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# Soil Surveys Engineering Pty. Limited

Specialist in Applied Geotechnics

Milton: ph +61 7 3369 6000 brisbane@soilsurveys.com.au  
Gold Coast: ph +61 7 5500 0465 goldcoast@soilsurveys.com.au  
Northern Rivers: ph +61 7 5523 4577 northernrivers@soilsurveys.com.au  
Mackay: ph +61 7 4942 2907 mackay@soilsurveys.com.au

## BOREHOLE RECORD SHEET

Location Number: BH 313

Project Number: 110-12936

Project Name: Cross River Rail

Location: Brisbane

Client: AECOM

Date: 04/01/2012

Page: 1 OF 6

Easting: 503210 Northing: 6960934 RL: -5.76 m  
Logger: DA/DT Operator: DA Machine: Scout 2

Drilling Method				Depth	Graphic	Description	Weathering	Strength Estimated	Defect Spacing	Rec (%)	RQD	Samples and Remarks
TC	WB	RR	NM/LC									
				1.0		Silty CLAY (CH) Very soft, high plasticity, dark grey, with some organics.						
				2.0								
				3.0								
				3.00								
				4.0		Clayey SAND (SC) Very loose, fine to medium grained, dark grey, high plasticity fines.						
				5.0								
				5.90								
				6.0		SAND (SP) Medium dense, fine to medium grained, grey and brown.						
				7.0								
				8.0								
				9.0								
				10.0								

### Comments:

1) Drilled from floating barge - all depths measured from river bed level. 2) Note: the coring method used was NQ3 not NM/LC. 3) Borehole grouted on completion.

Water First Noted Water Steady Level

### Defects - 1.54m : F,60° P,R,O,C

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

### Weathering Grades

RS - Residual Soil  
XW - Extremely weathered  
DW - Distinctly weathered  
SW - Slightly weathered  
FR - Fresh  
Rock Strength  
VW - Very weak  
W - Weak  
MS - Medium strong  
S - Strong  
VS - Very strong  
ES - Extremely strong

### Samples

U50  
SPT  
Disturbed Sample

Approved:  
Date:



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## BOREHOLE RECORD SHEET

Location Number: BH 313

Project Number: 110-12936

Project Name: Cross River Rail

Location: Brisbane

Client: AECOM

Date: 04/01/2012

Page: 2 OF 6

Easting: 503210 Northing: 6960934 RL: -5.76 m  
Logger: DA/DT Operator: DA Machine: Scout 2

Drilling Method				Depth	Graphic	Description	Weathering	Strength Estimated	Defect Spacing	Rec (%)	RQD	Samples and Remarks
TC	WB	RR	Casing									
				11.0		SAND (SP) Medium dense, fine to medium grained, grey and brown. (continued)						
				11.50								
				12.0		Sandy GRAVEL (GP) Medium dense, fine to medium size, grey and brown, fine to coarse grained sand.						
				13.0								
				14.0								
				15.0								
				16.0								
				17.0								
				17.00		Sandy GRAVEL (GP) Medium dense, fine to coarse size, grey and brown, fine to coarse grained sand.						
				17.90								
				18.0		Sandy GRAVEL (GP) Medium dense, fine to coarse size, grey and brown, fine to coarse grained sand, with some cobbles.						
				18.50								
				19.0		TUFF (DW) Medium strong, highly fractured, with some clay seams.						
				19.65								
				20.0			SW			100	73	

Comments:  
1) Drilled from floating barge - all depths measured from river bed level. 2) Note: the coring method used was NQ3 not NMLC. 3) Borehole grouted on completion.

Water First Noted Water Steady Level

Defects - 1.54m : F,60° P,R,O,C									
Depth (m)	Type	Diag (deg)	Planarity	Roughness	Aperture	With	Diag (deg)	Planarity	Roughness
	B - Bedding		C - Curvilinear	L - Slickensides	C - Closed	C - Clay			
	C - Clay seam		D - Discontinuous	P - Polished	F - Filled	F - Iron Oxide			
	F - Foliation		P - Planar	R - Rough	N - Clean	K - Calcite			
	H - Schistosity		S - Subplanar	S - Smooth	O - Open	L - Limonite			
	J - Joint		T - Stepped	V - Very rough	S - Silty	Q - Quartz			
	L - Cleavage		U - Undulating			S - Secondary mineral			
	R - Fracture					U - Unidentified mineral			
	S - Shear zone					W - Weathered rock			
	T - Contact					X - Carbonaceous			
	V - Vein					Z - Clean			
	Z - Decomposed zone								
	DI - Drilling induced break								

Weathering Grades		Samples	
RS - Residual Soil		U50	
XW - Extremely weathered			
DW - Distinctly weathered			
SW - Slightly weathered			
FR - Fresh			
Rock Strength		SPT	
VW - Very weak			
W - Weak			
MS - Medium strong			
S - Strong			
VS - Very strong			
ES - Extremely strong			

Approved: \_\_\_\_\_  
Date: \_\_\_\_\_



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## BOREHOLE RECORD SHEET

Location Number: BH 313

Project Number: 110-12936

Project Name: Cross River Rail

Location: Brisbane

Client: AECOM

Date: 04/01/2012

Easting: 503210

Northing: 6960934

RL: -5.76 m

Logger: DA/DT

Operator: DA

Machine: Scout 2

Page: 3 OF 6

Drilling Method				Depth	Graphic	Description	Weathering	Strength Estimated	Defect Spacing	Rec (%)	RQD	Samples and Remarks
TC	WB	RR	NM/C									
				20.30		CONGLOMERATE, coarse grained, pale light grey, speckled blue grey, granular, medium bedded, very closely spaced to closely spaced fractures. Clasts are fine gravel sized, sub-rounded, of siltstone, sandstone and quartz, with some medium gravel clasts. Clast supported. (continued)	FR					19.75-20.09 m; DI, 2°, S, R, O, Z 20.4m, Is50 = 0.26 MPa
				20.89								20.92 m; B, 7°, P, S, O, Z
				21.0								21.03-21.30 m; B, 6°, P, S, O, Z
				21.23		CONGLOMERATE, coarse grained, pale light grey, speckled blue grey, granular, medium bedded, moderately widely spaced fractures. Clasts are medium gravel sized, sub-rounded, of siltstone, sandstone and quartz. Clast supported.				100	73	21.34 m; J, 5°, P, S, O, Z 21.46 m; J, 5°, P, R, O, Z 21.53 m; B, 10°, P, R, O, Z 21.61 m; DI, 25°, S, R, O, Z 21.70 m; DI, 9°, S, R, O, Z
				21.86		MUDSTONE, fine grained, dark grey, banded pale brown and grey, cryptocrystalline, thinly laminated, closely spaced fractures, with siltstone laminae.						
				22.0		SANDSTONE, medium grained, brown and grey, granular, thinly bedded, very closely to moderately widely spaced fractures.						
				23.0		CONGLOMERATE, coarse grained, pale light grey, speckled blue grey, granular, medium bedded, moderately widely spaced fractures. Clasts are medium gravel sized, sub-rounded, of siltstone, sandstone and quartz. Clast supported.						23.4m, Is50 = 0.9 MPa
				23.72								
				24.0		CONGLOMERATE, coarse grained, pale light grey, speckled blue grey, granular, thinly bedded, moderately widely spaced fractures, thinly bedded, medium grained sandstone from 24.21m to 24.31m. Clasts are medium gravel sized, sub-rounded, of siltstone, sandstone and quartz. Clast supported.				99	92	
				24.46								
				25.0		CONGLOMERATE, coarse grained, pale light grey, speckled blue grey, granular, medium bedded, closely spaced to moderately widely spaced fractures. Clasts are coarse gravel sized, sub-rounded, of siltstone, sandstone and quartz, clast supported, medium grained sandstone band from 25.41m to 25.56m.						22.59-27.84 m; DI, 5°, S, R, O, Z
				26.0								
				26.39		CONGLOMERATE, coarse grained, pale light grey, speckled blue grey, granular, medium bedded, closely spaced to widely spaced fractures. Clasts are fine to coarse gravel sized, sub-rounded, of siltstone, sandstone, phyllite and quartz. Clast supported. Thin beds of siltstone from 27.88m to 27.95m and 28.19m to 28.24m.				100	78	26.64m, Is50 = 0.24 MPa
				27.0								
				28.0								27.89 m; B, 7°, P, S, O, Z
				28.46		CONGLOMERATE, coarse grained, light brown matrix with grey clasts, granular, medium bedded, closely to moderately widely spaced fractures. Clasts are coarse gravel sized, sub-rounded, of siltstone, sandstone and quartz, with some medium gravel clasts. Clast supported.						28.21 m; DI, 6°, S, R, O, Z 28.30 m; DI, 6°, S, R, O, Z
				29.0								28.56 m; DI, 66°, S, R, O, Z
				30.0						100	90	28.89 m; J, 89°, S, R, O, Z 28.94 m; DI, 10°, S, R, O, Z 29.7m, Is50 = 0.43 MPa

### Comments:

1) Drilled from floating barge - all depths measured from river bed level. 2) Note: the coring method used was NQ3 not NM/C. 3) Borehole grouted on completion.

Water First Noted Water Steady Level

Defects - 1.54m : F, 60°, P, R, O, C									
Depth (m)	Type	Dip (deg)	Planarity	Roughness	Aperture	Width	Frequency	Remarks	Notes
	B - Bedding		C - Curvilinear	L - Slickensides	C - Closed	C - Clay			
	F - Foliation		D - Discontinuous	P - Polished	F - Filled	F - Iron Oxide			
	H - Schistosity		P - Planar	R - Rough	N - Clean	K - Calcite			
	J - Joint		S - Subplanar	S - Smooth	O - Open	L - Limonite			
	L - Cleavage		T - Stepped	V - Very rough	S - Silty	Q - Quartz			
	R - Fracture		U - Undulating			S - Secondary mineral			
	S - Shear zone					U - Unidentified mineral			
	T - Contact					W - Weathered rock			
	V - Vein					X - Carbonaceous			
	Z - Decomposed Zone					Z - Clean			
	DI - Drilling Induced break								

Weathering Grades	
RS - Residual Soil	
XW - Extremely weathered	
DW - Distinctly weathered	
SW - Slightly weathered	
FR - Fresh	
Rock Strength	
VW - Very weak	
W - Weak	
MS - Medium strong	
S - Strong	
VS - Very strong	
ES - Extremely strong	

Samples	
U50	
SPT	
Disturbed Sample	

Approved:  
Date:



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## BOREHOLE RECORD SHEET

Location Number: BH 313

Project Number: 110-12936

Project Name: Cross River Rail

Location: Brisbane

Client: AECOM

Date: 04/01/2012

Page: 4 OF 6

Easting: 503210 Northing: 6960934 RL: -5.76 m  
Logger: DA/DT Operator: DA Machine: Scout 2

Drilling Method				Depth	Graphic	Description	Weathering	Strength Estimated RS W X US S VS ES	Defect Spacing 20 60 200 600	Rec (%)	RQD	Samples and Remarks
TC	WB	RR	NMLC									
				31.0	31.02	CONGLOMERATE, coarse grained, light brown matrix with grey clasts, granular, medium bedded, closely to moderately widely spaced fractures. Clasts are coarse gravel sized, sub-rounded, of siltstone, sandstone and quartz, with some medium gravel clasts. Clast supported. (continued)	FR			100	90	29.08-30.95 m; DI, 7°, S, R, O, Z
				32.0		SANDSTONE, fine grained, pale grey, granular, thinly bedded, closely spaced to moderately widely spaced fractures, with some siltstone and coal laminae.						31.21 m; BDI, 3°, P, S, O, Z 31.30 m; BDI, 3°, P, S, O, Z 31.35 m; J, 50°, P, S, O, Z
				32.61								31.8m, Is50 = 1.89 MPa
				33.0		Interlaminated MUDSTONE and SILTSTONE, fine grained, alternating dark grey and pale grey/white grey, cryptocrystalline, thinly laminated, fragmented to widely spaced fractures, with some fine grained sandstone laminae and quartz veins. Fine gravel conglomerate band from 37.97m to 38.0m, and medium to coarse gravel conglomerate band from 39.2m to 39.4m.						31.46-32.62 m; DI, 3°, P, S, O, Z
				34.0								32.74 m; J, 60°, P, R, O, Z 32.86 m; B, 3°, P, S, O, Z 32.95 m; J, 36°, P, S, O, Z
				35.0								33.03-33.24 m; B, 2°, P, S, O, Z 33.31 m; J, 60°, P, S, O, Z 33.36 m; J, 80°, P, S, O, Z
				36.0								34.55m, Is50 = 0.84 MPa
				37.0								36.08 m; J, 38°, P, S, O, Z 36.17 m; J, 19°, P, R, O, Z 33.34-39.17 m; B, 2°, P, S, O, Z
				38.0								36.27 m; J, 46°, P, R, O, Z 36.40 m; J, 45°, P, S, O, Z 36.76m, Is50 = 1.34 MPa
				39.0								37.3m, Is50 = 0.95 MPa
				39.75								39.25 m; DI, 4°, S, R, O, Z 39.41 m; J, 17°, P, S, O, Z 39.45 m; B, 8°, P, S, O, Z 39.58 m; B, 6°, P, S, O, Z
				40.0								39.78 m; J, 50°, P, R, O, Z

### Comments:

1) Drilled from floating barge - all depths measured from river bed level. 2) Note: the coring method used was NQ3 not NMLC. 3) Borehole grouted on completion.

Water First Noted Water Steady Level

Defects - 1.54m : F, 60°, P, R, O, C											
Depth (m)	Type	Dip (deg)	Planarity	Roughness	Aperture	Width	Frequency	Continuity	Polished	Filled	Notes
	B - Bedding		C - Curvilinear	L - Slickensides	C - Closed	C - Clay					
	C - Clay seam		D - Discontinuous	P - Polished	F - Filled	F - Iron Oxide					
	F - Foliation		P - Planar	R - Rough	N - Clean	K - Calcite					
	H - Schistosity		S - Subplanar	S - Smooth	O - Open	L - Limonite					
	J - Joint		T - Stepped	V - Very rough	S - Stain	Q - Quartz					
	L - Cleavage		U - Undulating			S - Secondary mineral					
	R - Fracture					U - Unidentified mineral					
	S - Shear zone					W - Weathered rock					
	T - Contact					X - Carbonaceous					
	V - Vein					Z - Clean					
	Z - Decomposed zone										
	DI - Drilling induced break										

Weathering Grades	
RS - Residual Soil	
XW - Extremely weathered	
DW - Distinctly weathered	
SW - Slightly weathered	
FR - Fresh	
Rock Strength	
VW - Very weak	
W - Weak	
MS - Medium strong	
S - Strong	
VS - Very strong	
ES - Extremely strong	

Samples	
U50	
SPT	
Disturbed Sample	

Approved:  
Date:





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## BOREHOLE RECORD SHEET

Location Number: BH 313

Project Number: 110-12936

Project Name: Cross River Rail

Location: Brisbane

Client: AECOM

Date: 04/01/2012

Easting: 503210 Northing: 6960934 RL: -5.76 m

Logger: DA/DT Operator: DA Machine: Scout 2

Page: 5 OF 6

Drilling Method				Depth	Graphic	Description	Weathering	Strength Estimated kN/m <sup>2</sup> / kPa	Defect Spacing mm	Rec (%)	RQD	Samples and Remarks
TC	WB	RR	NMLC									
				41.0		CONGLOMERATE, coarse grained, pale light grey, speckled blue grey, granular, thinly bedded, closely to moderately widely spaced fractures. Clasts are fine gravel sized, sub-rounded, of siltstone, sandstone and quartz, with some medium gravel clasts. Clast supported. Phyllite with quartz laminations from 40.53m to 40.57m. (continued)	FR			100	57	40.07 m; DI, 8°, P, R, O, Z 40.29 m; DI, 2°, S, R, O, Z 40.4m, Is50 = 0.75 MPa 40.35 m; DI, 11°, S, R, O, Z 40.53 m; T, 18°, P, S, O, Z 40.55 m; F, 23°, P, S, O, Z 40.71 m; J, 35°, P, R, O, Z
				41.23		Interlaminated MUDSTONE and SILTSTONE, fine grained, alternating dark grey and pale grey/white grey, cryptocrystalline, thinly laminated, closely to moderately widely spaced fractures, with some fine grained sandstone laminae, with a mudstone band from 41.65m to 41.85m.				100	51	41.18 m; DI, 8°, S, R, O, Z 41.23 m; DI, 5°, S, V, O, Z 41.42 m; J, 34°, P, R, O, Z 41.25-42.09 m; B, 7°, P, S, O, Z 41.90 m; J, 73°, S, R, O, Z
				42.0		CONGLOMERATE, coarse grained, pale light grey, speckled blue grey, granular, closely spaced fractures, thinly bedded. Clasts are coarse gravel sized, sub-rounded, of siltstone, sandstone and quartz, some medium gravel clasts, clast supported.						42.25 m; J, 56°, P, R, O, Z 42.4m, Is50 = 0.5 MPa
				42.08								
				42.56								
				43.0								43.08 m; J, 70°, S, R, O, Z
						CONGLOMERATE, coarse grained, pale light grey, speckled blue grey, granular, medium to thickly bedded, closely to widely spaced fractures. Clasts are fine gravel sized, sub-rounded, of siltstone, sandstone and quartz, some medium gravel clasts, clast supported, with some thin fine sandstone and siltstone beds.				100	83	43.60 m; J, 50°, S, R, O, Z 42.30-46.38 m; DI, 2°, S, R, O, Z 44.45m, Is50 = 0.45 MPa
				44.0								45.12 m; B, 6°, P, S, O, Z
												45.93 m; J, 15°, P, S, O, Z 46.3m, Is50 = 1.39 MPa
				46.0								
				46.74								46.78 m; B, 4°, P, R, O, Z 46.80 m; J, 26°, P, S, O, Z
				47.0		Interlaminated MUDSTONE and SILTSTONE, fine grained, alternating dark grey and pale grey, cryptocrystalline, thinly laminated, closely spaced fractures.				100	95	47.20 m; B, 4°, P, S, O, Z 47.45 m; J, 50°, C, S, O, Z 47.74 m; DI, 15°, S, R, O, Z
				47.27								48.24 m; J, 14°, P, S, O, Z 48.37 m; J, 21°, P, S, O, Z 48.48m, Is50 = 1.47 MPa
				47.83		CONGLOMERATE, coarse grained, pale light grey, speckled blue grey, granular. Clasts are fine gravel sized, of siltstone, sandstone and quartz, some medium gravel clasts, clast supported.						47.96-49.47 m; B, 2°, P, S, O, Z
				48.0		Interlaminated MUDSTONE and SILTSTONE, fine grained, alternating dark grey and pale grey, cryptocrystalline, thinly laminated, closely to moderately widely spaced fractures, with some fine grained sandstone laminae.						49.15m, Is50 = 0.35 MPa
				49.0								49.6m, Is50 = 1.46 MPa
				49.49						100	79	49.71 m; F, 44°, P, R, O, Z
				50.0								

### Comments:

1) Drilled from floating barge - all depths measured from river bed level. 2) Note: the coring method used was NQ3 not NMLC. 3) Borehole grouted on completion.

Water First Noted Water Steady Level

### Defects - 1.54m : F, 60°, P, R, O, C

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

### Weathering Grades

RS - Residual Soil
XW - Extremely weathered
DW - Distinctly weathered
SW - Slightly weathered
FR - Fresh
Rock Strength
VW - Very weak
W - Weak
MS - Medium strong
S - Strong
VS - Very strong
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### Samples

U50
SPT
Disturbed Sample

Approved:  
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## BOREHOLE RECORD SHEET

Location Number: BH 313

Project Number: 110-12936

Project Name: Cross River Rail

Location: Brisbane

Client: AECOM

Date: 04/01/2012

Easting: 503210 Northing: 6960934 RL: -5.76 m

Logger: DA/DT Operator: DA Machine: Scout 2

Page: 6 OF 6

Drilling Method				Depth	Graphic	Description	Weathering	Strength Estimated	Defect Spacing	Rec (%)	RQD	Samples and Remarks
TC	WB	RR	NMLC									
				51.0		Interbedded SANDSTONE and CONGLOMERATE, medium to coarse grained, pale grey speckled blue grey and dark grey, granular, medium to thickly interbedded, closely spaced to moderately widely spaced fractures. Conglomerate has metasediments present throughout including quartzite and phyllite. (continued)	FR			100	79	50.44 m; J, 76°, S, R, O, Z 50.47 m; T, 19°, P, S, O, Z 50.58 m; J, 75°, S, R, O, Z 50.72m, Is50 = 1.05 MPa 50.80 m; T, 40°, C, R, O, Z 50.94 m; DI, 80°, S, R, O, Z 51.07 m; J, 31°, P, R, O, Z  51.45m, Is50 = 0.91 MPa
				52.0								52.25m, Is50 = 2.13 MPa
				53.0						100	80	52.65 m; T, 37°, P, S, O, Z 51.30-54.15 m; DI, 4°, S, R, O, Z 52.83 m; F, 30°, P, S, O, Z
				54.0								53.65m, Is50 = 0.62 MPa 53.56 m; J, 46°, P, R, O, Z
				54.30		BOREHOLE BH 313 TERMINATED AT 54.30 m						54.10 m; J, 87°, U, R, O, Z
				55.0								
				56.0								
				57.0								
				58.0								
				59.0								
				60.0								

### Comments:

1) Drilled from floating barge - all depths measured from river bed level. 2) Note: the coring method used was NQ3 not NMLC. 3) Borehole grouted on completion.

Water First Noted Water Steady Level

Defects - 1.54m : F, 60°, P, R, O, C									
Depth (m)	Type	Dip (deg)	Planarity	Roughness	Aperture	Fill	Notes	Notes	Notes
	B - Bedding		C - Curvilinear	L - Slickensides	C - Closed	C - Clay			
	C - Clay seam		D - Discontinuous	P - Polished	F - Filled	P - Iron Oxide			
	F - Foliation		P - Planar	R - Rough	N - Clean	K - Calcite			
	H - Schistosity		S - Subplanar	S - Smooth	O - Open	L - Limonite			
	J - Joint		T - Stepped	V - Very rough	S - Stain	Q - Quartz			
	L - Cleavage		U - Undulating			S - Secondary mineral			
	R - Fracture					U - Unidentified mineral			
	S - Shear zone					W - Weathered rock			
	T - Contact					X - Carbonaceous			
	V - Vein					Z - Clean			
	Z - Decomposed Zone								
	DI - Drilling induced break								

Weathering Grades	
RS - Residual Soil	
XW - Extremely weathered	
DW - Distinctly weathered	
SW - Slightly weathered	
FR - Fresh	
Rock Strength	
VW - Very weak	
W - Weak	
MS - Medium strong	
S - Strong	
VS - Very strong	
ES - Extremely strong	

Samples	
U50	
SPT	
Disturbed Sample	

Approved:  
Date:





TITLE

AECOM  
Brisbane  
Cross River Rail  
Core Photo - BH 313

DRAWN

DT

DATE

26/04/2012

CHECKED

CB

DATE

26/04/2012

SCALE

Not To Scale

A4

PROJECT No

110-12936

FIGURE No

1/1



## IN-SITU PACKER PERMEABILITY TEST RESULT

**PROJECT:** **CRR**  
**PROJECT No.:** **110-12936**

**BH No.:** **313**  
**Test No.:** **1**  
**Date:** **4/01/2012**

Packer type: Double  
Packer pressure: 2000kPa  
Gauge pressures measured in: kPa  
Tested by: CS

Vertical depth to:  
(below river bed)

Top of test section (m):	33.00
Base of test section (m):	35.50
Centre of test section(m):	34.25
Base of casing (m):	32.00
Ground water (m)	TIDAL

Depth of centre of test section (m):	34.25
Length of test section (m):	2.50

Gauge Height above ground level (m):	
Hole Diameter in test section (mm)	75

1st period	Time (mins)	0	5	10	15	Average
Gauge Pressure 100	Flow reading	895.0	895.5	896.2	897.5	Flow (l/min)
	Water Take	0.00	0.50	0.70	1.30	0.167
2nd period	Time (mins)	0	5	10	15	Average
Gauge Pressure 200	Flow reading	902.0	903.0	903.0	903.0	Flow (l/min)
	Water Take	0.00	1.00	0.00	0.00	0.067
3rd period	Time (mins)	0	5	10	15	Average
Gauge Pressure 300	Flow reading	903.2	903.5	903.5	903.5	Flow (l/min)
	Water Take	0.00	0.30	0.00	0.00	0.020
4th period	Time (mins)	0	5	10	15	Average
Gauge Pressure 200	Flow reading	903.5	903.5	903.5	903.5	Flow (l/min)
	Water Take	0.00	0.00	0.00	0.00	0.000
5th period	Time (mins)	0	5	10	15	Average
Gauge Pressure 100	Flow reading					Flow (l/min)
	Water Take	0.00	0.00	0.00	0.00	0.000

Period	Flow (q) (l/min)	Gauge Press (kPa)	Gauge Press (m of water)	Friction Loss (m)*		Total Head (m)	Lugeon Value	Perm. (m/s)
				Basic	In extra rods			
1st	0.167	100.00	10.220	0.000	0.000	44.470	0.153	1.67E-08
2nd	0.067	200.00	20.440	0.000	0.000	54.690	0.050	5.42E-09
3rd	0.020	300.00	30.660	0.000	0.000	64.910	0.013	1.37E-09
4th	0.000	200.00	20.440	0.000	0.000	54.690	0.000	0.00E+00
5th	0.000	100.00	10.220	0.000	0.000	44.470	0.000	0.00E+00

\*Where friction loss is assumed to be negligible.

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

Note - zero flow in period 4 - test ended

## IN-SITU PACKER PERMEABILITY TEST RESULT

**PROJECT:** CRR  
**PROJECT No.:** 110-12936

**BH No.:** 313  
**Test No.:** 2  
**Date:** 4/01/2012

Packer type: Double  
Packer pressure: 2000kPa  
Gauge pressures measured in: kPa  
Tested by: CS

Vertical depth to:  
(below river bed)

Top of test section (m):	23.50
Base of test section (m):	25.50
Centre of test section(m):	24.50
Base of casing (m):	22.50
Ground water (m)	TIDAL

Depth of centre of test section (m):	24.50
Length of test section (m):	2.00

Gauge Height above ground level (m):	
Hole Diameter in test section (mm)	75

1st period	Time (mins)	0	5	10	15	Average
Gauge Pressure 100	Flow reading	910.0	914.0	919.0	924.0	Flow (l/min)
	Water Take	0.00	4.00	5.00	5.00	0.933
2nd period	Time (mins)	0	5	10	15	Average
Gauge Pressure 200	Flow reading	930.5	936.5	939.0	939.9	Flow (l/min)
	Water Take	0.00	6.00	2.50	0.90	0.627
3rd period	Time (mins)	0	5	10	15	Average
Gauge Pressure 300	Flow reading	941.0	944.0	949.0	951.0	Flow (l/min)
	Water Take	0.00	3.00	5.00	2.00	0.667
4th period	Time (mins)	0	5	10	15	Average
Gauge Pressure 200	Flow reading	951.5	954.0	958.0	958.0	Flow (l/min)
	Water Take	0.00	2.50	4.00	0.00	0.433
5th period	Time (mins)	0	5	10	15	Average
Gauge Pressure 100	Flow reading	958.5	961.0	963.0	971.0	Flow (l/min)
	Water Take	0.00	0.00	2.00	8.00	0.667

Period	Flow (q) (l/min)	Gauge Press (kPa)	Gauge Press (m of water)	Friction Loss (m)*		Total Head (m)	Lugeon Value	Perm. (m/s)
				Basic	In extra rods			
1st	0.933	100.00	10.220	0.000	0.000	34.720	1.373	1.42E-07
2nd	0.627	200.00	20.440	0.000	0.000	44.940	0.712	7.34E-08
3rd	0.667	300.00	30.660	0.000	0.000	55.160	0.617	6.37E-08
4th	0.433	200.00	20.440	0.000	0.000	44.940	0.493	5.08E-08
5th	0.667	100.00	10.220	0.000	0.000	34.720	0.981	1.01E-07

\*Where friction loss is assumed to be negligible.

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

Note - zero flow in period 4 - test ended