MPa o Is(50)=0.05 MPa х Is(50)=0.33 MPa o ENGINEERING BOREHOLE 09_04.GDT 31/08/05 -36 Siltstone interbed Is(50)=0.13 MPa Q (35) Coreloss MEERA PIER 7 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ Is(50)=0.23 MPa Is(50)=0.19 MPa 0 Siltstone interbed Is(50)=0.08 MPa Siltstone interbed Is(50)=0.15 MPa Is(50)=0.63 MPa Siltstone interbed 0 ls(50)=0.13 MPa ls(50)=0.16 MPa 0 Is(50)=0.21 MPa Siltstone interbed ls(50)=0.19 MPa 0 Is(50)=0.10 MPa Is(50)=0.66 MPa x o Weathered seam (42)Coreloss Clay infilled crushed seam -42.94 LL=30.6%; PI=10.4%; LS=5.0% SILTSTONE BOREHOLE WITH LITHOLOGY XW - HW :Generally exhibits engineering properties of grey to dark grey, moist, very stiff to hard silty clay grading into low strength rock with depth. HW LL=34.4%; PI=15.4%; LS=9.0%

REMARKS SPT N values in gravel can overestimate density due to influence of coarser size gravel particles. This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles were measured with respect to a



FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/2-2004 PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION LOCATION PIER 7 - NORTHERN FACE OF PILE CAP- DOWNSTREAM/RIGHT HAND SIDE COORDINATES 10216.9 E; 167963.9 N PROJECT No _FG5388 _ _ _ _ SURFACE R.L. __-3.74 __. DATE STARTED 02/04/05 DATUM SETP _____ JOB No DATUM _AHD _. DATE COMPLETED 08/04/05 DRILLER CAIRNS DRILLING RΙ ROD INTACT DEFECT SING ASH BORING RE DRILLING (m) ()% SPACING STRENGTH ADDITIONAL DATA $\widehat{\epsilon}$ MATERIAL DEPTH (200 AND SAMPLES DESCRIPTION 43.74 O X O A 3.74 CORE TEST RESULTS SS REC % 40 SILTSTONE XW - HW : (As above). ***** (24) XW. Clay seam Clay seam HWIs(50)=0.88 MPa Is(50)=0.90 MPa Is(50)=0.71 MPa Clay infilled 0 sheared zone Is(50)=0.71 MI Clay infilled broken zone parallel to Х -44.31 SANDSTONE lamination partings MW-SW: Pale grey to grey fine to medium Wedge shaped clay infilled sheared grained thinly laminated low to mainly 31/08/05 medium strength with some high strength bands. Broken zone with multidirectional 04.GDT Frequent carbonaceous laminations; easily ioints erodable and friable along defects in the upper area especially between 40.57 and Healed sheared zone ENGINEERING BOREHOLE 09 (19) 43.40m. Frequent lamination partings <30° (8/m) - Fractured, sheared and broken zones Broken zone parallel to lamination (300-700mm) - Joints 50-60° (3-4/m) - Joints 35-45° (3/1m) partings Defects are generally rough, open to MW Easily erodable and friable band (Healed shear zone?) closed and coated wth silty/sandy clay. MEERA PIER 7 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ Coreloss Clay infiled broken zone parallel to lamination partings Clay infilled crushed seam (89)is(50)=0.03 MPa Is(50)=0.50 MPa ٥ Broken zone parallel to lamination partings Is(50)=0.64 MPa Is(50)=0.25 MPa Is(50)=1.26 MPa Q o SW BOREHOLE WITH LITHOLOGY Is(50)=0.25 MPa χ UCS=22.5MPa MC=2.4% WD=2413N/m² ls(50)=2.28 MPa x Broken zone LOGGED BY

REMARKS SPT N values in gravel con everestimate density due to influence of coarser size gravel particles. This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles were measured with respect to a horizontal plane.

A. DISSANAYAKE (DISS)



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

BOREHOLE No	BH18
SHEET	_10 of _13
REFERENCE No	<u>H9567</u>

PROJEC				RADE PROJECT - GATEWAY BRIDGE DU								
LOCATIO				IERN FACE OF PILE CAP- DOWNSTREAM							OORDINATES 10216.9 E; 167963.9	
JOB No		388					ATE STAR					
JOB NO				DATUM AHD		DAT	E COMPLE	TED	_08/04/	05	DRILLER <u>CAIRNS DR</u> I	FTIMG -
PTH (m)	CASING WASH BORING WASH BORING WASH BORILING	RQD ()% CORE REC%	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	NTACT STRENGT	H SPA	FECT ACING mm)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES
47 -5	9.90 0.74	100 (98)		MUDSTONE DARK GREY FINE GRAINED THINLY LAMINATED SEDIMENTARY ROCK SW: Grey to dark grey, thinly laminated mainly low to medium strength. Some rehelaed sheared zones towards bottom. Joints 50-60° (2/m). Defects: - Joints @ 50° -60° (2/m). SANDSTONE SW: Pale grey to grey fine to medium grained thinly laminated mainly medium to high strength. Defects: mainly rough, closed to open, cross-cutting - Frequent laminated partings <30° (2-4/m) - Occasional fault planes - Occasional joint 65°		sw sw					Is(50)=0.05 MPa Siltstone interbed Siltstone interbed Siltstone interbed Siltstone interbed Is(50)=0.20 MPa Is(50)=1.45 MPa Is(50)=1.45 MPa Fault Clay infilled crushed seam Siltstone interbed Is(50)=0.73 MPa	x 0 -
REMA		N values i				<u>, </u>	No. of Concession, Name of Street, or other party of the least of the	CT BOOK				

SPT N values in gravel can exerestimate density due to influence of coarser size gravel particles. This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles were measured with respect to a horizontal plane.



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

BOREHOLE No <u>BH18</u>

SHEET <u>11</u> of <u>13</u>

REFERENCE NO <u>H9567</u>

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION PROJECT PIER 7 - NORTHERN FACE OF PILE CAP- DOWNSTREAM/RIGHT HAND SIDE LOCATION COORDINATES 10216.9 E; 167963.9 N SURFACE R.L. __-3.74 __. PROJECT No _FG5388 _ _ _ _ DATE STARTED _02/04/05 DATUM SETP _____ JOB No DATUM _AHD _. DATE COMPLETED _08/04/05 DRILLER CAIRNS DRILLING RΙ ROD INTACT DEFECT NG H BORING H DRILLING (m) ()% STRENGTH SPACING ADDITIONAL DATA $\hat{\epsilon}$ 8 MATERIAL DEPTH ((mm) LITHOLOGY AND GRAPHIC SAMPLE SAMPLES DESCRIPTION CASING WASH CORE CORE TEST RESULTS nsc REC % -53.74 50 INTERBEDDED MUDSTONE AND SANDSTONE.SANDSTONE DOMINANT SW: Pale grey to black, fine grained, thinly laminated and interbedded, medium to SW mainly high strength. Weathered seam Defects: - Frequent laminated partings <30° (4/m) HW Clay infilled crushed seam - Joints @ 45°-70° (4/m) Occasional weathered seams <70mm 31/08/05 UCS=20.5MPa 5 MC=4.2% GDT WD=2401N/m² ą, ENGINEERING BOREHOLE 09 SW Is(50)=0.85 MPa Is(50)=1.32 MPa 0 UCS=38.6MPa MC=3.8% (100) WD=2535N/m² ls(50)=0.28 MPa Is(50)=2.31 MPa O -55.64 SANDSTONE ls(50)=0.85 MPa O UCS=49.8MPa Is(50)=1.23 MPa SW: Pale grey to grey fine to medium GATEWAY UPGRADE PROJECT.GPJ MC=2.4% grained thinly laminated mainly medium to WD=2493N/m² Is(50)=1.99 MPa high strength. Defects: - Joints @ 70° (4/m) - Joints @ 50° (2/m) SW -56.59 ls(50)=0.46 MPa Is(50)=1.07 MPa Is(50)=0.59 MPa Is(50)=1.09 MPa INTERBEDDED MUDSTONE AND SANDSTONE. MUDSTONE DOMINANT MEERA PIER 7 BOREHOLES-GATEWAY BRIDGE 0 0 X SW: Pale grey to black, fine grained, thinly (s(50)=2.98 MPa UCS=53.1MPa laminated and interbedded, medium to Is(50)=1.76 MPa MC=2.8% mainly high strength. (s(50)=0.83 MPa WD=2421N/m² Is(50)=1.11 MPa o Frequent sandstone interbeds in the upper Defects: frequent laminated partings <20° (4/m)SW Occasional subvertical joints ls(50)=0.48 MPa ls(50)=1.90 MPa O UCS=27.2MPa MC=2.8% Is(50)=0.88 MPa х WD=2421N/m2 Is(50)=0.78 MPa O BOREHOLE WITH LITHOLOGY Is(50)=2.06 MPa 0 -58.29 Is(50)=0.18 MPa UCS=37.4MPa х MUDSTONE MC=3.6% WD=2443N/m² FINE GRAINED THINLY LAMINATED (79)SEDIMENTARY ROCK ls(50)=0.45 MPa ls(50)=1.73 MPa SW HW - SW: See below O Is(50)=0.39 MPa LOGGED BY

REMARKS SPT N values in gravel can overestimate density due to influence of coarser size gravel particles. This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles were measured with respect to a horizontal plane.

A. DISSANAYAKE (DISS)



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

REMARKS SPT N values in gravel can overestimate density due to influence of coarser size gravel particles. This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles were measured with respect to a

horizontal plane

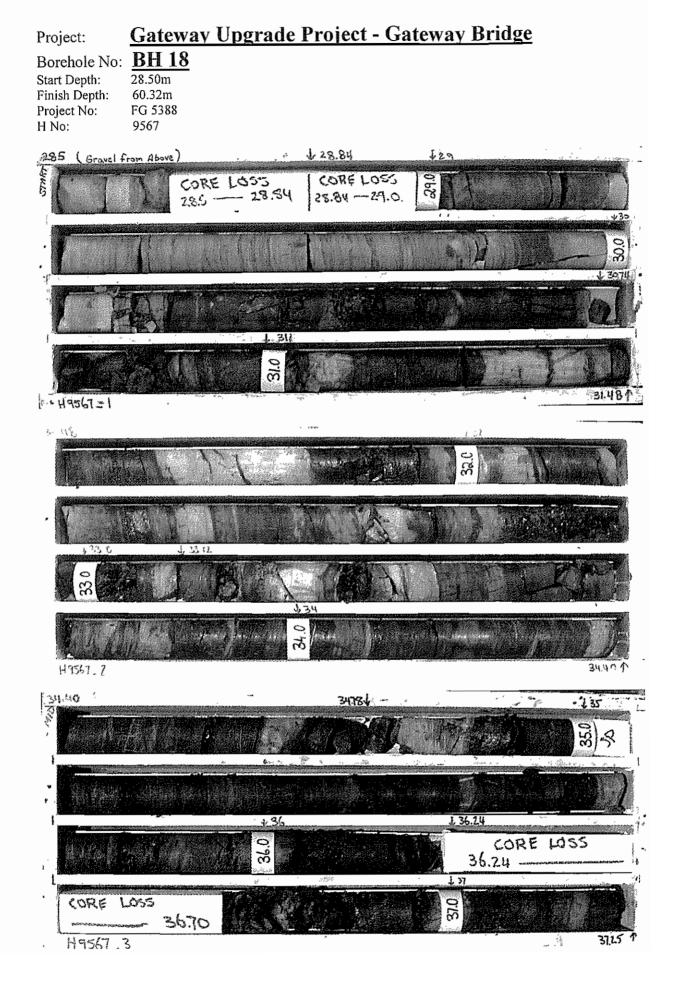


FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/2-2004

BOREHOLE No	BH18
SHEET	_13 _ of _13 _
REFERENCE No	H9567

PRC	JECT	<u>GAT</u>	<u>EM</u> ÁY I	<u>JPG</u>	RADE PROJECT - GATEWAY BRIDGE DUF	<u> LIC</u>	ATIC	M FOUNDATI	<u>10/1 1/1/</u>	/ES]	GATION	
	ATION	PIE	<u> 7 - NO</u>	RTH	<u>IERN FACE OF PILE CAP- DOWNSTREAM</u>							N
PRC	JECT No	F <u>G</u> 5	388		SURFACE R.L3_74			ATE STARTED				
JOB	No				DATUM <u>AHD</u>		DAT	E COMPLETED	08/04	<u>/05</u>		
용 DEPTH (m)	R.L. (m) -63.74	CASING WASH BORING CORE DRILLING	RQD ()% CORE REC%	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	JSC	STRENGTH SI	DEFECT PACING (mm)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES
- 80	-03./4		NEC 76		MUDSTONE HW-SW: (As above).		SW HW			W.S.	Highly fractured and slightly brecciated zone.	00 24
	-64.06	4	100				1'''			×		
-				İ	Borehole terminated at 60.32m			ļ †				
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REMARKS SPT N values in gravet can overestimate density due to influence of coarser size gravel particles. This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles were measured with respect to a horizontal plane.



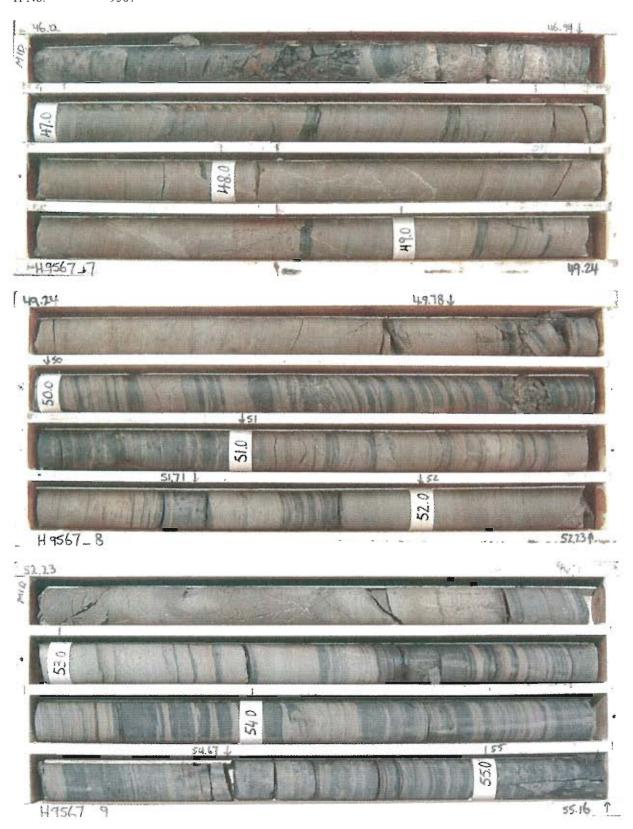


Borehole No: BH 18
Start Depth: 28.50m
Finish Depth: 60.32m
Project No: FG 5388
H No: 9567



Project: Gateway Upgrade Project - Gateway Bridge

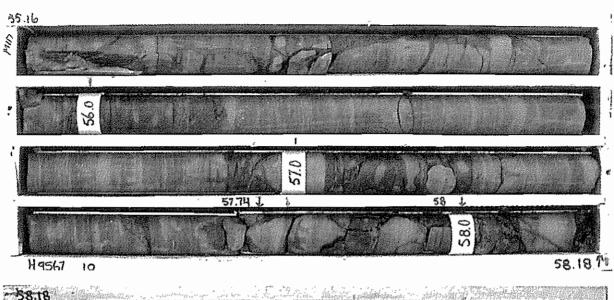
Borehole No: BH 18
Start Depth: 28.50m
Finish Depth: 60.32m
Project No: FG 5388
H No: 9567

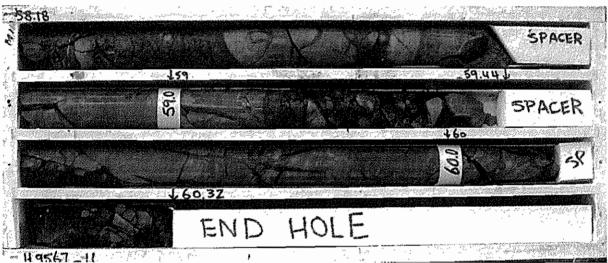


Project: Gateway Upgrade Project - Gateway Bridge

Borehole No: BH 18
Start Depth: 28.50m
Finish Depth: 60.32m
Project No: FG 5388

Project No: FG 53 H No: 9567





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



DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO : BH18
SHEET : 1 of 10

REFERENCE NO: H9567

PROJECT

GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION : PIER 7 – NORTI

PIER 7 - NORTHERN FACE OF PILE CAP - DOWNSTREAM/RIGHT HAND SIDE

PROJECT NO: FG5388 SURFACE R.L: -3.74 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
28.5-29.0	- 1	-	-	-	-	-	Core loss
29.16	LP	<5°	Ir	S	C	Cn	Dī
29.18	LP	<5°	P	S	С	Cn	DI
29.38	LP	<5°	Cu	R	С	Cn	DI
29.39	LP	<5°	P	R	С	Cn	DI
29.60	LP	<5°	P	R	С	Cn	DI
29.78	J	50°-70°	St	R	0	Cn	15
29.83	LP	30°	P	R	С	Cn	DI
29.87	LP	20°	P	S	Т	Cn	DI
29.87-30.00	Fr		Ir	R	Т	Cn	DI
30.10-30.15	BZ/WS	~	-	-	0	W	-
30.18	LP	<10°	P	S	C	Cn	DI
30.28	J	30°	St	S	С	Cn	DI
30.32-30.35	WS	-	-	-	0	W	
30.39-30.46	WS	-	-	-	0	W	1,000
30.49-30.52	WS	-	-	-	0	W	
30.65-30.90	WS	-	-	-	0	W	CI
31.0	LP	<15°	P	S		-	
31.18	LP	<5°	P	S	С		DI
31.26	LP	<5°	P	S	С	Cn	DI
31.48	LP	10°	P	S	С	Cn	DI
31.52	LP	10°	P	S	C	Cn	DI

Abbreviations

			Audien	MILLIAN			
	ROUGHNESS	,	WALL ALTERATIONS		ТУРЕ		OTHER
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly
S	Smooth	W	Weathered	В	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
Pl	Planar	С	Closed	SZ	Sheared Zone	Н	Horizontal
St	Stepped	0	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	Т	Tight	BZ	Broken Zone	Cn	Clean
lr	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.

F:GEOT533/4

Geotechnical Branch

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



DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO : BH18

SHEET : 2 of 10

REFERENCE NO: H9567

PROJECT

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION

PIER 7 - NORTHERN FACE OF PILE CAP - DOWNSTREAM/RIGHT HAND SIDE

PROJECT NO:

SURFACE R.L: -3.74

DRILLER

: CAIRNS DRILLING PTY LTD

FG5388

JOB NO

DATUM

: AHD

DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
31.53	LP	10°	P	S	С	Cn	Di
31.56	LP	10°	P	S	Č	Cn	DI
31.82	LP	10°	P	S	C	Cn	DI
31.83	LP	10°	P	S	С	Cn	DI
31.85	LP	10°	P	S	С	Cn	DI
31.94	LP	10°	P	S	С	Cn	DI
32.10	LP	15°	P	S	С	Cn	DI
32.11	LP	15°	P	S	С	Cn	DI
32.19	LP	15 °	P	S	С	Cn	DI
32.29	LP	15°	P	S	С		DI
32.35	LP	15°	P	S	С	Cn	DI
32.41	LP	15°	P	S	С	Cn	DI
32.49	LP	15 °	P	S	С	Ĉn	DI
32.60-32.63	BZ/WS	_		-	0	W	-
32.78-33.08	WS	-	-	-	0	W	CI
33.12	LP	10 °	P	S	0	Cn	
33.17-33.20	BZ/WS	-		_	О	W _	
33.33-33.39	BZ			-	0	-	
33.57-33.70	BZ	-	-	-	0	-	
33.82	LP	30°	P	S	С	Cn	
33.92	LP	30 °	P	S	Т	Cn	

Abbreviations

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	ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER
R	Rough	FeSt	Iron Stained	J	Joint	Р	Partly
S	Smooth	W	Weathered	В	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
		1000		FP	Foliation Parting	Ιn	Incipient
	PLANARITY		APERTURE	LP	Lamination Parting	SI	Sand Infill
Pl	Planar	С	Closed	SZ	Sheared Zone	Н	Horizontal
St	Stepped	0	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

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



DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO : BH18 SHEET : 3 of 10

RÉFERENCE NO: H9567

PROJECT

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION

PIER 7 - NORTHERN FACE OF PILE CAP - DOWNSTREAM/RIGHT HAND SIDE

PROJECT NO:

FG5388

SURFACE R.L: -3.74

DRILLER

: CAIRNS DRILLING PTY LTD

JOB NO

DATUM

: AHD

DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
34.10	LP/BP	20 °	P	S	T	Cn	
34.18	LP/BP	20 °	P	S	Υ	Cn	F3 E-01
34.59-34.60	WS	-	P	S	W		Parallel to LP
34.64	LP	<10°	W	S	C	Cn	
34.67	LP	<15°	Ir	S	C	Cn	
34.76	BP	15°	P	S	0	Cn	
34.95-34.97	CS	-	~	-	-	W	CI, High Plastic
34.98	LP	<10°	P	Š	Ö	Cn	
35.09	LP	<10°	P	S	С	Cn	
35.20	LP	<10°	Ir	S	С	Cn	
35.65-35.69	BZ	-	-	_	0		
35.58	LP	<10°	P	S	С	Cn	
36.03-36.11	BZ/WS	-	-	144	0	W	
36.17-36.24	BZ/WS	-		S	О	W	
36.24-36.70			-	-			Core Loss
36.70-36.88	WS	-	-	-		W	CI
36.92-36.98	WS	-	-			W	
37.02-37.13	BZ/WS	-	-	-	0		
37.20-37.25	BZ/WS	~	-	-	0		
37.30	J	60 °	P	S	С		
37.33	LP	0 0	P	S	С		

Abbreviations

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	ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly
S	Smooth	w	Weathered	В	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	Įn	Incipient
	PLANARITY		APERTURE	LP	Lamination Parting	SI	Sand Infill
Pl	Planar	С	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	0	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	ws	Weathered Seam	CI	Clay Infill
Cu	Curved	Т	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular		<u> </u>	HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture	DI	Drilling Induced

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



SHEET

BOREHOLE NO : BH18

REFERENCE NO: H9567

: 4 of 10

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

[CHARACTERISATION OF DBFECTS ARE IN ACCORDANCE WITH

ISRM SUGGESTED METHODS (1981)]

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION PROJECT INVESTIGATION

PIER 7 - NORTHERN FACE OF PILE CAP - DOWNSTREAM/RIGHT HAND SIDE LOCATION

PROJECT NO: FG5388 SURFACE R.L: -3.74 DRILLER : CAIRNS DRILLING PTY LTD

DATE DRILLED : 2 - 8/4/05 JOB NO **DATUM** AHD

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
37.37-37.44	BZ/WS	-		-	0	W	
37.57-37.64	BZ/WS			<u>-</u>	0	w	
37.76	LP	15°	Un	S	С	Cn	
37.50	LP	10°	P	S	С	Cn	<u> </u>
37.84-37.87	BZ/WS	-	-	-	0	W	
38.01	J	60 °	P	S	С	Cn	
38.07	LP	<5°	W	S	С	Cn	
38.15-38.19	BZ/WS	-	-		0	W	
38.39-38.42	BZ	~		-	0	Cn	
38.49-38.54	BZ	-	-	-	0		
38.54-39.00							Core Loss
39.0-39.20	WS	-	-		0	W	
39.20-40.0	WS				С	W	XW-HW rock
40.10-40.23	BZ		Ir		0		Parallel to LP
40.27-40.29	CS	25 °	P	S	С	VV	
40.41-40.14	LP	30 °	I r	S	C	W	CI
40.48	J	35°	P	S	С	Cn	
40.49-40.75	SZ/BrZ				С	W	CI
40.81	J	35°	P	S	С	Cn	-
40.84	J	30°	Ir	R	С	W	CI
40.91	J	45 °	Ir	R	С	W	

Abbreviations

	ROUGHNESS	-	WALL ALTERATIONS		TYPE		OTHER
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly
S	Smooth	w	Weathered	В	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
Ρl	Planar	C	Closed	SZ	Sheared Zone	Н	Horizontal
St	Stepped	0	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	ICI	Drilling Induced

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



DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

[CHARACTERISATION OF DEFECTS ARE IN ACCORDANCE WITH

ISRM SUGGESTED METHODS (1981)]

BOREHOLE NO : BH18 SHEET : 5 of 10 REFERENCE NO: H9567

PROJECT

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

LOCATION

INVESTIGATION

PROJECT NO:

FG5388

SURFACE R.L: -3.74

DATUM

PIER 7 - NORTHERN FACE OF PILE CAP - DOWNSTREAM/RIGHT HAND SIDE

AHD

DRILLER

: CAIRNS DRILLING PTY LTD

JOB NO

DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
41.0-41.19	BZ	MDJ	Ir	R	0		Parallel to LP
41.26-41.36	SZ	45 °	P	_	Т		3mm thick
41.42	J	60 °	Un	R	C		
41.52	J	50 °	P	S	С		
41.62-42.30	BZ/WS		Ir	-	O-C	W	PCI
42.34-42.52							Coreloss
42.52	LP	20 °	P	R	0	-	-
42.57	LP	20°	P	R	0		CI
42.60	LP	20 °	P	R	0		CI
42.65	LP	20 °	P	R	0		Cl
42.68	LP	20 °	Р	R	0		
42.71	LP	30-30 °	Ir	R	С		Со
42.50	LP	20°	P	R	-		CI
42.84	LP	20 °	P	S	0		CI
43.0-43.03	SZ	50°		-	С		Healed
43.17-43.41	BZ/WS	Closely spaced	-		0	W	Sandy CI
43.45	LP	20°	P	S	T	Cn	DI
43.47	LP	20°	P	S	С	Cn	DI
43.50	LP	20 °	P	S	С	Cn	DI
43.53	LP	<20°	P	S	C	Cn	DI
43.54	LP	<20°	P	S	С	Cn	DI

			Abbre	viation.	fi .		
	ROUGHNESS		WALL ALTERATIONS	ТУРЕ			OTHER
R	Rough	FeSt	Iron Stained	J	Joint	P	Partiy
S	Smooth	W	Weathered	В	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Со	Coal seam
				MDJ	Multidirectional Joints	In	Incipient
	PLANARITY		APERTURE	LP	Lamination Parting	SI	Sand Infill
P}	Planar	С	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	0	Open	CZ	Crushed Zone	٧	Vertical
Un	Undulating	F	Filled	ws	Weathered Seam	Cĩ	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
ľr	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				BrZ	Brecciated Zone	DI	Drilling Induced

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



DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO : BH18 SHEET : 6 of 10

REFERENCE NO: H9567

PROJECT

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION

PIER 7 - NORTHERN FACE OF PILE CAP - DOWNSTREAM/RIGHT HAND SIDE

PROJECT NO:

SURFACE R.L: -3.74

DRILLER

: CAIRNS DRILLING PTY LTD

FG5388

JOB NO

DATUM

: AHD

DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
43.66-43.70	BZ/WS		Un	R	W		CI
43.74	LP	20 °	P	S	T	Cn	DI
43.75	LP	20 °	P	S	Т	Cn	DI
44.08	LP	20 °	P	S	С	Cn	
44.16	LP	20 °	P	S	С	Cn	
44.55	J	50 °	P	S	Т	Cn	
44.70	J	50 °	P	SS	С	Cn	
44.75	J	50 °	P	S	С	Cn	
44.81-45.03	BZ/WS	Closely spaced	_	-	0	W	PCI
45.13	LP	25 °	P	-	Т		CI
45.23-45.25	J	60 °	Ir		le:		CI
45.37	J	60°	P	R	0		Cross cutting
45.58	LP	35°	P	R	С		Cross cutting
45.66	J	60°	P	R	С		Cross cutting
46.08	J	60°	Р	R	С	Cn	
46.30	J	50°	P	S	0	Cn	
46.45-47.00	SZ/CZ	-	-	-	C-T	W	CI, Healed
47.33	BP	20 °	P	S	С	Cn	DI
47.64	LP	10 °	P	R	С	Cn	DI
47.90-48.08	Fu	-	-	-	-	Cn	displaced
48.05	LP	<5 °	P	R	С		DI

Abbreviations

			5-5-5-5-7				
ROUGHNESS			WALL ALTERATIONS		TYPE		OTHER
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly
S	Smooth	w	Weathered	В	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Со	Coal seam
				FP	Foliation Parting	In	Incipient
	PLANARITY AI		APERTURE	TURE LP Lamination Partie		SI	Sand Infill
Pl	Planar	С	Closed	SZ	Sheared Zone	Н	Horizontal
St	Stepped	0	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	ws	Weathered Seam	CI	Clay Infill
Cu	Curved	Т	Tight	BZ	Broken Zone	Cn	Clean
Ir.	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture	DI	Drilling Induced

PROJECT

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



DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

[CHARACTERISATION OF DEFECTS ARE IN ACCORDANCE WITH ISRM SUGGESTED METHODS (1981)] BOREHOLE NO : BH18

SHEET : 7 of 10

REFERENCE NO: H9567

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION : PIER 7 – NORTHERN FACE OF PILE CAP – DOWNSTREAM/RIGHT HAND SIDE

PROJECT NO: FG5388 SURFACE R.L: -3.74 DRILLER: CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
48.45	LP	30 °	Р	S	С		DI
48.61-48.81	J	70 °	P	-	T	-	Healed
48.64-48.87	SZ	-		2	T	121	Healed
49.10-49.3	Fu	75 °			-	Cn	20mm displaceed
49.12	LP	15 °	P	S	T	Cn	DI
49.16	LP	30 °	P	S	T	Cn	DI
49.45	LP	25°	P	S	Т	Cn	DI
49.50	LP	25°	P	R	T	Cn	DI
49.60	LP	25°	Ir	R	T	Cn	DI
49.70	BP	25 °	Ir	R	0		
49.85	J	40°	St	R	0	W	-
49.87	J	65°	Ir	R	0	W	-
49.95	LP	25°	P	S	С	Cn	DI
50.00	J	70°	Р	S	0	Cn	
50.10	LP	25°	P	S	С	Cn	DI
50.12	LP	25°	Cu	R	С	Cn	DI
50.17	J	40°	Ir	R	С	Cn	
50.23	J	70°	P	S	С		CI
50.30	J	70°	P	S	С		CI
50.31-50.38	WS	-	20	-	Т	W	CI

Abbreviations

			715010	ruu:on	,		
ROUGHNESS			WALL ALTERATIONS		ТҮРЕ		OTHER
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly
S	Smooth	W	Weathered	В	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		APERTURE	APERTURE LP Lar		Sĭ	Sand Infill	
ΡI	Planar	С	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	0	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	ws	Weathered Seam	CI	Clay Infill
Cu	Curved	т	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fu	Fault	DI	Drilling Induced

Geotechnical Branch

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



DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO : BH18 : 8 of 10

REFERENCE NO: H9567

PROJECT

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION

PIER 7 – NORTHERN FACE OF PILE CAP – DOWNSTREAM/RIGHT HAND SIDE

PROJECT NO:

FG5388

SURFACE R.L: -3.74

DRILLER

: CAIRNS DRILLING PTY LTD

JOB NO

DATUM

: AHD

DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
50.53	LP	30°	P	S	Т		DI
50.62-50.66	WS	=	-	-	0	W	CI
50.76	LP	30°	P	S	Т		DI
50.80	J	35°	Ir	_	Т	Cn	
50.84	LP	30 °	Ir	-	T	Cn	
51.05	LP	30°	P	R	Т	Cn	DI
51.08	J	35°	P	R	Т	Cn	Cv
51.10	J	70°	P	-	Т	Cn	
51.18	J	70°	P	-	Т	13	DI
51.25	LP	20 °	P	R	Т	-	DI
51.30	J	70 °	Un	-	Т	- Cn	
51.66	LP	20 °	P	S	Υ	Cn	DI
51.72	LP	20 °	P	R	С	Cn	DI
51.89	LP	20 °	P		С	Cn	DI
51.91	LP	20 °	P	-	Т	Cn	DI
51.20	J	30 °	St	R	T	Cn	
52.30	J	70 °	Cu		Т	Cn	9 34
52.31	J	70 °	Cu		Т	Cn	
52.40	J	70 °	P	-, l	Т	Cn	
52.50	J	70 °	P		T	Cn	
52.60	l	48°	St	-	Т	Cn	

Abbreviations

ROUGHNESS		W	WALL ALTERATIONLPS		TYPE		OTHER
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly
S	Smooth	W	Weathered	В	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Cv	Calcite vein
				Fu	Fault	In	Incipient
	PLANARITY		APERTURE		Lamination Parting	SI	Sand Infill
P1	Planar	С	Closed	SZ	Sheared Zone	Н	Horizontal
St	Stepped	0	Ореп	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Си	Curved	Т	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.

F:GEOT533/4

Geotechnical Branch

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



DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO : BH18 SHEET : 9 of 10

REFERENCE NO: H9567

PROJECT

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION

PIER 7 - NORTHERN FACE OF PILE CAP - DOWNSTREAM/RIGHT HAND SIDE

PROJECT NO:

FG5388

SURFACE R.L: -3.74

DRILLER

: CAIRNS DRILLING PTY LTD

JOB NO

DATUM

: AHD

DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
52.65	J	48 °	P	R	С	Cn	DI
52.85	LP	30 °	P	S	Т	Cn	DI
53.23	LP	20 °	P	S	С	Cn	DI
53.40	LP	20°	P	-	Т	Cn	DI
53.42	LP	20°	P	-	Т	Cn	DI
53.49	LP	20°	P	-	т	Cn	DI
53.82	LP	15°	P	×	Т	Cn	DI
51.12-54.35	J	70-90 °	Cu		Т	Cn	
54.65	LP	10 °	P	-	С	Cn	DI
54.67	LP	10 °	P	-	С	Cn	DI
54.72	LP	10 °	P		C	Cn	DI
54.77	LP	10 °	P	-	С	Cn	DI
54.85	LP	10 °	P	-	С	Cn	DI
55.0-55.40	J	80-90 °	Un	S	T		PCI
55.50-55.95	J	80-90°	Un	S	T	-	PCI
56.10-56.17	WS	~	<u>-</u>	- 1	0	w	CI
55.97-56.05	BZ	10 °	-	-	_		
56.40	LP	<10 °	P	S	-		DI
56.96-57.00	BZ	-		-	0	Cn	Parallel to LP
57.05-57.27	BZ	-		7-	0	Cn	Parallel to LP
57.60	LP	15 °	P	S	С	Cn	DI

Abbreviations

	ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly
S	Smooth	W	Weathered	В	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Cv	Calcite vein
				FP	Foliation Parting	In	Incipient
PLANARITY			APERTURE		Lamination Parting	SI	Sand Infill
Pl	Planar	С	Closed	SZ	Sheared Zone	Н	Horizontal
St	Stepped	0	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	т	Tight	BZ	Broken Zone	Cn	Clean
lr	bregular			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.

F:GEOT533/4

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



DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO : BH18 SHEET : 10 of 10

REFERENCE NO: H9567

PROJECT

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION

PIER 7 - NORTHERN FACE OF PILE CAP - DOWNSTREAM/RIGHT HAND SIDE

: AHD

PROJECT NO:

FG5388

SURFACE R.L: -3.74

DRILLER

: CAIRNS DRILLING PTY LTD

JOB NO

DATUM

DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
57.74	LP	15°	P	_	-	Cn	DI
57.79	LP	30°	P	R	0	Cn	DI
57.86-57.90	BZ		P		0		CI, Parallel to LF
57.95-58.00	WS		-	-	О	W	
58.18-58.46	BrZ		-		С	W	CI
58.54	J	35 °	P	S	C	Cn	
58.64	J	35 °	P	S	С		
58.77	J	35 °	P	S	С		
58.85-59.10	J	85-90°	P	S	0		
59.15-59.35	BrZ			~	0		Cī
59.35-59.57	BZ	MDJ	-	-	O		CI
60.0-60.05	BZ	MDJ	-	-	0		CI
60.10-60.32	BrZ		-	-	0		CI
		-					_

Abbreviations

	ROUGHNESS	OUGHNESS WALL ALTERATIO		ТҮРЕ		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly
S	Smooth	W	Weathered	В	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	ВР	Bedding Parting	Co	Coal seam
				MDJ	Multidirectional Joints	In	Incipient
	PLANARITY APERTURE		APERTURE	LP	Lamination Parting	SI	Sand Infill
P!	Planar	С	Closed	SZ	Sheared Zone	Н	Horizontal
St	Stepped	0	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	Т	Tight	BZ	Broken Zone	Cn	Clean
Tr	Irregular			BrZ	Brecciated Zone	CS	Clay Seam
				Fr	Fracture	DI	Drilling Induced