Appendix E1 – Soils and Contaminated Land



Gladstone Area Water Board



Department of Main Roads

Queensland Government Department of CENTRAL QUEENSLAND GEOTECHNICAL UNIT 216 Richardson Road North Rockhampton Phone 4923 0712 Facsimile 4923 0753

Pro	ject:	: Gladstone-Fitzroy Water Pipeline		Pit No: TP40		
		Yarwun to Ambrose t type: Backhoe - 600mm Bucket		Easting: 291633 Elevation:	Northing: 7367870	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES		SAND NOTES	
	ZL CL	Silty Loam (TOPSOIL) - ALLUVIUM low plasticity, grey, organic matter, dry to moist, no structure Clay Loam, gravelly - Possibly RESIDUAL low to medium plasticity, orange-brown & brown, fine to medium gravel, dry to moist, moderate-strength				
1.0		- very strong (tending to weathered substrate)		PP >600kPa		
		MetaSiltstone - RESIDUAL extremely weathered, low to medium strength, grey, fractures at 20- 60mm spacings				
2.0						
		Pit Refusal @ 2.6m				
3.0						
	Groundwater: nil			Logged by: MRE Date: 14/09/07		_
geoteo <i>Edition</i>	chnical 1 (1990	Log record has been transcribed from the original Queensland Department of M "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i> D), by Golder Associates Pty Ltd. Soil descriptions are based on original classific ances by inspection of relevant soil samples.	Survey 2nd	Transcribed by: HEI	Р	



Golder Associates Test Pit Log Queensland Department of Main Roads CENTRAL QUEENSLAND GOVERNMENT Department of Main Roads CENTRAL QUEENSLAND GEOTECHNICAL UNIT 216 Richardson Road North Rockhampton Rockhampton Phone 4923 0712 Facsimile 4923 0753

_				Priorie 4923 0712 Facsimile 4923 0753	
Pro	ject:	: Gladstone-Fitzroy Water Pipeline		Pit No: TP43	
		Yarwun to Ambrose		Easting: 290407 Northing: 7368777	
Equip	oment	t type: Backhoe - 600mm Bucket		Elevation:	
Ê	0	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour,	l		l
DEPTH (m)	st SC	secondary components, moisture, consistency / structure.	SAMPLES	TESTS AND NOTES	l
Б	Aust	ROCK DESCRIPTION: lithology, colour, structure, weathering, strength,			
	Ĺ	defects.	<u> </u>		
	ZL	Silty Loam (TOPSOIL) - ALLUVIUM		1	
		low plasticity, grey, organic matter, dry to moist, no structure		1	
			l	1	
	-	MetaSiltstone - RESIDUAL	l	1	
		extremely weathered, low to medium strength, grey, fractures at 20- 100mm spacings	l	1	['
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			l	1	
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1.0			l		\vdash
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		- distinctly weathered, medium strength, grey with purple-black staining in defects,	l		
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3.0			J	·'	
		Pit Terminated @ 3.0m	l		<u> </u>
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_				Logged by: MRE	
Groun	Idwate	ər: nil		Date:14/09/07	
This To	est Pit	Log record has been transcribed from the original Queensland Department of M	ain Roads	Date. 14/09/07	
geotec	chnical	"Pit Log" record, into terminology consistent with The Australian Soil and Land	Survey 2nd	Transcribed by: HEP	
		by Golder Associates Pty Ltd. Soil descriptions are based on original classific ances by inspection of relevant soil samples.	ation supported		



Department of Main Roads

Proj	ject:	: Gladstone-Fitzroy Water Pipeline		Pit No: TP48	
		Ambrose to Epala t type: Backhoe - 600mm Bucket		Easting: 288501 Northing: 7370402 Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	MC	Medium Clay - ALLUVIUM medium plasticity, some sand, pale brown, just moist, very strong		PP >600kPa	
		MetaSiltstone extremely weathered, extremely low strength, interbedded with weathered, silty gravel bands (highly fractured)			
1.0					
		MetaSiltstone distinctly weathered, medium to high strength (massive)			
2.0				-	
		Refusal @ 2.0m		-	
				-	
3.0					
Groun	ndwate	er: nil		Logged by: JPT Date: 12/09/07	
geotec Edition	hnical (1990	Log record has been transcribed from the original Queensland Department of M "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i> 0), by Golder Associates Pty Ltd. Soil descriptions are based on original classific inces by inspection of relevant soil samples	Survey 2nd	Transcribed by: HEP	



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Project: Gladstone-Fitzroy Water Pipeline Pit No: TP49 Easting: 288051 Location: Ambrose to Epala Northing: 7370669 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency / structure. DEPTH (SAMPLES TESTS AND NOTES Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects. MC Medium Clay - ALLUVIUM medium plasticity, pale brown, just moist, strong very strong PP >600kPa 1.0 PP >600kPa very pale brown (bleached zone) PP >600kPa 2.0 PP=550kPa 3.0 Pit Terminated @ 3.0m Logged by: JPT Groundwater: nil Date: 12/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Transcribed by: HEP *Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples.



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Project: Gladstone-Fitzroy Water Pipeline			Pit No: TP50			
		Ambrose to Epala t type: Backhoe - 600mm Bucket		Easting: 287524 Elevation:	Northing: 7370957	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES		S AND NOTES	
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, pale brown mottled grey, moist, strong				
				PP >600kPa		
1.0		- grey mottled brown		PP >600kPa		
		pale brown mottled grey, dry				
2.0						
3.0		Pit Terminated @ 3.0m				
				Logged by: JPT		
	ndwate	er: nil Log record has been transcribed from the original Queensland Department of N	1ain Roads	Date: 12/09/07		
geoteo Edition	chnical 1 (1990	"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i> "), by Golder Associates Pty Ltd. Soil descriptions are based on original classific nces by inspection of relevant soil samples.	Survey 2nd	Transcribed by: HE	P	



Test Pit Log

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Queensland Government Rockhampton

Phone 4923 0712 Facsimile 4923 0753 Project: Gladstone-Fitzroy Water Pipeline Pit No: TP51 Location: Ambrose to Epala Easting: 287159 Northing: 7371377 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency / structure. DEPTH (SAMPLES TESTS AND NOTES Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects. MC Medium Clay - ALLUVIUM medium plasticity, pale brown, dry, strong PP >600kPa - traces of gravel, very strong 1.0 PP >600kPa мнс Medium Heavy Clay high plasticity fines, pale brown mottled grey, some sand, moist, very PP >600kPa strong 2.0 PP >600kPa 3.0 Pit Terminated @ 3.0m Logged by: JPT Groundwater: nil Date: 12/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Transcribed by: HEP Edition (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples



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Project: Gladstone-Fitzroy Water Pipeline Pit No: TP52 Easting: 286802 Location: Ambrose to Epala Northing: 7371844 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency / structure. DEPTH (SAMPLES TESTS AND NOTES Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects. MC Medium Clay - ALLUVIUM medium plasticity, pale brown, just moist, strong MHC Medium Heavy Clay medium to high plasticity, some sand, dark brown, moist, very strong PP >600kPa 1.0 - brown mottled grey PP >600kPa MC Medium Clay - Possibly RESIDUAL PP=550kPa medium plasticity, trace sand, orange-brown, just moist, strong 2.0 - trace of gravel 3.0 Pit Terminated @ 3.0m Logged by: JPT Groundwater: nil Date: 12/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Transcribed by: HEP Edition (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported n some instances by inspection of relevant soil samples



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Pro	ject:	: Gladstone-Fitzroy Water Pipeline		Pit No: TP53	
		Ambrose to Epala t type: Backhoe - 600mm Bucket		Easting: 286424 Northing: 7372206 Elevation:	
DEPTH (m)	t sc	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
		Medium Clay - ALLUVIUM medium plasticity, pale brown, just moist, strong			
		- pale brown, moist, moderate strength		PP=250kPa	
1.0		Medium Heavy Clay high plasticity fines, pale brown mottled red-brown, some sand, moist, very strong		- - PP >600kPa	
				PP >600kPa	
2.0					-
				PP >600kPa	
3.0	 	Pit Terminated @ 3.0m			
	ndwate	er: nil Log record has been transcribed from the original Queensland Department of M	Main Roads	Logged by: JPT Date: 12/09/07	
geoteo Edition	chnical ' 1 (1990	"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i>)), by Golder Associates Pty Ltd. Soil descriptions are based on original classific inces by inspection of relevant soil samples.	Survey 2nd	Transcribed by: HEP	



Test Pit Log	
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 216 Richardson Road North

 Rockhampton
 Phone 4923 0712 Facsimile 4923 0753

Pro	ject:	: Gladstone-Fitzroy Water Pipeline		Pit No: TP54	
		Epala to Raglan t type: Backhoe - 600mm Bucket		Easting: 286089 Northing: 7372499 Elevation:	
DEPTH (m)	0	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	MC	Medium Clay - ALLUVIUM medium plasticity, pale brown, just moist, strong		PP=215kPa	
1.0	-	Medium Heavy Clay high plasticity fines, pale brown mottled grey, some sand, moist, moderate - strong		PP=315kPa	
		- very strong		PP >600kPa	
				PP=565kPa	
2.0				PP=540kPa	
				PP=550kPa	
3.0		Pit Terminated @ 3.0m			
	•				
				-	
	ndwate			Logged by: JPT Date: 12/09/07	
geoteo Edition	chnical ' <i>n</i> (1990	Log record has been transcribed from the original Queensland Department of M "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i> D), by Golder Associates Pty Ltd. Soil descriptions are based on original classific inces by inspection of relevant soil samples.	Transcribed by: HEP		



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Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP55	
		Epala to Raglan type: Backhoe - 600mm Bucket		Easting: 285702 Northing: 7372900 Elevation:	
DEPTH (m)	0	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	MC	Medium Clay - ALLUVIUM			
		medium plasticity, pale brown, just moist, strong			
	мнс	Medium Heavy Clay			
	_	high plasticity fines, dark brown, some sand, just moist, very strong		PP >600kPa	
1.0					
				PP >600kPa	
	MC	Medium Clay - Possibly RESIDUAL medium plasticity, brown mottled grey, moist, trace of gravel			
		medium plasticity, brown mottled grey, moist, trace of gravel		PP >600kPa	
2.0					
		more gravel (>50%), pale brown mottled red & grey, dry			
0.0					
3.0		Pit Terminated @ 3.0m			
				Logged by: JPT	
Grour	ndwate	r: nil			
				Date: 12/09/07	
		Log record has been transcribed from the original Queensland Department of M "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i>			
Editior	n (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classific nees by inspection of relevant soil samples		Transcribed by: HEP	



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Projec	t: Gladstone-Fitzroy Water Pipeline		Pit No: TP56	
	: Epala to Raglan ent type: Backhoe - 600mm Bucket		Easting: 285453 Northing: 7373312 Elevation:	
DEPTH (m)	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
M [*]	C Medium Clay - ALLUVIUM medium plasticity, pale brown, just moist, strong			
	- dark brown, very strong			
			PP >600kPa	
1.0	modium to high placticity, polo brown motified gray, maint		PP >600kPa	
	- medium to high plasticity, pale brown mottled grey, moist		rr ~uuunra	
			PP >600kPa	
2.0				
			PP >600kPa	
			PP >600kPa	
3.0	Pit Terminated @ 3.0m			
Grounder	ater: nil		Logged by: JPT	
geotechnic Edition (19	ater: nil Pit Log record has been transcribed from the original Queensland Department of M al "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i> 90), by Golder Associates Pty Ltd. Soil descriptions are based on original classific stances by inspection of relevant soil samples.	Survey 2nd	Date: 12/09/07 Transcribed by: HEP	
in some ins	stances by inspection of relevant soil samples.			



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Project: Gladstone-Fitzroy Water Pipeline Pit No: TP57 Easting: 285195 Location: Epala to Raglan Northing: 7373744 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency / structure. DEPTH (SAMPLES TESTS AND NOTES Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects. MC Medium Clay - RESIDUAL medium plasticity, pale brown, just moist, strong 1.0 PP >600kPa very strong PP=450kPa 2.0 MC Medium Clay medium plasticity, pale brown mottled grey, trace of gravel, moist, strong 3.0 Pit Terminated @ 3.0m Logged by: JPT Groundwater: nil Date: 12/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Transcribed by: HEP Edition (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples.



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Proje	ect:	Gladstone-Fitzroy Water Pipeline		Pit No: TP58	
		Epala to Raglan type: Backhoe - 600mm Bucket		Easting: 284868 Northing: 7374184 Elevation:	
DEPTH (m)	0	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	MC	Medium Clay - RESIDUAL medium to high plasticity, some sand, pale brown, moist, very strong		PP >600kPa	
1.0		- medium plasticity, red-brown, strong		PP=450kPa	
		- medium to high plasticity fines, some gravel, brown mottled grey, dry		-	
2.0	LMC	Light Medium Clay low to medium plasticity fines, pale brown, dry, very strong			
		Pit Terminated @ 3.0m		Logged by: JPT	
geotech <i>Edition</i>	st Pit I nical ' (1990	er: nil Log record has been transcribed from the original Queensland Department of M "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i>)), by Golder Associates Pty Ltd. Soil descriptions are based on original classific nees by inspection of relevant soil samples.	Survey 2nd	Date: 13/09/07 Transcribed by: HEP	



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Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP59	
		Epala to Raglan type: Backhoe - 600mm Bucket		Easting: 284621 Northing: 7374537 Elevation:	
DEPTH (m)	0	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	MC	Medium Clay - RESIDUAL medium to high plasticity, some sand, pale brown, moist, very strong			
		- medium plasticity, red-brown, strong		PP=450kPa	
1.0					
	LMC	Light Medium Clay			
	Linio	low to medium plasticity fines, pale brown, dry, very strong			
2.0		MetaSiltstone		•	
		extremely weathered, low strength, grey.			
		Refusal @ 2.4m			
3.0					
0.0					
				Logged by: JPT	
Grour	ndwate	er: nil		Date: 13/09/07	
geotec	hnical '	Log record has been transcribed from the original Queensland Department of M "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i>), by Golder Associates Pty Ltd. Soil descriptions are based on original classific	Survey 2nd	Transcribed by: HEP	
in som	e insta	nces by inspection of relevant soil samples.		1	



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Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP60)	
		Epala to Raglan t type: Backhoe - 600mm Bucket		Easting: 284346 Elevation:	Northing: 7374894	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES		S AND NOTES	
	MC	Medium Clay - RESIDUAL medium plasticity, pale brown, some sand & gravel, just moist, strong				
1.0						
2.0						
	MC	Medium Clay medium plasticity, pale brown mottled grey, moist, trace of gravel				
3.0						
		Pit Terminated @ 3.0m				
				Logged by: JPT		
	ndwate			Date: 13/09/07		
geoteo Editior	hnical (1990	Log record has been transcribed from the original Queensland Department of M "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i>)), by Golder Associates Pty Ltd. Soil descriptions are based on original classific inces by inspection of relevant soil samples.	Survey 2nd	Transcribed by: HE	ΞP	



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Phone 4923 0712 Facsimile 4923 0753 Project: Gladstone-Fitzroy Water Pipeline Pit No: TP61 Location: Epala to Raglan Easting: 283936 Northing: 7375088 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency / structure. DEPTH SAMPLES TESTS AND NOTES Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects МС Medium Clay - Possibly RESIDUAL medium plasticity, some sand, pale brown, just moist, strong Gravel (Band) - Possibly RESIDUAL medium to coarse, medium plasticity fines, dark brown, dry, minor clay (structure less) 1.0 LMC Light Medium Clay - RESIDUAL medium plasticity fines, medium to coarse gravel, pale brown, just moist, strong MHC Medium Heavy Clay high plasticity, some sand, red-brown, minor gravel, very strong PP >600kPa 2.0 LMC Light Medium Clay medium plasticity fines, medium to coarse gravel (50%) with cobbles, pale brown, just moist 3.0 Pit Terminated @ 3.0m Logged by: JPT Groundwater: nil Date: 13/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Transcribed by: HEP Edition (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples



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Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP62	-
Loca	tion:	Epala to Raglan t type: Backhoe - 600mm Bucket		Easting: 283449 Northing: 7375147 Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
		Mudstone / Claystone - RESIDUAL extremely weathered, extremely low strength, brown			
1.0		- becoming distinctly weathered, massive			
		Refusal @ 1.5m			
2.0					
3.0					
				Loggod by: IPT	
Grour This T		er: nil Log record has been transcribed from the original Queensland Department of M	lain Roads	Logged by: JPT Date: 13/09/07	
geoteo Edition	chnical 1 (1990	"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i> D), by Golder Associates Pty Ltd. Soil descriptions are based on original classific inces by inspection of relevant soil samples.	Survey 2nd	Transcribed by: HEP	



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Pro	ject:	: Gladstone-Fitzroy Water Pipeline		Pit No: TP63	
		Epala to Raglan t type: Backhoe - 600mm Bucket		Easting: 282963 Northing: 7375227 Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	ZL	Silty Loam - ALLUVIUM			
		low plasticity, grey-brown, dry, friable, weak			
	ZCL	Silty Clay Loam - Possibly RESIDUAL low to medium plasticity, orange-brown, just moist, moderate strength		PP=280kPa	
	1	iow to medium plasticity, orange brown, just moist, moderate salengar			
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1.0	1				
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	1	· · · · · · · · · · · · · · · · · · ·			
	1	- mottled orange-brown & grey			ļ
	1			PP=280kPa	
	1				
	1				
	1	- pale orange-brown			
2.0	1				
	1				
	1				
	1				
	1				
	1				
	1				
	1				
2.0	1				
3.0		Pit Terminated @ 3.0m			
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	1				
	1				
	1				
	1				
	1				
			<u>. </u>	Logged by: MRE	
Grour	dwate	۶۳: nil		Date: 14/09/07	
This Te	est Pit	Log record has been transcribed from the original Queensland Department of M	/ain Roads	Date: 14/03/07	
geotec	hnical	"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i> D), by Golder Associates Pty Ltd. Soil descriptions are based on original classific	Survey 2nd	Transcribed by: HEP	
		inces by inspection of relevant soil samples.			



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Queensland CENTRAL QUEENSLAND GEOTECHNICAL UNIT 216 Richardson Road North Rockhampton Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline Pit No: TP64 Easting: 282456 Location: Epala to Raglan Northing: 7375285 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency / structure. DEPTH (SAMPLES TESTS AND NOTES Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects. Silty Loam - ALLUVIUM ZL low plasticity, grey, dry, friable, weak MC Medium Clay - Possibly RESIDUAL medium plasticity, orange-brown & grey, some fine to medium PP >600kPa gravel, dry-moist, , very strong 1.0 MetaSiltstone - RESIDUAL extremely weathered, very low strength, interbedded with orange-brown clay seams. - medium strength, grey, purple-black staining on defects, fracture spacings 20-60mm 2.0 3.0 Pit Terminated @ 3.0m Logged by: MRE Groundwater: nil Date: 14/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Transcribed by: HEP Edition (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples.



Department of Main Roads

Queensland Government 216 Richardson Road North Rockhampton

Phone 4923 0712 Facsimile 4923 0753 Project: Gladstone-Fitzroy Water Pipeline Pit No: TP65 Location: Epala to Raglan Easting: 281918 Northing: 7375363 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency / structure. DEPTH (SAMPLES TESTS AND NOTES Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects. LC Light Clay - RESIDUAL low plasticity, brown, dry, strong (completely weathered rock) MetaSiltstone - RESIDUAL extremely weathered, very low strength, interbedded with red-brown clay seams, fracture spacing 20-60mm. 1.0 - medium strength, grey, purple-black staining on defects, fracture spacings 20-60mm 2.0 3.0 Pit Terminated @ 3.0m Logged by: MRE Groundwater: nil Date: 14/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Transcribed by: HEP Edition (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported n some instances by inspection of relevant soil samples



Golder Associates Test Pit Log Queensland Department of Main Boots CENTRAL QUEENSLAND GOVERNMENT Department of Main Boots CENTRAL QUEENSLAND GEOTECHNICAL UNIT 216 Richardson Road North Rockhampton Rockhampton Phone 4923 0712 Facsimile 4923 0753

Pro	ject:	: Gladstone-Fitzroy Water Pipeline		Pit No: TP66	
		Epala to Raglan t type: Backhoe - 600mm Bucket		Easting: 281485 Northing: 7375389 Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	ZL	Silty Loam - ALLUVIUM low plasticity, grey, dry, friable, weak			
	ZCL	Silty Clay Loam low plasticity, brown, just moist, weak-moderate			
1.0	LC	Light Clay, gravelly - RESIDUAL medium plasticity, medium gravel, orange-brown & dark grey, dry			
2.0		Claystone extremely weathered, very low strength, orange-brown & black			
		MetaSiltstone extremely weathered, low strength			
3.0		Pit Terminated @ 3.0m			
		Fit Terminated @ 3.0m			
Grour				Logged by: MRE Date: 14/09/07	
geoteo Edition	chnical 1 (1990	Log record has been transcribed from the original Queensland Department of M "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i> D), by Golder Associates Pty Ltd. Soil descriptions are based on original classific inces by inspection of relevant soil samples.	Survey 2nd	Transcribed by: HEP	



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Queensland CENTRAL QUEENSLAND GEOTECHNICAL UNIT 216 Richardson Road North Rockhampton

Phone 4923 0712 Facsimile 4923 0753 Project: Gladstone-Fitzroy Water Pipeline Pit No: TP67 Easting: 280981 Location: Epala to Raglan Northing: 7375459 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency / structure. DEPTH (SAMPLES TESTS AND NOTES Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects. Light Clay - Possibly RESIDUAL LC low plasticity, orange-brown & grey, dry, friable MetaSiltstone Extremely weathered, low strength, grey with black & purple staining on fractures, and intermittent orange-brown & grey clay seams, fracture spacing 20-60mm 1.0 2.0 LMC Light Medium Clay mottled orange-brown & whitish [along western face of pit only], otherwise extremely weathered MetaSiltstone 3.0 Pit Terminated @ 3.0m Logged by: MRE Groundwater: nil Date: 14/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Transcribed by: HEP Edition (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples.



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Pro	ject:	: Gladstone-Fitzroy Water Pipeline		Pit No: TP68	3	
		Epala to Raglan t type: Backhoe - 600mm Bucket		Easting: 280471 Elevation:	Northing: 7375510	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES		S AND NOTES	
	ZCL	Silty Clay Loam - Possibly RESIDUAL low to medium plasticity, orange-brown & grey, dry MetaSiltstone Extremely weathered, low strength, grey, with intermittent orange-brown & grey clay seams (50% weathered gravel).				
		- low to medium strength, fracture spacing 20-60mm				
1.0						
2.0		- distinctly weathered, high strength				
		Refusal @ 2.5m				
3.0						
This T		Log record has been transcribed from the original Queensland Department of M		Logged by: MRE Date: 14/09/07		
Editior	ı (1990	"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i> 0), by Golder Associates Pty Ltd. Soil descriptions are based on original classificances by inspection of relevant soil samples.		Transcribed by: HI	ΞP	



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Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP69	
		Epala to Raglan type: Backhoe - 600mm Bucket		Easting: 279991 Northing: 7375641 Elevation:	
DEPTH (m)	0	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	ZCL	Silty Clay Loam - ALLUVIAL low plasticity, brown, dry, friable, weak			
	MHC	Medium Heavy Clay medium to high plasticity, brown with some grey, moist, weak-moderate			
			D 0.4m	PP=260kPa	
1.0					
			D 1.5m	PP=370kPa	
2.0					
		brown & grey mottled orange-brown, strong			
				PP=400kPa	
			D 2.5m		
3.0					
		Pit Terminated @ 3.0m			
Grour	ndwate	r: nil		Logged by: MRE	
This T	est Pit I	og record has been transcribed from the original Queensland Department of M		Date: 14/09/07	
Edition	n (1990	Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i>), by Golder Associates Pty Ltd. Soil descriptions are based on original classific nees by inspection of relevant soil samples.		Transcribed by: HEP	



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Proj	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP70	
		Epala to Raglan t type: Backhoe - 600mm Bucket		Easting: 279536 Northing: 7375796 Elevation:	
DEPTH (m)	t SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	мнс	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark brown, moist, weak - moderate	D 0.2m		
		- grey & brown	D 0.5m	PP=190kPa	
1.0	1				
			D 1.5m		
		- dark grey/black organic inclusions, moderate strength		PP=235kPa	
2.0					
3.0		- strong		PP=385kPa	
3.0	·	Pit Terminated @ 3.0m			
				-	
Groun	Idwate	ا۱ ۲: nil		Logged by: MRE Date: 14/09/07	
geotect Edition	hnical ' 1990 (Log record has been transcribed from the original Queensland Department of M "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land S</i>)), by Golder Associates Pty Ltd. Soil descriptions are based on original classific nces by inspection of relevant soil samples.	Survey 2nd	Transcribed by: HEP	



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				FIIOHE 4923 0712 Facsimile 4923 0755	
Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP71	
		Epala to Raglan t type: Backhoe - 600mm Bucket		Easting: 279070 Northing: 7376011 Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	LMC	Light Medium Clay - ALLUVIUM low to medium plasticity, mottled pale grey & brown, moist, strong	D 0.0-0.5m		
			D 0.5-1.0m	 PP=565kPa	
			0.0 1.011		
1.0		- trace of fine to medium gravel, very strong	D 1.0-1.5m		
				PP >600kPa	
			D 1.5-2.0m	-	
2.0				-	
		- strong	D 2.0-2.5m	PP=400kPa	
			D 2.5-3.0m	-	
			2 2.0 0.000	PP=370kPa	
3.0		Pit Terminated @ 3.0m			
		Fit Terminated @ 3.0m		-	
				-	
				-	
				-	
	ndwate			Logged by: JPT & MRE Date: 13/09/07	
geoteo <i>Editior</i>	chnical 1 (1990	Log record has been transcribed from the original Queensland Department of M "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i>)), by Golder Associates Pty Ltd. Soil descriptions are based on original classific inces by inspection of relevant soil samples.	Survey 2nd	Transcribed by: HEP	



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		ain koads	Phone 4923 0712	Facsimile 4923 0753	
Project: Glad	Istone-Fitzroy Water Pipeline		Pit No: TP72	2	
Location: Epala t Equipment type: B	o Raglan Backhoe - 600mm Bucket		Easting: 278599 Elevation:	Northing: 7376183	
E SOIL DE seconda	ESCRIPTION: Soil Type - Origin, major characteristics, colour, ary components, moisture, consistency / structure. DESCRIPTION: lithology, colour, structure, weathering, strengt	n, SAMPLES		IS AND NOTES	
low plas	am - ALLUVIAL ticity, brown, some fine to medium gravel	D 0.0-0.2m			
	ay, gravelly sticity, fine to coarse gravel, pale brown	D 2 0.2-0.5m			
low to m	edium Clay - RESIDUAL nedium plasticity, silt, mottled orange-brown & brown, some find um gravel, traces of carbonaceous matter, friable	D 2 0.5-1.0m			
1.0 pale o	orange-brown, medium to coarse gravel	 D 1.0-1.5m			
	of low strength, weathered MetaSiltstone (30%), orange-brow	D 1.5-2.0m			
2.0					
MetaSilt extreme & grey	istone Ily weathered, very low strength, some clay bands, orange-brow	D 2.0-2.5m vn			
		D 2.5-3.0m			
3.0					
	Pit Terminated @ 3.0m				
Groundwater: nil		•	Logged by: JPT Date: 12/09/07		
geotechnical "Pit Log" i Edition (1990), by Gold	d has been transcribed from the original Queensland Department of record, into terminology consistent with <i>The Australian Soil and La</i> der Associates Pty Ltd. Soil descriptions are based on original class nspection of relevant soil samples.	nd Survey 2nd	Transcribed by: H	EP	



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Project: Gladstone-Fitzroy Water Pipeline		Pit No: TP73				
		Epala to Raglan : type: Backhoe - 600mm Bucket		Easting: 278220 Elevation:	Northing: 7376360	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TEST	S AND NOTES	
	MC	Medium Clay - ALLUVIAL medium plasticity, dark grey/black, dry, trace fine sand, dry, strong	D 0.0-0.5m	PP >600kPa		
	LMC	Light Medium Clay, gravelly - RESIDUAL low to medium plasticity, red-brown, dry-moist, fine to coarse gravel	D 2 0.5-1.0m			
1.0		MetaSiltstone	D 1.0-1.5m			
		extremely weathered, very low strength, clay bands (50%), orange- brown & grey	D 1.5-2.0m			
2.0			D 2.0-2.5m			
			D 2.5-3.0m			
		- increased MetaSiltstone content				
3.0		Pit Terminated @ 3.0m				
Grour	ndwate	I er: nil		Logged by: JPT &	MRE	<u> </u>
geoteo Edition	This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i> (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported n some instances by inspection of relevant soil samples.			Date: 13/09/07 Transcribed by: HE	ĒP	



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Queensland CENTRAL QUEENSLAND GEOTECHNICAL UNIT 216 Richardson Road North Rockhampton

Phone 4923 0712 Facsimile 4923 0753 Project: Gladstone-Fitzroy Water Pipeline Pit No: TP74 Easting: 277841 Location: Raglan to Bajool Northing: 7376377 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency / structure. DEPTH (SAMPLES TESTS AND NOTES Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects. SCL Sandy Clay Loam - ALLUVIUM D 0.0-0.25m low to medium plasticity, dark brown/black, root fibres, moist, weak PP=450kPa LC Light Clay, sandy D 0.25-0.5m low to medium plasticity fines, fine sand, dark brown, dry-moist, moderate strength D 0.5-0.75m D 0.75-1.0m SCL Sandy Clay Loam 1.0 low plasticity fines, pale grey-brown, just moist, moderate-strong D 1.0-1.25m PP=420kPa D 1.25-1.5m MC Medium Clay D 1.5-1.75m medium plasticity, grey mottled orange-brown, moist, moderate strength D 1.75-2.0m 2.0 D 2.0-2.25m PP=360kPa D 2.25-2.5m LMC Light Medium Clay D 2.5-2.75m low to medium plasticity, grey, some red mottles, some organics, moist, PP=145kPa friable, weak D 2.75-3.0m 3.0 Pit Terminated @ 3.0m Logged by: JPT & MRE Groundwater: nil Date: 13/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Transcribed by: HEP Edition (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples



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		Pit No: TP77			
	-				
		Raglan to Bajool type: Backhoe - 600mm Bucket		Easting: 276548 Northing: 7376926 Elevation:	
		SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour,			
DEPTH (m)	Aust SC	social DESCRIPTION: Soli Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	LMC	Light Medium Clay - ALLUVIAL			
		low to medium plasticity, dark brown, some organics, trace fine gravel, moist, weak	D 0.0-0.6m	PP=190kPa	
			2 0.0 0.0		
			D 0.6-0.8m		
		mottled pale brown, strong	2 0.0 0.011	PP=500kPa	
		- dry, very strong	D 0.8-1.8m		
1.0				PP >600kPa	
		iust maint	D 1 8 2 0m		
2.0		- just moist	D 1.8-3.0m	PP >600kPa	
2.0					
3.0					L
		Pit Terminated @ 3.0m			
					\vdash
<u> </u>					-
					<u> </u>
<u> </u>					
				Logged by: JPT & MJW	<u> </u>
Grour	ndwate	er: nil			
Thie T	est Pit I	Log record has been transcribed from the original Queensland Department of M	lain Roads	Date: 18/09/07	
geoteo	chnical	"Pit Log" record, into terminology consistent with The Australian Soil and Land	Survey 2nd	Transcribed by: HEP	
		 by Golder Associates Pty Ltd. Soil descriptions are based on original classific nces by inspection of relevant soil samples. 			



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Pro	ject:	: Gladstone-Fitzroy Water Pipeline		Pit No: TP78	
		Raglan to Bajool t type: Backhoe - 600mm Bucket		Easting: 276033 Northing: 7377106 Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	LMC	Light Medium Clay - ALLUVIAL low to medium plasticity, dark brown, trace fine gravel, moist, strong	D 0.0-0.2m D 0.2-0.8m	PP=430kPa	
				PP=430kPa	
1.0	MC	Medium Clay medium plasticity, mottled pale brown & yellow-brown, trace of fine gravel, moist, strong	D 0.8-1.0m D 1.0-3.0m	PP=495kPa	
			D 1.0-3.0m	-	
				PP=525kPa	
2.0					
				-	
				-	
3.0				-	
5.0		Pit Terminated @ 3.0m		-	
				-	
				Logged by: JPT & MJW	
Groun			1ain Roads	Date: 18/09/07	
geotec Edition	This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd</i> <i>Edition</i> (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples			Transcribed by: HEP	



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Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP79	
		Raglan to Bajool : type: Backhoe - 600mm Bucket		Easting: 275470 Northing: 7377273 Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	SL	Sandy Loam - ALLUVIUM	D 0.0-0.25m		
	SCL	low plasticity, grey, dry, root fibres, weak structure Sandy Clay Loam	D 0.25-0.5m		
	UUL	medium plasticity, mottled pale brown & grey, fine gravel (3mm), moist,	D 0.20 0.011	PP=305kPa	
		moderate strength	-		
	MC	Medium Clay medium plasticity, pale brown & grey, trace gravel, moist,	D 0.5-0.75m		
		medium plasticity, pale brown & grey, trace gravel, moist, moderate strength	D 0.75-1.0m		
				PP=300kPa	
1.0			D 1.0-1.25m		
			D 1.0-1.25m		
			D 1.25-1.5m		
		- very strong	D 1.5-1.75m	PP >600kPa	
		- loamy organic layer, brown			
	HC	Heavy Clay	D 1.75-2.0m		
2.0		heavy plasticity, pale brown & grey, trace gravel, moist, strong			
			D 2.0-2.25m	PP=540kPa	
			D 2.25-2.5m		
			D 2.5-2.75m		
			D 2.0 2.1 011		
			D 2.75-3.0m	PP=510kPa	
3.0		Pit Terminated @ 3.0m			
					—
					<u> </u>
		1	1	Logged by: JPT & MJW	I
Grour	ndwate	er: nil		Date: 18/09/07	
		Log record has been transcribed from the original Queensland Department of		246. 10/00/07	
Edition	1 (1990	"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i>)), by Golder Associates Pty Ltd. Soil descriptions are based on original classifinces by inspection of relevant soil samples.		Transcribed by: HEP	



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Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP80	
		Raglan to Bajool : type: Backhoe - 600mm Bucket		Easting: 274851 Northing:7377453 Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	SCL	Sandy Clay Loam - ALLUVIUM medium plasticity, grey-brown, moist, strong	D 0.0-0.25m	PP >600kPa	
	MC	Medium Clay medium plasticity, pale brown & grey, trace gravel, moist, moderate strength	D 0.25-0.5m	PP=295kPa	
			D 0.5-0.75m		
	LS	Loamy Sand fine grained, low plasticity fines, grey with black organic matter, moist	D 0.75-1.0m	PP=130kPa	
1.0		weak structure	D 1.0-1.25m	PP=275kPa	
	MC	Medium Clay medium plasticity, pale brown & grey, trace gravel, moist, moderate strength	D 1.25-1.5m		
			D 1.5-1.75m		
			D 1.75-2.0m		
2.0	HC	Heavy Clay medium to high plasticity, pale brown & grey, trace gravel, occasional			
		organic inclusions, moist, moderate strength	D 2.0-2.25m	PP=345kPa	
			D 2.25-2.5m		
			D 2.5-2.75m		
3.0	LC	Light Clay low plasticity, pale brown & grey, black organic matter, moist, strong	D 2.75-3.0m	PP=425kPa	
		Pit Terminated @ 3.0m			
		l		Logged by: JPT & MJW	
	ndwate			Date: 18/09/07	
geoteo Edition	chnical 1 (1990	Log record has been transcribed from the original Queensland Department of M "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i> I), by Golder Associates Pty Ltd. Soil descriptions are based on original classifi- nces by inspection of relevant soil samples.	Survey 2nd	Transcribed by: HEP	



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Pro	Project: Gladstone-Fitzroy Water Pipeline		Pit No: TP81		
		Raglan to Bajool t type: Backhoe - 600mm Bucket		Easting: 274340 Northing: 7377627 Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	1 1	Sandy Clay Loam - ALLUVIUM low plasticity, fine sand, grey-brown, dry, root fibres, weak structure - traces of gravel	D 0.0-0.25m D 0.25-0.5m		
		Silty Clay Loam low to medium plasticity, trace fine gravel, brown, friable, just moist	D 0.5-0.75m		
1.0		strong	D 0.75-1.0m		
			D 1.0-1.25m	PP=550kPa	
			D 1.25-1.5m D 1.5-1.75m		
			D 1.75-2.0m	PP >600kPa - -	
2.0			D 2.0-2.25m	PP >600kPa	
	МНС	Medium Heavy Clay medium to high plasticity, mottled pale brown & grey, moist, strong (occasional organic matter)	D 2.25-2.5m		
			D 2.5-2.75m		
3.0	 	Pit Terminated @ 3.0m	D 2.75-3.0m	PP=550kPa	
					_
				-	
				Logged by: JPT & MJW	
This Te		Log record has been transcribed from the original Queensland Department of N		Date: 18/09/07	
Edition	n (1990	"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i>)), by Golder Associates Pty Ltd. Soil descriptions are based on original classifi- nces by inspection of relevant soil samples.		Transcribed by: HEP	



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Project: Gladstone-Fitzroy Water Pipeline F		Pit No: TP82			
		Raglan to Bajool t type: Backhoe - 600mm Bucket		Easting: 273824 Northing: 7377810 Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	ZCL	Silty Clay Loam - ALLUVIUM	D 0.0-0.25m		
		low to medium plasticity, brown, dry, root fibres, weak structure	D 0.25-0.5m		
	MC	Medium Clay	D 0.20 0.011	PP=130kPa	
		medium plasticity, brown, moist, weak (massive)			
			D 0.5-0.75m		
			D 0.75-1.0m		
1.0			D 1.0-1.25m		
		- grey, silty, occasional orange-brown mottles	D 1.0-1.25III	PP=145kPa	
					-
			D 1.5-1.75m		
			D 1.75-2.0m	PP=135kPa	
2.0			D 1.73-2.011	FF-IJJKFA	
			D 2.0-2.25m		
			D 2.25-2.5m		
			D 2.5-2.75m		
			D 2.75-3.0m	PP=130kPa	
3.0		Pit Terminated @ 3.0m			
					·
Grour	ndwate	er: nil		Logged by: JPT & MJW	
				Date: 18/09/07	
geotec	hnical	Log record has been transcribed from the original Queensland Department of M "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i>	Survey 2nd	Transcribed by: HEP	
		 by Golder Associates Pty Ltd. Soil descriptions are based on original classifing nees by inspection of relevant soil samples 	cation supported		



Golder Associates Test Pit Log Queensland Department of Main Roads CENTRAL QUEENSLAND GOVERNMENT Department of Main Roads CENTRAL QUEENSLAND GEOTECHNICAL UNIT 216 Richardson Road North Rockhampton Rockhampton Phone 4923 0712 Facsimile 4923 0753

Pro	ject:	: Gladstone-Fitzroy Water Pipeline		Pit No: TP83	
Locat	tion:	Raglan to Bajool t type: Backhoe - 600mm Bucket		Easting: 273381 Northing: 7378012 Elevation:	
DEPTH (m)	0	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	CL	Clay Loam - ALLUVIUM			
]	- 10	low plasticity, whitish grey (leached), dry	D 0.0-0.2m		
	MC	Medium Clay	D 0.2-2.2m		
	l	medium plasticity, dark brown, moist, moderate-strong	l	PP=320kPa	$ \rightarrow$
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2.0	l		l		
2.0	1		l		
	1		D 2.2-3.0m		
	ł				
	ł	- brown, very strong	l	PP >600kPa	
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				Logged by: JPT & MJW	
Groun	ndwate	ər: nil			
This T	est Pit	Log record has been transcribed from the original Queensland Department of M	lain Roads	Date: 18/09/07	
geotec	chnical '	"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i> . D), by Golder Associates Pty Ltd. Soil descriptions are based on original classific	Survey 2nd	Transcribed by: HEP	
		ances by inspection of relevant soil samples.	outer to pp		



Test Pit Log 🎙	Test F	Pit L	og
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Department of Main Roads

Queensland CENTRAL QUEENSLAND GEOTECHNICAL UNIT Government 216 Richardson Road North Rockhampton Phone 4923 0712 Facsimile 4923 0753

Project: Gladstone-Fitzroy Water Pipeline Pit No: TP84 Location: Raglan to Bajool Easting: 272969 Northing: 7378284 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency / structure. DEPTH (SAMPLES TESTS AND NOTES Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects. MC Medium Clay - ALLUVIUM medium plasticity, dark grey/black, dry, strong MHC Medium Heavy Clay PP >600kPa medium to high plasticity, dark grey/black, dry, strong LMC Light Medium Clay - RESIDUAL PP=550kPa 1.0 low to medium plasticity, pale brown, moist, strong mottled pale & orange-brown PP=510kPa 2.0 PP=590kPa - with traces of MetaSiltstone, very strong 3.0 Pit Terminated @ 3.0m Logged by: JPT & MJW Groundwater: nil Date: 18/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Transcribed by: HEP *Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples.



Department of Main Roads

Queensland CENTRAL QUEENSLAND GEOTECHNICAL UNIT Government 216 Richardson Road North Rockhampton

Phone 4923 0712 Facsimile 4923 0753 Project: Gladstone-Fitzroy Water Pipeline Pit No: TP85 Easting: 272544 Location: Raglan to Bajool Northing: 7378546 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency / structure. DEPTH (SAMPLES TESTS AND NOTES Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects. LS Loamy Sand - Possibly ALLUVIUM fine to medium, low plasticity fines, whitish grey (leached), dry, single grained LMC Light Medium Clay - RESIDUAL PP=480kPa low to medium plasticity, pale brown, moist, strong - trace of fine gravel 1.0 2.0 moderate strength PP=220kPa 3.0 Pit Terminated @ 3.0m Logged by: JPT & MJW Groundwater: nil Date: 18/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Transcribed by: HEP Edition (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported n some instances by inspection of relevant soil samples







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP86 Location: Raglan to Bajool Easting: 272107 Northing: 7378790 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects. LS Loamy Sand - ALLUVIUM fine grained, low plasticity fines, pale brown, weak, moist, no structure MHC Medium Heavy Clay medium to high plasticity, dark brown, moist, strong PP=300kPa - mottled brown, traces of fine to medium gravel 1.0 PP=330kPa PP=395kPa 2.0 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 04/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP87 Location: Raglan to Bajool Easting: 271665 Northing: 7379031 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects Loamy Sand - ALLUVIUM LS D 0.0-0.3m fine grained, low plasticity fines, pale brown, weak, moist, no structure SCL Sandy Clay Loam low to medium plasticity fines, dark brown, moist, no structure D 0.3-0.45m CS Clayey Sand D 0.45-1.05m PP=505kPa fine to medium, low to medium plasticity fines, brown, moist, very strong 1.0 D 1.0-1.25m D 1.05-1.75m - mottled grey, strong D 1.25-1.50m PP=400kPa 2.0 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 04/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP88 Location: Raglan to Bajool Easting: 271181 Northing:7379168 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects. Loamy Sand - ALLUVIUM LS D 0.0-0.6m fine grained, low plasticity fines, pale brown, weak, moist, no structure CS Clayey Sand D 0.6-1.5m fine to medium, medium plasticity clay fines, dark brown, moist, moderatestrong 1.0 MHC Medium Heavy Clay medium to high plasticity, mottled grey, moist, very strong D 1.5-3.0m PP >600kPa 2.0 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 04/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP90 Location: Raglan to Bajool Easting: 270184 Northing: 7379299 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects. мнс Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark grey/black, moist PP=190kPa 1.0 - mottled orange-brown and Back, moist, moderate strength PP=180kPa 2.0 - very moist, weak to moderate PP=125kPa - wet water inflow @ 2.4m PP=40kPa - weak 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 22/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP91 Location: Raglan to Bajool Easting: 269211 Northing: 7379536 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency, structure. DEPTH SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects HC Heavy Clay - ALLUVIUM D 0.0-0.25m high plasticity, dark grey, very moist, moderate strength, massive PP=140kPa D 0.25-0.5m D 0.5-0.75m HC Heavy Clay D 0.75-1.0m PP=220kPa high plasticity, grey, mottled pale brown, moist, moderate-strong 1.0 D 1.0-1.25m D 1.25-1.5m - mottled red-brown and grey, very moist PP=170kPa D 1.5-1.75m 2.0 D 1.75-2.0m D 2.0-2.25m D 2.25-2.5m PP=250kPa D 2.5-2.75m D 2.75-3.0m PP=220kPa 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 22/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HEP (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some nstances by inspection of relevant soil samples







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP92 Location: Raglan to Bajool Easting: 269211 Northing: 7379536 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects Heavy Clay - ALLUVIUM HC D 0.0-0.25m high plasticity, dark grey & orange brown, very moist, weak-moderate, massive MHC Medium Heavy Clay D 0.25-0.5m medium to high plasticity, grey & dark brown, organics, moist, weak-moderate PP=105kPa D 0.5-0.75m - moderate-strong PP=170kPa D 0.75-1.0m 1.0 D 1.0-1.25m D 1.25-1.5m D 1.5-1.75m with dark grey / black organic matter PP=220kPa D 1.75-2.0m 2.0 - no longer with organic matter D 2.0-2.25m D 2.25-2.5m PP=180kPa D 2.5-2.75m PP=195kPa D 2.75-3.0m water inflow @ 2.9m 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: 2.9m depth Date: 22/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HEP (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP93 Location: Raglan to Bajool Easting: 268978 Northing: 7379953 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects CL Clay Loam - ALLUVIAL D 0.0-0.25m low plasticity, dark brown, organic matter, dry, very weak, indistinct peds MHC Heavy Clay D 0.25-0.5m medium to high plasticity, grey mottled orange-brown, moist, moderate-strong PP=170kPa D 0.5-0.75m D 0.75-1.0m 1.0 D 1.0-1.25m D 1.25-1.5m PP=180kPa D 1.5-1.75m D 1.75-2.0m 2.0 D 2.0-2.25m PP=185kPa D 2.25-2.5m D 2.5-2.75m D 2.75-3.0m PP=190kPa 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 22/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HEP (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some nstances by inspection of relevant soil samples.



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Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP94	
		Raglan to Bajool type: Backhoe - 600mm Bucket		Easting: 269859 Northing: 7880401 Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	SCL	Sandy Clay Loam - ALLUVIUM	D 0.0-0.25m		
		low plasticity, fine sand, brown, dry, organic matter, weak structure	D 0.25-0.5m		
	LMC	Light Medium Clay, gravelly - Possibly RESIDUAL	D 0.23-0.011	PP >600kPa	
		low to medium plasticity, grey-brown, fine to coarse gravel (30%),	D 0 5 0 75m		
		moist, very strong	D 0.5-0.75m		
			D 0.75-1.0m		
1.0		- occasional red-brown mottles		PP=590kPa	
1.0			D 1.0-1.25m		
			D 1 25 1 5	PP=460kPa	
			D 1.25-1.5m	FF=400KF2	
			D 1.5-1.75m		
			D 1.75-2.0m		
2.0					
		- fine gravel, moderate strength	D 0 0 0 05m	DD-2204D-	
			D 2.0-2.25m	PP=320kPa	
			D 2.25-2.5m		
			D 0 5 0 75m		
			D 2.5-2.75m		
3.0			D 2.75-3.0m	PP=340kPa	
3.0		Pit Terminated @ 3.0m			
				Logged by: JPT & MJW	
Grour	ndwate	r: nil			
		Log record has been transcribed from the original Queensland Department of M		Date: 18/09/07	
		"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i>), by Golder Associates Pty Ltd. Soil descriptions are based on original classifi		Transcribed by: HEP	
		nces by inspection of relevant soil samples.			



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Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP95	
		Raglan to Bajool type: Backhoe - 600mm Bucket		Easting: 268539 Northing: 7380852 Elevation:	
DEPTH (m)	0	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	SCL	Sandy Clay Loam - ALLUVIUM	D 0.0-0.25m		
		low plasticity, fine sand, brown, moist, organic matter, weak structure			
			D 0.25-0.5m		
	LMC	Light Medium Clay, gravelly		PP >600kPa	
		low to medium plasticity, grey-brown, fine to coarse gravel and sand, moist, very strong	D 0.5-0.75m		
	LC	Light Clay	D 0.3-0.75m	PP >600kPa	
		low plasticity, grey, some fine to coarse gravel, moist, very strong	D 0.75-1.0m		
				PP >600kPa	
1.0					
			D 1.0-1.25m		
			D 1.25-1.5m		
		- occasional orange-brown mottles	D 1.25-1.5m		
			D 1.5-1.75m	PP >600kPa	
			D 1.75-2.0m	PP=470kPa	
2.0					
-	MC	Medium Clay - Possibly RESIDUAL	D 2.25-2.5m	PP=360kPa	
	WIC	medium plasticity, mottled red & orange brown, white and brown, moist,	D 2.20-2.011		
		trace of fine gravel, moderate - strong	D 2.5-2.75m		
			D 2.75-3.0m	PP=330kPa	
3.0					
		Pit Terminated @ 3.0m			
					⊢
0				Logged by: JPT & MJW	_
Grour	Idwate	r: nii		Date: 18/09/07	
		Log record has been transcribed from the original Queensland Department of I			
		"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i>), by Golder Associates Pty Ltd. Soil descriptions are based on original classifi		Transcribed by: HEP	
		nces by inspection of relevant soil samples.			







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP96 Location: Raglan to Bajool Easting: 268294 Northing: 7381287 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects. Loam - ALLUVIAL L D 0.0-0.25m low plasticity, grey, dry, weak, no structure LMC Light Medium Clay D 0.25-0.5m low to medium plasticity, dark grey, moist, moderately strong PP=330kPa MC Medium Clay D 0.5-0.75m PP=600kPa medium plasticity, mottled orange, grey & yellow-brown, moist, very strong D 0.75-1.0m 1.0 D 1.0-1.25m D 1.25-1.5m D 1.5-1.75m PP >600kPa - mottled orange, whitish grey & yellow-brown D 1.75-2.0m 2.0 D 2.0-2.25m D 2.25-2.5m D 2.5-2.75m D 2.75-3.0m PP >600kPa 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 22/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP97 Location: Raglan to Bajool Easting: 267975 Northing: 7381666 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects. LMC Light Medium Clay - ALLUVIUM D 0.0-0.25m low plasticity, dark brown, dry, strong, no structure PP >600kPa - pale brown, moist D 0.25-0.5m PP >600kPa moderate-strong D 0.5-0.75m PP=330kPa MC Medium Clay D 0.75-1.0m medium plasticity, pale brown, moist, strong 1.0 D 1.0-1.25m - grey and brown, trace of fine gravel, moist, strong D 1.25-1.5m PP >600kPa D 1.5-1.75m 2.0 D 1.75-2.0m D 2.0-2.25m - pale, brown, becoming wet, weak-moderate D 2.25-2.5m D 2.5-2.75m D 2.75-3.0m 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 22/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.





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Phone 4923 0712 Facsimile 4923 0753 Project: Gladstone-Fitzroy Water Pipeline Pit No: TP98 Easting: 267651 Location: Raglan to Bajool Northing: 7382053 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency / structure. DEPTH (SAMPLES TESTS AND NOTES Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects. HC Heavy Clay - ALLUVIUM D 0.0-0.25m high plasticity, dark brown, trace of fine gravel, organics, dry, strong PP >600kPa D 0.25-0.5m PP=510kPa D 0.5-0.75m - grey, no gravel D 0.75-1.0m PP >600kPa 1.0 D 1.0-1.25m D 1.25-1.5m HC Heavy Clay - Possibly RESIDUAL PP >600kPa pale orange-brown mottles, trace of fine & medium gravel D 1.5-1.75m D 1.75-2.0m 2.0 moderate-strong D 2.0-2.25m PP=415kPa D 2.25-2.5m D 2.5-2.75m D 2.75-3.0m PP=420kPa 3.0 Pit Terminated @ 3.0m Logged by: JPT & MJW Groundwater: nil Date: 04/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Transcribed by: HEP Edition (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported n some instances by inspection of relevant soil samples





Queensland CENTRAL QUEENSLAND GEOTECHNICAL UNIT 216 Richardson Road North Rockhampton

Phone 4923 0712 Facsimile 4923 0753 Project: Gladstone-Fitzroy Water Pipeline Pit No: TP99 Location: Raglan to Bajool Easting: 267268 Northing: 7382383 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency / structure. DEPTH (SAMPLES TESTS AND NOTES Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects. MC Medium Clay - ALLUVIUM D 0.0-0.25m medium plasticity, brown, trace of organic matter, friable, just moist, D 0.25-0.5m strong - mottled brown and dark grey/black, dry PP=555kPa D 0.5-0.75m D 0.75-1.0m HC PP >600kPa Heavy Clay 1.0 high plasticity, pale brown, trace of fine to medium gravel, dry, very strong D 1.0-1.25m PP >600kPa - mottled pale brown & grey, trace of fine (rounded) gravel D 1.25-1.5m D 1.5-1.75m PP >600kPa D 1.75-2.0m 2.0 D 2.0-2.25m PP >600kPa D 2.25-2.5m D 2.5-2.75m D 2.75-3.0m PP=405kPa 3.0 Pit Terminated @ 3.0m Logged by: JPT & MJW Groundwater: nil Date: 04/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Transcribed by: HEP Edition (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported n some instances by inspection of relevant soil samples







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP102 Location: Raglan to Bajool Easting: 265456 Northing: 7383178 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects. Silty Loam - ALLUVIUM ZL D 0.0-0.25m low plasticity, light brown, dry, friable, weak structure LC Light Clay, sandy D 0.25-0.5m low plasticity, pale brown, moist, moderate strength D 0.5-0.75m D 0.75-1.0m MC Medium Clay, sandy PP=460kPa 1.0 medium plasticity, fine sand, orange-brown, moist, strong D 1.0-1.25m - trace fine gravel, red-brown, just moist, very strong D 1.25-1.5m PP=540kPa D 1.5-1.75m PP=550kPa 2.0 D 1.75-2.0m - grey and yellow brown D 2.0-2.25m D 2.25-2.5m D 2.5-2.75m D 2.75-3.0m PP=600kPa 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 22/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP103 Location: Raglan to Bajool Easting: 265026 Northing: 7383367 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects HC Heavy Clay - ALLUVIUM D 0.0-0.25m PP=595kPa high plasticity, pale brown, moist, strong, massive MC Medium Clay D 0.25-0.5m medium plasticity, pale brown, trace of fine gravel (2-3mm), trace organics, PP=600kPa just moist, very strong D 0.5-0.75m D 0.75-1.0m 1.0 D 1.0-1.25m PP=600kPa D 1.25-1.5m PP=490kPa D 1.5-1.75m 2.0 D 1.75-2.0m D 2.0-2.25m PP=520kPa with dark grey organic matter, moist D 2.25-2.5m D 2.5-2.75m D 2.75-3.0m 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 22/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HEP (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some nstances by inspection of relevant soil samples







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP104 Location: Raglan to Bajool Easting: 264534 Northing: 7383580 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects. Medium Heavy Clay - ALLUVIUM MHC D 0.0-0.25m medium to high plasticity, yellow-brown, root fibres, moist, very strong PP=590kPa HC Heavy Clay D 0.25-0.5m high plasticity, mottled grey & pale brown, moist, strong, massive D 0.5-0.75m PP=465kPa D 0.75-1.0m 1.0 D 1.0-1.25m PP=520kPa very strong D 1.25-1.5m PP=345kPa strong D 1.5-1.75m 2.0 D 1.75-2.0m PP=380kPa D 2.0-2.25m D 2.25-2.5m D 2.5-2.75m - trace fine gravel (3mm) D 2.75-3.0m PP=420kPa 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 22/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP105 Location: Raglan to Bajool Easting: Northing: Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects. HC Heavy Clay - ALLUVIUM D 0.0-0.25m high plasticity, pale brown, just moist, very strong PP >600kPa D 0.25-0.5m PP >600kPa D 0.5-0.75m PP=485kPa - grey, black organic matter, moist, strong D 0.75-1.0m 1.0 D 1.0-1.25m D 1.25-1.5m PP=355kPa D 1.5-1.75m PP >600kPa very strong 2.0 D 1.75-2.0m D 2.0-2.25m D 2.25-2.5m LC Light Clay low plasticity layer, trace fine gravel, moist D 2.5-2.75m HC Heavy Clay PP=590kPa high plasticity, grey, moist, very strong D 2.75-3.0m 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Pro	ject:	Fitzroy - Gladstone Pipeline		Pit No: TP106	
		opproximate chainage 55.0 km (Eight Mile Creek)		Easting: 263763 Northing: 7383878	
Equip	oment	type: Caterpillar 432E backhoe with 600mm bucket	1	Elevation:	
DEPTH (m)	Aus	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
		Silty Clay Loam - ALLUVIUM	D 0.0-0.25m		Τ
	-	low to medium plasticity, dark grey, trace of fine gravel, dry, hard, friable			
			D 0.25-0.5m	PP = 450 kPa	
	MHC	Medium Heavy Clay	D 0.5-0.75m	PP = 200 kPa	
		medium to high plasticity, dark grey-brown, trace fine gravel, moist, stif			
			D 0.75-1.0m		
1.0					
	MC	Medium Clay	D 1.0-1.25m	PP = 150 kPa	
\vdash		medium plasticity, mottled pale brown, moist, firm			
			D 1.25-1.5m	PP = 100 kPa	-
			5 1.20 1.011		
		- becoming wet and soft	1	PP = 50 kPa	
			D 1.5-1.75m		
	- 0	Liete Olevi			-
2.0	LC	Light Clay low to medium plasticity, light grey-brown, traces of 'jarosite', wet, very soft	D 1.75-2.0m		-
			D 2.0-2.25m		
			D 2.25-2.5m		
			D 2.5-2.75m		
				WATER INFLOW	-
2.0			D 2.75-3.0m		
3.0		Pit Terminated @ 3.0m			
					<u> </u>
					\vdash
					-
					-
					-
Groun	ndwate	er: 2.7m depth		Logged by: MJW Date: 23/10/07	-
geotec (1990)	hnical , by Go	Log record has been transcribed from the original Queensland Department of Main Roa "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey</i> older Associates Pty Ltd. Soil descriptions are based on original classification supported inspection of relevant soil samples.	2nd Edition	Transcribed by: HEP	







		Fitzray Cladatana Binalina		Dit No. TD107	
Proj	ect	Fitzroy - Gladstone Pipeline		Pit No: TP107	
Locat	ion: A	Approximate chainage 54.5 km		Easting: 263236 Northing: 7383969	
Equip	ment	type: Caterpillar 432E backhoe with 600mm bucket	-	Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
		Light Clay - ALLUVIUM	D 0.0-0.25m		
	20	low to medium plasticity, dark brown, trace of fine to medium gravel, dry, hard	D 0.0 0.2011		
			D 0.25-0.5m	PP = 450 kPa	
		dark grey, stiff	D 0.5-0.75m	PP = 150 kPa	
			D 0.75-1.0m		
1.0					
	HC	Heavy Clay medium to high plasticity, grey, moist	D 1.0-1.25m	PP = 100 kPa	
		nioson to nigh plastoly, groy, molat			
			D 1.25-1.5m		
		- with orange brown mottle		PP = 150 kPa	
			D 1.5-1.75m		
		- no mottling			
2.0			D 1.75-2.0m	PP = 100 kPa	
			D 2.0-2.25m		
			D 2.25-2.5m		
				PP = 150 kPa	
			D 2.5-2.75m		
			D 2.75-3.0m	PP = 100 kPa	
3.0			D 2.70 0.011		
		Pit Terminated @ 3.0m			
				Logged by: MJW	
Groun	dwate	er: nil		Date: 23/10/07	
		Log record has been transcribed from the original Queensland Department of Main Roa			
(1990),	, by Go	"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey</i> a older Associates Pty Ltd. Soil descriptions are based on original classification supported		Transcribed by: HEP	
instanc	es by	inspection of relevant soil samples.			







Pro	ject	: Fitzroy - Gladstone Pipeline		Pit No: TP108	
Loca	tion: /	Approximate chainage 53.9 km		Easting: 262752 Northing: 7384143	
Equip	omen	t type: Caterpillar 432E backhoe with 600mm bucket		Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
	МС	Medium Clay - ALLUVIUM	D 0.0-0.25m		
		medium to high plasticity, dark brown, organics, moist, very stiff			
			D 0.25-0.5m	PP = 250 kPa	
			D 0.5-0.75m	PP = 200 kPa	
			D 0 75 4 0 0		
			D 0.75-1.0m		-
1.0				PP = 250 kPa	
			D 1.0-1.25m		
		- grey mottled pale brown, stiff			
			D 1.25-1.5m		
				PP = 150 kPa	
			D 1 5 1 75m		
			D 1.5-1.75m		
		Heavy Clay			
2.0		high plasticity, grey with orange brown mottles, firm to stiff	D 1.75-2.0m	PP = 100 kPa	
			D 2.0-2.25m		
			D 2.25-2.5m		
			D 2.5-2.75m	PP = 100 kPa	
3.0			D 2.75-3.0m		
		Pit Terminated @ 3.0m			
					-
Grour	ndwate	er: nil		Logged by: MJW	
				Date: 23/10/07	
		Log record has been transcribed from the original Queensland Department of Main Roa		1	
(1990)	, by Go	"Pit Log" record, into terminology consistent with The Australian Soil and Land Survey a older Associates Pty Ltd. Soil descriptions are based on original classification supported		Transcribed by: HEP	
instan	ces by	inspection of relevant soil samples.			







Proj	ject:	Fitzroy - Gladstone Pipeline		Pit No: TP109	
Locat	tion: A	Approximate chainage 53.5 km		Easting: 262282 Northing: 7384313	
Equip	oment	type: Caterpillar 432E backhoe with 600mm bucket		Elevation:	
DEPTH (m)	Aust S	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
		Loamy Sand - ALLUVIUM	D 0.0-0.25m		
		fine grained, some clay, dark brown, organic matter, dry, friable			
		Light Clay low to medium plasticity, dark brown, just moist, hard	D 0.25-0.5m	PP = 450 kPa	
		- moist, stiff	D 0.5-0.75m	PP = 150 kPa	
			D 0.75-1.0m		
1.0					
			D 1.0-1.25m		
	MHC	Medium Heavy Clay		PP = 50 kPa	
		medium to high plasticity, dark grey, moist, soft to firm	D 1.25-1.5m		
				PP = 50 kPa	
			D 1.5-1.75m		
2.0		 some orange brown mottling, becoming wet and very soft. 	D 1.75-2.0m		
2.0			2 0 2.0		
			D 2.0-2.25m		<u> </u>
			D 2.25-2.5m		
			D 2.5-2.75m		
3.0			D 2.75-3.0m		
0.0		Pit Terminated @ 3.0m			
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				Logged by: MJW	1
Groun	nawate	r: not noted		Date: 23/10/07	
		Log record has been transcribed from the original Queensland Department of Main Roa		1	
(1990),	, by Go	"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey</i> a older Associates Pty Ltd. Soil descriptions are based on original classification supported inspection of relevant soil samples.		Transcribed by: HEP	
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Department of Main Roads

Pro	ject	: Fitzroy - Gladstone Pipeline		Pit No: TP110	
Loca	tion: A	Approximate chainage 53.0 km		Easting: 261811 Northing: 7384482	
Equip	omen	t type: Caterpillar 432E backhoe with 600mm bucket		Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
	LC	Light Clay - ALLUVIUM	D 0.0-0.25m		
		low to medium plasticity, grey-brown, trace of organic matter, dry, hard, friable - less organic matter	D 0 25-0 5m	PP = 400 kPa	
			0.20 0.011		
			D 0.5-0.75m	PP >450 kPa	
			D 0.75-1.0m		
1.0					
	MC	Medium Clay medium to high plasticity, mottled pale brown & grey, moist	D 1.0-1.25m	PP = 350 kPa	
	HC	Heavy Clay	1		
		medium to high plasticity, mottled pale brown, grey and red-brown, moist, very st	1D 1.25-1.5m		
				PP = 300 kPa	
			D 1.5-1.75m		
2.0			D 1.75-2.0m		
			D 2.0-2.25m		
			D 2.25-2.5m		
				PP = 300 kPa	
			D 2.5-2.75m		
			D 2.75-3.0m		
3.0		Pit Terminated @ 3.0m			-
Creation	adurati		•	Logged by: MJW	·
Grour	ndwate	51. 1111		Date: 23/10/07	
This T	est Pit	Log record has been transcribed from the original Queensland Department of Main Roa	ads	1	
geoteo (1990)	chnical), by Go	"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey</i> older Associates Pty Ltd. Soil descriptions are based on original classification supported inspection of relevant soil samples.	2nd Edition	Transcribed by: HEP	



Golder Test Pit Log



Pro	ject:	Fitzroy - Gladstone Pipeline		Pit No: TP111	
		Approximate chainage 52.5 km (Port Alma rail spur) type: Caterpillar 432E backhoe with 600mm bucket		Easting: 261341 Northing: 7384652 Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
	LC	Light Clay - ALLUVIUM	D 0.0-0.25m		
		low to medium plasticity, grey, trace of organic matter, dry, hard, friable			
		- less organic matter	D 0.25-0.5m	PP = 350 kPa	
			D 0.5-0.75m	PP >450 kPa	
			D 0.75-1.0m		-
			D 0.75-1.011		
1.0					
			D 1.0-1.25m	PP = 400 kPa	
	MHC	Medium Heavy Clay	D 1.25-1.5m		
		medium plasticity, mottled dark brown and red-brown, moist, hard			
				PP = 400 kPa	
			D 1.5-1.75m		
		- becoming stiff			
2.0			D 1.75-2.0m	PP = 250 kPa	
			D 2 0 2 25m		-
			D 2.0-2.25m		
			D 2.25-2.5m		
			D 2.5-2.75m	PP = 200 kPa	
			D 2.75-3.0m		
3.0					
		Pit Terminated @ 3.0m			
					-
					<u> </u>
				Logged by: MJW	
Grour	ndwate	er: nil		Date: 23/10/07	
		Log record has been transcribed from the original Queensland Department of Main Roa		1	
		"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey</i> 2 older Associates Pty Ltd. Soil descriptions are based on original classification supported		Transcribed by: HEP	
		inspection of relevant soil samples.	oomo		





Pro	ject	: Fitzroy - Gladstone Pipeline		Pit No: TP112	
		Approximate chainage 52.0 km t type: Caterpillar 432E backhoe with 600mm bucket		Easting: 260868 Northing: 7384835 Elevation:	
Էզար	Jinen		1		
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure.	SAMPLES	TESTS and NOTES	
B	1	ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.		NOTES	
	ZCL	Silty Clay Loam - ALLUVIUM	D 0.0-0.25m		
		low to medium plasticity, dark grey, trace of fine gravel, just moist, very stiff			
			D 0.25-0.5m	PP = 300 kPa	
	LC	Light Clay	D 0.5-0.75m		
		low to medium plasticity, pale grey-brown, moist, hard			
			D 0.75-1.0m	PP >450 kPa	
1.0					
	MC	Medium Clay	D 1.0-1.25m		
		medium to high plasticity, grey mottled pale brown and orange, moist, very stiff			
				PP = 250 kPa	
			D 1.25-1.5m		
		- stiff			
			D 1.5-1.75m		
				PP = 200 kPa	
2.0			D 1.75-2.0m		
			D 2.0-2.25m		
		- pale brown			
			D 2.25-2.5m		
			D 0 5 0 75m		
			D 2.5-2.75III	PP = 200 kPa	
			D 2.75-3.0m		
3.0			D 2.70 0.011		
0.0		Pit Terminated @ 3.0m			
C 1-1				Logged by: MJW	
Grour	ndwate	er: mi		Date: 23/10/07	
		Log record has been transcribed from the original Queensland Department of Main Roa "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 3			
(1990)	, by Go	older Associates Pty Ltd. Soil descriptions are based on original classification supported		Transcribed by: HEP	
instand	ces by	inspection of relevant soil samples.			



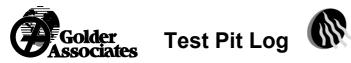


Pro	ject:	Fitzroy - Gladstone Pipeline		Pit No: TP114	
		Approximate chainage 51.1 km		Easting: 259924 Northing: 7385216	
		type: Caterpillar 432E backhoe with 600mm bucket		Elevation:	
DEPTH (m)	Aust S	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
		Silty Clay Loam - ALLUVIUM	D 0.0-0.25m		1
		low plasticity, brown, organics, just moist, hard, friable			
		Heavy Clay medium to high plasticity, dark brown, moist, hard, friable	D 0.25-0.5m	PP >450 kPa	
			D 0.5-0.75m		
			D 0.75-1.0m	PP = 400 kPa	
1.0		- mottled pale brown, very stiff	D 1.0-1.25m		
			D 1.25-1.5m	PP = 350 kPa	
			D 1.5-1.75m		
2.0			D 1.75-2.0m	PP = 300 kPa	
			D 2.0-2.25m		
		- red-brown mottling	D 2.25-2.5m	PP = 250 kPa	
			D 2.5-2.75m		
3.0			D 2.75-3.0m	PP = 250 kPa	
		Pit Terminated @ 3.0m			Ľ
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Grour				Logged by: MJW Date: 23/10/07	1
geotec (1990)	hnical , by Go	Log record has been transcribed from the original Queensland Department of Main Roa "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey</i> a older Associates Pty Ltd. Soil descriptions are based on original classification supported inspection of relevant soil samples.	2nd Edition	Transcribed by: HEP	





Project: Fitzroy - Gladstone Pipeline			Pit No: TP115		
		Approximate chainage 50.7 km t type: Caterpillar 432E backhoe with 600mm bucket		Easting: 259486 Northing: 7385392 Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
	LMC	Light Medium Clay - ALLUVIUM	D 0.0-0.25m		
		medium plasticity, dark grey-brown, trace of fine gravel, moist, very stiff			
			D 0.25-0.5m	PP = 350 kPa	
	LC	Light Clay			-
		low to medium plasticity, pale brown, moist, stiff	D 0.5-0.75m	PP = 250 kPa	
			D 0.3-0.7 5m	FF - 230 KFa	
			D 0.75-1.0m		
1.0					
			D 1.0-1.25m	PP >450 kPa	
			D 4 05 4 5m		
			D 1.25-1.5m		
				PP >450 kPa	
			D 1.5-1.75m		
	LMC	Light Medium Clay			
2.0		medium plasticity, mottled pale brown and grey, moist, hard	D 1.75-2.0m		
			D 0 0 0 0 D		
			D 2.0-2.25m		
			D 2.25-2.5m		
				PP >450 kPa	
			D 2.5-2.75m		
3.0		- mottled brown, grey and red-brown, stiff	D 2.75-3.0m	PP = 200 kPa	
3.0		Pit Terminated @ 3.0m		PP = 200 KPa	<u> </u>
<u> </u>		<u> </u>	1	Logged by: MJW	<u> </u>
Groundwater: nil				Date: 23/10/07	
		Log record has been transcribed from the original Queensland Department of Main Roa "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2			
(1990)	, by Go	older Associates Pty Ltd. Soil descriptions are based on original classification supported		Transcribed by: HEP	
instan	ces by	inspection of relevant soil samples.		1	





Project: Fitzroy - Gladstone Pipeline				Pit No: TP116	
Loca	tion: A	Approximate chainage 50.2 km		Easting: 258995 Northing: 7385590	
Equi	pmen	t type: Caterpillar 432E backhoe with 600mm bucket		Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
	MC	Medium Clay - ALLUVIUM			
		medium to high plasticity, dk grey-brown, trace fine gravel, moist, hard, friable		PP >450 kPa	
				FF >430 KFa	
	мнс	Medium Heavy Clay			
		medium to high plasticity, mottled pale and orange brown, trace sand & gravel, moist			
		moist			
1.0					
2.0					
		 mottled pale brown and grey (Possibly Residual) 			
3.0					
		Pit Terminated @ 3.0m			
				Logged by: MJW	
Grou	Groundwater: nil			Date: 23/10/07	
				4	
		Log record has been transcribed from the original Queensland Department of Main Roa "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2		Transarihad by: USD	
(1990)), by Go	older Associates Pty Ltd. Soil descriptions are based on original classification supported inspection of relevant soil samples.		Transcribed by: HEP	





Project: Fitzroy - Gladstone Pipeline			Pit No: TP117			
Loca	tion: A	Approximate chainage 49.6 km		Easting: 258552 Northing: 7385769		
Equi	pmen	t type: Caterpillar 432E backhoe with 600mm bucket		Elevation:		
DEPTH (m)		SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES		
		Light Medium Clay - ALLUVIUM low to medium plasticity, dark brown, moist, hard, friable		PP >450 kPa		
	МНС	Medium Heavy Clay medium to high plasticity, mottled pale and orange brown, trace gravel, wet, stiff		PP = 100 kPa		
1.0						
2.0						
	LC	Light Clay, sandy (Possibly Residual) Iow plasticity, orange-brown, moist, stiff				
		iow plasticity, orange-brown, moist, sun				
3.0		Dit Terminated @ 2.0m				
		Pit Terminated @ 3.0m				
				Logged by: MJW		
This T geoteo	Groundwater: nil This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i> (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some			Date: 23/10/07 Transcribed by: HEP		
		inspection of relevant soil samples.	-			







Project: Fitzroy - Gladstone Pipeline			Pit No: TP118		
Loca	tion: A	Approximate chainage 49.0 km		Easting: 258071 Northing: 7385963	
Equip	oment	t type: Caterpillar 432E backhoe with 600mm bucket		Elevation:	
DEPTH (m)	ŝn	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
		Medium Clay - ALLUVIUM			
		medium to high plasticity, dark brown, trace fine gravel, moist, hard, friable			
					-
				PP >450 kPa	
1.0					
					-
	MHC	Medium Heavy Clay (Possibly Residual)			
		medium to high plasticity, mottled pale and orange brown, trace gravel, moist, hard			
				PP >450 kPa	-
2.0					
				PP >450 kPa	
3.0					
		Pit Terminated @ 3.0m			
				Logged by: MJW	
Grour	Groundwater: nil			Date: 23/10/07	
				4	
geoteo	chnical	Log record has been transcribed from the original Queensland Department of Main Roa "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey</i> 2	2nd Edition	Transcribed by: HEP	
(1990)	, by Go	older Associates Pty Ltd. Soil descriptions are based on original classification supported inspection of relevant soil samples.	in some		







Proj	ject:	Fitzroy - Gladstone Pipeline		Pit No: TP119	
Locat	tion: A	Approximate chainage 48.5 km		Easting: 257595 Northing: 7386154	
Equip	oment	type: Caterpillar 432E backhoe with 600mm bucket		Elevation:	
DEPTH (m)	Au€	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
		Silty Loam - ALLUVIUM low plasticity, brown, organic matter (roots), dry, hard, friable	D 0.0-0.25m		
	MHC	Medium Heavy Clay medium to high plasticity, brown, moist, trace fine gravel, dry, hard	D 0.25-0.5m	PP >450 kPa	
	ZCL	Silty Clay Loam low plasticity, brown, organic matter (roots), dry, hard, friable	D 0.5-0.75m	PP = 400 kPa	
		iow plasticity, brown, organic matter (roots), ory, naro, mable	D 0.75-1.0m		
1.0		- varying clay content tending to light clay	D 1.0-1.25m	PP = 400 kPa	
			D 1.25-1.5m		
			D 1.5-1.75m	PP >450 kPa	
2.0			D 1.75-2.0m		
	HC	Heavy Clay medium to high plasticity, mottled brown, moist, very stiff	D 2.0-2.25m	PP = 300 kPa	
			D 2.25-2.5m	FF - 300 KFa	
			D 2.5-2.75m		
3.0			D 2.75-3.0m	PP = 300 kPa	
		Pit Terminated @ 3.0m			
Groun	ndwate	er: nil		Logged by: MJW Date: 23/10/07	
geotec (1990),	hnical , by Go	Log record has been transcribed from the original Queensland Department of Main Roa "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey</i> 2 older Associates Pty Ltd. Soil descriptions are based on original classification supported inspection of relevant soil samples.	2nd Edition	Transcribed by: HEP	







Proj	ject:	Fitzroy - Gladstone Pipeline		Pit No: TP120	
		Approximate chainage 48.0 km		Easting: 257144 Northing: 7386336	
		type: Caterpillar 432E backhoe with 600mm bucket		Elevation:	
DEPTH (m)	ust S	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
	HC	Heavy Clay	D 0.0-0.25m		
		medium to high plasticity, dark grey-brown, trace fine gravel, moist, hard	D 0.25-0.5m	PP >450 kPa	
		- grey-brown	D 0.5-0.75m		
			D 0.75-1.0m	PP >450 kPa	
1.0		- mottled pale brown, trace gravel (Possibly Residual)	D 1.0-1.25m		
			D 1.25-1.5m	PP = 400 kPa	
			D 1.5-1.75m		
2.0		- very stiff	D 1.75-2.0m	PP = 350 kPa	
		- very sum	D 2.0-2.25m	11 - JJU NF a	
			D 2.25-2.5m D 2.5-2.75m	PP = 300 kPa	
			D 2.75-3.0m		
3.0			2.10 0.011	PP = 300 kPa	
		Pit Terminated @ 3.0m			
Groun				Logged by: MJW Date: 23/10/07	
geotec (1990),	hnical , by Go	Log record has been transcribed from the original Queensland Department of Main Roa "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2</i> Ider Associates Pty Ltd. Soil descriptions are based on original classification supported inspection of relevant soil samples.	2nd Edition	Transcribed by: HEP	







Project: Fitzroy - Gladstone Pipeline			Pit No: TP121		
Loca	tion: A	Approximate chainage 47.5 km		Easting: 256785 Northing: 7386752	
Equip	oment	t type: Caterpillar 432E backhoe with 600mm bucket		Elevation:	
DEPTH (m)		SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
	LS	Loamy Sand - ALLUVIAL			
		fine grained, low plasticity fines, pale brown, dry, loose			
	LMC	Light Medium Clay (Possibly Residual)		PP >450 kPa	
		low to medium plasticity, pale brown, dry, hard			
1.0					
		- trace fine gravel			
				PP >450 kPa	
2.0					
		Medium Heavy Clay - Residual medium to high plasticity, mottled pale brown and grey, moist, very stiff		PP = 350 kPa	
3.0					
		Pit Terminated @ 3.0m			
					<u> </u>
Grour	Groundwater: nil			Logged by: MJW	_
Cioui	awalt	A. 10		Date: 23/10/07	
This T	est Pit	Log record has been transcribed from the original Queensland Department of Main Roa	ıds	1	
geoteo	chnical	"Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2 older Associates Pty Ltd. Soil descriptions are based on original classification supported	2nd Edition	Transcribed by: HEP	
		inspection of relevant soil samples.			







Project: Fitzroy - Gladstone Pipeline			Pit No: TP122			
Loca	tion: A	Approximate chainage 46.9 km		Easting: 256464 Northing: 7387180		
Equi	pmen	type: Caterpillar 432E backhoe with 600mm bucket		Elevation:		
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES		
	LC	Light Clay - ALLUVIUM				
		low to medium plasticity, dk brown, moist, hard, friable		PP >450 kPa		
				11 - +00 KI a	-	
	MHC	IHC Medium Heavy Clay medium to high plasticity, dark grey, trace fine gravel, moist, hard				
				PP >450 kPa		
				PP 2450 KPa	-	
1.0		- dark brown				
				PP >450 kPa		
	мнс	Medium Heavy Clay - (Possibly Residual)			_	
2.0	NII IC	medium heavy clay - (r ossibly residual) medium to high plasticity, mottled brown and orange brown, moist				
				PP >450 kPa		
					-	
					_	
3.0						
		Pit Terminated @ 3.0m				
					_	
Grour	ndwate	nil		Logged by: MJW		
Giour	uwale	21 - 1111		Date: 23/10/07		
This T	est Pit	Log record has been transcribed from the original Queensland Department of Main Roa	ds			
(1990)), by Go	"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2</i> older Associates Pty Ltd. Soil descriptions are based on original classification supported inspection of relevant soil samples.		Transcribed by: HEP		







Location: Approximate chainage 46.4 km Easting: 256190 Northing: 7387546 Equipment type: Caterpiller 432E backbow with 600mm bucket Easting: 256190 Northing: 7387546 Image: state of the	Project: Fitzroy - Gladstone Pipeline			Pit No: TP123		
Understand Solid DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. SAMPLES TESTS and NOTES MC Medium Clay - ALLUVIUM medium to high plasticity, dark grey, some fine gravel, moist, hard D 0.0-0.26m P > 450 kPa P 10 - dark grey-brown, stiff D 0.75-1.0m PP = 400 kPa P - dark grey-brown, stiff D 1.0-1.25m PP = 250 kPa P - dark brown, trace of fine gravel, hard D 1.5-1.75m PP > 450 kPa P - odark brown, trace of fine gravel, hard D 1.75-2.0m PP > 450 kPa P 2.0 - mottled pale and orange brown D 1.75-2.0m PP > 450 kPa P 3.0 - D 2.5-2.75m PP = 400 kPa D D 2.0 - D 1.75-2.0m P > 450 kPa D D 2.0 - D 2.5-2.75m PP = 400 kPa D D 2.0 - D 2.5-2.75m PP = 400 kPa D D	Location: Approximate chainage 46.4 km			Easting: 256190 Northing: 7387546		
Mc Medium Clay - ALLUVIUM medium to high plasticity, dark grey, some fine gravel, moist, hard D 0.0-0.25m PP >450 kPa 0 0.5-0.75m PP = 400 kPa 0 10 - dark grey-brown, stiff 0 0.75-1.0m PP = 250 kPa - dark brown, trace of fine gravel, hard 0 1.0-1.25m PP >450 kPa - dark brown, trace of fine gravel, hard 0 1.5-1.75m PP >450 kPa - tortited pale and orange brown 0 1.75-2.0m PP >450 kPa 0 0.20-2.25m PP >400 kPa 1.0-1.25m 0 0 0 1.5-1.75m PP >450 kPa 0 0 0 1.75-2.0m PP >450 kPa 0 0 2.0-2.25m PP >450 kPa 1.0-1.25m 0 0 0 0 0 1.75-2.0m PP >450 kPa 1.0-1.25m	Equip	ment	type: Caterpillar 432E backhoe with 600mm bucket		Elevation:	
medium to high plasticity, dark grey, some fine gravel, moist, hard D 0.25-0.5m PP >450 kPa D 0.5-0.75m PP = 400 kPa D 0.75-1.0m D 0.75-1.0m - dark grey-brown, stiff D 1.0-1.25m - dark brown, trace of fine gravel, hard D 1.25-1.5m - dark brown, trace of fine gravel, hard D 1.5-1.75m - dark brown, trace of fine gravel, hard D 1.5-1.75m - dark brown, trace of fine gravel, hard D 1.5-1.75m D 1.5-1.75m PP >450 kPa D 1.5-2.05m PP >450 kPa D 1.5-1.75m D 1.5-1.75m D 1.5-2.575m PP >450 kPa D 1.5-2.575m PP >450 kPa D 1.5-2.575m PP >450 kPa	DEPTH (m)	Aust	components, moisture, consistency, structure.			
1.0 - dark grey-brown, stiff D 0.25-0.5m PP = 400 kPa 1.0 - dark grey-brown, stiff D 0.75-1.0m PP = 250 kPa 1.0 - dark brown, trace of fine gravel, hard D 1.0-1.25m PP = 400 kPa 1.0 - dark brown, trace of fine gravel, hard D 1.25-1.5m PP >450 kPa 2.0 - mottled pale and orange brown D 1.75-2.0m PP >450 kPa 2.0 D 2.0-2.25m D 2.25-2.5m PP = 400 kPa 3.0 D 2.75-3.0m PP = 400 kPa D 2.75-3.0m				D 0.0-0.25m		
$ \begin{array}{c} $			medium to high plasticity, dark grey, some fine gravel, moist, hard	D 0 25-0 5m	PP >150 kPa	
1.0 - dark grey-brown, stiff D 0.75-1.0m PP = 250 kPa 1.0 - dark grey-brown, stiff D 1.0-1.25m PP = 250 kPa - dark brown, trace of fine gravel, hard D 1.25-1.5m PP >450 kPa - mottled pale and orange brown D 1.5-1.75m PP >450 kPa 2.0 D 1.5-2.0m PP >450 kPa 2.0 D 1.5-2.5m PP >450 kPa 0 2.0-2.25m D 2.5-2.75m PP = 400 kPa 0 2.75-3.0m D 2.75-3.0m PP = 400 kPa				D 0.23-0.311		
1.0 - dark grey-brown, stiff D 0.75-1.0m PP = 250 kPa 1.0 - dark grey-brown, stiff D 1.0-1.25m PP = 250 kPa - dark brown, trace of fine gravel, hard D 1.25-1.5m PP >450 kPa - mottled pale and orange brown D 1.5-1.75m PP >450 kPa 2.0 D 1.5-2.0m PP >450 kPa 2.0 D 1.5-2.5m PP >450 kPa 0 2.0-2.25m D 2.5-2.5m PP = 400 kPa 0 2.75-3.0m D 2.75-3.0m PP = 400 kPa						
$ \begin{array}{ c c c c c } & - & & & & & & & & & & & & & & & & & $				D 0.5-0.75m	PP = 400 kPa	
D 1.0-1.25m - dark brown, trace of fine gravel, hard - dark brown, trace of fine gravel, hard - mottled pale and orange brown 2.0 - mottled pale and orange brown D 1.5-1.75m D 1.5-1.75m D 1.5-2.0m D 1.75-2.0m D 2.0-2.25m D 2.25-2.5m D 2.25-2.5m D 2.25-2.5m D 2.75-3.0m P > 400 kPa				D 0.75-1.0m		
D 1.0-1.25m - dark brown, trace of fine gravel, hard - dark brown, trace of fine gravel, hard - mottled pale and orange brown 2.0 - mottled pale and orange brown D 1.5-1.75m D 1.5-1.75m D 1.5-2.0m D 1.75-2.0m D 2.0-2.25m D 2.25-2.5m D 2.25-2.5m D 2.25-2.5m D 2.75-3.0m P > 400 kPa						-
- dark brown, trace of fine gravel, hard D 1.25-1.5m PP >450 kPa - dark brown, trace of fine gravel, hard D 1.5-1.75m PP >450 kPa - mottled pale and orange brown D 1.75-2.0m PP >450 kPa 2.0 D 1.75-2.0m PP >450 kPa 0 D 2.0-2.25m D 2.0-2.25m D 2.5-2.75m PP = 400 kPa D 3.0 D 2.75-3.0m PD = 400 kPa	1.0		- dark grey-brown, stiff	D / A / A D	PP = 250 kPa	
 - dark brown, trace of fine gravel, hard - dark brown, trace of fine gravel, hard - mottled pale and orange brown - mottled pale and orange brown D 1.5-1.75m D 1.75-2.0m PP >450 kPa D 2.0-2.25m D 2.0-2.25m D 2.25-2.5m D 2.25-2.5m D 2.5-2.75m PP = 400 kPa D 2.75-3.0m 				D 1.0-1.25m		
 - dark brown, trace of fine gravel, hard - dark brown, trace of fine gravel, hard - mottled pale and orange brown - mottled pale and orange brown D 1.5-1.75m D 1.75-2.0m PP >450 kPa D 2.0-2.25m D 2.0-2.25m D 2.25-2.5m D 2.25-2.5m D 2.5-2.75m PP = 400 kPa D 2.75-3.0m 						
2.0 - mottled pale and orange brown 2.0 - mottled pale and orange brown D 1.75-2.0m D 2.0-2.25m D 2.25-2.5m D 2.5-2.75m PP = 400 kPa D 2.75-3.0m				D 1.25-1.5m		
2.0 - mottled pale and orange brown D 1.75-2.0m PP >450 kPa 2.0 D 2.0-2.25m D 2.0-2.25m D 2.25-2.5m D 2.5-2.75m PP = 400 kPa D 2.75-3.0m D 2.75-3.0m D 2.75-3.0m			- dark brown, trace of fine gravel, hard		PP >450 kPa	
2.0 D 1.75-2.0m PP >450 kPa				D 1.5-1.75m		
2.0 D 1.75-2.0m PP >450 kPa						
D 2.0-2.25m D 2.0-2.25m D 2.25-2.5m D 2.5-2.75m D 2.5-2.75m D 2.75-3.0m	2.0		- mottled pale and orange brown	D 1 75 0 0m		
D 2.25-2.5m D 2.25-2.5m D 2.5-2.75m D 2.5-2.75m D 2.75-3.0m	2.0			D 1.75-2.011	FF 2450 KFa	
D 2.5-2.75m PP = 400 kPa				D 2.0-2.25m		-
D 2.5-2.75m PP = 400 kPa						
D 2.75-3.0m				D 2.25-2.5m		-
3.0				D 2.5-2.75m	PP = 400 kPa	
3.0						
3.0				D 2 75-3 0m		
Pit Terminated @ 3.0m	3.0					
			Pit Terminated @ 3.0m			
						\vdash
Logged by: MJW					Logged by: M.IW	
Groundwater: nil Date: 23/10/07	Ground	dwate	er: nil			
This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i>					Transarihad but UED	
(1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples.	(1990),	by Go	older Associates Pty Ltd. Soil descriptions are based on original classification supported			





Queensland Government Department of Main Roads

Pro	ject:	: Fitzroy - Gladstone Pipeline	Pit No: TP124			
				Easting: 255871 Northing: 7387970 Elevation:		
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES			
		Medium Clay - ALLUVIUM				
		medium to high plasticity, dark grey, some fine gravel, moist, hard				
				PP >450 kPa		
1.0						
		- brown, very stiff				
		- blown, very sum				
				PP = 300 kPa		
2.0		- medium to high plasticity, mottled dark brown and grey, moist				
				PP = 300 kPa		
3.0						
		Pit Terminated @ 3.0m				
				Loggod by: MIW		
Groundwater: nil				Logged by: MJW		
				Date: 22/10/07		
geotec	hnical	Log record has been transcribed from the original Queensland Department of Main Roa "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2	2nd Edition			
(1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples.				Transcribed by: HEP		







Project: Fitzroy - Gladstone Pipeline				Pit No: TP125	
Location: Approximate chainage 45.7 km				Easting: 255584 Northing: 7388354	
Equip	oment	type: Caterpillar 432E backhoe with 600mm bucket		Elevation:	
DEPTH (m)	ust S	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
		Medium Heavy Clay (Possibly Residual)			
		medium to high plasticity, orange-brown, moist, very stiff, friable			
				PP = 300 kPa	
1.0					
		- pale brown			
2.0				PP = 300 kPa	
2.0					
		- mottled brown and grey			
				PP = 350 kPa	
3.0					
0.0		Pit Terminated @ 3.0m			
					<u> </u>
					<u> </u>
				Logged by: MJW	
Groundwater: nil			Date: 22/10/07		
This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i>			Transcribed by: HEP		
(1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples.					







Pro	ject	: Fitzroy - Gladstone Pipeline	Pit No: TP126			
Location: Approximate chainage 45.2 km (Station Ck)				Easting: 255282 Northing: 7388757		
		t type: Caterpillar 432E backhoe with 600mm bucket		Elevation:		
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES		
	MC	Medium Clay - ALLUVIUM				
		medium plasticity, dark grey, trace of fine gravel, dry, hard		PP >450 kPa	-	
		- mottled dark grey & dark brown, moist, stiff		PP = 200 kPa		
					_	
1.0						
1.0						
		- mottled pale brown and grey, moist, very stifft				
				PP = 300 kPa	_	
2.0						
					-	
					_	
3.0					_	
		Pit Terminated @ 3.0m				
					_	
					\vdash	
Grour	ndwate	er: nil		Logged by: MJW		
				Date: 22/10/07		
		Log record has been transcribed from the original Queensland Department of Main Roa				
		"Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2 older Associates Pty Ltd. Soil descriptions are based on original classification supported		Transcribed by: HEP		
		inspection of relevant soil samples.				





Pro	ject:	Fitzroy - Gladstone Pipeline	Pit No: TP127			
Location: Approximate chainage 44.6 km				Easting: 254984 Northing: 7389154		
Equi	oment	type: Caterpillar 432E backhoe with 600mm bucket		Elevation:		
DEPTH (m)	Aust S	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES		
		Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark grey, dry, hard		PP >450 kPa		
1.0		- pale brown		PP >450 kPa		
		- dark grey-brown		PP >450 kPa		
2.0				PP >450 kPa		
3.0					-	
		Pit Terminated @ 3.0m				
	ndwate		Logged by: MJW Date: 22/10/07			
geoteo (1990)	chnical), by Go	Log record has been transcribed from the original Queensland Department of Main Roa "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey</i> older Associates Pty Ltd. Soil descriptions are based on original classification supported inspection of relevant soil samples.	Transcribed by: HEP			





Pro	ject:	: Fitzroy - Gladstone Pipeline	Pit No: TP128			
Location: Approximate chainage 44.1 km				Easting: 254681 Northing: 7389558		
Equipment type: Caterpillar 432E backhoe with 600mm bucket				Elevation:		
DEPTH (m)	Aust S	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES		
		Medium Heavy Clay - ALLUVIUM				
		medium to high plasticity, dark grey, dry, hard		PP >450 kPa		
	HC	Heavy Clay				
		high plasticity, dark grey/black, moist, very stiff				
				PP = 350 kPa		
1.0						
1.0					-	
		Medium Heavy Clay				
		medium to high plasticity, mottled brown and grey, moist, very stiff		PP = 350 kPa		
				PP = 350 KFa		
2.0						
3.0		Pit Terminated @ 3.0m			┢──	
		l	<u> </u>	Logged by: MJW	<u> </u>	
Grour	ndwate	ər: nil		Date: 22/10/07		
				-		
geoteo (1990)	chnical), by Go	Log record has been transcribed from the original Queensland Department of Main Roa "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2</i> older Associates Pty Ltd. Soil descriptions are based on original classification supported inspection of relevant soil samples.	2nd Edition	Transcribed by: HEP		







Pro	ject:	Fitzroy - Gladstone Pipeline		Pit No: TP129			
Loca	tion: A	Approximate chainage 43.6 km		Easting: 254390 Northing: 73	89947		
Equi	oment	type: Caterpillar 432E backhoe with 600mm bucket		Elevation:			
DEPTH (m)	Aust S	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES			
	MHC	Medium Heavy Clay - ALLUVIUM					
		medium to high plasticity, dark grey, dry, hard		PP >450 kPa			
	MUC	Medium Lleon (Clau (Dessibly Desidual)		PP >450 kPa			
	MILC	Medium Heavy Clay (Possibly Residual) medium to high plasticity, brown, trace of fine gravel, dry, hard		PP >450 KPa			
1.0		- pale brown					
				PP >450 kPa			
2.0							
		- mottled brown and grey		PP >450 kPa			
3.0		Pit Terminated @ 3.0m					
<u> </u>				Logged by: MJW			
Grour	ndwate	er: nil		Date: 22/10/07			
		Log record has been transcribed from the original Queensland Department of Main Roa "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey</i> 2		Transmitted LLCD			
(1990)	, by Go	older Associates Pty Ltd. Soil descriptions are based on original classification supported inspection of relevant soil samples.		Transcribed by: HEP			







Department of Main Roads

Pro	ject:	Fitzroy - Gladstone Pipeline		Pit No: TP130	
Location: Approximate chainage 43.1 km				Easting: 254187 Northing: 7390392	
Equip	oment	type: Caterpillar 432E backhoe with 600mm bucket		Elevation:	
DEPTH (m)	Au	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
		Silty Loam - ALLUVIUM	D 0.0-0.25m		
		non-plastic, dark brown, trace of fine gravel, dry, hard			
			D 0.25-0.5m	PP >450 kPa	
	LMC	Light Clay	D 0.5-0.75m	PP >450 kPa	
		medium plasticity, dark brown, just moist, hard	D 0 75 1 0m		
		- mottled pale/yellow bown, trace fine gravel, moist, very stiff	D 0.75-1.0m		
1.0				PP 250-300 kPa	
			D 1.0-1.25m		
			D 1 25 1 5m		
			D 1.25-1.5m	PP >450 kPa	
			D 1.5-1.75m		
2.0	MC	Medium Clay (Possibly Residual) medium to high plasticity, mottled pale brown and grey, moist, hard	D 1.75-2.0m	PP = 400 kPa	
2.0			2		
			D 2.0-2.25m		
			D 2.25-2.5m		
			D 2.5-2.75m	PP = 400 kPa	
			D 2.75-3.0m		
3.0		Pit Terminated @ 3.0m			-
					<u> </u>
					-
					L
Groundwater: nil				Logged by: MJW Date: 22/10/07	
				4	
This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i>					
(1990)	, by Go	older Associates Pty Ltd. Soil descriptions are based on original classification supported		Transcribed by: HEP	
nstan	es by	inspection of relevant soil samples.		1	





Dro	icoti	Eitzrov Cladatana Dinalina		Dit No: TD121	
-		Fitzroy - Gladstone Pipeline	Pit No: TP131		
		Approximate chainage 42.7 km : type: Caterpillar 432E backhoe with 600mm bucket		Easting: 254053 Northing: 7390879 Elevation:)
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
	MHC	Medium Heavy Clay - ALLUVIUM medium plasticity, dark brown, moist, hard	D 0.0-0.25m	PP >450 kPa	
	MC	Medium Clay, sandy (Possibly Residual)	D 0.25-0.5m		
		low to medium plasticity, mottled pale / yellow brown, moist, stiff trace of fine gravel	D 0.5-0.75m	PP = 200 kPa	
		- very stiff to hard	D 0.75-1.0m	PP = 250 kPa	
1.0			D 1.0-1.25m	PP = 400 kPa	
			D 1.25-1.5m		
			D 1.5-1.75m	PP = 300 kPa	
2.0			D 1.75-2.0m	PP = 350 kPa	
			D 2.0-2.25m D 2.25-2.5m		
				PP = 300 kPa	
3.0			D 2.75-3.0m		
0.0		Pit Terminated @ 3.0m			
Groundwater: nil			Logged by: MJW Date: 22/10/07		
geotec (1990)	hnical , by Go	Log record has been transcribed from the original Queensland Department of Main Roa "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey</i> 3 older Associates Pty Ltd. Soil descriptions are based on original classification supported inspection of relevant soil samples.	2nd Edition	Transcribed by: HEP	







Pro	iect:	Fitzroy - Gladstone Pipeline	Pit No: TP132		
			Easting: 253925 Northing: 7391366 Elevation:		
DEPTH (m)	Aus	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
		Silty Loam - ALLUVIUM	D 0.0-0.25m	PP >450 kPa	
		low plasticity, pale brown (leahced), dry, hard	D 0.25-0.5m	PP = 200 kPa	
		Medium Heavy Clay medium to high plasticity, dark brown, occasional fine gravel, moist, stiff			
			D 0.5-0.75m	PP = 100 kPa	
			D 0.75-1.0m		
1.0				PP = 350 kPa	
		- brown mottled, very stiff to hard	D 1.0-1.25m		
			D 1.25-1.5m		
				PP = 300 kPa	
			D 1.5-1.75m		
2.0			D 1.75-2.0m	PP = 300 kPa	
			D 2.0-2.25m		
			D 2.25-2.5m		
			D 2.20 2.011	PP = 350 kPa	
			D 2.5-2.75m		
3.0			D 2.75-3.0m		
		Pit Terminated @ 3.0m			
Groundwater: nil			Logged by: MJW Date: 22/10/07		
This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i> (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples.			2nd Edition	Transcribed by: HEP	







Pro	ject	: Fitzroy - Gladstone Pipeline	Pit No: TP133		
Loca	tion: /	Approximate chainage 41.7 km		Easting: 253798 Northing: 7391847	
Equip	omen	t type: Caterpillar 432E backhoe with 600mm bucket		Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
	MHC	Medium Heavy Clay - ALLUVIUM	D 0.0-0.25m	PP >450 kPa	
		medium to high plasticity, dark grey-brown, just moist, hard			
			D 0.25-0.5m		
			-		
		- moist, stiff to very stiff	D 0.5-0.75m	PP = 150 kPa	
			D 0.5-0.75m		
			D 0.75-1.0m	PP = 250 kPa	
1.0					
	мнс	Medium Heavy Clay (Possibly Residual)	D 1.0-1.25m	PP >450 kPa	
		medium to high plasticity, mottled pale / yellow brown, moist, hard			
			D 1.25-1.5m		
				PP >450 kPa	
			D 1.5-1.75m		
2.0			D 1.75-2.0m		
				PP >450 kPa	
			D 2.0-2.25m		
			D 2.25-2.5m		
			D 2.20 2.011		
			D 2.5-2.75m	PP >450 kPa	
			D 0 75 0 0m		
3.0			D 2.75-3.0m		
		Pit Terminated @ 3.0m			
Grour	ndwate	er: nil		Logged by: MJW	
				Date: 22/10/07	
		Log record has been transcribed from the original Queensland Department of Main Roa		1	
(1990)	, by Go	"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey</i> older Associates Pty Ltd. Soil descriptions are based on original classification supported inspection of relevant soil samples.		Transcribed by: HEP	





Project: Fitzroy - Gladstone Pipeline	Pit No: TP134
Location: Approximate chainage 41.2 km Equipment type: Caterpillar 432E backhoe with 600mm bucket	Easting: 253671 Northing: 7392332 Elevation:
Image: Construct of the second and	AMPLES TESTS and NOTES
MHC Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark brown, dry, hard	PP >450 kPa
brown, trace of fine gravel, very stiff 1.0 MHC Medium Heavy Clay - RESIDUAL Pale brown, fine to medium gravel, hard	PP = 350 kPa
	PP >450 kPa
2.0	
3.0 mottled pale brown and grey	PP >450 kPa
Pit Terminated @ 3.0m	
Groundwater: nil	Logged by: MJW Date: 22/10/07
This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd I</i> (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in s instances by inspection of relevant soil samples.	Edition Transcribed by: HEP







Location: Approximate change 40.8 km Ecq0ment type: Caterplier 432: backhoe with 600nm bucket Equation:	Project: Fitzroy - Gladstone Pipeline		Pit No: TP135			
Soll_DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary pomponenis, moistime, structure, weathering, strength, defects SAMPLES TESTS and NOTES HC Heavy Clay - ALLUVUM Monograduation of the strength of the structure, weathering, strength, defects PP - 450 MPa 10 - eark brown, moist, friable - eark brown, moist, friable PP - 450 MPa - dry, hard - eark brown, moist, friable PP - 450 MPa - dry, hard - eark brown, moist, friable PP - 450 MPa - dry, hard - eark brown, moist, friable PP - 450 MPa - dry, hard - eark brown, moist, friable PP - 450 MPa - dry, hard - eark brown, moist, friable - eark brown, moist, friable - dry, hard - eark brown, moist, friable - eark brown, moist, friable - dry, hard - eark brown, moist, friable - eark brown, moist, friable - dry, hard - eark brown, moist, friable - eark brown, moist, friable - eark brown, moist, friable - dry, hard - eark brown, moist, friable - eark brown, moist, friable - eark brown, moist, friable - dry, hard - eark brown, moist, friable - eark brown, moist, friable - eark brown, moist, friable - dry, hard -	Loca	tion: A	Approximate chainage 40.8 km		Easting: 253537 Northing: 7392841	
HC Heavy Clay - ALLUVIUM high plasticity, dark grey / black, trace gravet, just moist, hard high plasticity, dark grey / black, trace gravet, just moist, hard PP >450 kPa - dark brown, moist, frable - dark brown, frab	Equi	omen	t type: Caterpillar 432E backhoe with 600mm bucket		Elevation:	
nigh pleatioly, dark grey / black, trace gravel, just moist, hard PP >450 kPa - dark brown, moist, friable PP = 350 kPa - dark brown, moist, friable PP = 350 kPa - dark brown, moist, friable PP >450 kPa	DEPTH (m)	Aust SC	components, moisture, consistency, structure.			
- dark brown, molat, friable - dark brown, molat, friable - dark brown, molat, friable - dark brown, molat, friable - dry, hard 20 PP >450 kPa PP >450 kPa PP >450 kPa PP >450 kPa PP >450 kPa PP >450 kPa PP >450 kPa PD >450 kPa						
- disk brown, molst, friable - disk brown, molst, friable - disk, brown, molst, friable, brown, molst, friable, brown, molst, brown, molst, brown, molst, friable, brown, molst, brown, molst, friable, brown, molst, brown, molst, friable, brown, molst, brown, molst, brown, molst, brown, molst, brown, molst, brown,			high plasticity, dark grey / black, trace gravel, just moist, hard		PP >450 kPa	
10 PP = 350 kPa - dry, hard PP > 450 kPa 2.0 PP > 450 kPa 3.0 Pit Terminated @ 3.0m 3.0 Pit Terminated @ 3.0m Groundwater: nil Logged by: MJW Date: 22/10/07 Transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Class Survey 200 dEdition" Transcribed by: HEP					11 - +00 KI a	
10 PP = 350 kPa - dry, hard PP > 450 kPa 2.0 PP > 450 kPa 3.0 Pit Terminated @ 3.0m 3.0 Pit Terminated @ 3.0m Groundwater: nil Logged by: MJW Date: 22/10/07 Transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Class Survey 200 dEdition" Transcribed by: HEP						
10 PP = 350 kPa - dry, hard PP > 450 kPa 2.0 PP > 450 kPa 3.0 Pit Terminated @ 3.0m 3.0 Pit Terminated @ 3.0m Groundwater: nil Logged by: MJW Date: 22/10/07 Transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Department of Man Roads geotechnical "Pt Log record has been transcribed from the original Queensiand Class Survey 200 dEdition" Transcribed by: HEP						
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- dry, hard PP >450 kPa 20 - dry, hard 20 PP >450 kPa 3.0 Pit Terminated @ 3.0m 3.0 Pit Terminated @ 3.0m Groundwater: nil Logged by: MJW Date: 22/10/07 Tris Test Pit Log record has been transcribed from the original Queerstand Department of Main Roads geolebrinkal "Pit Log" record, into terminology consistent with "TPe Australian Sale Lad Survey 20d Edition Transcribed by: HEP			- dark brown, moist, friable			
2.0 PP >450 kPa 2.0 Pit Terminated @ 3.0m 3.0 Pit Terminated @ 3.0m 3.0 Pit Terminated @ 3.0m Groundwater: nil Logged by: MJW Date: 22/10/07 Tris Test Pit Log record, into terminology consistent with <i>The Australian Soli and Land Survey 2nd Edition</i> This Test Pit Log record, into terminology consistent with <i>The Australian Soli and Land Survey 2nd Edition</i> Transcribed by: HEP	1.0				PP = 350 kPa	
2.0 PP >450 kPa 2.0 Pit Terminated @ 3.0m 3.0 Pit Terminated @ 3.0m 3.0 Pit Terminated @ 3.0m Groundwater: nil Logged by: MJW Date: 22/10/07 Tris Test Pit Log record, into terminology consistent with <i>The Australian Soli and Land Survey 2nd Edition</i> This Test Pit Log record, into terminology consistent with <i>The Australian Soli and Land Survey 2nd Edition</i> Transcribed by: HEP						
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3.0 Pit Terminated @ 3.0m 3.0 Pit Terminated @ 3.0m Groundwater: nil Image: State of the state of the original Gueensiand Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i> groups the state of the original Gueensiand Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i> (Transcribed by: HEP					PP >450 kPa	
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Pit Terminated @ 3.0m Pit Terminated @ 3.0m Logged by: MJW Logged by: MJW Date: 22/10/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i> (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some						
Pit Terminated @ 3.0m Pit Terminated @ 3.0m Logged by: MJW Logged by: MJW Date: 22/10/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i> (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some						
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Groundwater: nil Logged by: MJW Date: 22/10/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i> (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some	3.0					
Groundwater: nil Date: 22/10/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads Date: 22/10/07 geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i> Transcribed by: HEP			Pit Terminated @ 3.0m			
Groundwater: nil Date: 22/10/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads Date: 22/10/07 geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i> Transcribed by: HEP						
Groundwater: nil Date: 22/10/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads Date: 22/10/07 geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i> Transcribed by: HEP	L					
Groundwater: nil Date: 22/10/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads Date: 22/10/07 geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i> Transcribed by: HEP						
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Groundwater: nil Date: 22/10/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads Date: 22/10/07 geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i> Transcribed by: HEP	-					
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Groundwater: nil Date: 22/10/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads Date: 22/10/07 geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i> Transcribed by: HEP						
Groundwater: nil Date: 22/10/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads Date: 22/10/07 geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i> Transcribed by: HEP					Llogged by: MIW	
This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i> (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some	Grou	ndwate	ər: nil			
geotechnical "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2nd Edition</i> (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some					Bato. 22/10/01	
	geoteo (1990)	chnical), by Go	"Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2 older Associates Pty Ltd. Soil descriptions are based on original classification supported	2nd Edition	Transcribed by: HEP	





Pro	ject	: Fitzroy - Gladstone Pipeline		Pit No: TP136	
Loca	tion: A	Approximate chainage 40.2 km		Easting: 253413 Northing: 7393310	
Equip	omen	t type: Caterpillar 432E backhoe with 600mm bucket		Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure.	SAMPLES	TESTS and NOTES	
		ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.			
	SCL	Sandy Clay Loam			
	ЦС	low plasticity, pale brown, just moist (desiccated), very stiff, friable Heavy Clay		PP = 300 kPa	
		high plasticity, yellowish and orange-brown, moist, stiff			
				PP = 150 kPa	
1.0					
		í 			
		- dark brown, trace of fine gravel, dry, hard			
				PP >450 kPa	
2.0					
3.0					
		Pit Terminated @ 3.0m			
				Loggod by: MIW	
Grour	ndwate	ər: nil		Logged by: MJW	
				Date: 22/10/07	
geoteo (1990)	hnical , by Go	Log record has been transcribed from the original Queensland Department of Main Roa "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2</i> older Associates Pty Ltd. Soil descriptions are based on original classification supported inspection of relevant soil samples.	2nd Edition	Transcribed by: HEP	
instant		inspesses of folovant our outpied.			





Pro	ject	: Fitzroy - Gladstone Pipeline		Pit No: TP137	
Loca	tion: A	Approximate chainage 39.7 km		Easting: 253293 Northing: 7393769	
Equip	omen	t type: Caterpillar 432E backhoe with 600mm bucket		Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
	LC	Light Clay - ALLUVIUM			
		low to medium plasticity, dark grey / black, trace of fine gravel, dry, hard		PP >450 kPa	
	ZCL	Silty Clay Loam			
		low plasticity, dark brown, trace of fine gravel, dry, very stiff			
				PP = 350 kPa	
					-
1.0					
		Liekt Clau			
	LC	Light Clay low to medium plasticity, dark brown, dry, hard		PP >450 kPa	-
		iow to meaning pasiety, dark brown, dry, nard			
		low plasticity fines, with fine sand and fine to medium gravel (50%), dry			
2.0					
	HC	Heavy Clay			
	ne	high plasticity, dark grey, dry, hard		PP >450 kPa	
3.0		Pit Terminated @ 3.0m			
					-
					-
Grour	ndwate	er: nil		Logged by: MJW	
0.001				Date: 22/10/07	
This T	est Pit	Log record has been transcribed from the original Queensland Department of Main Roa	ds	1	
geoteo	chnical	"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey 2</i> older Associates Pty Ltd. Soil descriptions are based on original classification supported	2nd Edition	Transcribed by: HEP	
		inspection of relevant soil samples.	III SUITE	· ·	







Pro	ject:	Fitzroy - Gladstone Pipeline		Pit No: TP138	
	-	Approximate chainage 39.2 km (Bob Ck)		Easting: 253164 Northing: 7394259	
Equip	oment	type: Caterpillar 432E backhoe with 600mm bucket		Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
	LS	Loamy Sand - ALLUVIUM	D 0.0-0.25m		
		fine grained, low to medium plasticity, brown, dry, loose			
	МС	Medium Clay low to medium plasticity, brown, trace of fine gravel, moist, stiff	D 0.25-0.5m	PP = 100 kPa	
			D 0.5-0.75m		
	мнс	Medium Heavy Clay	D 0.75-1.0m	PP = 100 kPa	
1.0		medium heavy olay medium the plasticity, mottled dark brown and brown, moist, very stiff trace of fine to medium gravel	D 1.0-1.25m	PP = 200 kPa	
			D 1.25-1.5m		
			D 1.5-1.75m	PP = 400 kPa	
2.0	MC	Medium Clay - RESIDUAL low to medium plasticity, pale brown, fine and medium gravel, moist, hard	D 1.75-2.0m	PP >450 kPa	
			D 2.0-2.25m		
			D 2.25-2.5m		
			D 2.5-2.75m		
			D 2.75-3.0m	PP >450 kPa	
3.0		Pit Terminated @ 3.0m			
					<u> </u>
					-
					<u> </u>
					<u> </u>
Grour	ndwate	er: nil		Logged by: MJW Date: 22/10/07	1
geoteo (1990)	chnical), by Go	Log record has been transcribed from the original Queensland Department of Main Roa "Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey</i> older Associates Pty Ltd. Soil descriptions are based on original classification supported inspection of relevant soil samples.	2nd Edition	Transcribed by: HEP	







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP151 Location: Midgee to Gavial Coordinates: Е Ν m AHD Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, ٤ SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects. HC Heavy Clay - ALLUVIUM D 0.0-0.25m high plasticity, grey-brown, trace sand, organics, moist, strong, poor pedology - predominantly grey D 0.25-0.5m D 0.5-0.75m D 0.75-1.0m 1.0 PP=350-450kPa D 1.0-1.25m D 1.25-1.5m D 1.5-1.75m LC Light Clay, sandy Seepage Layer 2.0 low plasticity, red-brown mottled grey, fine sand, very moist, weak D 1.75-2.0m MC Medium Clav medium plasticity, grey, some fine sand, root fibres, just moist, strong D 2.0-2.25m PP=310-350kPa D 2.25-2.5m D 2.5-2.75m - becoming red-brown mottled D 2.75-3.0m 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HEP (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some nstances by inspection of relevant soil samples



Test Pit Log



CENTRAL QUEENSLAND Queensland GEOTECHNICAL UNIT 216 Richardson Road North Rockhampton

Phone 49230712 Facsimile 49230753 Project: Gladstone-Fitzroy Water Pipeline Pit No: TP152 Location: Midgee to Gavial Easting: 249948 Northing: 7400854 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, DEPTH (m) SC secondary components, moisture, consistency, structure. SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects. HC Heavy Clay - ALLUVIUM high plasticity, dark brown, moist, strong, indistinct pedology HC Heavy Clay high plasticity, grey-brown, moist, strong, massive 1.0 PP=320-440kPa s Sand Fine to medium grained, pale brown, wet, weak, single grained MHC Medium Heavy CLAY medium to high plasticity, orange-brown mottled grey, some fine sand, moist, 2.0 strong, massive PP=320-400kPa 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HEP (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some nstances by inspection of relevant soil samples.







CENTRAL QUEENSLAND QueenslandCENTRAL QUEENSLAND
GEOTECHNICAL UNIT
216 Richardson Road North Rockhampton Phone 49230712 Facsimile 49230753

Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP15	3	
Loca	tion: N	Aidgee to Gavial		Easting: 249745	Northing: 7401307	
Equip	oment	type: Backhoe - 600mm Bucket		Elevation:		
(u)	sc	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour,				
DEPTH (m)	Aust S	secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength,	SAMPLES		S and	
DEI	A	defects.		NO	TES	
	HC	Heavy Clay - ALLUVIUM				
		high plasticity, dark grey-brown, moist, moderately strong, indistinct pedology				
-		grey-brown, strong, massive				
				PP=250-420kPa		
				FF-230-420KFa		
1.0						
-						
	S	SAND				
-		Fine to medium grained, pale brown, wet, weak, single grained				
	MC	Medium Heavy CLAY medium to high plasticity, red & orange-brown mottled grey, some fine sand,				
		moist, strong, massive				
2.0						
-						
-						
		- moderate-strong		PP=140-180kPa		
3.0						
-		Pit Terminated @ 3.0m				
-						
						<u> </u>
-				Originally Logged b	y: JPT & MJW	-
Grour	ndwate	r: nil		Date:		
This T	est Pit L	og record has been transcribed from the original Queensland Department of Main F	loads	1		
geoteo	chnical "	Pit Log" record, into terminology consistent with The Australian Soil and Land Surve	y 2nd Edition	Transcribed by: HE	P	
		der Associates Pty Ltd. Soil descriptions are based on original classification support	eu in some	Í		







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP154 Location: Midgee to Gavial Easting: 249565 Northing: 7401770 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects HC Heavy Clay - ALLUVIUM high plasticity, dark brown, just moist, strong - brown PP=200-300kPa 1.0 pale grey, moist, structure evident (slicken sided fissuring) 2.0 PP=250-350kPa PP=200-250kPa 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP155	
		Gavial to Rocklands type: Backhoe - 600mm Bucket		Easting: 249413 Northing:7402261 Elevation:	
		SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour,			
DEPTH (m)	Aust SC	secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength,	SAMPLES	TESTS and NOTES	
		defects. Silty Clay Loam - ALLUVIUM	D 0.0-0.25m		1
	201	medium plasticity, grey-brown, root fibres, dry, strong, peds to 10mm	D 0.0-0.2011		
	LC	Light Clay			
		low plasticity, grey-brown, fine gravel (5mm), just moist, very strong	D 0.25-0.5m		
	MC	Medium Clay		PP >600kPa	
		medium plasticity, grey & red-brown, just moist, very strong, some structure			
			D 0.75-1.0m		
1.0					
-			D / 05 / 5		
-	мнс	Medium Heavy Clay	D 1.25-1.5m		
		high plasticity, grey mottled brown, moist, strong, structured, slicken sided			
2.0			D 1.75-2.0m		
				PP=350-500kPa	
			D 2.25-2.5m		
2.0			D 2.75-3.0m		
3.0		Pit Terminated @ 3.0m			
					
					┣—
					<u> </u>
					
					<u> </u>
				Originally Logged by: JPT & MJW	1
Grour	ndwate	r: nil			
				Date:	
		.og record has been transcribed from the original Queensland Department of Main F Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Surve</i>		Trans a sile at la LUCD	
(1990)	, by Gol	lder Associates Pty Ltd. Soil descriptions are based on original classification suppor		Transcribed by: HEP	
instand	es by ii	nspection of relevant soil samples.			







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP159 Location: Gavial to Rocklands Easting: 248352 Northing: 7403859 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects LMC Light Medium Clay - ALLUVIUM low to medium plasticity, dark grey, traces of fine gravel, dry, moderate-strong D 0.0-0.6m PP=335kPa D 0.6-0.9m D 0.9-2.1m - dark brown, very strong PP >600kPa 1.0 - pale brown, moist, strong PP=440kPa 2.0 D 2.1-3.0m - mottled grey, very strong PP=560kPa 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 03/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP160 Location: Gavial to Rocklands Easting: 247989 Northing: 7404338 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects LMC Light Medium Clay - ALLUVIUM low to medium plasticity, dark grey, traces of fine gravel, dry, moderate-strong D 0.0-0.5m PP=405kPa D 0.5-1.1m - dark brown, very strong PP >600kPa 1.0 D 1.1-1.4m PP >600kPa - mottled brown, moist, strong PP=425kPa 2.0 D 1.4-3.0m 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 03/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP161 Location: Gavial to Rocklands Easting: 247736 Northing: 7404773 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects LMC Light Medium Clay - ALLUVIUM low to medium plasticity, dark grey, traces of fine gravel, dry, very strong PP >600kPa -dark grey, moist PP=465kPa 1.0 - mottled grey PP=550kPa 2.0 - mottled brown PP=490kPa 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 03/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP162 Easting: 247710 Location: Gavial to Rocklands Northing: 7405326 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects LMC Light Medium Clay - ALLUVIUM D 0.0-0.5m low to medium plasticity, brown, traces of fine gravel, dry, very strong D 0.5-0.8m 1.0 D 0.8-2.4m 2.0 D 2.4-3.0m 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP163 Location: Gavial to Rocklands Easting: 247473 Northing: 7405690 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects мнс Medium Heavy Clay - ALLUVIUM high plasticity, dark grey-brown, moist, very strong, indistinct pedology D 0.0-0.9m PP=575kPa D 0.9-1.1m 1.0 - mottled grey PP >600kPa 2.0 LMC Light Medium Clay D 2.0-2.3m low to medium plasticity, grey mottled orange-brown, trace fine gravel, moist, PP >600kPa very strong D 2.25-2.5m 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 03/09/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HEP (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP165 Location: Rocklands to Archer Park Easting: 246779 Northing: 7406343 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects ZCL Silty Clay Loam - ALLUVIUM D 0.0-0.25m low to medium plasticity, dark grey, root fibres, trace of fine gravel, just moist, very strong, poor ped development PP >600kPa D 0.25-0.5m D 0.5-0.75m D 0.75-1.0m PP >600kPa 1.0 D 1.0-1.25m PP=600kPa LC Light Clay D 1.25-1.5m PP=505kPa low plasticity, grey mottled pale brown & orange, just moist, very strong MC Medium Clay - RESIDUAL medium plasticity, grey & red-brown, just moist, very strong, structured D 1.5-1.75m - trace fine gravel (2-3mm) 2.0 D 1.75-2.0m PP=530kPa D 2.25-2.5m D 2.5-2.75m MHC Medium Heavy Clay PP > 600 kPamedium to high plasticity, grey, trace organic matter, moist, very strong D 2.75-3.0m 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 30/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HEP (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP166 Location: Rocklands to Archer Park Easting: 246376 Northing: 7406640 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects MC Medium Clay - ALLUVIUM D 0.0-0.25m medium plasticity, dark grey, root fibres, moist, moderately weak D 0.25-0.5m PP=475kPa MHC Medium Heavy Clay PP=370kPa medium to high plasticity, grey, moist, moderately strong D 0.5-0.75m D 0.75-1.0m 1.0 - dark grey, trace of fine gravel, very strong D 1.0-1.25m PP=535kPa D 1.25-1.5m D 1 5-1 75m PP=540kPa 2.0 D 1.75-2.0m - with black organic matter, strong D 2.0-2.25m D 2.25-2.5m PP=410kPa D 2.5-2.75m D 2.75-3.0m 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 30/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HEP (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some nstances by inspection of relevant soil samples



Test	Pit	Log	

Department of Main Roads

Queensland Government CENTRAL QUEENSLAND GEOTECHNICAL UNIT 216 Richardson Road North Rockhampton Phone 4923 0712 Facsimile 4923 0753

Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP167	
		Rocklands to Archer Park t type: Backhoe - 600mm Bucket		Easting: 245957 Northing: 7406971 Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency / structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS AND NOTES	
	MC	Medium Clay - ALLUVIUM medium plasticity, dark grey/grey-brown, trace fine gravel, dry, friable	D 0.0-0.25m D 0.25-0.5m	PP >600kPa	
	HC	Heavy Clay high plasticity, dark grey, traces of fine gravel, moist	D 0.5-0.75m D 0.75-1.0m	PP=515kPa	
1.0		- moderate-strong	D 1.0-1.25m	PP=395kPa	
			D 1.25-1.5m D 1.5-1.75m		
			D 1.75-2.0m		
2.0		- mottled orange & grey, very moist, moderate strength	D 2.0-2.25m	PP=285kPa	
			D 2.25-2.5m D 2.5-2.75m		
			D 2.75-3.0m	PP=275kPa	
3.0		Pit Terminated @ 3.0m			
				Logged by: JPT & MJW	
Grour		er: nil	Main Roads	Date: 03/09/07	
geotec	hnical	"Pit Log" record, into terminology consistent with <i>The Australian Soil and Land</i>)), by Golder Associates Pty Ltd. Soil		Transcribed by: HEP	







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP168 Location: Rocklands to Archer Park Easting: 245524 Northing: 7407225 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects ZCL Silty Clay Loam - ALLUVIUM D 0.0-0.25m low to medium plasticity, dark grey-brown, root fibres, moist, moderate strong, peds to 10mm D 0.25-0.5m - predominantly dark grey, trace root fibres & organics D 0.5-0.75m D 0.75-1.0m 1.0 D 1.0-1.25m MC Medium Clay - RESIDUAL medium plasticity, with silt, grey and red-brown, trace of fine gravel, moist, D 1.25-1.5m strong D 1.5-1.75m 2.0 D 1.75-2.0m D 2.25-2.5m D 2.5-2.75m D 2.75-3.0m 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 30/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP169 Location: Rocklands to Archer Park Easting: 245114 Northing: 7407507 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects Medium Clay - ALLUVIUM MC D 0.0-0.25m medium plasticity, with silt, grey-brown, root fibres, moist, weak LC Light Clay D 0.25-0.5m low plasticity, with silt, dark brown, organic matter, moist, weak - moderate D 0.5-0.75m D 0.75-1.0m 1.0 D 1.0-1.25m with more dark grey/black organic matter D 1.25-1.5m MC Medium Clay medium plasticity, with fine gravel (3-5mm), grey, very moist, weak D 1.5-1.75m 2.0 D 1.75-2.0m Light Clay LC low plasticity, grey and pale brown, moist, weak-moderate D 2.0-2.25m D 2.25-2.5m some red-brown D 2.5-2.75m D 2.75-3.0m 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 30/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HEP (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some nstances by inspection of relevant soil samples.







Phone 49230712 Facsimile 49230753 Project: Gladstone-Fitzroy Water Pipeline Pit No: TP171 Location: Rocklands to Archer Park Easting: 254460 Northing: 7470880 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects MHC Medium Heavy Clay - ALLUVIUM D 0.0-0.25m medium to high plasticity, dark grey, trace of fine gravel, trace organics, PP >600kPa dry, very strong, structured D 0.25-0.5m D 0.5-0.75m D 0.75-1.0m - no organics 1.0 D 1.0-1.25m D 1.25-1.5m PP=530kPa D 1.5-1.75m D 1.75-2.0m HC Heavy Clay 2.0 high plasticity, mottled grey & orange-brown, moist, very strong D 2.0-2.25m PP=575kPa D 2.25-2.5m D 2.5-2.75m 3.0 D 2.75-3.0m Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 31/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Test Pit Log Rockhampton Phone 49230712 Facsimile 49230753

Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP172	
		Rocklands to Archer Park		Easting: 244153 Northing: 7407981	
Equip	oment	type: Backhoe - 600mm Bucket		Elevation:	
(u)	sc	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour,			
Η	stS	secondary components, moisture, consistency, structure.	SAMPLES	TESTS and	
DEPTH (m)	Aust :	ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.		NOTES	
					1
	CL	Clay Loam - ALLUVIAL	D 0.0-0.25m		
		low to medium plasticity, dark grey, root fibres, traces of fine gravel, dry, stror	g	PP >600kPa	
			D 0.25-0.5m		
	LC	Light Clay			
		low plasticity, grey, trace sand & gravel, moist, very strong			
			D 0.5-0.75m		
			2 0.0 0.1 0	PP >600kPa	
			D 0 75 4 0m	FF 2000KFa	
			D 0.75-1.0m		
		- Pale brown & grey			
1.0				PP=520kPa	
			D 1.0-1.25m		
	MC	Medium Clay - Possibly RESIDUAL	D 1.25-1.5m		
	WIO		D 1.20 1.0m	PP=600kPa	
		medium plasticity, mottled grey & orange-brown, moist, very strong		PP=000kPa	
			D 1.5-1.75m		
2.0			D 1.75-2.0m		
		traca of organia mottor, moderata atrong	+	- PP=365kPa	
		- trace of organic matter, moderate-strong		FF-303KFa	
			D 2.0-2.25m		
			D 2.5-2.75m		
			D 2.75-3.0m	PP=395kPa	
3.0			2.10 0.011		
5.0		Dit Torminated @ 2.0m			
		Pit Terminated @ 3.0m			
		1	l	Originally Logged by: JPT & MJW	
Grour	ndwate	r: nil		Chigh any Logged by. JF I & 10000	
Cioul	.awate			Date: 31/08/07	
This T	est Pit I	og record has been transcribed from the original Queensland Department of Main	Roads	1	
geoteo	hnical "	Pit Log" record, into terminology consistent with The Australian Soil and Land Surv	ey 2nd Edition	Transcribed by: HEP	
		Ider Associates Pty Ltd. Soil descriptions are based on original classification support	ted in some	TAIISCIDEU DY. HEF	
Instant	ces by ir	nspection of relevant soil samples.			







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP173 Location: Rocklands to Archer Park Easting: 243758 Northing: 7408126 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects Clay Loam - ALLUVIAL CL low to medium plasticity, dark grey, root fibres, traces of fine gravel, dry, strong PP >600kPa PP=410kPa 1.0 LMC Light Medium Clay - Possibly RESIDUAL low to medium plasticity, grey & orange-brown, moist, very strong PP=500kPa 2.0 PP=425kPa 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 31/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP180 Location: Archer Park North Easting: 241128 Northing: 7409351 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects MHC Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark brown, just moist, strong - pale brown PP=470kPa 1.0 PP >600kPa grey mottled orange-brown, moist PP=360kPa 2.0 Clayey Sand, gravelly - Possibly RESIDUAL CS medium grained, low plasticity fines, fine - medium gravel, grey mottled orange-brown, moist, moderate-strong 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 30/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HEP (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP181 Easting: 240622 Location: Archer Park North Northing: 7409321 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects MHC Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark brown, moist, strong MC Medium Clay, sandy PP >600kPa medium plasticity, fine to medium sand, dark brown, just moist, very strong 1.0 PP=475kPa - pale grey mottled orange-brown, strong PP=465kPa 2.0 - dry 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 30/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP182 Easting: 240125 Location: Archer Park North Northing: 7409423 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects MHC Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark brown, moist, strong MC Medium Clay, sandy medium plasticity, fine to medium sand, dark brown, just moist, very strong PP >600kPa 1.0 pale grey mottled orange-brown PP >600kPa 2.0 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 30/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP184 Easting: 239216 Location: Archer Park North Northing: 7409784 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects MHC Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark brown, moist, strong PP >600kPa MC Medium Clay, sandy medium plasticity, fine to medium sand, dark brown, just moist, very strong PP >600kPa 1.0 - pale grey PP=505kPa 2.0 pale grey mottled orange-brown, moist, strong PP=335kPa 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 30/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP185 Easting: 238704 Location: Archer Park North Northing: 7409838 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects MHC Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark brown, moist, strong MC Medium Clay, sandy medium plasticity, fine to medium sand, dark brown, moist, moderate-strong PP=315kPa 1.0 pale grey PP=470kPa 2.0 - pale grey mottled orange-brown PP=385kPa 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 30/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Test Pit Log Rockhampton Phone 49230712 Facsimile 49230753

Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP186					
		Archer Park North type: Backhoe - 600mm Bucket		Easting: 238198 Northing: 7409907 Elevation:					
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES						
	MHC	Medium Heavy Clay - ALLUVIUM							
		medium to high plasticity, dark brown, moist, strong							
	МС	Medium Clay, condy							
	WC	Medium Clay, sandy medium plasticity, fine to medium sand, dark brown, just moist, very strong		PP >600kPa					
1.0									
2.0									
		- pale grey mottled orange-brown		PP >600kPa					
3.0		Pit Terminated @ 3.0m							
		Ç							
				Originally Logged by: JPT & MJW					
Grour	ndwate	r: nil		Date: 30/08/07					
geoteo	This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HED								
		der Associates Pty Ltd. Soil descriptions are based on original classification support respection of relevant soil samples.		-					







Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP191	
		Archer Park North type: Backhoe - 600mm Bucket		Easting: 235982 Northing: 7410192 Elevation:	
DEPTH (m)	t SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES	
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark grey, just moist, very strong		PP >600kPa	
		- moist, moderate strength		PP=200kPa	
1.0					
2.0					
		- pale brown mottled grey, strong		PP=400kPa	
3.0					
		Pit Terminated @ 3.0m			
Grou	ndwater	I	L	Originally Logged by: JPT & MJW Date: 27/08/07	1
geoteo (1990)	chnical "), by Gol	og record has been transcribed from the original Queensland Department of Main R Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Surve</i> Ider Associates Pty Ltd. Soil descriptions are based on original classification support nspection of relevant soil samples.	y 2nd Edition	Transcribed by: HEP	







Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP192	
		Archer Park North		Easting: 235618 Northing: 7410237	
		type: Backhoe - 600mm Bucket		Elevation:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure.			
EPT	Aust	ROCK DESCRIPTION: lithology, colour, structure, weathering, strength,	SAMPLES	TESTS and NOTES	
DE		defects.		NOTES	
	MHC	Medium Heavy Clay - ALLUVIUM			
		medium to high plasticity, dark grey, moist, moderate strength		PP=145kPa	
		- very strong		PP >600kPa	
		ion y outering			
1.0					
2.0					
3.0					
		Pit Terminated @ 3.0m			
		_			
Grour	ndwate	r: nil		Originally Logged by: JPT & MJW	
				Date:	
		og record has been transcribed from the original Queensland Department of Main Ro Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Survey</i>			
(1990)	, by Gol	der Associates Pty Ltd. Soil descriptions are based on original classification supporte		Transcribed by: HEP	
Instan	ces by ir	nspection of relevant soil samples.			







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP193 Easting: 235200 Location: Archer Park North Northing: 7410287 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects HC Heavy Clay - ALLUVIUM plasticity, dark grey, very moist, moderate strength PP=155kPa 1.0 PP=465kPa moist, strong 2.0 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 27/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP194 Location: Archer Park North Easting: 234853 Northing: 7410330 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects LMC Light Medium Clay - ALLUVIUM low to medium plasticity, dark grey, moist, strong PP=320kPa MC Medium Clay medium plasticity, pale brown, traces of fine gravel, moist, moderate strength PP=170kPa 1.0 PP >600kPa MHC Medium Heavy Clay medium to high plasticity, mottled light brown & grey, very moist, strong moist 2.0 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 27/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP195 Location: Archer Park North Easting: 234451 Northing: 7410537 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects LMC Light Medium Clay - ALLUVIUM low to medium plasticity, dark grey, moist, strong PP=440kPa PP=515kPa - pale brown, with dark grey (black) inclusions 1.0 Light Medium Clay - RESIDUAL LMC PP >600kPa pale brown, traces of fine gravel, very strong LC Light Clay, gravelly low plasticity, fine to medium gravel, pale brown, dry 2.0 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 27/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP196 Easting: 234322 Location: Archer Park North Northing: 7410880 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects Clay Loam - ALLUVIAL CL low to medium plasticity, dark grey, moist MHC Medium Heavy Clay medium to high plasticity, darl grey, moist, strong PP=535kPa 1.0 LC Light Clay, gravelly low to medium plasticity fines; poorly graded fine to medium gravel, dark PP >600kPa grey, moist, very strong pale brown - RESIDUAL PP=590kPa 2.0 Weathered Rock - GRANITE Extremely Weathered 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 27/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HEP (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some instances by inspection of relevant soil samples.







Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP197	
		Archer Park North		Easting: 234182 Northing: 7411239	
		type: Backhoe - 600mm Bucket		Elevation:	
DEPTH (m)	t SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength,	SAMPLES	TESTS and NOTES	
		defects. Clay Loam - ALLUVIAL			
	0L	low to medium plasticity, dark grey, moist			
	LMC	Light Medium Clay			
		light to medium plasticity, dark grey, moist, moderate - strong		PP=350kPa	
		Light Clay, gravelly		PP=550kPa	
1.0		low to medium plasticity fines; poorly graded fine to medium gravel, dark grey, moist, very strong			
		- pale yellow-brown (possibly RESIDUAL)		PP=570kPa	
2.0					
	LMC	Light Medium Clay (possibly RESIDUAL)			
		low to medium plasticity, mottled yellow-brown & grey, moist, strong		PP >600kPa	
3.0					
		Pit Terminated @ 3.0m			
					<u> </u>
					<u> </u>
				Originally Logged by: JPT & MJW	I
Grour	ndwater	r: nil			
Thic T	oct Dit I	on record has been transcribed from the original Ouesenland Department of Main D	oade	Date:27/08/07	
geotec	hnical "	og record has been transcribed from the original Queensland Department of Main R Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Surve</i>	y 2nd Edition	Transcribed by: HEP	
		der Associates Pty Ltd. Soil descriptions are based on original classification support respection of relevant soil samples.	ed in some		







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP198 Location: Archer Park North Easting: 234204 Northing: 7411781 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects Clay Loam - ALLUVIAL CL low to medium plasticity, dark grey, moist MC Medium Clay (possibly RESIDUAL) medium plasticity, silt, pale brown, just moist, very strong PP >600kPa 1.0 pale grey LMC Light Medium Clay, gravelly - RESIDUAL low to medium plasticity fines; poorly graded fine to medium gravel, pale brown, moist, very strong PP >600kPa 2.0 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 27/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HEP (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP199 Location: Archer Park North Easting: 234221 Northing: 7412149 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects Clay Loam - ALLUVIAL CL low to medium plasticity, dark grey, moist Light Clay, gravelly LC low to medium plasticity fines; poorly graded fine to medium gravel, dark 1.0 grey, moist, very strong LMC Light Medium Clay low to medium plasticity, dark grey, moist, very strong PP >600kPa 2.0 LMC Light Medium Clay, gravelly - RESIDUAL low to medium plasticity fines; poorly graded fine to medium gravel, pale brown, moist, very strong 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 27/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HEP (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some nstances by inspection of relevant soil samples







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP200 Location: Archer Park North Easting: 234349 Northing: 7412579 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects Clay Loam - ALLUVIAL CL low to medium plasticity, dark grey, moist MHC Medium Heavy Clay medium to high plasticity, dark grey/black, moist pale brown 1.0 LMC Light Medium Clay, gravelly low to medium plasticity fines; poorly graded fine to medium gravel, pale brown, moist, very strong 2.0 MHC Medium Heavy Clay PP=410kPa 3.0 medium to high plasticity, dark grey/black, moist, strong Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 27/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HEP (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some nstances by inspection of relevant soil samples







Golder ssociates Test Pit Log Queensland Department of Main Poorde Phone 49230712 Facsimile 49230753

Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP201	
Loca	tion: A	Archer Park North		Easting: ? Northing: ?	
DEPTH (m)	U	type: Backhoe - 600mm Bucket SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	Elevation: TESTS and NOTES	
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark grey/black, moist, moderate strength - grey		PP=330kPa	
				PP=410kPa 	
1.0				-	
2.0	MC	Medium Clay medium plasticity, pale brown mottled orange, traces of fine gravel, strong		PP=535kPa	
				-	
	LC	Light Clay, sandy (possibly RESIDUAL) low plasticity, brown, just moist, very strong, massive		PP >600kPa	
3.0		Pit Terminated @ 3.0m		-	
				-	
				-	
				-	
				-	
				Originally Logged by: JPT & MJW	
Grour	ndwate	:: nil		Date: 28/08/07	
geoteo (1990)	hnical " , by Gol	og record has been transcribed from the original Queensland Department of Main R Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Surve</i> der Associates Pty Ltd. Soil descriptions are based on original classification support hspection of relevant soil samples.	y 2nd Edition	Transcribed by: HEP	







Test Pit Log Rockhampton Phone 49230712 Facsimile 49230753

Pro	iect:	Gladstone-Fitzroy Water Pipeline		Pit No: 1	[P202	
Loca	tion: A	Archer Park North		Easting: ?	Northing: ?	
	oment	type: Backhoe - 600mm Bucket	1	Elevation:		
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES		TESTS and NOTES	
	MHC	Medium Heavy Clay - ALLUVIUM				
		medium to high plasticity, dark grey/black, moist, moderate strength		PP=405kPa		
		- grey, strong				
				PP=505kPa		
1.0						
		- grey, very strong				
				PP >600kPa		
2.0						
3.0						
		Pit Terminated @ 3.0m				
	1					
	1					
0				Originally Lo	ogged by: JPT & MJW	
Groui	ndwate	r: mi		Date: 28/08	/07	
		og record has been transcribed from the original Queensland Department of Main F		1		
(1990)), by Gol	Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Surve</i> der Associates Pty Ltd. Soil descriptions are based on original classification suppor hspection of relevant soil samples.		Transcribed	by: HEP	







Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No:	FP203	
Loca	tion: A	Archer Park North		Easting: ?	Northing: ?	
DEPTH (m)	Aust SC	type: Backhoe - 600mm Bucket SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	Elevation:	TESTS and NOTES	
	MHC	Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark grey/black, moist, moderate strength		PP=320kPa		
		- grey, very strong		PP >600kPa		
1.0						
	MC	Medium Clay medium plasticity, pale grey, traces of fine gravel, moist, very strong		PP=580kPa		
2.0						
3.0		Pit Terminated @ 3.0m				
				Originally Lo	ogged by: JPT & MJW	
Grour	ndwate	r: nil		Date: 28/08		
geoteo (1990)	hnical " , by Gol	og record has been transcribed from the original Queensland Department of Main F. Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Surve</i> Ider Associates Pty Ltd. Soil descriptions are based on original classification support nspection of relevant soil samples.	y 2nd Edition	Transcribed	by: HEP	







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Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: T	P205	-
		Archer Park North type: Backhoe - 600mm Bucket		Easting: Elevation:	Northing:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES		TESTS and NOTES	
	LMC	Light Medium Clay - ALLUVIUM low to medium plasticity, dark grey, dry, very strong		PP >600kPa		
		- just moist		PP >600kPa		
1.0	LC	Light Clay, gravelly - Possibly RESIDUAL low to medium plasticity fines, poorly graded gravel (up to 50%), mottled purple-grey & orange-brown, dry, strong				
2.0						
3.0						
		Pit Terminated @ 3.0m				
Grour	ndwate	r: nil		Originally Loo Date: 28/08/	gged by: JPT & MJW 07	
geoteo (1990)	hnical " , by Go	og record has been transcribed from the original Queensland Department of Main F Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Surve</i> der Associates Pty Ltd. Soil descriptions are based on original classification support nspection of relevant soil samples.	y 2nd Edition	Transcribed b	by: HEP	







Golder Ssociates Test Pit Log Queensland Department of Main Poole Rockhampton Phone 49230712 Facsimile 49230753

Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP207	
		Archer Park North		Easting: Northing:	
	oment	type: Backhoe - 600mm Bucket		Elevation:	
DEPTH (m)	L.	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength,	SAMPLES	TESTS and NOTES	
ā		defects.		10120	<u> </u>
-	CL	Clay Loam - ALLUVIAL			
		low plasticity, pale brown, just moist, very strong		PP >600kPa	
	LMC	Light Medium Clay			
		low to medium plasticity, grey, moist		PP >600kPa	
		iow to medicin plasticity, grey, molet			
		- mottled grey & red-brown			
				PP >600kPa	
1.0					
-					
2.0					
2.0					
-					
3.0		Pit Terminated @ 3.0m			
					┣──
					<u> </u>
					<u> </u>
			-	Originally Logged by: JPT & MJW	-
Grour	ndwate	r: nil		Date: 28/08/07	
This T	est Pit L	og record has been transcribed from the original Queensland Department of Main F	Roads	1	
geoteo	hnical "	Pit Log" record, into terminology consistent with The Australian Soil and Land Surve der Associates Pty Ltd. Soil descriptions are based on original classification suppor	ey 2nd Edition	Transcribed by: HEP	
		spection of relevant soil samples.		-	







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP208 Location: Archer Park North Easting: Northing: Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects Clay Loam - ALLUVIAL CL low plasticity, pale brown, just moist, strong MC Medium Clay - Possibly RESIDUAL medium plasticity, grey, trace of fine gravel, moist, strong 1.0 - mottled grey & red-brown 2.0 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 28/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP209 Location: Archer Park North Easting: Northing: Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects Clay Loam - ALLUVIAL CL low plasticity, pale brown, just moist, very strong PP >600kPa MC Medium Clay - Possibly RESIDUAL medium plasticity, grey, trace of fine gravel, moist, very strong PP=590kPa - mottled pale orange brown & grey 1.0 PP >600kPa 2.0 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 28/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.



Test Pit Log



N

CENTRAL QUEENSLAND GEOTECHNICAL UNIT 216 Richardson Road North Rockhampton Phone 49230712 Facsimile 49230753

Pro	ject:	Gladstone-Fitzroy Water Pipeline	Pit No: TP212					
		Archer Park North type: Backhoe - 600mm Bucket		Easting: Northing: Elevation:				
DEPTH (m)	t SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, defects.	SAMPLES	TESTS and NOTES				
		Clay Loam - ALLUVIAL low to medium plasticity, dark grey, just moist, very strong		PP >600kPa				
		Medium Clay medium plasticity, pale grey, trace of fine gravel, just moist, very strong		PP >600kPa				
1.0	 							
1.0	 							
	LMC	Light Medium Clay - Possibly RESIDUAL low to medium plasticity, mottled pale grey & orange-brown, moist,		PP >600kPa				
		very strong						
2.0								
3.0		Pit Terminated @ 3.0m			F			
			<u> </u>	Originally Logged by: JPT & MJW				
	ndwater		Daada	Date: 28/08/07				
geoteo (1990)	chnical "I), by Gol	Log record has been transcribed from the original Queensland Department of Main 'Pit Log" record, into terminology consistent with <i>The Australian Soil and Land Sun</i> Ider Associates Pty Ltd. Soil descriptions are based on original classification support nspection of relevant soil samples.	vey 2nd Edition	Transcribed by: HEP				







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP213 Location: Archer Park North Easting: Northing: Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects LMC Light Medium Clay - ALLUVIUM low to medium plasticity, pale brown, trace of fine gravel, moist, strong. PP=510kPa very strong PP >600kPa 1.0 - mottled brown & orange-brown PP >600kPa - mottled red-brown & grey PP >600kPa 2.0 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 29/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP214 Location: Archer Park North Easting: Northing: Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects LMC Light Medium Clay - ALLUVIUM low to medium plasticity, pale brown, trace of fine gravel, moist, strong. 1.0 - mottled brown & orange-brown - mottled red-brown & grey 2.0 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 29/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP215 Location: Archer Park North Northing: Easting: Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects LMC Light Medium Clay - ALLUVIUM low to medium plasticity, pale brown, trace of fine gravel, moist, strong. PP=570kPa MC Medium Clay - Possibly RESIDUAL medium plasticity, pale brown, trace of fine gravel, moist, moderate strength PP=285kPa 1.0 LMC Light medium Clay low to medium plasticity, pale grey, trace of fine gravel, moist, very strong PP=590kPa - mottled pale grey & orange-brown, strong PP=445kPa 2.0 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 29/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP216 Location: Archer Park North Easting: Northing: Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects LMC Light Medium Clay - ALLUVIUM low to medium plasticity, pale brown, trace of fine gravel, moist, PP=335kPa moderate-strong. - very strong PP >600kPa 1.0 - mottled orange-brown & grey, strong PP=390kPa LC Light Clay, gravelly - RESIDUAL 2.0 low to medium plasticity fines, poorly graded gravel (up to 50%), pale brown, dry, moderate-strong 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 29/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP217 Location: Archer Park North Easting: Northing: Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ξ SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects MHC Medium Heavy Clay - ALLUVIUM medium to high plasticity, dark grey/black, trace of sand and fine gravel, moist, PP=205kPa moderate strength - very moist, moderate-weak PP=165kPa 1.0 LC Light Clay, gravelly - Possibly RESIDUAL dry strong 2.0 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 29/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HEP (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some nstances by inspection of relevant soil samples







Pro	ject:	Gladstone-Fitzroy Water Pipeline		Pit No: TP218a	
				Easting: Northing:	
DEPTH (m)	Aust SC	SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, secondary components, moisture, consistency, structure. ROCK DESCRIPTION: lithology, colour, structure, weathering, strength,	SAMPLES	TESTS and NOTES	
	CL				
		Gravel predominantly coarse with cobbles and boulders (blue stone), low to medium plasticity fines, grey, dry			
1.0		Backhoe Refusal @ 0.9m			
2.0					
3.0					
Location: Archer Park North Equipment type: Backhoe - 600mm Bucket Elevation: Equipment type: Backhoe - 600mm Bucket Elevation: Elev					
geoteo (1990)	hnical " , by Gol	Pit Log" record, into terminology consistent with The Australian Soil and Land Surve	y 2nd Edition	Transcribed by: HEP	







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP218b Location: Archer Park North Easting: 236888 Northing: 7421017 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ê SC secondary components, moisture, consistency, structure. DEPTH SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects. LMC Light Medium Clay - ALLUVIUM low to medium plasticity, dark grey/black, trace of fine gravel, dry, very strong PP >600kPa PP=415kPa dark brown, moist, strong LMC Light Medium Clay low to medium plasticity fines, pale brown, some sand, trace of fine gravel, 1.0 moist, strong PP=430kPa 2.0 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 29/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with The Australian Soil and Land Survey 2nd Edition Transcribed by: HEP (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some nstances by inspection of relevant soil samples.







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP219 Location: Archer Park North Easting: Northing: Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH (SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects LMC Light Medium Clay - ALLUVIUM low to medium plasticity, some fine sand, pale brown, trace of fine gravel, PP=405kPa moist LC Light Clay, sandy low to medium plasticity, fine to medium sand, very pale brown, moist, traces PP >600kPa of fine gravel 1.0 mottled pale brown, orange-brown and grey PP >600kPa SCL Sandy Clay Loam (Possibly Colluvium) low to medium plasticity fines, dark brown, with coarse gravel including 2.0 cobbles & boulders 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 29/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP instances by inspection of relevant soil samples







Project: Gladstone-Fitzroy Water Pipeline Pit No: TP220 Location: Archer Park North Easting: 237672 Northing: 7421199 Equipment type: Backhoe - 600mm Bucket Elevation: SOIL DESCRIPTION: Soil Type - Origin, major characteristics, colour, Ē SC secondary components, moisture, consistency, structure. DEPTH SAMPLES TESTS and Aust ROCK DESCRIPTION: lithology, colour, structure, weathering, strength, NOTES defects LS Loamy Sand - ALLUVIUM low to medium plasticity fines, dark brown, moist D 0.0-0.4m D 0.4-0.9m SCL Sandy Clay Loam low to medium plasticity fines, red-brown, moist, strong PP=415kPa D 0.9-1.2m 1.0 LMC Light Medium Clay, sandy low to medium plasticity, mottled red-brown, pale brown & grey, moist, strong PP=460kPa D 1.2-2.0m mottled grey, very strong PP >600kPa 2.0 - pale grey D 2.0-3.0m PP >600kPa 3.0 Pit Terminated @ 3.0m Originally Logged by: JPT & MJW Groundwater: nil Date: 29/08/07 This Test Pit Log record has been transcribed from the original Queensland Department of Main Roads geotechnical "Pit Log" record, into terminology consistent with *The Australian Soil and Land Survey 2nd Edition* (1990), by Golder Associates Pty Ltd. Soil descriptions are based on original classification supported in some Transcribed by: HEP nstances by inspection of relevant soil samples.

Appendix E1 - Soil Test Results

	FITZROY -	GLADSTO	DNE PIPELI	NE: LABO	RATORY T	EST SUMN	IARY.	Page 1 o	f 2								
R'ton Laboratory No. Distance (ex intake) Test Pit No. Sample depth	R07/2360 1.1 219 1.4-1.8	R07/2361 2.7 215 1.3-3.0	R07/2362 6.2 208 0.9-3.0	R07/2363 9.2 202 1.0-3.0	R07/2364 10.2 200 0.2-2.8	R07/2365 11.6 197 1.3-2.5	R07/2366 12.9 194 0.4-1.0	R07/2367 16.8 185 0.5-1.5	R07/2368 18.8 181 2.3-3.0	R07/2369 22.7 172 2.0-2.25	R07/2370 24.8 167 1.5-1.75	R07/2371 27.3 162 0.8-2.4	R07/2372 31.0 155 2.0-2.5	R07/2373 32.5 152 2.5-2.75	R07/2374 41.0 136 1.0-3.0	R07/2375 43.0 132 1.5-1.75	R07/2376 45.5 127 2.0-3.0
Description USCS Colour (Munsell) Origin	C with S CI L OL BN Residual	C CH GY BN Alluvial	C CH BN Alluvial	C CH BK Alluvial	S C CI D GY BN Alluvial	C CH L YL BN Alluvial	C CH OL GY Alluvial	C CH BK Alluvial	S C CL OL BN Alluvial	C CI OL BN Alluvial	C CH BK Alluvial	C CI BN Alluvial	C CH GY BN Alluvial	S C CI L OL BN Alluvial	C CH D GY BN Alluvial	C CI	C CH D GY BN Alluvial
Particle Size 26.5mm 19.0mm 9.50mm 4.75mm 2.36mm 0.425mm 0.075mm 0.0135mm 0.002mm	100 97 73	100 93	100 99 97	100 99 99	100 99 94 89 67 61	100 99 94 49 11	100 98 98 95 90	100 97 95	100 99 70	100 99 93	100	100 86	100 97 53 48	100 99 65	100 99 97	100 98 94 36 32	100 98 97 96 94
LL PI LS	43.2 28.4 11.0	67.2 50.8 20.2	63.8 47.0 19.0	77.2 52.0 19.8	47.6 29.4 15.0	64.0 46.6 19.4	72.2 51.8 20.2	64.2 43.2 19.0	32.2 15.4 5.0	42.0 26.8 13.8	76.4 54.6 20.4	36.0 20.6 9.0	62.6 43.6 17.6	41.8 26.0 12.4	61.2 44.0 19.6	45.4 31.8 15.2	57.4 35.8 17.8
Emerson Class Percent dispersion pH (Q121) pH (Q121) [1:5 Ratio] Conductivity (Q122A) Salinity (Q122D)	1 6.4 9.0 2.7 0.4	1 7.3 7.9 2.5 0.4	1 7.6 7.9 2.7 1.0	1 5.9 6.3 3.4 0.8	1 7.6 8.3 1.7 0.2	1 7.5 8.9 4.2 0.6	1 8.1 8.7 2.3 0.3	2 6.7 6.9 5.6 1.0	2 7.7 8.4 2.5 0.5	1 7.2 7.6 3.9 1.0	1 6.6 7.5 5.8 2.5	1 7.7 8.8 2.7 0.8	1 43 7.0 6.7 2.5 1.4	2 3.1 4.0 4.0 1.4	1 8.1 8.6 1.5 0.4	1 7.0 7.4 3.6 0.7	2 8.4 9.0 2.9 0.9
Munsell codes: Descriptors:	Dark greyis Greyish bro Brown Dark yellow Yellowish b	own vish brown prown	D GY BN GY BN BN	2.5Y 5/2 10YR 4/3, 10YR 4/4 10YR 5/4,	2.5Y 4/2, 10` 10YR 5/3	(R 3/2	Light yellov Light olive Olive brown Olive Olive grey	brown	L YL BN L OL BN OL BN OL OL OL GY	2.5Y 6/4 2.5Y 5/3, 2 2.5Y 4/3, 2 5Y 4/3 5Y 4/2							

FITZROY - GLADSTONE PIPELINE: LABORATORY TEST SUMMARY.									Page 2 of 2								
						D = 10000											D 0 T (0 0 0 0
R'ton Laboratory No.	R07/2377			R07/2380						R07/2386							
Distance (ex intake)	48.0	50.1 118	53.6 111	55.1 108	57.5	60.5	62.0 95	64.5 90	67.0 85	69.6 80	70.2	75.1 69	78.1	80.0	82.0 55	83.6	85.3
Test Pit No.	122	-			103	98					79		63	59		52	49
Sample depth	0.9-1.8	2.0-3.0	1.0-1.25	2.0-2.5	2.5-2.75	1.25-1.5	1.25-1.5	1.25-1.5	1.0-1.25	1.0-1.25	2.0-2.5	0.4-2.0	0.4-1.3	1.5-2.0	2.0-2.5	1.5-2.0	1.0-1.50
Description	С	С	С	С	С	С	C with S	С	С	С	С	С	С	GSC	C with S	С	С
USCS	СН	CH	CI	CH	CH	CH	CI	CH	CI	СН	CI	CH	CI	CH	CI	CI	CI
Colour (Munsell)	D GY BN	OL	D GY BN	D GY BN	L YL BN	OL	OL BN	BK	YL BN	OL GY	BN	BN	L OL BN	D YL BN	D YL BN	YL BN	L OL BN
Origin	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Residual	Residual	Residual	Alluvial?
Particle Size																	
26.5mm														100			
19.0mm	100													90			
9.50mm	97													81			
4.75mm	96				100	100	100							75	100		
2.36mm	94	100	100		99	99	99				100		100	71	96	100	100
0.425mm	91	99	98	100	97	97	87			100	99	100	97	58	91	99	98
0.075mm	87	96	96	99	96	94	78	100	100	99	95	99	92	52	81	89	96
0.0135mm					77	•		98			54		37			15	
0.002mm					64			81			48		35			11	
LL	59.4	60.2	45.2	67.4	60.4	57.4	42.4	81.8	38.0	63.0	40.2	51.4	36.6	51.8	40.2	40.2	44.4
PI	37.2	38.0	27.6	43.8	43.8	41.8	28.2	55.8	22.8	43.2	24.0	35.0	20.2	31.0	16.8	22.2	28.8
LS	19.2	18.4	13.8	19.2	18.4	15.8	19.0	20.0	13.0	19.0	12.0	15.8	12.2	16.2	9.8	12.2	14.6
Emerson Class	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1
Percent dispersion					5								2			85	
pH (Q121)	8.1	7.1	7.7	6.6	6.7	7.3	8.3	6.8	7.2	7.1	6.2	4.1	8.1	7.5	4.1	4.4	8.2
pH (Q121) [1:5 Ratio]	8.7	9.6	8.0	7.6	8.6	7.9	8.5	7.7	8.6	7.8	7.1	5.0	8.9	8.5	5.3	5.5	8.8
Conductivity (Q122A)	3.0	3.2	3.6	2.8	4.0	2.8	3.6	2.7	3.3	4.8	3.1	3.2	2.7	3.9	3.1	2.1	3.2
Salinity (Q122D)	0.4	0.6	1.6	1.2	1.5	1.0	1.2	2.2	1.2	0.9	0.9	0.6	0.4	1.0	0.5	0.6	0.1
Munsell codes:	Black, very	dark grev	BK	5Y 2.5/1, 5	Y 3/1		Light yellov	vish brown	L YL BN	2.5Y 6/4							
			D GY BN	2.5Y 3/2, 2.5Y 4/2, 10YR 3/2			Light olive brown L C		L OL BN	OL BN 2.5Y 5/3, 2.5Y 5/4							
	Grevish brown GY BN		2.5Y 5/2			Olive brow	n	OL BN	2.5Y 4/3, 2.5Y 4/4								
	Brown		BN	10YR 4/3,	10YR 5/3		Olive		OL	5Y 4/3							
	Dark yellov	vish brown	D YL BN	10YR 4/4			Olive grey		OL GY	5Y 4/2							
	Yellowish b		YL BN	10YR 5/4,	10YR 5/6		0 - 7										
Descriptors:	$C = clav_{s}$	= sand/sar	ndy, G = gra	vellv													
Becchpiolo.	0 – 0iuy, 0	- 50110/501	$a_{j}, o = gre$	() Only													

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lient: roject: ocation:	ARUP Gladstone Epala to Ra	•	ipeline	••••••			•	led By: lob No:	Golder 077633062		
			_pHf	ox Scree	ning Test Results	<u>i</u>			25		
Location	рН _F	рН ғох	Indic	ation	Location	pH _F	рНгох	Indication			
Drilled:	14/09/07										
TP69 0.4m	6.2	4.8	Nil AS	S/PASS	TP70 0.2m	5.5	3.8	Possible PASS			
TP69 1.5m	4.5	3.9	Possible PASS TP70 0.5m 4.		4.7	3.6	Possible PASS				
TP69 2.5m	4.7	4.0	Improba	ole PASS	TP70 1.5m	5.8	6.5	Nil ASS/PASS			
Drilled:	13/09/07				Drilled:	12/	/09/07				
TP71 0.0-0.5m	5.3	4.5	Nil AS	S/PASS	TP72 0.0-0.2m	6.6	4.2	Improbable PA			
TP71 0.5-1.0m	6.9	6.8		S/PASS	TP72 0.2-0.5m	7.1	4.8	Nil A	SS/PASS		
TP71 1.0-1.5m	7.5	8.0	Nil AS	S/PASS	TP72 0.5-1.0m	6.9	6.3	Nil A	SS/PASS		
TP71 1.5-2.0m	7.3	8.2	Nil AS	S/PASS	TP72 1.0-1.5m	8.7	8.5	Nil A	SS/PASS		
TP71 2.0-2.5m	7.5	8.3	Nil AS	S/PASS	TP72 1.5-2.0m	8.8	9.0	Nil A	SS/PASS		
TP71 2.5-3.0m	7.5	8.2	Nil AS	S/PASS	TP72 2.0-2.5m	8.6	8.6	Nil ASS/PASS Nil ASS/PASS			
					TP72 2.5-3.0m	8.6	8.7				
Location	Action Criteria (mole H [*] /t)	TAA (mole H ⁺ /t)	a-ANC (mole H⁺/t)	Texture Description		S _{POS} (%)	Acidity' (mole H ⁺ /t)		(kg/m³)		
TP69 1.5m	36	26		L	C, grey-brown	<0.02	26	4.7	3		
TP70 0.5m	62	37		MC	, brown, mottled	<0.02	37	4.4	4		
TP71 0.0-0.5m	36	31			C, grey-brown	<0.02	31	4.6	3		
TP72 0.0-0.2m	36	20		SL,	brown, organics	<0.02	20	* 3			
				·							
Remarks:	Liming rate for sands a ANC is onl ^a	s are bas nd clay a y determir	ed on a FC nd 'net pot ned when j	DS of 1.5, a ential acidit oH is >= 6.5	utralising Capacity. Sea ssumed density of 1.4 y' as determined by an o um Reducible Sulfur te	tonne/m ³ alysis.			ed.		
	pHFox "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) - Golder Associates										
Test Procedures:	pHFox "AS				ion with Hydrogen Per	oxide) - G	Golder Assoc	iates			

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http://WWW.golder.com							Sama	ad Du	Coldor	
Client:	ARUP	Cit-set.	Dinalina				•	led By:		
Project:	Gladstone Fitzroy Pipeline Job No: 0776									
Location:	Raglan to I	Bajool		NY Soroo	ning Toot Booulto			*	25	
				· · · · · · · · · · · · · · · · · · ·	ning Test Results				25	
Location	рН _F	рНғох	Indic	ation	Location	рН _F	рН ғох	Indication		
Drilled:	13/09/07				Drilled:	18	/09/07			
TP73 0.0-0.5m	6.5	4.8	Nil ASS/PASS		TP77 0.0-0.6m	5.6	3.3	Poss	ible PASS	
TP73 0.5-1.0m	5.5	6.0	Nil AS	S/PASS	TP77 0.6-0.8m	6.4	4.9	Nil ASS/PASS		
TP73 1.0-1.5m	6.2	6.5	Nil AS	S/PASS	TP77 0.8-1.8m	6.6	6.1	Nil ASS/PASS		
TP73 1.5-2.0m	6.5	6.1	Nil AS	S/PASS	TP77 1.8-3.0m	7.7	7.8	Nil ASS/PASS		
TP73 2.0-2.5m	6.7	7.7	Nil AS	S/PASS	TP78 0.0-0.2m	5.4	4.1	Improl	bable PASS	
TP73 2.5-3.0m	6.6	7.1	Nil AS	S/PASS	TP78 0.2-0.8m	5.7	4.6	Nil A	SS/PASS	
					TP78 0.8-1.0m	7.7	7.9	Nil A	SS/PASS	
					TP78 1.0-3.0m	7.6	8.0	Nil A	SS/PASS	
Drilled:	13/09/07									
TP74 0.00-0.25m	5.5	4.1	Improba	ble PASS	TP74 1.25-1.50m			No Sample		
TP74 0.25-0.50m	6.7	4.6	Nil AS	S/PASS	TP74 1.50-1.75m	6.7	7.7	Nil ASS/PASS		
TP74 0.50-0.75m	7.1	6.0	Nil AS	S/PASS	TP74 1.75-2.0m	6.5	7.5	Nil ASS/PASS		
TP74 0.75-1.0m	7.3	6.3	Nil ASS/PASS		TP74 2.00-2.25m	6.1	6.3	Nil ASS/PASS		
TP74 1.00-1.25m	7.4	7.7	Nil ASS/PASS		TP74 2.50-2.75m	4.2	3.0	Poss	sible PASS	
TP74 1.25-1.50m	7.1	7.9	Nil ASS/PASS		TP74 2.75-3.0m	4.4	3.2	Poss	sible PASS	
				Quantitat	ive Test Results			r	9	
Location	Action	TAA	a-ANC	Taxe	huns Description	SPOS	'Net	pHox	Lime Rate	
	Criteria	(mole H⁺/t)	(mole H⁺/t)	Texture Description		(%)	Acidity' (mole H*/t)		(kg/m ³)	
TP73 0.0-0.5m	(mole H ⁺ /t) 36	12		SCL, I	orown - pale brown	<0.02	12	*	nil	
TP74 0.00-0.25m	36	11		SCL, d	ark brown, organics	<0.02	11	*	nil	
TP74 0.50-0.75m	36	<2		L	C, dark brown	<0.02	<10	_*	nil	
TP74 1.00-1.25m	36	<2	62		SCL, brown	<0.02	<10	7.1	nil	
TP74 1.50-1.75m	62	<2	60	M	C, brown-grey	<0.02	<10	7.0	nil	
TP74 2.5-2.75m	62	34		MC, g	rey-black, organics	<0.02	44	5.5	5	
TP74 2.75-3.00m	36	92		LC, g	rey, reddish brown	<0.02	111	4.4	12	
TP77 0.0-0.6m	18	13		LS, dk brown, trace organics		0.02	26	3.5	3	
TP78 0.0-0.2m	36	44		CL, brown		<0.02	44	*	5	
Remarks:	TAA - Total	Actual	Acidity A	NC - Acid I	Neutralising Capacity.	Seos - Pe	roxide Oxidis	able Su	lfur	
itemanto.			-		, assumed density of 1		-			
	-				dity' as determined by					
		•	•		· ·	analy old.				
	ANC is only * All sample				o.o mium Reducible Sulfur	test, whe	ere pHox is n	ot deter	mined.	
				•						
Test Procedures:					lation with Hydrogen P	eroxide)	- Golder As	sociates	•	
	SPOCAS n	netnod -	ALS BIIS	spane						
Prepared By: TN/S	LS				Checked By:		HP	1	9/11/07	

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Client:	ARUP						Samp	led By:	Golder		
Project:	Gladstone Fitzroy Pipeline Job No: 077633062										
ocation:	Raglan to I	-	•								
	¥		pHfox	Screeni	ing Test Results				36		
Location	рН _F	рНгох	Indic	ation	Location	рН _F	рН _{FOX}	Indication			
Drilled:	18/09/07										
TP79 0.00-0.25m	6.3	3.5	Possibl	e PASS	TP79 1.50-1.75m	8.3	8.6	Nil A	SS/PASS		
TP79 0.25-0.50m	8.8	8.5	Nil ASS/PASS		TP79 1.75-2.0m	8.1	8.7	Nil ASS/PASS			
TP79 0.50-0.75m	8.9	8.7	Nil ASS/PASS		TP79 2.00-2.25m	8.1	8.7	Nil ASS/PASS			
TP79 0.75-1.0m	8.9	8.6		S/PASS	TP79 2.25-2.50m	7.8	8.4	Nil ASS/PASS			
TP79 1.00-1.25m	9.0	8.8		S/PASS	TP79 2.50-2.75m	8.7	8.7	Nil ASS/PASS			
TP79 1.25-1.50m	8.6	8.8	Nil ASS/PASS		TP79 2.75-3.0m	7.8	8.4	Nil ASS/PASS			
Drilled:	18/09/07	L									
TP80 0.00-0.25m	5.4	3.5	Possib	e PASS	TP80 1.50-1.75m	7.6	7.9		SS/PASS		
TP80 0.25-0.50m	6.3	4.8	Nil AS	S/PASS	TP80 1.75-2.0m	7.6	8.0		SS/PASS		
TP80 0.50-0.75m	7.0	5.9	Nil AS	S/PASS	TP80 2.00-2.25m	7.8	8.3	Nil ASS/PASS			
TP80 0.75-1.0m	7.3	6.8	Nil AS	S/PASS	TP80 2.25-2.50m	7.6	8.2	Nil ASS/PASS			
TP80 1.00-1.25m	7.2	7.4	NII ASS/PASS		TP80 2.00-2.25m	7.8	8.3	Nil ASS/PASS			
TP80 1.25-1.50m	7.6	7.7	NII ASS/PASS		TP80 2.75-3.0m	7.7	8.5	Nil ASS/PASS			
Drilled:	18/09/07										
TP81 0.00-0.25m	6.5	6,2	NILASS/PASS		TP81 1.50-1.75m	8.0	8.6	Nil A	SS/PASS		
TP81 0.25-0.50m	8.4	7.5	NII ASS/PASS		TP81 1.75-2.0m	7.8	8.7		SS/PASS		
TP81 0.50-0.75m	8.1	8.3	Nil ASS/PASS		TP81 2.00-2.25m	7.7	8.4	NILASS/PASS			
TP81 0.75-1.0m	8.3	8.7	Nil ASS/PASS		TP81 2.25-2.50m	7.8	8.5	NILASS/PASS			
TP81 1.00-1.25m	8.3	8.7	Nil AS	S/PASS	TP81 2.50-2.75m	7.6	8.3	Nil ASS/PASS			
TP81 1.25-1.50m	8.2	8.7	Nil AS	S/PASS	TP81 2.75-3.0m	7.6	8.2	Nil A	SS/PASS		
			Q	<u>iantitati</u>	ve Test Results				6		
Location	Action	TAA	a-ANC			S _{POS}	'Net	pH _{ox}	Lime Rate		
	Criteria	(mole	(mole	Text	ure Description	(%)	Acidity'		(kg/m ³)		
	(mole H*/t)	H⁺/t)	H⁺/t)		······································		(mole H ⁺ /t)				
TP79 0.00-0.25m	36	10			, grey, organics	<0.02*	<10	*	nil		
TP79 2.00-2.25m	62	<2	53		C, yellow-grey	<0.02	<10	8.2	nil		
TP80 0.00-0.25m	36	18			rey-brown, organics	<0.02*	18	*	nil		
TP80 1.00-1.25m	18	<2			ey, black organics	<0.02*	<10	*	nil		
TP81 0.00-0.25m	36	8			rey-brown, organics	<0.02*	<10	*	nil		
TP81 0.50-0.75m	36	<2	184		rown-grey, organics	<0.02*	<10	*	nil		
Remarks:					Neutralising Capacity			lisable S	ulfur		
	Liming rate	s are ba	sed on a	FOS of 1.8	5, assumed density of	1.4 tonne	e/m ³				
	for sands a	ind clay a	and 'net p	otential ac	idity' as determined b	y analysi	s.				
	ANC is only										
					omium Reducible Sulfi	ur test, w	here pHox is	not dete	ermined.		
	i il secolo i										
Test Procedures:	-	S Scree	ning Tesť	' (rapid oxi	dation with Hydrogen	Peroxide) – Golder A	Associate	es		
Test Procedures:	-				dation with Hydrogen	Peroxide	e) – Golder A	Associate	98		

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Client:	ARUP					Sampl	ed By: Golder			
Project:	Gladstone	Fitzroy	Pipeline			J	Job No: 077633062			
Location:	Raglan to	Bajool								
		pHfox Screening Test Results								
Location	pH _F	рНгох	Indication	Location	рН _F	рН ғох	Indication			
Drilled:	Drilled: 18/09/07			Drilled:	04	/09/07				
TP83 0.0-0.2m	5.6	3.2	Possible PASS	TP87 0.0-0.3m	6.8	7.2	Nil ASS/PASS			
TP83 0.2-2.2m	7.0	5.9	Nil ASS/PASS	TP87 0.3-0.45m	6.7	5.1	Nil ASS/PASS			
TP83 2.2-3.0m	6.8	7.2	Nil ASS/PASS	TP87 0.45-1.05m	5.3	4.5	Nil ASS/PASS			
				TP87 1.05-1.75m	7.4	7.4	Nil ASS/PASS			
				TP87 1.25-1.50m	6.1	5.1	NII ASS/PASS			
Drilled:	04/09/07									
TP88 0.0-0.6m	6.8	6.2	Nil ASS/PASS							
TP88 0.6-1.50m	7.0	7.1	Nil ASS/PASS							
TP88 1.50-3.0m	7.6	7.9	Nil ASS/PASS							

Quantitative Test Results

Location	Action Criteria (mole H [*] /t)	TAA (mole H [*] /t)	a-ANC (mole H [*] /t)	Texture Description	S _{POS} (%)	'Net Acidity' (mole H [*] /t)	рН _{ох}	Lime Rate (kg/m ³)
TP83 0.0-0.2m	36	23		CL, pale brown	<0.02	23	*	- 3
TP87 0.3-0.45m	36	29		ZL, brown	<0.02	29	4	3
TP88 0.0-0.6m	36	4	64	SL, grey-brown	<0.02	2	6.7	nil

Remarks:	•	C - Acid Neutralising Capacity. SPO		able Sulfur					
	Liming rates are based on a FO	S of 1.5, assumed density of 1.4 t	onne/m ³						
est Procedures:	for sands and clay and 'net potential acidity' as determined by analysis.								
	ANC is only determined when pH is >= 6.5								
	* All samples have undergone the Chromium Reducible Sulfur test, where pHox is not determined.								
	pHFox "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) - Golder Associates								
est Procedures:	pHFox "ASS Screening Test" (ra	apid oxidation with Hydrogen Pero	xide) – Golder Ass	ociates					
Fest Procedures:	pHFox "ASS Screening Test" (ra SPOCAS method - ALS Brisba		xide) - Golder Ass	ociates					



Client:	ARUP						Sam	oled By:	Golder
Project:	Gladstone	Fitzroy F	lipeline					Job No:	077633062
_ocation:	Raglan to I	Bajool	-						
			<u>pHfox</u>	Screer	ning Test Results				-35
Location	pH _F	рНгох	Indica	ation	Location	pH _F	рН гох	Ind	ication
Drilled:	18/09/07		•		· · · · · · · · · · · · · · · · · · ·				
TP82 0.00-0.25m	5.4	3.4	Possible	PASS	TP82 1.75-2.0m	6.2	5.4	Nil A	SS/PASS
TP82 0.25-0.50m	7.4	4.8	Nil ASS	/PASS	TP82 2.00-2.25m	5.8	4.9	Nil A	SS/PASS
TP82 0.50-0.75m	4.9	4.1	Improbab	le PASS	TP82 2.25-2.50m	6.4	5.5	Nil A	SS/PASS
TP82 0.75-1.0m	5.4	4.2	Improbab	le PASS	TP82 2.50-2.75m	6.4	5.8	Nil A	SS/PASS
TP82 1.00-1.25m	5.7	4.9	Nil ASS	/PASS	TP82 2.75-3.0m	6.4	7.4	Nil A	SS/PASS
TP82 1.50-1.75m	6.1	5.2	Nil ASS	/PASS					
Drilled:	18/09/07								
TP94 0.00-0.25m	6.3	4.8	Nil ASS	/PASS	TP94 1.50-1.75m	4.8	4.7	Nil A	SS/PASS
TP94 0.25-0.50m	8.3	8.5	Nil ASS		TP94 1.75-2.0m	4.8	4.8	Nil ASS/PASS	
TP94 0.50-0.75m	8.3	8.8	Nil ASS/PASS		TP94 2.00-2.25m	4.7	4.7	Nil ASS/PASS	
TP94 0.75-1.0m	7.0	8.3	Nil ASS/PASS		TP94 2.25-2.50m	4.8	4.7	Nil A	SS/PASS
TP94 1.00-1.25m	5.3	5.0	Nil ASS/PASS		TP94 2.50-2.75m	4.8	5.1	Nil A	SS/PASS
TP94 1.25-1.50m	4.9	4.6	Nil ASS/PASS		TP94 2.75-3.0m	4.8	4.6	Nil A	SS/PASS
Drilled:	18/09/07								
TP95 0.00-0.25m	5.2	3.7	Possible PASS		TP95 1.50-1.75m	8.4	8.9	Nil A	SS/PASS
TP95 0.25-0.50m	6.1	6.7	Nil ASS/PASS		TP95 1.75-2.0m	8.5	8.9	Nil A	SS/PASS
TP95 0.50-0.75m	7.8	8.0	Nil ASS	/PASS	TP95 2.00-2.25m			No	Sample
TP95 0.75-1.0m	8.0	7.1	Nil ASS	/PASS	TP95 2.25-2.50m	8.4	7.8	Nil A	SS/PASS
TP95 1.00-1.25m	9.2	9.0	Nil ASS	/PASS	TP95 2.50-2.75m	9.1	9.1	Nil A	SS/PASS
TP95 1.25-1.50m	9.2	9.3	Nil ASS	/PASS	TP95 2.75-3.0m	8.6	7.6	Nil A	SS/PASS
			Qı	iantitati	ive Test Results				6
Location	Action	TAA	a-ANC			SPOS	'Net Acidity'	pHox	Lime Rate
	Criteria	(mole	(mole	Text	ure Description	(%)	(mole H ⁺ /t)	P. 0X	(kg/m ³)
	(mole H ⁺ /t)	H⁺/t)	H⁺/t)			(///			(·· J ···· /
TP82 0.00-0.25m	36	5	50		ZCL, brown	<0.02	<10	6.8	nil
TP82 0.50-0.75m	36	22			LC, brown	<0.02	29	4.7	3
TP82 2.00-2.25m	62	11	-		HC, grey	<0.02	17	6.3	nil
TP94 1.25-1.50m	62	18		LMC,	pale grey, brown	<0.02	18	5.3	nil
TP95 0.00-0.25m	36	6			SCL, brown	<0.02	<10	4.1	nil
TP95 2.25-2.50m	36	<2	29		LC, grey	<0.02	<10	8.2	nil
Remarks:	TAA - Total	Actual Ac	idity. ANC	- Acid Ne	eutralising Capacity. SP	os - Pero	xide Oxidisable	e Sulfur	
	Liming rates	s are base	d on a FOS	S of 1.5, a	ssumed density of 1.4	tonne/m ²	3		
	-				y' as determined by an				
		-	-						
	ANC is only	determin	eu when pr	113 - 0.0					
est Procedures:	ANC is only pHFOX "ASS SPOCAS m	Screenir	ng Test" (ra	pid oxidat	ion with Hydrogen Per	oxide) –	Golder Associ	ates	



Client:	ARUP						Sam	oled By:	Golder
Project:	Gladstone	Fitzrov P	ipeline				-		077633062
Location:	Raglan to	-							
			<u>pHf</u>	ox Scree	ening Test Results				35
Location	pH _F	рН ғох	Indic	ation	Location	pH _F	рНгох	Ind	ication
Drilled:	22/08/07	L					L		
TP91 0.00-0.25m	6.5	5.2	Nil AS	S/PASS	TP91 1.50-1.75m	7.1	6.2	Nil A	SS/PASS
TP91 0.25-0.50m	6.4	5.6		S/PASS	TP91 1.75-2.0m	7.3	6.7		SS/PASS
TP91 0.50-0.75m	6.2	4.4	Improba	ble PASS	TP91 2.25-2.50m	7.3	6.3	Nil A	SS/PASS
TP91 0.75-1.0m	6.9	6.6		S/PASS	TP91 2.50-2.75m	7.3	6.9	Nil A	SS/PASS
TP91 1.00-1.25m	6.9	5.8	Nil AS	S/PASS	TP91 2.75-3.0m	7.3	7.1	Nil A	SS/PASS
TP91 1.25-1.50m	6.9	6.3	Nil AS	S/PASS					
Drilled:	22/08/07								
TP92 0.00-0.25m	6.3	3.2	Possib	le PASS	TP92 1.50-1.75m	6.4	6.4	Nil A	SS/PASS
TP92 0.25-0.50m	5.7	3.6	Possib	le PASS	TP92 1.75-2.0m	6.6	7.1	Nil A	SS/PASS
TP92 0.50-0.75m	5.9	3.7	Possible PASS		TP92 2.00-2.25m	6.8	7.6	~	SS/PASS
TP92 0.75-1.0m	5.8	3.9	Possible PASS		TP92 2.25-2.50m	6.9	6.8	Nil ASS/PASS	
TP92 1.00-1.25m	5.7	4.0	Improbable PASS		TP92 2.50-2.75m	7.1	7.1	Nil ASS/PASS	
TP92 1.25-1.50m	6.2	6.7	Nil ASS/PASS		TP92 2.75-3.0m	7.2	6.9	Nil ASS/PASS	
Drilled:	22/08/07								
TP93 0.00-0.25m	7.3	5.8	Nil ASS/PASS		TP93 1.50-1.75m	7.0	5.2	Nil A	SS/PASS
TP93 0.25-0.50m	7.2	5.8	Nil ASS/PASS		TP93 1.75-2.0m	6.4	5.3	Nil A	SS/PASS
TP93 0.50-0.75m	6.9	5.2	Nil AS	S/PASS	TP93 2.00-2.25m	6.4	5.3		SS/PASS
TP93 0.75-1.0m	6.3	5.0	Nil AS	S/PASS	TP93 2.25-2.50m	6.4	5.2		SS/PASS
TP93 1.00-1.25m	6.4	4.7	Nil AS	S/PASS	TP93 2.50-2.75m	6.4	5.0		SS/PASS
TP93 1.25-1.50m	6.3	4.5	Nil AS	S/PASS	TP93 2.75-3.0m	6.7	5.8	Nil A	SS/PASS
				Quantita	tive Test Results				F
Location	Action	ΤΑΑ	a-ANC			SPOS	'Net Acidity'	pHox	5 Lime Rate
Location	Criteria	(mole	(mole	Tex	ture Description	(%)	(mole H [*] /t)	Priox	(kg/m ³)
	(mole H ⁺ /t)		H⁺/t)		110			7.0	
TP91 0.50-0.75m	62	25	33		HC, grey	<0.02	28	7.2	3
TP92 0.00-0.25m	62	46	-	HC, g	rey, organic matter	<0.02*	46	*	5
TP92 0.75-1.0m	62	26			HC, grey	<0.02	26	5.5	3
TP92 1.50-1.75m	62	6	18		HC, grey	<0.02	<10	7.0	nil
TP93 1.25-1.50m	62	21			HC, grey	<0.02	21	5.7	3
Remarks:	TAA - Total	Actual Ac	idity. AN	C - Acid Ne	eutralising Capacity. Sec	os - Perox	ide Oxidisable	Sulfur	
					ssumed density of 1.4				
	-				y' as determined by an				
						J = · - ·			
	ANC is only					- 4 1			1
	* All sample	es have ur	ndergone i	the Chromi	um Reducible Sulfur te	st, where	phox is not de	etermined	•
Test Procedures:	pHFox "AS	S Screenii	ng Test" (r	rapid oxidat	tion with Hydrogen Perc	oxide) – (Golder Associa	ates	
	SPOCAS n								
Prepared By: TN/SLS					Checked By:		HA	/r	111 107
Toparca by. Twolo							19		<u>(· · · · · · / · / · · · · / · · · · · </u>



Client:	ARUP						Sam	oled By:	Golder
Project:	Gladstone	Fitzrov P	ipeline				-	Job No:	077633062
ocation:	Raglan to E	•	· · · · · ·						
			pHf	ox Scree	ening Test Results				24
Location	рН _F	рН⊧ох	Indic	ation	Location	рН _F	рН⊧ох	Ind	ication
Drilled:	22/08/07								
TP96 0.00-0.25m	9.0	8.8	Nil AS	S/PASS	TP96 1.50-1.75m	6.7	5.9	Nil A	SS/PASS
TP96 0.25-0.50m	9.3	7.5		S/PASS	TP96 1.75-2.0m	6.1	7.1		SS/PASS
TP96 0.50-0.75m	8.7	8.6	Nil AS	S/PASS	TP96 2.00-2.25m	5.8	5.7	Nil A	SS/PASS
TP96 0.75-1.0m	8.1	8.1		S/PASS	TP96 2.25-2.50m	5.5	5.0	Nil A	SS/PASS
TP96 1.00-1.25m	7.6	8.2		S/PASS	TP96 2.50-2.75m	5.6	5.3	Nil A	SS/PASS
TP96 1.25-1.50m	7.4	8.1	Nil AS	S/PASS	TP96 2.75-3.0m	4.8	5.7	Nil A	SS/PASS
Drilled:	22/08/07								
TP97 0.00-0.25m	8.7	8.4	Nil AS	S/PASS	TP97 1.50-1.75m	8.6	8.7	Nil A	SS/PASS
TP97 0.25-0.50m	8.6	8.2	Nil AS	S/PASS	TP97 1.75-2.0m	8.2	8.5	Nil A	SS/PASS
TP97 0.50-0.75m	8.4	8.4			TP97 2.00-2.25m	8.1	8.6	Nil A	SS/PASS
TP97 0.75-1.0m	7.9	8.3	Nil ASS/PASS		TP97 2.25-2.50m	8.3	8.7	Nil ASS/PASS	
TP97 1.00-1.25m	8.3	8.3	Nil ASS/PASS		TP97 2.50-2.75m	7.7	7.5	Nil ASS/PASS	
TP97 1.25-1.50m	8.4	8.2	NII ASS/PASS		TP97 2.75-3.0m	7.6	7.8	Nil ASS/PASS	
				Quantita	tive Test Results				. 2
Location	Action	TAA	a-ANC			SPOS	'Net Acidity'	pH _{ox}	Lime Ra
	Criteria	(mole	(mole	Tex	ture Description	(%)	(mole H [*] /t)		(kg/m ³)
	(mole H ⁺ /t)	<u> </u>	H ⁺ /t)	LC sand	ly, organics, grey & red	<0.02	<10	5.9	nil
TP96 2.25-2.50m	36	6			LC, pale brown		24	8.4	3
TP97 2.75-3.0m	36	<2	33			0.22	24	0.4	S
								·	
	Liming rates for sands ar ANC is only pH _{FOX} "ASS	are base nd clay an determin S Screenir	ed on a FC d 'net pot ed when p ng Test" (r	DS of 1.5, a ential acidi oH is >= 6. rapid oxida	eutralising Capacity. SPos assumed density of 1.4 to ty' as determined by ana 5 tion with Hydrogen Perod	onne/m ³ lysis.			
Remarks: Fest Procedures: Prepared By: TN/SLS	Liming rates for sands ar ANC is only	are base nd clay an determin S Screenir	ed on a FC d 'net pot ed when p ng Test" (r	DS of 1.5, a ential acidi oH is >= 6. rapid oxida	assumed density of 1.4 to ty' as determined by ana 5	onne/m ³ lysis.		ates	1 1 107

611 Coronation Drive TOOWONG QLD 4066 (PO Box 1734, MILTON BC QLD 4064) Telephone: (61-7) 3721 5400 Facsimile: (61-7) 3721 5401



Client:	ARUP						Samp	led By:	Golder
Project:	Gladstone	Fitzroy P	ipeline					Job No:	077633062
ocation:	Raglan to I	-	•						
			pHf	ox Scree	ning Test Results				24
Location	pH _F	рН⊧ох	Indic	ation	Location	рН _F	рН⊧ох	Indi	cation
Drilled:	04/09/07								
TP98 0.00-0.25m	6.8	6.4	Nil AS	S/PASS	TP98 1.50-1.75m	7.7	7.7	Nil AS	SS/PASS
TP98 0.25-0.50m	8.3	7.0	and the second	S/PASS	TP98 1.75-2.0m	7.4	7.8	Nil As	SS/PASS
TP98 0.50-0.75m	8.4	7.5	Nil AS	ASS/PASS TP98 2.00-2.25m 7.7		7.7	7.1	Nil ASS/PASS	
TP98 0.75-1.0m	8.1	7.6		S/PASS	TP98 2.25-2.50m	7.5	7.6	Nil ASS/PASS	
TP98 1.00-1.25m	8.2	7.4		S/PASS	TP98 2.50-2.75m	7.6	7.0	Nil AS	SS/PASS
TP98 1.25-1.50m	7.8	7.1		S/PASS	TP98 2.75-3.0m	7.5	6.9	Nil As	SS/PASS
Drilled:	04/09/07						-		
TP99 0.00-0.25m	8.2	7.6	Nil AS	S/PASS	TP99 1.50-1.75m	8.6	9.0	Nil As	SS/PASS
TP99 0.25-0.50m	8.8	8.0		S/PASS	TP99 1.75-2.0m	8.7	9.0	Nil ASS/PASS	
TP99 0.50-0.75m	8.4	7.9	Nil ASS/PASS		TP99 2.00-2.25m	8.5	8.7	NII ASS/PASS	
TP99 0.75-1.0m	8.3	8.4	Nil ASS/PASS		TP99 2.25-2.50m	8.6	8.8	Nil ASS/PASS	
TP99 1.00-1.25m	8.3	8.6	Nil ASS/PASS		TP99 2.50-2.75m	8.6	8.9	Nil ASS/PASS	
TP99 1.25-1.50m	8.6	8.6	Nil ASS/PASS		TP99 2.75-3.0m	8.4	9.0	Nil ASS/PASS	
				Quantita	tive Test Results				3
Location	Action	TAA	a-ANC			S _{POS}	'Net Acidity'	pHox	Lime Rat
Lovation	Criteria	(mole			ture Description	(%)	(mole H ⁺ /t)		(kg/m ³)
	(mole H [*] /t)	H⁺/t)	H⁺/t)			(,			
TP98 0.00-0.25m	62	6			C, brown, organics	<0.02*	<10	*	nil
TP98 2.75-3.0m	62	<2	23	· · ·	e orange-brown & grey	<0.02	<10	7.2	nil
TP99 0.00-0.25m	62	<2	304	MC	, brown, organics	<0.02*	<10	*	nil
					eutralising Capacity. SPo assumed density of 1.4 t		ide Oxidisable	Sulfur	
Remarks:	for sands a ANC is only	nd clay ar / determin	id 'net pot ed when j	ential acidi pH is >= 6.	ty' as determined by ana	alysis.	pHox is not de	termined	
Remarks: Test Procedures:	for sands a ANC is only * All sample	nd clay ar / determin es have ur S Screeni	nd 'net pot ed when ndergone ng Test" (ential acidi pH is >= 6. the Chrom rapid oxida	ty' as determined by ana 5	alysis. st, where			



	ARUP								Golder
Project:	Gladstone	-	ipeline					lob No:	077633062
_ocation:	Raglan to E	3ajool							
			pHfo	<u>x Scree</u>	<u>ning Test Results</u>				12
Location	рН _F	рНгох	Indic	ation	Location	рН _F	рН⊧ох	Ind	lication
Drilled:	22/08/07								
TP102 0.00-0.25m	7.5	4.8	NilAS	S/PASS	TP102 1.50-1.75m	8.6	8.6	Nil A	SS/PASS
TP102 0.25-0.50m	8.1	6.4		S/PASS	TP102 1.75-2.0m	8.7	8.5		SS/PASS
TP102 0.50-0.75m	8.4	8.0	Nil ASS/PASS		TP102 2.00-2.25m	8.8	8.9		SS/PASS
TP102 0.75-1.0m	7.8	8.1	Nil ASS/PASS		TP102 2.25-2.50m	8.9	9.0		SS/PASS
TP102 1.00-1.25m	8.3	8.7	Nil ASS/PASS		TP102 2.50-2.75m	8.7	8.7		SS/PASS
TP102 1.25-1.50m	8.7	8.7	Nil ASS/PASS		TP102 2.75-3.0m	9.1	8.8	Nil ASS/PAS	
Location	Action Criteria (mole H ⁺ /t)	TAA (mole 	a-ANC (mole H [*] /t)		ture Description	S _{POS} (%)	'Net Acidity' (mole H ⁺ /t)	pH _{ox}	Lime Rat (kg/m ³)
TD402.0.00.0.25m	(mole H*/t) 36	H /t) <2	H'/t)		_C, red-brown	<0.02	<10	6.4	nil
TP102 0.00-0.25m TP102 2.25-2.50m	62	<2	149		pale brown, grey	<0.02	<10	9.0	nil
TP102 2.23-2.30m	62	<2	53		MC, red-brown	< 0.02	<10	7.7	nil
					• • • • •				
Remarks:	Liming rates for sands ar ANC is only	s are base nd clay an determin S Screenir	ed on a FC d 'net pote ed when p ng Test" (r	DS of 1.5, a ential acidi DH is >= 6. rapid oxida	eutralising Capacity. Se assumed density of 1.4 ty' as determined by an 5 tion with Hydrogen Perd	tonne/m ^a alysis.	i		



Client:	ARUP						Sam	pled By:	Golder
Project:	Gladstone	Fitzrov F	Pipeline						077633062
Location:	Raglan to								
	¥		<u>pH</u> t	fox Scree	ening Test Results				36
Location	pH _F	рНгох	Indi	cation	Location	pH _F	рНгох	lnc	lication
Drilled:	22/08/07		I						
TP103 0.00-0.25m	8.4	8.5	Nil AS	S/PASS	TP103 1.50-1.75m	7.9	8.4	NiLA	SS/PASS
TP103 0.25-0.50m	8.5	8.4	(S/PASS	TP103 1.75-2.0m	7.9	8.5		SS/PASS
TP103 0.50-0.75m	8.2	8.5		S/PASS	TP103 2.00-2.25m	7.8	8.5		SS/PASS
TP103 0.75-1.0m	8.0	8.3	Nil AS	S/PASS	TP103 2.25-2.50m	7.4	8.2		SS/PASS
TP103 1.00-1.25m	8.0	8.1	Nil AS	S/PASS	TP103 2.50-2.75m	7.9	7.5	Nil A	SS/PASS
TP103 1.25-1.50m	7.9	7.9	Nil AS	S/PASS	TP103 2.75-3.0m	7.6	8.5	Nil A	SS/PASS
Drilled:	22/08/07								
TP104 0.00-0.25m	8.9	7.8	Nil AS	S/PASS	TP104 1.50-1.75m	7.4	6.9	Nil A	SS/PASS
TP104 0.25-0.50m	8.7	8.6	Nil AS	S/PASS	TP104 1.75-2.0m	7.4	7.8	Nil A	SS/PASS
TP104 0.50-0.75m	8.3	8.0	Nil ASS/PASS		TP104 2.00-2.25m	7.8	8.0	Nil ASS/PASS	
TP104 0.75-1.0m	8.0	7.8	Nil ASS/PASS		TP104 2.25-2.50m	7.7	8.2	Nil A	SS/PASS
TP104 1.00-1.25m	8.2	7.4	Nil ASS/PASS		TP104 2.50-2.75m	7.2	7.8		SS/PASS
TP104 1.25-1.50m	8.2	7.6	Nil ASS/PASS		TP104 2.75-3.0m	7.8	8.0	Nil A	SS/PASS
Drilled:	22/08/07					1			
TP105 0.00-0.25m	5.9	4.2	Improbable PASS		TP105 1.50-1.75m	8.1	8.1	Nil A	SS/PASS
TP105 0.25-0.50m	7.5	8.0	Nil AS	S/PASS	TP105 1.75-2.0m	7.2	7.4	Nil A	SS/PASS
TP105 0.50-0.75m	5.5	5.0	Nil AS	S/PASS	TP105 2.00-2.25m	7.9	8.0	Nil A	SS/PASS
TP105 0.75-1.0m	8.2	8.4		S/PASS	TP105 2.25-2.50m	7.6	7.8		SS/PASS
TP105 1.00-1.25m	6.7	6.5		S/PASS	TP105 2.50-2.75m	7.7	7.9	Nil ASS/PASS	
TP105 1.25-1.50m	7.8	8.2	Nil AS	S/PASS	TP105 2.75-3.0m	7.5	7.0	Nil A	SS/PASS
				Quantita	tive Test Results				6
Location	Action	TAA	a-ANC			S _{POS}	'Net Acidity'	pH _{ox}	Lime Rate
	Criteria	(mole	(mole	Tex	ture Description	(%)	(mole H [*] /t)		(kg/m ³)
	(mole H ⁺ /t)	H [*] /t)	H ⁺ /t)	110	0				
TP103 2.50-2.75m	62	<2	209	-	y&pale brown, gravel	0.03	<10	9.2	nil
TP104 1.00-1.25m	62	<2	29		IC, pale brown	<0.02	<10	7.3	nil
TP104 1.50-1.75m	62	<2	66		grey & pale brown	0.03	<10	7.7	nil
TP105 0.00-0.25m	36	13		LC,	brown, organics	0.03	31	4.3	3
TP105 0.50-0.75m	62	20	32	HC, y	ellow brown & grey	<0.02	20	6.6	3
TP105 2.25-2.50m	36	<2	199	LC, 9	grey & pale brown	0.02	<10	8.6	nil
Remarks:	TAA - Total	Actual Ac	idity. AN	C - Acid Ne	utralising Capacity, Spor	s - Peroxi	de Oxidisable	Sulfur	-
					ssumed density of 1.4 to				
					y' as determined by ana				
	ANC is only	-	-			.,			
						(ala)		1 - -	
Test Procedures:	SPOCAS m				ion with Hydrogen Pero	xiae) — G	Solder Associa	ies	
Prepared By: TN/SL					Checked By:		II A		111 100
	-~				опеолец ру.		<u>H</u> A	(•	1/11/07



Client:	ARUP						Sam	pled By:	Golder
Project:	Gladstone	Fitzroy F	Pipeline					Job No:	07763306
Location:	Raglan to	Bajool	•						
			pH	fox Scre	ening Test Results				36
Location	рН _F	рНгох	Indi	cation	Location	рН _F	рНгох	Ind	lication
Drilled:	23/10/07								
TP106 0.00-0.25m	6.0	4.6	Nit AS	S/PASS	TP106 1.50-1.75m	4.9	4.0	Improt	able PASS
TP106 0.25-0.50m	6.4	5.5		S/PASS	TP106 1.75-2.0m	5.8	1.9		PASS
TP106 0.50-0.75m	6.5	5.6		S/PASS	TP106 2.00-2.25m	4.3	2.7		able PASS
TP106 0.75-1.0m	6.7	5.8		S/PASS	TP106 2.25-2.50m	4.2	3.0		ible PASS
TP106 1.00-1.25m	6.2	5.6		S/PASS	TP106 2.50-2.75m	4.2	3.3		ible PASS
TP106 1.25-1.50m	6.5	5.7	Nil AS	S/PASS	TP106 2.75-3.0m	4.1	3.0		ible PASS
Drilled:	23/10/07								
TP107 0.00-0.25m	7.1	7.5	Nil AS	S/PASS	TP107 1.50-1.75m	7.4	7.3	Nil A	SS/PASS
TP107 0.25-0.50m	7.3	6.5	Nil AS	S/PASS	TP107 1.75-2.0m	7.5	8.3	Nil A	SS/PASS
TP107 0.50-0.75m	8.3	8.4	Nil ASS/PASS		TP107 2.00-2.25m	7.5	8.2	Nil ASS/PASS	
TP107 0.75-1.0m	8.3	8.5	Nil ASS/PASS		TP107 2.25-2.50m	7.4	7.2	Nil ASS/PASS	
TP107 1.00-1.25m	8.0	8.3	Nil ASS/PASS		TP107 2.50-2.75m	7.5	7.0	Nil ASS/PAS	
TP107 1.25-1.50m	7.7	7.7	Nil ASS/PASS		TP107 2.75-3.0m	7.4	7.8	Nil ASS/PASS	
Drilled:	23/10/07								
TP108 0.00-0.25m	7.4	6.4	Nil AS	S/PASS	TP108 1.50-1.75m	7.6	8.0	Nil A	SS/PASS
TP108 0.25-0.50m	7.3	7.3	Nil ASS/PASS		TP108 1.75-2.0m	7.6	7.9	Nil A	SS/PASS
TP108 0.50-0.75m	7.1	7.3	Nil AS	S/PASS	TP108 2.00-2.25m	7.4	7.7	Nil ASS/PAS	
TP108 0.75-1.0m	7.4	7.3		S/PASS	TP108 2.25-2.50m	7.1	7.5	Nil ASS/PASS	
TP108 1.00-1.25m	7.7	7.4	Nil ASS/PASS TP108 2.50-2.75m 5.6		4.4	Improb	able PASS		
TP108 1.25-1.50m	7.6	7.3	Nil AS	S/PASS	TP108 2.75-3.0m	5.3	4.0	Improt	able PASS
				Quantita	tive Test Results				_
Location	Action	TAA	a-ANC						5 Lime Rat
Location	Criteria	(mole	(mole	Tex	ture Description	S _{POS} (%)	'Net Acidity' (mole H⁺/t)	рН _{ох}	(kg/m ³)
TP106 1.75-2.0m	(mote H⁺/t) 36	<u> </u>	H ⁺ /t} 	L(, dk grey-brown	0.97	616	2.2	64
TP106 2.25-2.5m	36	29			C, grey-brown	<0.02	49	3.6	6
TP107 0.25-0.5m	36	<2	90		k brown, trace sand	0.04	<10	6.6	nil
TP108 0.0-0.25m	62	5		MC,	dk brown, organics	<0.02	<10	<10	nil
TP108 2.75-3.0m	62	24			y, some orange-brown	<0.02	25	4.8	3
Remarks:	Liming rates	are base Id clay an	d on a FC d 'net pot	DS of 1.5, a ential acidi	eutralising Capacity. SPOS Issumed density of 1.4 to ty' as determined by ana	onne/m ³	de Oxidisable	Sulfur	ŧ
Test Procedures:	pHFox "ASS SPOCAS m			-	tion with Hydrogen Pero	xide) - G	Golder Associa	tes	

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Client:	ARUP						•	led By:	
Project:	Gladstone	Fitzroy P	ipeline				•	Job No:	077633062
Location:	Raglan to I	Bajool							
			pHf	ox Scree	ning Test Results				48
Location	pH _F	рНгох	Indic	ation	Location	pH _F	рНгох	Indi	cation
Drilled:	23/10/07	P				• •	1		
TP109 0.00-0.25m	6.5	4.6		S/PASS	TP109 1.50-1.75m	7.4	6.8	NiLAS	SS/PASS
TP109 0.25-0.50m	6.7	6.1		S/PASS	TP109 1.75-2.0m	7.3	6.8		SS/PASS
TP109 0.50-0.75m	7.0	7.1		S/PASS	TP109 2.00-2.25m	7.3	6.4		SS/PASS
TP109 0.75-1.0m	7.4	7.8		S/PASS	TP109 2.25-2.50m	7.1	6.2		SS/PASS
TP109 1.00-1.25m	7.3	7.3	the second s	S/PASS	TP109 2.50-2.75m	7.2	6.0	Nil ASS/PAS	
TP109 1.25-1.50m	7,4	6.8		S/PASS	TP109 2.75-3.0m	6.6	5.5		SS/PASS
Drilled:	23/10/07								
TP110 0.00-0.25m	6.6	5.5	Nil AS	S/PASS	TP110 1.50-1.75m	7.3	8.1	Nil AS	SS/PASS
TP110 0.25-0.50m	7.4	6.6		S/PASS	TP110 1.75-2.0m	7.6	7.3		SS/PASS
TP110 0.50-0.75m	7.0	6.0		S/PASS	TP110 2.00-2.25m	7.5	7.8	Nil AS	SS/PASS
TP110 0.75-1.0m	7.4	7.6	NII ASS/PASS		TP110 2.25-2.50m	7.6	7.8	Nil ASS/PASS	
TP110 1.00-1.25m	7.6	8.1	Nil ASS/PASS		TP110 2.50-2.75m	7.5	7.0	Nil ASS/PASS	
TP110 1.25-1.50m	7.7	8.1	Nil ASS/PASS		TP110 2.75-3.0m	7.3	7.0	NII ASS/PASS	
Drilled:	23/10/07							*	
TP111 0.00-0.25m	7.4	6.7	Nil AS	S/PASS	TP111 1.50-1.75m	7.5	8.0	Nil ASS/PAS	
TP111 0.25-0.50m	7.5	7.8	Nil AS	S/PASS	TP111 1.75-2.0m	7.4	7.7	Nil ASS/PASS	
TP111 0.50-0.75m	7.7	8.1	Nil AS	S/PASS	TP111 2.00-2.25m	7.4	7.2	Nil ASS/PASS	
TP111 0.75-1.0m	7.9	7.8	Nil AS	S/PASS	TP111 2.25-2.50m	7.5	7.6	Nil As	SS/PASS
TP111 1.00-1.25m	7.8	7.7	Nil AS	S/PASS	TP111 2.50-2.75m	7.2	7.8		SS/PASS
TP111 1.25-1.50m	7.8	8.2	Nil AS	S/PASS	TP111 2.75-3.0m	7.3	8.0	Nil ASS/PASS	
Drilled:	23/10/07								
TP112 0.00-0.25m	7.1	6.3	Nil AS	S/PASS	TP112 1.50-1.75m	7.7	7.0	Nil As	SS/PASS
TP112 0.25-0.50m	7.8	7.5	Nil AS	S/PASS	TP112 1.75-2.0m	7.6	7.2	Nil ASS/PAS	
TP112 0.50-0.75m	8.1	8.1	Nil AS	S/PASS	TP112 2.00-2.25m	6.8	6.1	Nil ASS/PA	
TP112 0.75-1.0m	8.2	7.7	· · · · · ·	S/PASS	TP112 2.25-2.50m	5.9	5.5	Nil A	SS/PASS
TP112 1.00-1.25m	7.8	8.2		S/PASS	TP112 2.50-2.75m	5.7	5.4	Nil A	SS/PASS
TP112 1.25-1.50m	7.7	8.0		S/PASS	TP112 2.75-3.0m	5.5	5.6		SS/PASS
				Quantita	tive Test Results				3
Location	Action	TAA	a-ANC			SPOS	'Net Acidity'	pH _{ox}	Lime Rat
	Criteria	(mole	(mole	Tex	ture Description	(%)	(mole H⁺/t)	P.1.0X	(kg/m ³)
	(mole H ⁺ /t)	H⁺/භ	H*/t)						
TP109 0.0-0.25m	36	13	-		brown, trace organics	<0.02	13	*	nil
TP110 0.0-0.25m	36	12		_	rey brown, organics	<0.02	12	*	nil
TP112 2.25-2.5m	62	9		MC	, pale grey-brown	0.02	22	6.0	3
Remarks:					eutralising Capacity. Spo		de Oxidisable	Sulfur	
	Liming rates	s are base	ed on a FC)S of 1.5, a	ssumed density of 1.4 t	onne/m ³			
	for sands ar	nd clay an	d 'net pote	ential acidi	ty' as determined by ana	alysis.			
	ANC is only	determin	ed when p	oH is >= 6.:	5				
					um Reducible Sulfur tes	t, where j	oHox is not de	termined.	
Test Procedures:	pHFox "ASS	S Screenir	ng Test" (r	apid oxida	tion with Hydrogen Pero	xide) - G	Golder Associa	tes	
	SPOCAS m		-,	-	ý ý				
Prepared By: HP					Checked By:		řήβ		1 11/0-

"这个人,这些人来的帮助吗?" 1. S. 1. S. S. tracks, composition of Comp and the state of the an 10£.∞≓ Here No. 1. D. W. S. W. S. H. W. S. S. P.



Client:	ARUP							oled By:	
Project:	Gladstone	Fitzroy P	ipeline					Job No:	077633062
Location:	Bajool to A	rcher							
			pHfe	ox Scree	ening Test Results				36
Location	pH _F	рНгох		ation	Location	pH _F	рН⊧ох	Indi	cation
Drilled:	23/10/07								
	6.0	3.5	Descibi	le PASS	TP114 1.50-1.75m	8.0	7.8	Nil AS	SS/PASS
TP114 0.00-0.25m TP114 0.25-0.50m	7.3	6.1		S/PASS	TP114 1.75-2.0m	7.9	8.2		SS/PASS
	7.7	7.0		S/PASS	TP114 2.00-2.25m	7.8	8.1		SS/PASS
TP114 0.50-0.75m TP114 0.75-1.0m	7.8	7.3		S/PASS	TP114 2.25-2.50m	7.8	8.1		SS/PASS
	8.2	7.9			TP114 2.50-2.75m	7.7	7.9		SS/PASS
TP114 1.00-1.25m	8.0	8.3	Nil ASS/PASS Nil ASS/PASS		TP114 2.75-3.0m	7.7	8.0		SS/PASS
TP114 1.25-1.50m		0.0	NII AO	SIFAGO	111142.75-5.00	1	0.0		
Drilled:	23/10/07							NCI A	00/0400
TP115 0.00-0.25m	8.1	7.6	Nil ASS/PASS Nil ASS/PASS		TP115 1.50-1.75m	7.8	8.3		SS/PASS
TP115 0.25-0.50m	8.2	8.3			TP115 1.75-2.0m	7.7	8.2		SS/PASS
TP115 0.50-0.75m	8.2	8.4	Nil ASS/PASS		TP115 2.00-2.25m	7.9	8.2	NILASS/PASS	
TP115 0.75-1.0m	8.1	8.6		S/PASS	TP115 2.25-2.50m	7.9	8.3	NILASS/PASS	
TP115 1.00-1.25m	8.3	8.6		S/PASS	TP115 2.50-2.75m	8.0	8.5	Nil ASS/PASS Nil ASS/PASS	
TP115 1.25-1.50m	7.9	8.4	Nil ASS/PASS		TP115 2.75-3.0m	7.9	8.3	NILA	55/PA55
Drilled:	23/10/07				· · · · · · · · · · · · · · · · · · ·				
TP119 0.00-0.25m	6.2	4.6	Nil AS	S/PASS	TP119 1.50-1.75m	8.0	7.6		SS/PASS
TP119 0.25-0.50m	7.0	5.6	Nil AS	S/PASS	TP119 1.75-2.0m	7.8	8.1		SS/PASS
TP119 0.50-0.75m	6.6	5.4	Nil AS	S/PASS	TP119 2.00-2.25m	7.9	8.2		SS/PASS
TP119 0.75-1.0m	7.1	6.0	Nil AS	S/PASS	TP119 2.25-2.50m	8.1	7.9		SS/PASS
TP119 1.00-1.25m	7.7	7.2	Nil AS	S/PASS	TP119 2.50-2.75m	8.0	8.2		SS/PASS
TP119 1.25-1.50m	7.9	7.3	Nil AS	S/PASS	TP119 2.75-3.0m	7.9	8.2	Nil A	SS/PASS
				Quantita	tive Test Results	_			3
Location	Action Criteria (mole H*/t)	TAA (mole H [*] /t)	a-ANC (mole H [*] /t)	Tex	ture Description	S _{POS} (%)	'Net Acidity' (mole H*/t)	рН _{ох}	Lime Rate (kg/m ³)
TP114 0.0-0.25m	36	14		ZL	, brown, organics	<0.02	14	*	nil
TP119 0.0-0.25m	36	10		ZL	, brown, organics	<0.02	10	*	nil
TP119 0.5-0.75m	36	9	67	ZC	L, brown, organics	<0.02	<10	6.7	nil
Remarks:	TAA - Total	Actual Ac	idity. AN	C - Acid N	eutralising Capacity. Sec	s - Peroxi	de Oxidisable	Sulfur	
	Liming rates	s are base	d on a FC	DS of 1.5, a	assumed density of 1.4	tonne/m ³			
	•				ty' as determined by an				
	ANC is only	-				,			
	-				um Reducible Sulfur te	st, where	pHox is not de	termined	
Test Brassdures	· · · · ·				tion with Hydrogen Pero				
Test Procedures:	SPOCAS m				alen mar rijarogon i on				
									111 107



Client: Project: Location:	ARUP Gladstone Bajool to A	•	ipeline					oled By: Job No:	Golder 077633062
			<u>pHf</u>	ox Scree	ening Test Results				24
Location	рН _F	рНгох	India	cation	Location	рН _F	рН⊧ох	Ind	ication
Drilled:	23/10/07								
TP120 0.00-0.25m	7.7	7.8	Nil AS	S/PASS	TP120 1.50-1.75m	8.1	8.5	Nil A	SS/PASS
TP120 0.25-0.50m	8.1	8.5	Nil AS	S/PASS	TP120 1.75-2.0m	8.2	8.5	Nil A	SS/PASS
TP120 0.50-0.75m	8.1	8.4	Nil AS	S/PASS	TP120 2.00-2.25m	8.0	8.4	Nil ASS/PASS	
TP120 0.75-1.0m	8.1	8.4	Nil AS	S/PASS	TP120 2.25-2.50m	8.0	8.4	Nil A	SS/PASS
TP120 1.00-1.25m	8.2	8.5	Nil AS	S/PASS	TP120 2.50-2.75m	8.1	8.0	Nil A	SS/PASS
TP120 1.25-1.50m	8.3	8.8	Nil AS	S/PASS	TP120 2.75-3.0m	8.1	8.5	Nil A	SS/PASS
Drilled:	23/10/07		· ,						
TP123 0.00-0.25m	6.7	4.5	Nil AS	S/PASS	TP123 1.50-1.75m	8.4	8.6	Nil A	SS/PASS
TP123 0.25-0.50m	6.0	3.6		le PASS	TP123 1.75-2.0m	8.2	8.5	Nil ASS/PASS	
TP123 0.50-0.75m	6.9	5.8		S/PASS	TP123 2.00-2.25m	8.2	8.4	Nil ASS/PAS	
TP123 0.75-1.0m	8.2	8.2	Nil ASS/PASS		TP123 2.25-2.50m	8.1	8.4	Nil A	SS/PASS
TP123 1.00-1.25m	7.7	7.4	Nil ASS/PASS		TP123 2.50-2.75m	8.0	8.4	Nil A	SS/PASS
TP123 1.25-1.50m	8.0	8.2	· · · · · · · · · · · · · · · · · · ·	S/PASS	TP123 2.75-3.0m	8.3	8.7	Nil A	SS/PASS
Location	Action Criteria	TAA (mole H [*] /t)	a-ANC (mole H [*] /t)		tive Test Results	S _{POS} (%)	'Net Acidity' (mole H [*] /t)	рН _{ох}	1 Lime Rat (kg/m³)
TP123 0.25-0.5m	(mole H*/t) 62	23	90	MC, d	k brown, trace sand	<0.02	23	6.9	3
	- -								
Remarks:	Liming rates for sands a ANC is only	s are base nd clay ar determin	ed on a FC id 'net pot ed when	DS of 1.5, a ential acidi pH is >= 6.		onne/m ³ alysis.			
Test Procedures:	pH⊧ox "ASS SPOCAS m				tion with Hydrogen Pero	xide) – (Golder Associa	ites	
Prepared By: HP					Checked By:		HA	[0	9/11/07



Client:	ARUP				· · · · · · · · · · · · · · · · · · ·		Some	led By:	Golder
		17 34 17)				•	•	077633062
Project:	Gladstone	-	ripeline	· .			•	JOD 110.	077633062
Location:	Archer to N	lidgee							
			pHfc	ox Scree	ning Test Results				36
Location	pH _F	рН гох	Indic	ation	Location	рН _F	рН ғох	Indi	cation
Drilled:	22/10/07		•						
TP130 0.00-0.25m	5.3	3.3	Possibl	e PASS	TP130 1.50-1.75m	7.5	8.1	Nil As	SS/PASS
TP130 0.25-0.50m	5.8	4.3		ole PASS	TP130 1.75-2.0m	7.7	8.1	Nil As	SS/PASS
TP130 0.50-0.75m	5.9	5.2		S/PASS	TP130 2.00-2.25m	7.7	8.0	Nil As	SS/PASS
TP130 0.75-1.0m	7.3	6.8	1	S/PASS	TP130 2,25-2.50m	7.7	7.1	Nil As	SS/PASS
TP130 1.00-1.25m	7.6	7.6		S/PASS	TP130 2.50-2.75m	7.7	7.5	Nil As	SS/PASS
TP130 1.25-1.50m	7.8	8.1		S/PASS	TP130 2.75-3.0m	7.8	8.0	Nil As	SS/PASS
Drilled:	22/10/07								
TP131 0.00-0.25m	6.4	5.0	NiLASS	S/PASS	TP131 1.50-1.75m	6.3	6.0	Nil A	SS/PASS
TP131 0.25-0.50m	6.1	5.2		S/PASS	TP131 1.75-2.0m	6.7	6.6		SS/PASS
TP131 0.50-0.75m	5.9	5.2		S/PASS	TP131 2.00-2.25m	6.7	6.7		SS/PASS
TP131 0.75-1.0m	6.2	6.5		S/PASS	TP131 2.25-2.50m	6.9	6.6		SS/PASS
TP131 1.00-1.25m	5.9	5.6		S/PASS	TP131 2.50-2.75m	6.9	6.3	Nil ASS/PASS	
TP131 1.25-1.50m	6.0	6.0			6.6	NII ASS/PASS			
Drilled:	22/10/07	0.0							
TP132 0.00-0.25m	5.9	3.7	Possibl	le PASS	TP132 1.50-1.75m	7.6	8,1	Nil A	SS/PASS
TP132 0.25-0.50m	7.6	7.0		S/PASS	TP132 1.75-2.0m	7,4	7.8		SS/PASS
TP132 0.50-0.75m	7.9	8.0		S/PASS	TP132 2.00-2.25m	7.1	7.7	Nil A	SS/PASS
TP132 0.75-1.0m	8.1	8.5		S/PASS	TP132 2.25-2.50m	6.6	6.0	Nil A	SS/PASS
TP132 1.00-1.25m	8.0	8.4		S/PASS	TP132 2.50-2.75m	6.1	5.7	Nil A	SS/PASS
TP132 1.25-1.50m	7.8	8.4	Nil AS	S/PASS	TP132 2.75-3.0m	5.9	5.8	Nil A	SS/PASS
				Quantita	tive Test Results				4
Leastion	Action	TAA	a-ANC	Genericite		SPOS	'Net Acidity'	pHox	Lime Rate
Location	Criteria (mole H ⁺ /t)	(mole H ⁺ /t)	(mole H ⁺ /t)	Tex	ture Description	(%)	(mole H ⁺ /t)	PHOX	(kg/m ³)
TP130 0.0-0.25m	36	35		··· ·	ZL, dk brown	<0.02	35	*	4
TP130 0.5-0.75m	36	13			ZL, dk brown	<0.02	13	4.8	nil
TP131 0.0-0.25m	62	13			MHC, brown	<0.02	13	*	nil
TP132 0.0-0.25m	36	24	- 1	2	ZL, grey-brown	<0.02	24	*	3
Remarks:	Liming rate for sands a ANC is only	s are base nd clay ar / determir	ed on a FC nd 'net pote ned when p)S of 1.5, a ential acidi oH is >= 6.:	eutralising Capacity. Seo assumed density of 1.4 t ty' as determined by ana 5 um Reducible Sulfur tes	onne/m ³ alysis.			
Test Procedures:					tion with Hydrogen Pero				
rest riocedules.	SPOCAS n								
Prepared By: HP					Checked By:		НЛ	1	9/11/07



Client: Project: Location:	ARUP Gladstone Bajool to A	•	ipeline					oled By: Job No:	Golder 077633062
			<u>pHf</u>	ox Scree	ening Test Results				24
Location	рН _F	рН⊧ох	Indi	cation	Location	рН _F	рHғох	Ind	ication
Drilled:	22/10/07								
TP133 0.00-0.25m	7.5	8.0	Nil AS	S/PASS	TP133 1.50-1.75m	7.6	7.9	Nil A	SS/PASS
TP133 0.25-0.50m	7.7	7.8	Nil AS	S/PASS	TP133 1.75-2.0m	7.5	8.1	Nil ASS/PA	
TP133 0.50-0.75m	7.7	8.2	Nil AS	S/PASS	TP133 2.00-2.25m	7.5	8.1	Nil A	SS/PASS
TP133 0.75-1.0m	7.7	8.3	Nil AS	S/PASS	TP133 2.25-2.50m	7.7	8.3	Nil A	SS/PASS
TP133 1.00-1.25m	7.8	8.2	Nil AS	S/PASS	TP133 2.50-2.75m	7.5	8.2	Nil A	SS/PASS
TP133 1.25-1.50m	7.8	8.3	Nil AS	S/PASS	TP133 2.75-3.0m	7.5	8.2	Nil A	SS/PASS
Drilled:	22/10/07								
TP138 0.00-0.25m	6.6	4.5	Nil AS	S/PASS	TP138 1.50-1.75m	8.6	8.4	Nil A	SS/PASS
TP138 0.25-0.50m	7.2	6.8	Nil AS	S/PASS	TP138 1.75-2.0m	8.6	8.5	Nil ASS/PAS	
TP138 0.50-0.75m	7.4	6.5	Nil AS	S/PASS	TP138 2.00-2.25m	8.7	8.6	Nil ASS/PAS	
TP138 0.75-1.0m	7.8	6.5	Nil AS	S/PASS	TP138 2.25-2.50m	8.8	8.8	Nil A	SS/PASS
TP138 1.00-1.25m	8.2	7.8	Nil AS	S/PASS	TP138 2.50-2.75m	8.6	8.5	Nil A	SS/PASS
TP138 1.25-1.50m	8.3	8.2	Nil AS	S/PASS	TP138 2.75-3.0m	8.7	8.7	NILA	SS/PASS
Location	Action	TAA	a-ANC		tive Test Results	SPOS	'Net Acidity'	рН _{ох}	1 Lime Rat
	Criteria (mole H [*] /t)	(mole H⁺/t)	(mole H [*] /t)	Tex	ture Description	(%)	(mole H [*] /t)		(kg/m³)
TP138 0.0-0.25	18	9			LS, brown	<0.02	<10	*	nil
Remarks:	Liming rates for sands ar ANC is only	are base nd clay an determin	ed on a FO nd 'net pot ed when i	DS of 1.5, a ential acidi pH is >= 6.	eutralising Capacity. Spo assumed density of 1.4 t ty' as determined by ana 5 um Reducible Sulfur tes	onne/m ³ alysis.			
Test Procedures:		S Screenii	ng Tesť" (i	rapid oxida	tion with Hydrogen Pero		Golder Associa	ites	
Prepared By: HP					Checked By:		FV.	1 (•	7/11/07



Client:	ARUP						•	•	Golder
Project:	Gladstone	-	ipeline		1		•	Job No:	0776330
ocation:	Midgee to	Gavial							
			<u>pH1</u>	ox Scree	ening Test Results				12
Location	pH _F	рНгох	Indi	cation	Location	pH _F	рН⊧ох	Ind	ication
Drilled:	not listed								
TP151 0.00-0.25m	6.9	6.2	Nil AS	S/PASS	TP151 1.50-1.75m	7.3	7.4	Nil A	SS/PASS
TP151 0.25-0.50m	7.6	7.4	Nil AS	S/PASS	TP151 1.75-2.0m	6.7	6.2	Nil A	SS/PASS
TP151 0.50-0.75m	7.3	6.4	Nil AS	S/PASS	TP151 2.00-2.25m	6.2	6.6	Nil ASS/PAS	
TP151 0.75-1.0m	7.3	7.3	Nil AS	S/PASS	TP151 2.25-2.50m	7.3	6.9	Nil ASS/PA	
TP151 1.00-1.25m	7.3	7.0	Nil AS	S/PASS	TP151 2.50-2.75m	7.7	7.6	Nil ASS/PAS	
TP151 1.25-1.50m	7.3	7.1	Nil AS	S/PASS	TP151 2.75-3.0m	7.9	8.5	Nil A	SS/PASS
				Quantita	tive Test Results				1
Location	Action	TAA	a-ANC			SPOS	'Net Acidity'	pH _{ox}	Lime Ra
	Criteria (mole H ⁺ /t)	(mole H⁺/t)	(mole H⁺/t)	Тех	ture Description	(%)	(mole H [*] /t)	1 01	(kg/m ³
TP151 1.75-2.0m	36	25		LC, sar	ndy, grey & red-brown	<0.02	31	5.0	3
									·
Remarks:	Liming rates	s are base	ed on a F	OS of 1.5, a	eutralising Capacity. Sec assumed density of 1.4 t	onne/m ³	ide Oxidisable	Sulfur	
Remarks:	Liming rates for sands a	s are base nd clay an	ed on a F(id 'net pol	OS of 1.5, a ential acidi	assumed density of 1.4 t ty' as determined by ana	onne/m ³	ide Oxidisable	Sulfur	
Remarks: Test Procedures:	Liming rates for sands an ANC is only	s are base nd clay an determin S Screenir	ed on a Fo id 'net pol ed when ng Test" (DS of 1.5, a ential acidi pH is >= 6. rapid oxida	assumed density of 1.4 t ty' as determined by ana	onne/m ³ alysis.			



Client:	ARUP						Samp	oled By:	Golder
Project:	Gladstone	Fitzroy Pi	peline					Job No:	077633062
ocation:	Gavial to R	•	•						
			pHfe	ox Scree	ning Test Results				11
Location	рН _F	рН _{FOX}	Indic	ation	Location	pH _F	рН ғох	Ind	ication
Drilled:	not listed								
TP155 0.0-0.25m	6.4	4.7	Nil AS	S/PASS	TP155 1.75-2.0m	5.8	4.3	Improb	able PASS
TP155 0.25-0.50m	5.6	4.9		S/PASS	TP155 2.25-2.50m	5.7	5.6	Nil A	SS/PASS
TP155 0.75-1.0m	5.5	5.0		S/PASS	TP155 2.75-3.0m	6.4	6.4	Nil A	SS/PASS
TP155 1.25-1.50m	5.3	4.5		S/PASS					
Drilled:	03/09/07								
TP163 0.0-0.9m	6.6	4.6	Nil AS	S/PASS					
TP163 0.9-1.1m	6.6	5.6		S/PASS					
TP163 2.0-3.0m	7.9	6.7	Nil AS	S/PASS					
TP163 2.25-2.50m	6.9	7.7		S/PASS					
	l								
			9	Quantita	tive Test Results				3
Location	Action	TAA	a-ANC			S _{POS}	'Net Acidity'	pHox	Lime Rat
	Criteria (mole H ⁺ /t)	(mole H⁺/t)	(mole H [*] /t)	Тех	ture Description	(%)	(mole H⁺/t)		(kg/m ³)
TP155 1.75-2.0m	62	<2	16	MC, gr	ey & brown, organics	<0.02	<10	7.0	nil
TP163 0.0-0.9m	36	12			_C, dark brown	<0.02	12	4.9	nil
TP163 2.25-2.50m	36	<2	136	LMC, sa	ndy, grey & red-brown	<0.02	<10	9.0	nil
Remarks:	Liming rates	s are base nd clay ar	ed on a FC id 'net pot	DS of 1.5, a ential acidi	eutralising Capacity. Spor assumed density of 1.4 tr ty' as determined by ana 5	onne/m ³	ide Oxidisable	Sulfur	
Remarks: Test Procedures:	Liming rates for sands a ANC is only	s are base nd clay ar determin S Screenii	ed on a FC id 'net pot ed when p ng Test" (r	DS of 1.5, a ential acidi oH is >= 6. rapid oxida	assumed density of 1.4 to ty' as determined by ana	onne/m ³ Ilysis.			



Client:	ARUP						Samp	led By:	Golder
Project:	Gladstone	Fitzroy P	ipeline				J	lob No:	077633062
Location:	Gavial to R	ocklands							
			pHf	ox Scree	ening Test Results				24
Location	pH _⊭	рН _{FOX}	Indic	ation	Location	рН _F	рН ⊧ох	Indi	cation
Drilled:	03/09/07				Drilled:	03	/09/07		
TP159 0.0-0.6	7.5	5.4	Nil AS	S/PASS	TP162 0.0-0.5	8.4	8.2	Nil A	SS/PASS
TP159 0.6-0.9	7.9	7.4	Nil ASS	S/PASS	TP162 0.5-0.8	8.1	8.3	Nil A	SS/PASS
TP159 0.9-2.1	8.2	8.2	Nil ASS	S/PASS	TP162 0.8-2.4	8.0	8.4	Nil A	SS/PASS
TP159 2.1-3.0	7.9	8.4	Nil AS	S/PASS	TP162 2.4-3.0	8.5	8.7	Nil A	SS/PASS
Drilled:	03/09/07								
TP160 0.0-0.5	7.5	4.7	Nil AS	S/PASS					
TP160 0.5-1.1	7.4	7.0	Nil AS	S/PASS					
TP160 1.1-1.4	7.8	6.8	NII AS	S/PASS					
TP160 1.4-3.0	8.3	8.6	Nil AS	S/PASS					
Drilled:	30/08/07								
TP165 0.00-0.25m	6.1	4.6	Nil AS	S/PASS	TP165 1.50-1.75m	7.5	7.8	Nil A	SS/PASS
TP165 0.25-0.50m	6.1	5.5	Nil AS	S/PASS	TP165 1.75-2.0m	7.6	7.7	Nil A	SS/PASS
TP165 0.50-0.75m	6.4	5.8	Nil AS	S/PASS	TP165 2.00-2.25m	7.5	7.8	Nil ASS/PASS	
TP165 0.75-1.0m	7.3	6.7	Nil AS	S/PASS	TP165 2.25-2.50m	7.4	7.8	Nil A	SS/PASS
TP165 1.00-1.25m	7.4	6.9	Nil AS	S/PASS	TP165 2.50-2.75m	7.4	7.6	Nil A	SS/PASS
TP165 1.25-1.50m	7.3	7.8	Nil AS	S/PASS	TP165 2.75-3.0m	7.4	7.6	Nil A	SS/PASS
					· · · · · · · · · · · · · · · · · · ·				
				<u>Quantita</u>	ative Test Results				3
Location	Action	TAA	a-ANC	_		SPOS	'Net Acidity'	pHox	Lime Rate
	Criteria	(mole H [*] /t)	(mole H⁺/t)	Tex	cture Description	(%)	(mole H⁺/t)		(kg/m ³)
	(mole H*/t)	2		LC.	sandy, dark brown	<0.02	<10	7.2	nil
TP159 0.0-0.6m	36				ZL, dark brown	<0.02	<10	7.2	nil
TP160 0.0-0.5m	36	4	25		., dark grey, gravel	<0.02*	25	*	3
TP165 0.00-0.25m	36	25 <2	260		LC, grey	<0.02	<10	8.9	nil
TP165 1.00-1.25m	30		200			1			<u>.</u>
								0.10	
Remarks:					eutralising Capacity. Spo		de Oxidisable	Sultur	
					assumed density of 1.4 t				
					ty' as determined by ana s	arysis.			
	ANC is only				o ium Reducible Sulfur tes	t. where r	Hox is not de	termined	I.
	All sample	ss nave u	lueigone			.,			
Test Procedures:					tion with Hydrogen Pero	xide) – C	older Associa	ites	
	SPOCAS n	aathad (ano					

(Bisbane Laboratory)



Client: Project:	ARUP Gladstone	-	•				•	ed By: ob No:	Golder 077633062
Location:	Rocklands	to Arche	·	ox Scree	ening Test Results	<u> </u>			24
Location	pH _F	рНгох		ation	Location	pH⊧	рНгох	Ind	ication
Drilled:	03/09/07				Drilled:				
TP167 0.00-0.25m	8.1	7.4	NELASS	S/PASS	TP167 1.50-1.75m	7.7	7.1	Nil A	SS/PASS
TP167 0.00-0.25m	7.6	6.4		S/PASS	TP167 1.75-2.0m	7.7	8.2		SS/PASS
TP167 0.50-0.75m	7.5	7.1		S/PASS	TP167 2.00-2.25m	7.6	8.3		SS/PASS
TP167 0.75-1.0m	7.7	7.3		S/PASS	TP167 2.25-2.50m	7.7	8.2		SS/PASS
TP167 1.00-1.25m	8.0	7.5		S/PASS	TP167 2.50-2.75m	7.7	7.6		SS/PASS
TP167 1.25-1.50m	7.7	7.1		S/PASS	TP167 2.75-3.0m	7.7	8.1	Nil A	SS/PASS
Drilled:	30/08/07				····		•••		
TP166 0.00-0.25m	7.6	5.0	Nil AS	S/PASS	TP166 1.50-1.75m	7.5	8.2	Nil A	SS/PASS
TP166 0.25-0.50m	7.5	7.1	Nil AS	S/PASS	TP166 1.75-2.0m	7.6	8.3	Nil A	SS/PASS
TP166 0.50-0.75m	7.6	7.2		S/PASS	TP166 2.00-2.25m	7.3	8.5	Nil A	SS/PASS
TP166 0.75-1.0m	7.7	8.0		S/PASS	TP166 2.25-2.50m	7.4	8.3		SS/PASS
TP166 1.00-1.25m	7.6	8.2		S/PASS	TP166 2.50-2.75m	7.4	8.1		SS/PASS
TP166 1.25-1.50m	7.2	8.3		S/PASS	TP166 2.75-3.0m	7.4	8.1	Nil A	SS/PASS
Location	Action	ΤΑΑ	a-ANC	Quantita	tive Test Results	S _{POS}	'Net	pH _{ox}	3 Lime Rate
Location	Criteria (mole H ⁺ /t)	(mole H⁺/t)	(mole H ⁺ /t)	Tex	ture Description	(%)	Acidity' (mole H ⁺ /t)	P**0X	(kg/m³)
TP166 0.00-0.25m	62	16			dark grey, organics	<0.02*	16	*	nil
TP167 0.00-0.25m	62	<2	75	MC, gr	ey & brown, organics	<0.02	<10	6.9	nil
TP167 2.50-2.75m	62	<2	55		HC, grey	<0.02	<19	7.0	nil
Remarks:	Liming rates for sands a ANC is only	s are base nd clay ar / determin	ed on a FC id 'net pot ed when p	OS of 1.5, a ential acidi oH is >= 6.	eutralising Capacity. Sec assumed density of 1.4 t ty' as determined by and 5 ium Reducible Sulfur tes	onne/m ³ alysis.			ed.
Remarks: Test Procedures:	Liming rates for sands a ANC is only * All sample	s are base nd clay ar / determin es have ur S Screenin	ed on a FC id 'net pot ed when p indergone f ing Test" (i	DS of 1.5, a ential acidi DH is >= 6. the Chrom rapid oxida	assumed density of 1.4 t ty' as determined by and 5	onne/m ³ alysis. st, where	oHox is not d	etermine	ed.



Client:	ARUP						Samp	led By:	Golder
Project:	Gladstone	Fitzroy P	ipeline					Job No:	077633062
Location:	Rocklands	-	-						
······			pHi	fox Scre	ening Test Results				35
Location	pH _F	рНгох	Indic	ation	Location	рН _ғ	рН _{FOX}	Ind	ication
Drilled:	30/08/07		<u> </u>		Drilled:				
TP168 0.00-0.25m	6.2	4.5	NiLAS	S/PASS	TP168 1.50-1.75m	7.8	7.3	Nil A	SS/PASS
TP168 0.25-0.50m	6.6	5.4		S/PASS	TP168 1.75-2.0m	8.0	7.3		SS/PASS
TP168 0.50-0.75m	7.0	6.1		S/PASS	TP168 2.00-2.25m	7.9	7.7		SS/PASS
TP168 0.75-1.0m	7.7	6.8		S/PASS	TP168 2.25-2.50m	7.9	8.1	Nil A	SS/PASS
TP168 1.00-1.25m	8.0	8.0		S/PASS	TP168 2.50-2.75m	7.9	7.5	Nil A	SS/PASS
TP168 1.25-1.50m	7.7	7.6		S/PASS	TP168 2.75-3.0m	8.0	7.8	Nil A	SS/PASS
Drilled:	30/08/07				Drilled:				
TP169 0.00-0.25m	5.4	3.5	Possib	le PASS	TP169 1.50-1.75m	8.0	7.6	Nil A	SS/PASS
TP169 0.25-0.50m	6.8	5.3	Nil AS	S/PASS	TP169 1.75-2.0m	7.9	8.1	Nil A	SS/PASS
TP169 0.50-0.75m	7.0	6.1	Nil ASS/PASS		TP169 2.00-2.25m	7.9	8.1	Nil A	SS/PASS
TP169 0.75-1.0m	7.6	6.8	Nil AS	S/PASS	TP169 2.25-2.50m	7.5	7.8	Nil A	SS/PASS
TP169 1.00-1.25m	7.8	7.0	Nil AS	S/PASS	TP169 2.50-2.75m	7.8	6.9	Nil A	SS/PASS
TP169 1.25-1.50m	7.9	7.0	Nil AS	S/PASS	TP169 2.75-3.0m	7.8	7.0	Nil ASS/PASS	
Drilled:	31/08/07				Drilled:				
TP172 0.00-0.25m	5.5	3.1	Possible PASS		TP172 1.50-1.75m	7.5	7.6	Nil A	SS/PASS
TP172 0.25-0.50m	6.3	5.6	Nil ASS/PASS		TP172 1.75-2.0m	7.5	6.9		SS/PASS
TP172 0.50-0.75m	6.5	5.7	NII ASS/PASS		TP172 2.00-2.25m	7.6	7.9	Nil A	SS/PASS
TP172 0.75-1.0m	6.9	6.8	Nil AS	S/PASS	TP172 2.50-2.75m	7.5	7.7		SS/PASS
TP172 1.00-1.25m	7.1	6.7	Nil AS	S/PASS	TP172 2.75-3.0m	7.5	7.4	Nil A	SS/PASS
TP172 1.25-1.50m	7.2	6.8	Nil AS	S/PASS					
				Quantita	ative Test Results				4
Location	Action	TAA	a-ANC			S _{POS}	'Net Acidity'	pHox	Lime Rat
	Criteria	(mole	(mole	Te>	cture Description	(%)	(mole H ⁺ /t)		(kg/m ³)
	(mole H⁺/t)	H⁺/t)	H⁺/t}			(,			
TP168 0.00-0.25m	36	25		ZCL,	dark grey, organics	<0.02*	25	*	3
TP169 0.00-0.25m	62	27	80	LMC, da	rk brown-grey, organics	<0.02	27	6.9	3
TP172 0.00-0.25m	36	26	60	С	L, grey, organics	<0.02	26	6.9	3
TP172 0.75-1.0m	36	<2	173	l	_C, sandy, grey	<0.02	<10	8.4	nil
Remarks:	TAA - Total	Actual Ac	idity. AN	C - Acid Ne	eutralising Capacity. Spos	- Peroxic	le Oxidisable	Sulfur	
					ssumed density of 1.4 to				
	-				ty' as determined by ana				
	ANC is only					.,			
	•				um Reducible Sulfur test	t, where p	Hox is not de	termined	L
Test Procedures:	•				tion with Hydrogen Perox	kide) – G	iolder Associa	tes	
	SPOCAS m	ethod – A	LS Brisba	ane					
							HА		7/11/07

611 Coronation Drive TOOWONG QLD 4066 (PO Box 1734, MILTON BC QLD 4064) Telephone: (61-7) 3721 5400 Facsimile: (61-7) 3721 5401 http://WWW.golder.com



http://WWW.golder.com	1								
Client:	ARUP						•	led By:	
Project:	Gladstone	Fitzroy F	'ipeline					Job No:	077633062
Location:	Connectior	1 to Fitzro	by River	·					
			pH	fox Scre	ening Test Results				
Location	pH _F	рНгох	India	cation	Location	рН _F	рНғох	Ind	ication
Drilled:									
TP220 0.0-0.4	6.4	5.1	Nil AS	S/PASS	· · · · · · · · · · · · · · · · · · ·				
TP220 0.4-0.9	8.3	8.2		S/PASS					
TP220 0.9-1.2	8,1	8.4		S/PASS					
TP220 1.2-2.0	7.6	8.0		S/PASS					
TP220 2.0-3.0	7.0	7.4	Nil AS	S/PASS					
l - dian	• -4i			Quantita	ative Test Results		Inter A stational		1 ima Data
Location	Action Criteria	TAA (mole	a-ANC (mole	Тех	cture Description	SPOS	'Net Acidity'	pH _{ox}	Lime Rate
	(mole H ⁺ /t)	(illole H⁺/t)	(inole H⁺/t)	104	cure Description	(%)	(mole H*/t)		(kg/m³)
TP220 0.0-0.4m	36	<2		LC,	, Sandy, dk brown	<0.02	<10	*	nil
TP220 2.0-3.0m	36	2	28	1	le grey-brown mottled	<0.02	<10	6.9	nil
Remarks:	Liming rates for sands ar ANC is only	s are base nd clay an r determin	ed on a FC id 'net pote ed when p	DS of 1.5, a ential acidit pH is >= 6.5	eutralising Capacity. Sroa assumed density of 1.4 to ty' as determined by ana 5 um Reducible Sulfur tes	onne/m ³ Ilysis.			

 Test Procedures:
 pHFox "ASS Screening Test" (rapid oxidation with Hydrogen Peroxide) – Golder Associates

 SPOCAS method – ALS Brisbane
 Prepared By: BM

 Checked By:
 1/21 ((107))

Environmental Division



CERTIFICATE OF ANALYSIS

Work Order	: EB0710275	Page	: 1 of 12
Client		Laboratory	: Environmental Division Brisbane
Contact	: MS SILVANA SANTOMARTINO	Contact	: Tim Kilmister
Address	: P O BOX 1734 MILTON QLD AUSTRALIA 4064	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: ssantomartino@golder.com.au	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 3721 5400	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 3721 5401	Facsimile	: +61-7-3243 7218
Project	: 077633062 GLADSTONE-FITZROY PIPELINE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	:		
C-O-C number	:	Date Samples Received	: 11-SEP-2007
Sampler	: SILVANA SANTOMARTINO	Issue Date	: 18-SEP-2007
Site	: GLADSTONE-FITZROY PIPELINE		
		No. of samples received	: 21
Quote number	: BN/240/07	No. of samples analysed	: 21

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

accordance with NATA	Signatories	Position	Accreditation Category
accreditation requirements.	Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics

Accredited for compliance with ISO/IEC 17025.

This document is issued in

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes.

 Key :
 CAS Number = Chemistry Abstract Services number

 LOR = Limit of reporting
 ^ = Result(s) reported is calculated using analyte detections at or above the LOR. (eg. <5 + 5 + 7 = 12).</td>

- ANC not required because pH KCI less than 6.5
- Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from kg/t dry weight to kg/m3 in-situ soil, multiply reported results x wet bulk density of soil in t/m3.



Sub-Matrix: SOIL		Cli	ent sample ID :	TP91 0.50-0.75m	TP92 0.00-0.25m	TP92 0.75-1.0m	TP92 1.50-1.75m	TP93 1.25-1.50m
	Cl	ient sampli	ng date / time:	22-AUG-2007 15:00				
Compound	CAS Number	LOR	Unit	EB0710275-001	EB0710275-002	EB0710275-003	EB0710275-004	EB0710275-005
EA029-A: pH Measurements	er te ritamber							
pH KCI (23A)		0.1	pH Unit	5.2		4.8	5.8	4.8
pH OX (23B)		0.1	pH Unit	7.2		5.5	7.0	5.7
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)		2	mole H+ / t	25		26	6	21
Titratable Peroxide Acidity (23G)		2	mole H+ / t	<2		6	<2	6
Titratable Sulfidic Acidity (23H)		2	mole H+ / t	<2		<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.04		0.04	<0.02	0.03
sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S	<0.02		<0.02	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S	<0.02		<0.02	<0.02	<0.02
EA029-C: Sulfur Trail								
KCI Extractable Sulfur (23Ce)		0.02	% S	0.03		<0.02	<0.02	<0.02
Peroxide Sulfur (23De)		0.02	% S	0.04		<0.02	<0.02	<0.02
Peroxide Oxidisable Sulfur (23E)		0.02	% S	<0.02		<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)		10	mole H+ / t	<10		<10	<10	<10
EA029-D: Calcium Values								
KCI Extractable Calcium (23Vh)		0.02	% Ca	0.16		0.08	0.07	0.10
Peroxide Calcium (23Wh)		0.02	% Ca	0.22		0.10	0.09	0.12
Acid Reacted Calcium (23X)		0.02	% Ca	0.06		<0.02	<0.02	0.02
acidity - Acid Reacted Calcium (a-23X)		10	mole H+/t	28		<10	<10	11
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	0.04		<0.02	<0.02	<0.02
EA029-E: Magnesium Values								
KCI Extractable Magnesium (23Sm)		0.02	% Mg	0.16		0.18	0.18	0.15
Peroxide Magnesium (23Tm)		0.02	% Mg	0.20		0.20	0.21	0.18
Acid Reacted Magnesium (23U)		0.02	% Mg	0.04		0.02	0.03	0.03
Acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	31		17	28	24
sulfidic - Acid Reacted Magnesium		0.02	% S	0.05		0.03	0.04	0.04
(s-23U)								
EA029-F: Excess Acid Neutralising Capaci	ity							
Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3	0.17			0.09	
acidity - Excess Acid Neutralising Capacity (a-23Q)		10	mole H+ / t	33			18	
sulfidic - Excess Acid Neutralising Capacity (s-23Q)		0.02	% S	0.05			0.03	



Sub-Matrix: SOIL		Cli	ent sample ID :	TP91 0.50-0.75m	TP92 0.00-0.25m	TP92 0.75-1.0m	TP92 1.50-1.75m	TP93 1.25-1.50m
	Cl	ient sampli	ing date / time:	22-AUG-2007 15:00				
Compound	CAS Number	LOR	Unit	EB0710275-001	EB0710275-002	EB0710275-003	EB0710275-004	EB0710275-005
EA029-H: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5		1.5	1.5	1.5
Net Acidity (sulfur units)		0.02	% S	0.04		0.04	<0.02	0.03
Net Acidity (acidity units)		10	mole H+ / t	28		26	<10	21
Liming Rate		1	kg CaCO3/t	2		2	<1	2
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit		4.4			
Titratable Actual Acidity (23F)		2	mole H+ / t		46			
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S		0.07			
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.02	% S		<0.02			
acidity - Chromium Reducible Sulfur		10	mole H+ / t		<10			
(a-22B)								
EA033-D: Retained Acidity								
Net Acid Soluble Sulfur (20Je)		0.02	% S		<0.02			
acidity - Net Acid Soluble Sulfur (a-20J)		10	mole H+ / t		<10			
sulfidic - Net Acid Soluble Sulfur (s-20J)		0.02	% pyrite S		<0.02			
KCI Extractable Sulfur (23Ce)		0.02	% S		<0.02			
HCI Extractable Sulfur (20Be)		0.02	% S		<0.02			
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-		1.5			
Net Acidity (sulfur units)		0.02	% S		0.07			
Net Acidity (acidity units)		10	mole H+ / t		46			
Liming Rate		1	kg CaCO3/t		3			



Sub-Matrix: SOIL		Cli	ent sample ID :	TP96 2.25-2.50m	TP97 2.75-3.0m	TP102 0.75-1.0m	TP103 2.50-2.75m	TP104 1.50-1.75m
	Cl	ient sampli	ng date / time:	22-AUG-2007 15:00				
Compound	CAS Number	LOR	Unit	EB0710275-006	EB0710275-007	EB0710275-008	EB0710275-009	EB0710275-010
EA029-A: pH Measurements	CAS Number	2011	C III					
pH KCI (23A)		0.1	pH Unit	5.0	6.7	5.9	8.4	7.5
pH OX (23B)		0.1	pH Unit	5.9	8.4	7.7	9.2	7.7
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)		2	mole H+ / t	6	<2	<2	<2	<2
Titratable Peroxide Acidity (23G)		2	mole H+ / t	<2	<2	<2	<2	<2
Titratable Sulfidic Acidity (23H)		2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
EA029-C: Sulfur Trail								
KCI Extractable Sulfur (23Ce)		0.02	% S	<0.02	<0.02	<0.02	0.02	0.02
Peroxide Sulfur (23De)		0.02	% S	<0.02	0.22	<0.02	0.03	0.03
Peroxide Oxidisable Sulfur (23E)		0.02	% S	<0.02	0.22	<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)		10	mole H+ / t	<10	137	<10	<10	<10
EA029-D: Calcium Values								
KCI Extractable Calcium (23Vh)		0.02	% Ca	0.06	0.15	0.14	0.35	0.21
Peroxide Calcium (23Wh)		0.02	% Ca	0.08	0.81	0.18	0.66	0.24
Acid Reacted Calcium (23X)		0.02	% Ca	<0.02	0.66	0.04	0.31	0.02
acidity - Acid Reacted Calcium (a-23X)		10	mole H+/t	<10	329	17	153	13
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	<0.02	0.53	0.03	0.24	0.02
EA029-E: Magnesium Values								
KCI Extractable Magnesium (23Sm)		0.02	% Mg	0.09	0.12	0.10	0.16	0.19
Peroxide Magnesium (23Tm)		0.02	% Mg	0.11	0.76	0.13	0.21	0.22
Acid Reacted Magnesium (23U)		0.02	% Mg	0.02	0.64	0.03	0.05	0.03
Acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	18	526	22	38	27
sulfidic - Acid Reacted Magnesium		0.02	% S	0.03	0.84	0.04	0.06	0.04
(s-23U)								
EA029-F: Excess Acid Neutralising Capaci	ity							
Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3		0.16	0.27	1.05	0.33
acidity - Excess Acid Neutralising Capacity (a-23Q)		10	mole H+ / t		33	53	209	66
sulfidic - Excess Acid Neutralising Capacity (s-23Q)		0.02	% S		0.05	0.08	0.34	0.10



Sub-Matrix: SOIL		Clie	ent sample ID _:	TP96 2.25-2.50m	TP97 2.75-3.0m	TP102 0.75-1.0m	TP103 2.50-2.75m	TP104 1.50-1.75m
	Cl	ient sampli	ng date / time:	22-AUG-2007 15:00				
Compound	CAS Number	LOR	Unit	EB0710275-006	EB0710275-007	EB0710275-008	EB0710275-009	EB0710275-010
EA029-H: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)		0.02	% S	<0.02	0.04	<0.02	<0.02	<0.02
Net Acidity (acidity units)		10	mole H+ / t	<10	24	<10	<10	<10
Liming Rate		1	kg CaCO3/t	<1	2	<1	<1	<1



Sub-Matrix: SOIL		Cli	ent sample ID :	TP105 2.25-2.50m	TP151 1.75-2.0m	TP155 1.75-2.0m	TP163 2.25-2.50m	TP165 0.00-0.25m
	Cl	lient sampli	ng date / time:	22-AUG-2007 15:00				
Compound	CAS Number	LOR	Unit	EB0710275-011	EB0710275-012	EB0710275-013	EB0710275-014	EB0710275-015
EA029-A: pH Measurements								
pH KCI (23A)		0.1	pH Unit	7.5	4.7	6.4	8.2	
pH OX (23B)		0.1	pH Unit	8.6	5.0	7.0	9.0	
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)		2	mole H+ / t	<2	25	<2	<2	
Titratable Peroxide Acidity (23G)		2	mole H+ / t	<2	24	<2	<2	
Titratable Sulfidic Acidity (23H)		2	mole H+ / t	<2	<2	<2	<2	
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	0.04	<0.02	<0.02	
sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S	<0.02	0.04	<0.02	<0.02	
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	
EA029-C: Sulfur Trail								
KCI Extractable Sulfur (23Ce)		0.02	% S	<0.02	0.04	<0.02	<0.02	
Peroxide Sulfur (23De)		0.02	% S	0.02	0.05	<0.02	<0.02	
Peroxide Oxidisable Sulfur (23E)		0.02	% S	0.02	<0.02	<0.02	<0.02	
acidity - Peroxide Oxidisable Sulfur (a-23E)		10	mole H+ / t	13	<10	<10	<10	
EA029-D: Calcium Values								
KCI Extractable Calcium (23Vh)		0.02	% Ca	0.17	0.17	0.04	0.32	
Peroxide Calcium (23Wh)		0.02	% Ca	0.21	0.20	0.05	0.39	
Acid Reacted Calcium (23X)		0.02	% Ca	0.04	0.03	<0.02	0.07	
acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	19	14	<10	34	
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	0.03	0.02	<0.02	0.05	
EA029-E: Magnesium Values								
KCI Extractable Magnesium (23Sm)		0.02	% Mg	0.20	0.17	0.06	0.16	
Peroxide Magnesium (23Tm)		0.02	% Mg	0.25	0.19	0.07	0.19	
Acid Reacted Magnesium (23U)		0.02	% Mg	0.05	0.02	<0.02	0.03	
Acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	43	19	<10	27	
sulfidic - Acid Reacted Magnesium		0.02	% S	0.07	0.03	<0.02	0.04	
(s-23U)								
EA029-F: Excess Acid Neutralising Capaci	ty							
Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3	1.00		0.08	0.68	
acidity - Excess Acid Neutralising Capacity (a-23Q)		10	mole H+ / t	199		16	136	
sulfidic - Excess Acid Neutralising Capacity (s-23Q)		0.02	% S	0.32		0.02	0.22	



Sub-Matrix: SOIL		Cli	ent sample ID :	TP105 2.25-2.50m	TP151 1.75-2.0m	TP155 1.75-2.0m	TP163 2.25-2.50m	TP165 0.00-0.25m
	Cli	ient sampli	ng date / time:	22-AUG-2007 15:00				
Compound	CAS Number	LOR	Unit	EB0710275-011	EB0710275-012	EB0710275-013	EB0710275-014	EB0710275-015
EA029-H: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5	1.5	1.5	1.5	
Net Acidity (sulfur units)		0.02	% S	<0.02	0.05	<0.02	<0.02	
Net Acidity (acidity units)		10	mole H+ / t	<10	31	<10	<10	
Liming Rate		1	kg CaCO3/t	<1	2	<1	<1	
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit					5.0
Titratable Actual Acidity (23F)		2	mole H+ / t					25
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S					0.04
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.02	% S					<0.02
acidity - Chromium Reducible Sulfur		10	mole H+ / t					<10
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-					1.5
Net Acidity (sulfur units)		0.02	% S					0.04
Net Acidity (acidity units)		10	mole H+ / t					25
Liming Rate		1	kg CaCO3/t					2



Sub-Matrix: SOIL		Cli	ent sample ID :	TP165 1.00-1.25m	TP166 0.00-0.25m	TP168 0.00-0.25m	TP169 0.00-0.25m	TP172 0.00-0.25m
	Cl	lient sampli	ng date / time:	22-AUG-2007 15:00				
Compound	CAS Number	LOR	Unit	EB0710275-016	EB0710275-017	EB0710275-018	EB0710275-019	EB0710275-020
EA029-A: pH Measurements	CAS Number	LOIT	onin					
pH KCI (23A)		0.1	pH Unit	8.1			4.9	4.8
pH OX (23B)		0.1	pH Unit	8.9			6.9	6.9
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)		2	mole H+ / t	<2			27	26
Titratable Peroxide Acidity (23G)		2	mole H+ / t	<2			<2	<2
Titratable Sulfidic Acidity (23H)		2	mole H+/t	<2			<2	<2
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02			0.04	0.04
sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S	<0.02			<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S	<0.02			<0.02	<0.02
EA029-C: Sulfur Trail								
KCI Extractable Sulfur (23Ce)		0.02	% S	<0.02			<0.02	<0.02
Peroxide Sulfur (23De)		0.02	% S	<0.02			<0.02	<0.02
Peroxide Oxidisable Sulfur (23E)		0.02	% S	<0.02			<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)		10	mole H+ / t	<10			<10	<10
EA029-D: Calcium Values								
KCI Extractable Calcium (23Vh)		0.02	% Ca	0.47			0.10	0.36
Peroxide Calcium (23Wh)		0.02	% Ca	0.83			0.48	0.42
Acid Reacted Calcium (23X)		0.02	% Ca	0.35			0.39	0.06
acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	176			193	30
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	0.28			0.31	0.05
EA029-E: Magnesium Values								
KCI Extractable Magnesium (23Sm)		0.02	% Mg	0.27			0.15	0.19
Peroxide Magnesium (23Tm)		0.02	% Mg	0.34			0.19	0.21
Acid Reacted Magnesium (23U)		0.02	% Mg	0.08			0.04	0.02
Acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	64			35	20
sulfidic - Acid Reacted Magnesium		0.02	% S	0.10			0.06	0.03
(s-23U)								
EA029-F: Excess Acid Neutralising Capac	ity							
Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3	1.30			0.40	0.30
acidity - Excess Acid Neutralising Capacity (a-23Q)		10	mole H+ / t	260			80	60
sulfidic - Excess Acid Neutralising Capacity (s-23Q)		0.02	% S	0.42			0.13	0.10



Sub-Matrix: SOIL		Cli	ent sample ID :	TP165 1.00-1.25m	TP166 0.00-0.25m	TP168 0.00-0.25m	TP169 0.00-0.25m	TP172 0.00-0.25m
	Cl	ient sampli	ng date / time:	22-AUG-2007 15:00				
Compound	CAS Number	LOR	Unit	EB0710275-016	EB0710275-017	EB0710275-018	EB0710275-019	EB0710275-020
EA029-H: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5			1.5	1.5
Net Acidity (sulfur units)		0.02	% S	<0.02			0.04	0.04
Net Acidity (acidity units)		10	mole H+ / t	<10			27	26
Liming Rate		1	kg CaCO3/t	<1			2	2
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit		5.1	5.3		
Titratable Actual Acidity (23F)		2	mole H+/t		16	25		
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S		0.02	0.04		
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.02	% S		<0.02	<0.02		
acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t		<10	<10		
EA033-E: Acid Base Accounting ANC Fineness Factor		0.5	-		1.5	1.5		
Net Acidity (sulfur units)		0.02	% S		0.02	0.04		
Net Acidity (acidity units)		10	mole H+/t		16	25		
Liming Rate		1	kg CaCO3/t		1	20		



Sub-Matrix: SOIL		Cli	ent sample ID :	TP172 0.75-1.0m			
	Cl	ient sampli	ng date / time:	22-AUG-2007 15:00			
Compound	CAS Number	LOR	Unit	EB0710275-021			
EA029-A: pH Measurements	er te Humber						
pH KCI (23A)		0.1	pH Unit	7.8			
pH OX (23B)		0.1	pH Unit	8.4			
EA029-B: Acidity Trail							
Titratable Actual Acidity (23F)		2	mole H+ / t	<2			
Titratable Peroxide Acidity (23G)		2	mole H+ / t	<2			
Titratable Sulfidic Acidity (23H)		2	mole H+ / t	<2		 	
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02			
sulfidic - Titratable Peroxide Acidity		0.02	% pyrite S	<0.02			
(s-23G)							
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S	<0.02			
EA029-C: Sulfur Trail							
KCI Extractable Sulfur (23Ce)		0.02	% S	0.11			
Peroxide Sulfur (23De)		0.02	% S	0.11			
Peroxide Oxidisable Sulfur (23E)		0.02	% S	<0.02			
acidity - Peroxide Oxidisable Sulfur		10	mole H+ / t	<10			
(a-23E)							
EA029-D: Calcium Values							
KCI Extractable Calcium (23Vh)		0.02	% Ca	0.54			
Peroxide Calcium (23Wh)		0.02	% Ca	0.78			
Acid Reacted Calcium (23X)		0.02	% Ca	0.24			
acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	120		 	
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	0.19			
EA029-E: Magnesium Values							
KCI Extractable Magnesium (23Sm)		0.02	% Mg	0.23			
Peroxide Magnesium (23Tm)		0.02	% Mg	0.30			
Acid Reacted Magnesium (23U)		0.02	% Mg	0.07			
Acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	57		 	
sulfidic - Acid Reacted Magnesium		0.02	% S	0.09			
(s-23U)							
EA029-F: Excess Acid Neutralising Capacit	у						
Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3	0.87			
acidity - Excess Acid Neutralising		10	mole H+ / t	173			
Capacity (a-23Q)		0.00	* 0				
sulfidic - Excess Acid Neutralising		0.02	% S	0.28			
Capacity (s-23Q)							
EA029-H: Acid Base Accounting		0.5					
ANC Fineness Factor		0.5	-	1.5	<u> </u>		



Sub-Matrix: SOIL	Client sample ID :			TP172 0.75-1.0m		
	Cl	ient sampli	ng date / time:	22-AUG-2007 15:00		
Compound	CAS Number	LOR	Unit	EB0710275-021		
EA029-H: Acid Base Accounting						
Net Acidity (sulfur units)		0.02	% S	<0.02		
Net Acidity (acidity units)		10	mole H+ / t	<10		
Liming Rate		1	kg CaCO3/t	<1		

Environmental Division



QUALITY CONTROL REPORT

Work Order	: EB0710275	Page	: 1 of 8
Client	: GOLDER ASSOCIATES	Laboratory	: Environmental Division Brisbane
Contact	: MS SILVANA SANTOMARTINO	Contact	: Tim Kilmister
Address	: P O BOX 1734 MILTON QLD AUSTRALIA 4064	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: ssantomartino@golder.com.au	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 3721 5400	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 3721 5401	Facsimile	: +61-7-3243 7218
Project	: 077633062 GLADSTONE-FITZROY PIPELINE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: GLADSTONE-FITZROY PIPELINE		
C-O-C number	:	Date Samples Received	: 11-SEP-2007
Sampler	: SILVANA SANTOMARTINO	Issue Date	: 18-SEP-2007
Order number	:		
		No. of samples received	: 21
Quote number	: BN/240/07	No. of samples analysed	: 21

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

ΝΑΤΑ	NATA Accredited Laboratory 825 This document is issued in	Signatories This document has been electronically carried out in compliance with procedures spec	о ў	cated below. Electronic signing has been
NATA	accordance with NATA	Signatories	Position	Accreditation Category
	accreditation requirements.	Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics
WORLD RECOGNISED	Accredited for compliance with ISO/IEC 17025.			

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

 Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

 CAS Number = Chemistry Abstract Services number

 LOR = Limit of reporting

 RPD = Relative Percentage Difference

= Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:-No Limit; Result between 10 and 20 times LOR:-0% - 50%; Result > 20 times LOR:-0% - 20%.

Sub-Matrix: SOIL						Laboratory I	Duplicate (DUP) Report	•	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA029-A: pH Measu	rements (QC Lot: 49199	99)							
EB0710275-001	TP91 0.50-0.75m	EA029: pH KCI (23A)		0.1	pH Unit	5.2	5.3	1.9	0% - 20%
		EA029: pH OX (23B)		0.1	pH Unit	7.2	7.2	0.0	0% - 20%
EB0710275-012	TP151 1.75-2.0m	EA029: pH KCI (23A)		0.1	pH Unit	4.7	4.8	2.1	0% - 20%
		EA029: pH OX (23B)		0.1	pH Unit	5.0	5.0	0.0	0% - 20%
EA029-B: Acidity Tr	ail (QC Lot: 491999)								
EB0710275-001	TP91 0.50-0.75m	EA029: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.04	0.04	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity		0.02	% pyrite S	<0.02	<0.02	0.0	
		(s-23G)							
		EA029: sulfidic - Titratable Sulfidic Acidity		0.02	% pyrite S	<0.02	<0.02	0.0	
		(s-23H)							
		EA029: Titratable Actual Acidity (23F)		2	mole H+ / t	25	24	5.7	0% - 50%
		EA029: Titratable Peroxide Acidity (23G)		2	mole H+ / t	<2	<2	0.0	
		EA029: Titratable Sulfidic Acidity (23H)		2	mole H+ / t	<2	<2	0.0	
EB0710275-012	TP151 1.75-2.0m	EA029: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.04	0.04	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity		0.02	% pyrite S	0.04	0.04	0.0	No Limit
		(s-23G)							
		EA029: sulfidic - Titratable Sulfidic Acidity		0.02	% pyrite S	<0.02	<0.02	0.0	
		(s-23H)							
		EA029: Titratable Actual Acidity (23F)		2	mole H+ / t	25	24	5.4	0% - 50%
		EA029: Titratable Peroxide Acidity (23G)		2	mole H+ / t	24	22	5.2	0% - 50%
		EA029: Titratable Sulfidic Acidity (23H)		2	mole H+ / t	<2	<2	0.0	
EA029-C: Sulfur Tra	il (QC Lot: 491999)								
EB0710275-001	TP91 0.50-0.75m	EA029: KCI Extractable Sulfur (23Ce)		0.02	% S	0.03	0.03	0.0	No Limit
		EA029: Peroxide Sulfur (23De)		0.02	% S	0.04	0.04	0.0	No Limit
		EA029: Peroxide Oxidisable Sulfur (23E)		0.02	% S	<0.02	<0.02	0.0	
		EA029: acidity - Peroxide Oxidisable Sulfur		10	mole H+ / t	<10	<10	0.0	
		(a-23E)							
EB0710275-012	TP151 1.75-2.0m	EA029: KCI Extractable Sulfur (23Ce)		0.02	% S	0.04	0.05	0.0	No Limit
		EA029: Peroxide Sulfur (23De)		0.02	% S	0.05	0.05	0.0	No Limit
		EA029: Peroxide Oxidisable Sulfur (23E)		0.02	% S	<0.02	<0.02	0.0	
		EA029: acidity - Peroxide Oxidisable Sulfur		10	mole H+ / t	<10	<10	0.0	
		(a-23E)							
EA029-D: Calcium V	/alues (QC Lot: 491999)								
EB0710275-001	TP91 0.50-0.75m	EA029: KCI Extractable Calcium (23Vh)		0.02	% Ca	0.16	0.17	0.0	No Limit
		EA029: Peroxide Calcium (23Wh)		0.02	% Ca	0.22	0.23	0.0	0% - 50%
		EA029: Acid Reacted Calcium (23X)		0.02	% Ca	0.06	0.06	0.0	No Limit

Page	: 4 of 8
Work Order	: EB0710275
Client	: GOLDER ASSOCIATES
Project	: 077633062 GLADSTONE-FITZROY PIPELINE



Sub-Matrix: SOIL						t			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA029-D: Calcium \	/alues (QC Lot: 491999)	- continued							
EB0710275-001 T	TP91 0.50-0.75m	EA029: sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	0.04	0.05	0.0	No Limit
		EA029: acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	28	29	0.0	No Limit
EB0710275-012	TP151 1.75-2.0m	EA029: KCI Extractable Calcium (23Vh)		0.02	% Ca	0.17	0.19	10.6	No Limit
		EA029: Peroxide Calcium (23Wh)		0.02	% Ca	0.20	0.20	0.0	0% - 50%
		EA029: Acid Reacted Calcium (23X)		0.02	% Ca	0.03	<0.02	0.0	
		EA029: sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	0.02	<0.02	0.0	
		EA029: acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	14	<10	33.9	
EA029-E: Magnesiu	m Values (QC Lot: 4919	99)							
EB0710275-001	TP91 0.50-0.75m	EA029: KCI Extractable Magnesium (23Sm)		0.02	% Mg	0.16	0.16	0.0	No Limit
		EA029: Peroxide Magnesium (23Tm)		0.02	% Mg	0.20	0.20	0.0	0% - 50%
		EA029: Acid Reacted Magnesium (23U)		0.02	% Mg	0.04	0.04	0.0	No Limit
		EA029: sulfidic - Acid Reacted Magnesium		0.02	% S	0.05	0.05	0.0	No Limit
		(s-23U)							
		EA029: Acidity - Acid Reacted Magnesium		10	mole H+ / t	31	30	0.0	No Limit
		(a-23U)							
EB0710275-012	TP151 1.75-2.0m	EA029: KCI Extractable Magnesium (23Sm)		0.02	% Mg	0.17	0.18	9.9	No Limit
		EA029: Peroxide Magnesium (23Tm)		0.02	% Mg	0.19	0.19	0.0	No Limit
		EA029: Acid Reacted Magnesium (23U)		0.02	% Mg	0.02	<0.02	0.0	
		EA029: sulfidic - Acid Reacted Magnesium		0.02	% S	0.03	<0.02	0.0	
		(s-23U)							
		EA029: Acidity - Acid Reacted Magnesium		10	mole H+ / t	19	<10	60.4	
		(a-23U)							
EA029-F: Excess A	cid Neutralising Capacity	/ (QC Lot: 491999)							
EB0710275-001	TP91 0.50-0.75m	EA029: Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3	0.17	0.18	7.0	No Limit
		EA029: sulfidic - Excess Acid Neutralising		0.02	% S	0.05	0.06	0.0	No Limit
		Capacity (s-23Q)							
		EA029: acidity - Excess Acid Neutralising		10	mole H+ / t	33	36	7.0	No Limit
		Capacity (a-23Q)							
EA033-A: Actual Ac	idity (QC Lot: 492000)								
EB0710275-002	TP92 0.00-0.25m	EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.07	0.08	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	46	48	6.1	0% - 20%
		EA033: pH KCI (23A)		0.1	pH Unit	4.4	4.4	0.0	0% - 20%
EA033-B: Potontial	Acidity (QC Lot: 492000)				-				
EB0710275-002	TP92 0.00-0.25m	EA033: Chromium Reducible Sulfur (22B)		0.02	% S	< 0.02	< 0.02	0.0	
		EA033: acidity - Chromium Reducible Sulfur		10	mole H+ / t	<10	<10	0.0	
		(a-22B)							
EA022 D. Detained	Acidity (QC Lot: 492000)								
EB0710275-002	TP92 0.00-0.25m			0.02	% pyrite S	<0.02	<0.02	0.0	
LDU/ 102/ J-002	17 92 0.00-0.2011	EA033: sulfidic - Net Acid Soluble Sulfur (s-20J)		0.02	% pyrite S	<0.02	<0.02	0.0	
		EA033: Net Acid Soluble Sulfur (20Je)		0.02	% S	<0.02	<0.02	0.0	
		EA033: KCI Extractable Sulfur (23Ce)		0.02	70 3	<u></u> \0.02	∼ 0.02	0.0	

Page	5 of 8
Work Order	: EB0710275
Client	: GOLDER ASSOCIATES
Project	: 077633062 GLADSTONE-FITZROY PIPELINE



Sub-Matrix: SOIL			Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA033-D: Retained Acidity (QC Lot: 492000) - continued									
EB0710275-002	TP92 0.00-0.25m	EA033: HCI Extractable Sulfur (20Be)		0.02	% S	<0.02	<0.02	0.0	
		EA033: acidity - Net Acid Soluble Sulfur (a-20J)		10	mole H+ / t	<10	<10	0.0	



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL		Method Blank (MB) Re	port		Laboratory Control Spike (LC	S) Report	
				Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound CAS Numb	er LOR	Unit	Result	Concentration	LCS	Low	High
EA029-B: Acidity Trail (QCLot: 491999)							
	2	mole H+ / t	<2				
EA029: Titratable Peroxide Acidity (23G)	2	mole H+ / t	<2				
EA029: Titratable Sulfidic Acidity (23H)	2	mole H+ / t	<2				
EA029: sulfidic - Titratable Actual Acidity (s-23F) -	0.02	% pyrite S	<0.02				
EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	0.02	% pyrite S	<0.02				
EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	0.02	% pyrite S	<0.02				
EA029-C: Sulfur Trail (QCLot: 491999)							
EA029: KCI Extractable Sulfur (23Ce)	0.02	% S	<0.02				
EA029: Peroxide Sulfur (23De)	0.02	% S	<0.02				
EA029: Peroxide Oxidisable Sulfur (23E)	0.02	% S	<0.02				
EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	10	mole H+ / t	<10				
EA029-D: Calcium Values (QCLot: 491999)							
EA029: KCI Extractable Calcium (23Vh)	0.02	% Ca	<0.02				
EA029: Peroxide Calcium (23Wh)	0.02	% Ca	<0.02				
EA029: Acid Reacted Calcium (23X)	0.02	% Ca	<0.02				
EA029: acidity - Acid Reacted Calcium (a-23X) -	10	mole H+ / t	<10				
EA029: sulfidic - Acid Reacted Calcium (s-23X) -	0.02	% S	<0.02				
EA029-E: Magnesium Values (QCLot: 491999)							
EA029: KCI Extractable Magnesium (23Sm) -	0.02	% Mg	<0.02				
EA029: Peroxide Magnesium (23Tm)	0.02	% Mg	<0.02				
EA029: Acid Reacted Magnesium (23U)	0.02	% Mg	<0.02				
EA029: Acidity - Acid Reacted Magnesium (a-23U) -	10	mole H+ / t	<10				
EA029: sulfidic - Acid Reacted Magnesium (s-23U)	0.02	% S	<0.02				
EA029-F: Excess Acid Neutralising Capacity (QCLot: 491999)							
EA029: Excess Acid Neutralising Capacity (23Q)	0.02	% CaCO3	<0.02				
EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	10	mole H+ / t	<10				
EA029: sulfidic - Excess Acid Neutralising Capacity	0.02	% S	<0.02				
(s-23Q)							
EA033-A: Actual Acidity (QCLot: 492000)							
EA033: Titratable Actual Acidity (23F)	2	mole H+ / t	<2				
EA033: sulfidic - Titratable Actual Acidity (s-23F)	0.02	% pyrite S	<0.02				
EA033-B: Potential Acidity (QCLot: 492000)							
	0.02	% S	<0.02				
EA033: acidity - Chromium Reducible Sulfur (a-22B)	10	mole H+ / t	<10				

Page	: 7 of 8
Work Order	: EB0710275
Client	: GOLDER ASSOCIATES
Project	: 077633062 GLADSTONE-FITZROY PIPELINE



ub-Matrix: SOIL			Method Blank (MB) Re	port	Laboratory Control Spike (LCS) Report				
					Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EA033-D: Retained Acidity (QCLot: 492000)									
EA033: Net Acid Soluble Sulfur (20Je)		0.02	% S	<0.02					
EA033: acidity - Net Acid Soluble Sulfur (a-20J)		10	mole H+ / t	<10					
EA033: sulfidic - Net Acid Soluble Sulfur (s-20J)		0.02	% pyrite S	<0.02					
EA033: KCI Extractable Sulfur (23Ce)		0.02	% S	<0.02					
EA033: HCI Extractable Sulfur (20Be)		0.02	% S	<0.02					



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

• No Matrix Spike (MS) Results are required to be reported.

SAMPLE CHAIN OF CUSTODY DOCUMENTATION - SOIL

Project ID:		0776	33062		Quote/Order	r No.:			-	GOLD	R ASSOCI	IATES PT	Y LTD			Ph	one: (07)	3721 5400			AA		
Site Locatica:	2 2 -	Gladstone-Fi	itzrov Pipe	eline	Lab Name:			ALS		- 611 Cor	onation Dri	ive. Toowo	ng, Qld 4066	5		Fa	v: (07)	3721 5401		(Folde	r.
Sampled By:		Silvana Sa								1			0. 4			14	x. (07)	5721 5401		N.	C As	sociz	ites
			7		BY:					-1			- 1734 Milto	~~~	064								
Turnaround (Days)								1		-1 -	Manager:		ary Parsons	;									
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Email Format:	PDF 🗹	E	xcel	Other	Email Addre	e: ssantomartin	@golder.co	m.au							A	NALYSIS R	EQUIRE	D					
Comments/Special Please e-mail resul		Santomartino						No CONTAINERS	POSSIBLE HIGH CONCENTRATION	EA-033 (Chromium Suite)	029 (SPOCAS)												
	eclared Fire Ant A		N					LAID	E H	Chro	(SPC												
Samples taken fro	om a known Weed	and or Pest Area:		1	N			- NO	CEN	33 (0	029 (
	SAMPLE		SAMPLE	SAMPLE	SAMPLE	CONTAINER		Ŭ.º	SON	A-0. uite)	EA - (
<u>├</u>	ID P91 0,50-0,75m		MATRIX Soil	DATE	TIME	PRESERVAT			N N	ыs	ш Х												
	P92 0.00-0.25m		Soil	Aug-07 Aug-07		Bag Bag	Frozen Frozen	1	N N	x	- <u>^</u>								-			1	
	TP92 0.75-1.0m		Soil	Aug-07		Bag	Frozen	1	N		x										n:		
· · · · · · · · · · · · · · · · · · ·	P92 1.50-1.75m		Soil	Aug-07		Bag	Frozen	1	N		X							En	vironr	nental	Divisio	л	
	P93 1.25-1.50m		Soil	22/08/07		Bag	Frozen	1	N		X							AO	В	risban	е		
ĿΤ	P96 2.25-2.50m		Soil	22/08/07		Bag	Frozen	1	N	1	X							A'5	•	ork Ord	ler		
т 7	TP97 2.75-3.0m		Soil	22/08/07		Bag	Frozen	1	N	1	X							· _				-	
S T	P102 0.75-1.0m		Soil	22/08/07		Bag	Frozen	1	N	1	X						w - 97	E	-B()71()Z/3	5	
4 TF	P103 2.50-2.75m		Soil	22/08/07		Bag	Frozen	1	N	1	X							_					
	P104 1.50-1.75m		Soil	22/08/07		Bag	Frozen	1	N		X							10.110.111	11 11 (11) (11) (11)	1 I N 11 I N 11 I I		IN NUM	
<i>i </i> TF	P105 2.25-2.50m		Soil	Aug-07		Bag	Frozen	1	N		Х												
12 T	P151 1.75-2.0m		Soil	Aug-07		Bag	Frozen	1	N		X												
13 T	P155 1.75-2.0m		Soil	Aug-07		Bag	Frozen	1	N		X											1444	
	P163 2.25-2.50m		Soil	Aug-07		Bag	Frozen	1	N		Х										10040 5	000	
/ <u>5</u> TF	P165 0.00-0.25m		Soil	Aug-07		Bag	Frozen	1	N	X								Tele	ephone	: +61-7	/-3243 /	222	
	P165 1.00-1.25m		Soil	Aug-07		Bag	Frozen	1	N		X												
	P166 0.00-0.25m		Soil	Aug-07		Bag	Frozen	1	N	X									1	I		1	1
	P168 0.00-0.25m		Soil	Aug-07		Bag	Frozen	1	N	X									_				
	P169 0.00-0.25m		Soil	Aug-07		Bag	Frozen	1	N		Х												
THE PARTY N. P. M. CONTROL AND ADDRESS OF ADDRESS OF ADDRESS ADDRE	P172 0.00-0.25m P172 0.75-1.0m		Soil Soil	Aug-07		Bag	Frozen	1	N N	l	X X												
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	SIGNATUR			COMPANY		DATE		TIME		1			NATURE			COMPAN		DATE		TIME		ipment M	
RELEASED BY	M.	Nart	U	GOLDER		11/9/2007	,			RELE	SED BY											ing Ref:	
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Golder Form No. GA_BQ-035 - Revision 8 - Date: 25/11/03

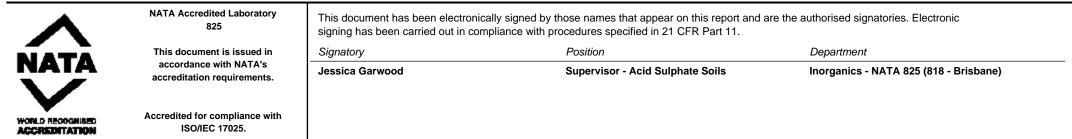


ALS Environmental

CERTIFICATE OF ANALYSIS

Client	GOLDER ASSOCIATES	Laboratory	Environmental Division Brisbane	Page	ິ 1 of 15
Contact	: MS SILVANA SANTOMARTINO	Contact	TIM.KILMISTER Kilmister	Work Order	[:] EB0711439
Address	P O BOX 1734 MILTON QLD AUSTRALIA 4064	Address	32 Shand Street Stafford QLD Australia 4053		
E-mail	🗄 ssantomartino@golder.com.au	E-mail	Services.Brisbane@alsenviro.com		
Telephone	÷ 3721 5400	Telephone	£ +61-7-3243 7222		
Facsimile	∷ 3721 5401	Facsimile	∑ +61-7-3243 7218		
Project	÷ 077633062	Quote number	: BN/240/07	Date received	4 Oct 2007
Order number	∶ - Not provided -			Date issued	∴ 16 Oct 2007
C-O-C number	- Not provided -			No. of samples	- Received : 28
Site	GLADSTONE-FITZROY PIPELINE				Analysed : 28

ALSE - Excellence in Analytical Testing



Page Number	2 of 15
Client	GOLDER ASSOCIATES
Work Order	ÉEB0711439



Comments

This report for the ALSE reference EB0711439 supersedes any previous reports with this reference. Results apply to the samples as submitted. All pages of this report have been checked and approved for release.

This report contains the following information:

- 1 Analytical Results for Samples Submitted
- 1 Surrogate Recovery Data

The analytical procedures used by ALS Environmental have been developed from established internationally-recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported herein. Reference methods from which ALSE methods are based are provided in parenthesis.

When moisture determination has been performed, results are reported on a dry weight basis. When a reported 'less than' result is higher than the LOR, this may be due to primary sample extracts/digestion dilution and/or insuffient sample amount for analysis. Surrogate Recovery Limits are static and based on USEPA SW846 or ALS-QWI/EN38 (in the absence of specified USEPA limits). Where LOR of reported result differ from standard LOR, this may be due to high moisture, reduced sample amount or matrix interference. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number, LOR = Limit of Reporting. * Indicates failed Surrogate Recoveries.

Specific comments for Work Order EB0711439

Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m3'.

Work Order : EB0711439						ALS Environmen
Applytical Bassilta	Client Sample ID :	TP74_0.00-0.25m	TP74_0.50-0.75m	TP74_1.00-1.25m	TP74_1.50-1.70m	TP74_2.25-2.50m
Analytical Results	Sample Matrix Type / Description :	SOIL	SOIL	SOIL	SOIL	SOIL
	Sample Date / Time :	(30 Sep 2007)	(30 Sep 2007)			
		(15:00)	(15:00)	(15:00)	(15:00)	(15:00)
	Laboratory Sample ID :					
Analyte	CAS number LOR Units	EB0711439-001	EB0711439-002	EB0711439-003	EB0711439-004	EB0711439-005
EA029-A: pH Measurements						
pH KCI (23A)	0.1 pH Unit			6.8	6.0	4.8
pH OX (23B)	0.1 pH Unit			7.1	7.0	5.5
EA029-B: Acidity Trail	· · · · · ·			•		•
Titratable Actual Acidity (23F)	2 mole H+ / t			<2	<2	34
Titratable Peroxide Acidity (23G)	2 mole H+ / t			<2	<2	12
Titratable Sulfidic Acidity (23H)	2 mole H+ / t			<2	<2	<2
sulfidic - Titratable Actual Acidity	0.02 % pyrite S			<0.02	<0.02	0.05
(s-23F)						
sulfidic - Titratable Peroxide Acidity (s-23G)	0.02 % pyrite S			<0.02	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity	0.02 % pyrite S			<0.02	<0.02	<0.02
(s-23H)						
EA029-C: Sulfur Trail			-			-
KCI Extractable Sulfur (23Ce)	0.02 % S			0.03	0.06	0.08
Peroxide Sulfur (23De)	0.02 % S			0.03	0.08	0.09
Peroxide Oxidisable Sulfur (23E)	0.02 % S			<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur	10 mole H+ / t			<10	<10	11
(a-23E)						
EA029-D: Calcium Values						
KCI Extractable Calcium (23Vh)	0.02 % Ca			0.14	0.17	0.12
Peroxide Calcium (23Wh)	0.02 % Ca			0.15	0.20	0.14
Acid Reacted Calcium (23X)	0.02 % Ca			<0.02	0.03	<0.02
acidity - Acid Reacted Calcium (a-23X)	10 mole H+ / t			<10	15	<10
sulfidic - Acid Reacted Calcium (s-23X)	0.02 % S			<0.02	0.02	<0.02
EA029-E: Magnesium Values				•	•	
KCI Extractable Magnesium (23Sm)	0.02 % Mg			0.12	0.22	0.18
Peroxide Magnesium (23Tm)	0.02 % Mg			0.14	0.27	0.21
Acid Reacted Magnesium (23U)	0.02 % Mg			0.02	0.05	0.04
acidity - Acid Reacted Magnesium	10 mole H+ / t			17	40	29
(a-23U)						
sulfidic - Acid Reacted Magnesium	0.02 % S			0.03	0.06	0.05
(s-23U)						
EA029-F: Excess Acid Neutralising C						
Excess Acid Neutralising Capacity	0.02 % CaCO3			0.31	0.30	
(23Q)						
acidity - Excess Acid Neutralising	10 mole H+ / t			62	60	
Capacity (a-23Q)	0.00 0/ 0			0.10	0.10	
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	0.02 % S			0.10	0.10	

Page Number: 3 of 15Client: GOLDER ASSOCIATESWork Order: EB0711439



Client : GOLDER ASS	SOCIATES					(ALS)
Work Order : EB0711439						ALS Environment
Applytical Pagylta	Client Sample ID :	TP74_0.00-0.25m	TP74_0.50-0.75m	TP74_1.00-1.25m	TP74_1.50-1.70m	TP74_2.25-2.50m
Analytical Results	Sample Matrix Type / Description :	SOIL	SOIL	SOIL	SOIL	SOIL
	Sample Date / Time :	(30 Sep 2007) (15:00)				
	Laboratory Sample ID :					
Analyte	CAS number LOR Units	EB0711439-001	EB0711439-002	EB0711439-003	EB0711439-004	EB0711439-005
EA029-H: Acid Base Accounting						
ANC Fineness Factor	0.5			1.5	1.5	1.5
Net Acidity (sulfur units)	0.02 % S			<0.02	<0.02	0.07
Net Acidity (acidity units)	10 mole H+ / t			<10	<10	44
Liming Rate	1 kg CaCO3/t			<1	<1	3
EA033-A: Actual Acidity		•		·		
pH KCI (23A)	0.1 pH Unit	5.7	6.4			
Titratable Actual Acidity (23F)	2 mole H+ / t	11	<2			
sulfidic - Titratable Actual Acidity (s-23F)	0.02 % pyrite S	<0.02	<0.02			
EA033-B: Potential Acidity		•	•	•		- •
Chromium Reducible Sulfur (22B)	0.02 % S	<0.02	<0.02			
acidity - Chromium Reducible Sulfur (a-22B)	10 mole H+ / t	<10	<10			
EA033-E: Acid Base Accounting						
ANC Fineness Factor	0.5	1.5	1.5			
Net Acidity (sulfur units)	0.02 % S	<0.02	<0.02			
Net Acidity (acidity units)	10 mole H+ / t	11	<10			
· · · · · · · · · · · · · · · · · · ·						

<1

<1

kg CaCO3/t

1



Liming Rate

Page Number ∴ 4 of 15

Work Order : EB0711439						ALS Environmenta
Analytical Results	Client Sample ID : Sample Matrix Type / Description : Sample Date / Time :	TP74_2.50-2.75m SOIL (30 Sep 2007) (15:00)	TP79_0.00-0.25m SOIL (30 Sep 2007) (15:00)	TP79_2.00-2.25m SOIL (30 Sep 2007) (15:00)	TP80_0.00-0.25m SOIL (30 Sep 2007) (15:00)	TP80_1.00-1.25m SOIL (30 Sep 2007) (15:00)
	Laboratory Sample ID :					
Analyte	CAS number LOR Units	EB0711439-006	EB0711439-007	EB0711439-008	EB0711439-009	EB0711439-010
EA029-A: pH Measurements				-		-
pH KCI (23A)	0.1 pH Unit	4.3		6.5		
pH OX (23B)	0.1 pH Unit	4.4		8.2		
EA029-B: Acidity Trail			•			-
Titratable Actual Acidity (23F)	2 mole H+ / t	92		<2		
Titratable Peroxide Acidity (23G)	2 mole H+ / t	55		<2		
Titratable Sulfidic Acidity (23H)	2 mole H+ / t	<2		<2		
sulfidic - Titratable Actual Acidity (s-23F)	0.02 % pyrite S	0.15		<0.02		
sulfidic - Titratable Peroxide Acidity (s-23G)	0.02 % pyrite S	0.09		<0.02		
sulfidic - Titratable Sulfidic Acidity (s-23H)	0.02 % pyrite S	<0.02		<0.02		
EA029-C: Sulfur Trail			•			
KCI Extractable Sulfur (23Ce)	0.02 % S	0.07		<0.02		
Peroxide Sulfur (23De)	0.02 % S	0.08		<0.02		
Peroxide Oxidisable Sulfur (23E)	0.02 % S	<0.02		<0.02		
acidity - Peroxide Oxidisable Sulfur (a-23E)	10 mole H+ / t	<10		<10		
EA029-D: Calcium Values						
KCI Extractable Calcium (23Vh)	0.02 % Ca	0.13		0.12		
Peroxide Calcium (23Wh)	0.02 % Ca	0.14		0.14		
Acid Reacted Calcium (23X)	0.02 % Ca	<0.02		<0.02		
acidity - Acid Reacted Calcium (a-23X)	10 mole H+ / t	<10		<10		
sulfidic - Acid Reacted Calcium (s-23X)	0.02 % S	<0.02		<0.02		
EA029-E: Magnesium Values						
KCI Extractable Magnesium (23Sm)	0.02 % Mg	0.14		0.20		
Peroxide Magnesium (23Tm)	0.02 % Mg	0.16		0.25		
Acid Reacted Magnesium (23U)	0.02 % Mg	0.03		0.04		
acidity - Acid Reacted Magnesium (a-23U)	10 mole H+ / t	24		35		
sulfidic - Acid Reacted Magnesium (s-23U)	0.02 % S	0.04		0.06		
EA029-F: Excess Acid Neutralising C	apacity		I	l		ļ
Excess Acid Neutralising Capacity (23Q)	0.02 % CaCO3			0.26		
acidity - Excess Acid Neutralising Capacity (a-23Q)	10 mole H+ / t			53		
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	0.02 % S			0.08		





Client : GOLDER ASSO Work Order : EB0711439	CIATES						
Analytical Results	S	Client Sample ID : Type / Description : ample Date / Time : oratory Sample ID :	TP74_2.50-2.75m SOIL (30 Sep 2007) (15:00)	TP79_0.00-0.25m SOIL (30 Sep 2007) (15:00)	TP79_2.00-2.25m SOIL (30 Sep 2007) (15:00)	TP80_0.00-0.25m SOIL (30 Sep 2007) (15:00)	
Analyte	CAS number LO		EB0711439-006	EB0711439-007	EB0711439-008	EB0711439-009	
EA029-G: Retained Acidity				•		•	-
Net Acid Soluble Sulfur (20Je)	0.02	% S	0.02				
acidity - Net Acid Soluble Sulfur (a-20J)	10	mole H+ / t	<10				
sulfidic - Net Acid Soluble Sulfur (s-20J)	0.02	% pyrite S	<0.02				
HCI Extractable Sulfur (20Be)	0.02	2 % S	0.09				
EA029-H: Acid Base Accounting					-		
ANC Fineness Factor	0.5		1.5		1.5		
Net Acidity (sulfur units)	0.02	% S	0.18		<0.02		
Net Acidity (acidity units)	10	mole H+ / t	111		<10		
Liming Rate	1	kg CaCO3/t	8		<1		
EA033-A: Actual Acidity				•		•	-
pH KCI (23A)	0.1	pH Unit		5.6		5.1	T
Titratable Actual Acidity (23F)	2	mole H+ / t		10		18	
sulfidic - Titratable Actual Acidity (s-23F)	0.02	% pyrite S		<0.02		0.03	

<0.02

<10

1.5

< 0.02

<10

<1

0.02 % S

0.02 % S

0.5

1

10 mole H+ / t

10 mole H+ / t

kg CaCO3/t

Page Number

EA033-B: Potential Acidity Chromium Reducible Sulfur (22B)

ANC Fineness Factor

Net Acidity (sulfur units)

Net Acidity (acidity units)

(a-22B)

Liming Rate

acidity - Chromium Reducible Sulfur

EA033-E: Acid Base Accounting

∶ 6 of 15



TP80_1.00-1.25m SOIL (30 Sep 2007) (15:00) EB0711439-010

6.4 <2 <0.02

< 0.02

<10

1.5

< 0.02

<10

<1

< 0.02

<10

1.5

0.03

18

1

Work Order : EB0711439							ALS Environmental
Analytical Results	Sample Matrix⊺ Sa	Client Sample ID : Type / Description : mple Date / Time : pratory Sample ID :	TP81_0.00-0.25m SOIL (30 Sep 2007) (15:00)	TP81_0.50-0.75m SOIL (30 Sep 2007) (15:00)	TP82_0.00-0.25m SOIL (30 Sep 2007) (15:00)	TP82_0.50-0.75m SOIL (30 Sep 2007) (15:00)	TP82_2.00-2.25m SOIL (30 Sep 2007) (15:00)
Analyte	CAS number LOR		EB0711439-011	EB0711439-012	EB0711439-013	EB0711439-014	EB0711439-015
EA029-A: pH Measurements					4		
pH KCI (23A)	0.1	pH Unit			5.5	4.9	5.4
pH OX (23B)	0.1	pH Unit			6.8	4.7	6.3
EA029-B: Acidity Trail		·				•	
Titratable Actual Acidity (23F)	2	mole H+/t			5	22	11
Titratable Peroxide Acidity (23G)	2	mole H+/t			<2	<2	<2
Titratable Sulfidic Acidity (23H)	2	mole H+ / t			<2	<2	<2
sulfidic - Titratable Actual Acidity	0.02	% pyrite S			<0.02	0.03	<0.02
(s-23F)							
sulfidic - Titratable Peroxide Acidity (s-23G)	0.02	% pyrite S			<0.02	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)	0.02	% pyrite S			<0.02	<0.02	<0.02
EA029-C: Sulfur Trail						1	
KCI Extractable Sulfur (23Ce)	0.02	% S			<0.02	0.02	0.04
Peroxide Sulfur (23De)		% S			<0.02	0.03	0.06
Peroxide Oxidisable Sulfur (23E)		% S			<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)		mole H+ / t			<10	<10	<10
EA029-D: Calcium Values							
KCI Extractable Calcium (23Vh)	0.02	% Ca			0.16	0.06	0.12
Peroxide Calcium (23Wh)	0.02	% Ca			0.18	0.06	0.12
Acid Reacted Calcium (23X)	0.02	% Ca			0.02	<0.02	<0.02
acidity - Acid Reacted Calcium (a-23X)	10	mole H+ / t			12	<10	<10
sulfidic - Acid Reacted Calcium (s-23X)	0.02	% S			<0.02	<0.02	<0.02
EA029-E: Magnesium Values							
KCI Extractable Magnesium (23Sm)	0.02	% Mg			0.06	0.08	0.21
Peroxide Magnesium (23Tm)	0.02	% Mg			0.07	0.10	0.23
Acid Reacted Magnesium (23U)	0.02	% Mg			<0.02	<0.02	0.02
acidity - Acid Reacted Magnesium	10	mole H+ / t			10	13	18
(a-23U)							
sulfidic - Acid Reacted Magnesium (s-23U)	0.02	% S			<0.02	0.02	0.03
EA029-F: Excess Acid Neutralising C	anacity						
Excess Acid Neutralising Capacity (23Q)		% CaCO3			0.25		
acidity - Excess Acid Neutralising Capacity (a-23Q)	10	mole H+ / t			50		
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	0.02	% S			0.08		





GOLDER A330	URILU .					
Work Order : EB0711439						ALS Environment
Analytical Recylla	Client Sample ID :	TP81_0.00-0.25m	TP81_0.50-0.75m	TP82_0.00-0.25m	TP82_0.50-0.75m	TP82_2.00-2.25m
Analytical Results	Sample Matrix Type / Description :	SOIL	SOIL	SOIL	SOIL	SOIL
	Sample Date / Time :	(30 Sep 2007)				
		(15:00)	(15:00)	(15:00)	(15:00)	(15:00)
	Laboratory Sample ID :					
Analyte	CAS number LOR Units	EB0711439-011	EB0711439-012	EB0711439-013	EB0711439-014	EB0711439-015
EA029-H: Acid Base Accounting						
ANC Fineness Factor	0.5			1.5	1.5	1.5
Net Acidity (sulfur units)	0.02 % S			<0.02	0.05	0.03
Net Acidity (acidity units)	10 mole H+ / t			<10	29	17
Liming Rate	1 kg CaCO3/t			<1	2	1
EA033-A: Actual Acidity						
pH KCI (23A)	0.1 pH Unit	5.5	8.1			
Titratable Actual Acidity (23F)	2 mole H+ / t	8	<2			
sulfidic - Titratable Actual Acidity (s-23F)	0.02 % pyrite S	<0.02	<0.02			
EA033-B: Potential Acidity	•					•
Chromium Reducible Sulfur (22B)	0.02 % S	<0.02	<0.02			
acidity - Chromium Reducible Sulfur (a-22B)	10 mole H+ / t	<10	<10			
EA033-C: Acid Neutralising Capacity					•	·
Acid Neutralising Capacity (19A1)	0.01 % CaCO3		0.92			
acidity - Acid Neutralising Capacity (a-19A1)	10 mole H+ / t		184			
sulfidic - Acid Neutralising Capacity (s-19A1)	0.01 % pyrite S		0.29			
EA033-E: Acid Base Accounting						
ANC Fineness Factor	0.5	1.5	1.5			
Net Acidity (sulfur units)	0.02 % S	<0.02	<0.02			
Net Acidity (acidity units)	10 mole H+ / t	<10	<10			
Liming Rate	1 kg CaCO3/t	<1	<1			

Page Number: 8 of 15Client: GOLDER ASSOCIATESWork Order: EB0711439



Work Order . EB0/11439								ALS ENVIRONMENT
Analytical Paculta		Clie	ent Sample ID :	TP94_1.25-1.50m	TP95_0.00-0.25m	TP95_2.25-2.50m	TP98_0.00-0.25m	TP98_2.75-3.0m
Analytical Results	Samp	ole Matrix Type	e / Description :	SOIL	SOIL	SOIL	SOIL	SOIL
		Samp	le Date / Time :	(30 Sep 2007)				
		Laborat	ory Sample ID :	(15:00)	(15:00)	(15:00)	(15:00)	(15:00)
Analyte	CAS number		Units	EB0711439-016	EB0711439-017	EB0711439-018	EB0711439-019	EB0711439-020
EA029-A: pH Measurements					1	+	ł	ł
pH KCI (23A)		0.1 pl	HUnit	4.6	5.4	6.6		6.8
pH OX (23B)		0.1 pl		5.3	4.1	8.2		7.2
EA029-B: Acidity Trail		0.1 pi		0.0		0.2		1.2
Titratable Actual Acidity (23F)		2 m	ole H+ / t	18	6	<2		<2
Titratable Peroxide Acidity (23G)			ole H+ / t	12	<2	<2		<2
Titratable Sulfidic Acidity (23H)			ole H+/t	<2	<2	<2		<2
sulfidic - Titratable Actual Acidity			pyrite S	0.03	<0.02	<0.02		<0.02
(s-23F)		0.02 /0	s pyrite O	0.00	NO.02	50.02		<0.02
sulfidic - Titratable Peroxide Acidity (s-23G)		0.02 %	pyrite S	<0.02	<0.02	<0.02		<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02 %	pyrite S	<0.02	<0.02	<0.02		<0.02
EA029-C: Sulfur Trail						-		•
KCI Extractable Sulfur (23Ce)		0.02 %	S	<0.02	<0.02	<0.02		0.03
Peroxide Sulfur (23De)		0.02 %		<0.02	<0.02	<0.02		0.03
Peroxide Oxidisable Sulfur (23E)		0.02 %		<0.02	<0.02	<0.02		<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)			ole H+ / t	<10	<10	<10		<10
EA029-D: Calcium Values			I					
KCI Extractable Calcium (23Vh)		0.02 %	Ca	0.05	0.07	0.05		0.33
Peroxide Calcium (23Wh)		0.02 %	Ca	0.04	0.07	0.06		0.35
Acid Reacted Calcium (23X)		0.02 %		<0.02	<0.02	<0.02		0.02
acidity - Acid Reacted Calcium (a-23X)			ole H+/t	<10	<10	<10		12
sulfidic - Acid Reacted Calcium (s-23X)		0.02 %		<0.02	<0.02	<0.02		<0.02
EA029-E: Magnesium Values								ł
KCI Extractable Magnesium (23Sm)		0.02 %	Ma	0.08	0.02	0.09		0.19
Peroxide Magnesium (23Tm)		0.02 %		0.10	0.03	0.12		0.21
Acid Reacted Magnesium (23U)		0.02 %		<0.02	<0.02	0.04		0.02
acidity - Acid Reacted Magnesium (a-23U)			ole H+ / t	12	<10	31		21
sulfidic - Acid Reacted Magnesium (s-23U)		0.02 %	S S	<0.02	<0.02	0.05		0.03
EA029-F: Excess Acid Neutralising C	apacity		1		ı	۱ 	·	
Excess Acid Neutralising Capacity (23Q)		0.02 %	CaCO3			0.14		0.12
		4.0	1 11 //			00		00

29

0.05

10 mole H+ / t

0.02 % S

acidity - Excess Acid Neutralising

sulfidic - Excess Acid Neutralising

Capacity (a-23Q)

Capacity (s-23Q)



23

0.04

•	0 of 15 SOLDER ASSOCIATE	S							ALS
Work Order : E	B0711439								ALS Environment
Analytical Resu	ılts	Sample	Matrix Ty San	ient Sample ID : ype / Description : nple Date / Time : atory Sample ID :	TP94_1.25-1.50m SOIL (30 Sep 2007) (15:00)	TP95_0.00-0.25m SOIL (30 Sep 2007) (15:00)	TP95_2.25-2.50m SOIL (30 Sep 2007) (15:00)	TP98_0.00-0.25m SOIL (30 Sep 2007) (15:00)	TP98_2.75-3.0m SOIL (30 Sep 2007) (15:00)
Analyte	CAS	number	LOR	Units	EB0711439-016	EB0711439-017	EB0711439-018	EB0711439-019	EB0711439-020
EA029-H: Acid Base Ac	ccounting								-
ANC Fineness Factor			0.5		1.5	1.5	1.5		1.5
Net Acidity (sulfur units)			0.02	% S	0.03	<0.02	<0.02		<0.02
Net Acidity (acidity units)			10	mole H+ / t	18	<10	<10		<10
Liming Rate			1	kg CaCO3/t	1	<1	<1		<1
EA033-A: Actual Acidit	ty					-		•	
pH KCI (23A)			0.1	pH Unit				6.1	
Titratable Actual Acidity (2	23F)		2	mole H+ / t				6	
sulfidic - Titratable Actual (s-23F)	Acidity		0.02	% pyrite S				<0.02	
EA033-B: Potential Aci	dity			•					·
Chromium Reducible Sulfu	ur (22B)		0.02	% S				<0.02	
acidity - Chromium Reduc (a-22B)	ble Sulfur		10	mole H+ / t				<10	

0.5

1

0.02 % S

10 mole H+ / t

kg CaCO3/t

Page Number

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EA033-E: Acid Base Accounting

ANC Fineness Factor

Liming Rate

Net Acidity (sulfur units)

Net Acidity (acidity units)

1.5

< 0.02

<10

<1

GOLDER A330	CIATES					
Vork Order : EB0711439						ALS Environme
Analytical Deculta	Client Sample ID :	TP99_0.00-0.25m	TP102_0.00-0.25m	TP102_2.25-2.50m	TP104_1.00-1.25m	TP105_0.00-0.25m
Analytical Results	Sample Matrix Type / Description : Sample Date / Time : Laboratory Sample ID :	SOIL (30 Sep 2007) (15:00)	SOIL (30 Sep 2007) (15:00)	SOIL (30 Sep 2007) (15:00)	SOIL (30 Sep 2007) (15:00)	SOIL (30 Sep 2007) (15:00)
Analyte	CAS number LOR Units	EB0711439-021	EB0711439-022	EB0711439-023	EB0711439-024	EB0711439-025
EA029-A: pH Measurements	·		•			
pH KCI (23A)	0.1 pH Unit		6.6	8.3	7.4	5.6
pH OX (23B)	0.1 pH Unit		6.4	9.0	7.3	4.3
EA029-B: Acidity Trail						
Titratable Actual Acidity (23F)	2 mole H+ / t		<2	<2	<2	13
Titratable Peroxide Acidity (23G)	2 mole H+/t		<2	<2	<2	<2
Titratable Sulfidic Acidity (23H)	2 mole H+/t		<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	0.02 % pyrite S		<0.02	<0.02	<0.02	0.02
sulfidic - Titratable Peroxide Acidity (s-23G)	0.02 % pyrite S		<0.02	<0.02	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)	0.02 % pyrite S		<0.02	<0.02	<0.02	<0.02
EA029-C: Sulfur Trail						
KCI Extractable Sulfur (23Ce)	0.02 % S		<0.02	0.03	<0.02	<0.02
Peroxide Sulfur (23De)	0.02 % S		<0.02	0.03	<0.02	0.03
Peroxide Oxidisable Sulfur (23E)	0.02 % S		<0.02	<0.02	<0.02	0.03
acidity - Peroxide Oxidisable Sulfur (a-23E)	10 mole H+ / t		<10	<10	<10	18
EA029-D: Calcium Values						
KCI Extractable Calcium (23Vh)	0.02 % Ca		0.35	0.35	0.25	0.32
Peroxide Calcium (23Wh)	0.02 % Ca		0.34	0.74	0.25	0.34
Acid Reacted Calcium (23X)	0.02 % Ca		<0.02	0.39	<0.02	<0.02
acidity - Acid Reacted Calcium (a-23X)	10 mole H+ / t		<10	194	<10	<10
sulfidic - Acid Reacted Calcium (s-23X)	0.02 % S		<0.02	0.31	<0.02	<0.02
EA029-E: Magnesium Values						
KCI Extractable Magnesium (23Sm)	0.02 % Mg		0.06	0.15	0.22	0.22
Peroxide Magnesium (23Tm)	0.02 % Mg		0.07	0.12	0.23	0.23
Acid Reacted Magnesium (23U)	0.02 % Mg		<0.02	<0.02	<0.02	<0.02
a sidity. A sid Desisted Manual since			10	40	40	40

<10

< 0.02

<10

< 0.02

0.74

149

0.24

10 mole H+ / t

0.02 % CaCO3

10 mole H+ / t

0.02 % S

0.02 % S

acidity - Acid Reacted Magnesium

sulfidic - Acid Reacted Magnesium

Excess Acid Neutralising Capacity

acidity - Excess Acid Neutralising

sulfidic - Excess Acid Neutralising

EA029-F: Excess Acid Neutralising Capacity

(a-23U)

(s-23U)

(23Q)

Capacity (a-23Q)

Capacity (s-23Q)



<10

< 0.02

<10

< 0.02

0.14

29

0.05

Client : GOLDER ASSO	CIATES						(ALS)
Nork Order : EB0711439							ALS Environmen
Analytical Results	Sample Matrix Typ	ent Sample ID : be / Description : ble Date / Time :	TP99_0.00-0.25m SOIL (30 Sep 2007) (15:00)	TP102_0.00-0.25m SOIL (30 Sep 2007) (15:00)	TP102_2.25-2.50m SOIL (30 Sep 2007) (15:00)	TP104_1.00-1.25m SOIL (30 Sep 2007) (15:00)	TP105_0.00-0.25m SOIL (30 Sep 2007) (15:00)
	Laborat	tory Sample ID :					
Analyte	CAS number LOR	Units	EB0711439-021	EB0711439-022	EB0711439-023	EB0711439-024	EB0711439-025
EA029-H: Acid Base Accounting							
ANC Fineness Factor	0.5			1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	0.02 %	6 S		<0.02	<0.02	<0.02	0.05
Net Acidity (acidity units)	10 m	nole H+ / t		<10	<10	<10	31
Liming Rate	1 k	g CaCO3/t		<1	<1	<1	2
EA033-A: Actual Acidity					•	•	-
pH KCI (23A)	0.1 p	H Unit	8.1				
Titratable Actual Acidity (23F)	2 m	nole H+ / t	<2				
sulfidic - Titratable Actual Acidity (s-23F)	0.02 %	6 pyrite S	<0.02				
EA033-B: Potential Acidity					•		-
Chromium Reducible Sulfur (22B)	0.02 %	6 S	<0.02				
acidity - Chromium Reducible Sulfur (a-22B)	10 n	nole H+ / t	<10				
EA033-C: Acid Neutralising Capacity							
Acid Neutralising Capacity (19A1)	0.01 %	6 CaCO3	1.52				
acidity - Acid Neutralising Capacity (a-19A1)	-	nole H+ / t	304				
sulfidic - Acid Neutralising Capacity (s-19A1)	0.01 %	% pyrite S	0.49				
EA033-E: Acid Base Accounting							
ANC Fineness Factor	0.5		1.5				
				1			

< 0.02

<10

<1

0.02 % S

 10
 mole H+ / t

 1
 kg CaCO3/t



Page Number: 12 of 15Client: GOLDER ASSOCIATES

Net Acidity (sulfur units)

Net Acidity (acidity units)

Liming Rate

. EBU/11439						
Analytical Baculta	Client Sample ID :	TP105_0.50-0.75m	TP167_0.00-0.25m	TP167_2.50-2.75m		
Analytical Results	Sample Matrix Type / Description :	SOIL	SOIL	SOIL		
	Sample Date / Time :	(30 Sep 2007)	(30 Sep 2007)	(30 Sep 2007)		
		(15:00)	(15:00)	(15:00)		
	Laboratory Sample ID :	FROT (1400.000	ED0744 (00 007	ED0744400.000		
Analyte	CAS number LOR Units	EB0711439-026	EB0711439-027	EB0711439-028		
EA029-A: pH Measurements						
pH KCI (23A)	0.1 pH Unit	5.1	6.4	6.9		
pH OX (23B)	0.1 pH Unit	6.6	6.9	7.0		
EA029-B: Acidity Trail						
Titratable Actual Acidity (23F)	2 mole H+ / t	20	<2	<2		
Titratable Peroxide Acidity (23G)	2 mole H+/t	<2	<2	<2		
Titratable Sulfidic Acidity (23H)	2 mole H+ / t	<2	<2	<2		
sulfidic - Titratable Actual Acidity	0.02 % pyrite S	0.03	<0.02	<0.02		
(s-23F)						
sulfidic - Titratable Peroxide Acidity (s-23G)	0.02 % pyrite S	<0.02	<0.02	<0.02		
sulfidic - Titratable Sulfidic Acidity (s-23H)	0.02 % pyrite S	<0.02	<0.02	<0.02		
EA029-C: Sulfur Trail					1	
KCI Extractable Sulfur (23Ce)	0.02 % S	<0.02	<0.02	0.05		
Peroxide Sulfur (23De)	0.02 % S	<0.02	<0.02	0.05		
Peroxide Oxidisable Sulfur (23E)	0.02 % S	<0.02	<0.02	<0.02		
acidity - Peroxide Oxidisable Sulfur (a-23E)	10 mole H+ / t	<10	<10	<10		
EA029-D: Calcium Values						
KCI Extractable Calcium (23Vh)	0.02 % Ca	0.16	0.64	0.33		
Peroxide Calcium (23Wh)	0.02 % Ca	0.17	0.75	0.38		
Acid Reacted Calcium (23X)	0.02 % Ca	<0.02	0.11	0.05		
acidity - Acid Reacted Calcium (a-23X)	10 mole H+ / t	<10	55	23		
sulfidic - Acid Reacted Calcium (s-23X)	0.02 % S	<0.02	0.09	0.04		
EA029-E: Magnesium Values	0.02 70 0	10102	0.00			
KCI Extractable Magnesium (23Sm)	0.02 % Mg	0.25	0.32	0.28		
Peroxide Magnesium (23Tm)	0.02 % Mg	0.28	0.32	0.32		
Acid Reacted Magnesium (23U)	0.02 % Mg	0.28	0.05	0.03		
acidity - Acid Reacted Magnesium	10 mole H+ / t	20	39	29		
(a-23U)		20	39	29		
sulfidic - Acid Reacted Magnesium (s-23U)	0.02 % S	0.03	0.06	0.05		
EA029-F: Excess Acid Neutralising C	anacity	l			l	
Excess Acid Neutralising Capacity (23Q)	0.02 % CaCO3	0.16	0.37	0.28		
acidity - Excess Acid Neutralising Capacity (a-23Q)	10 mole H+ / t	32	75	55		
cultidia Exaces Acid Neutrolising	0.00.0/ 0	0.05	0.12	0.00		

0.05

0.12

0.09



sulfidic - Excess Acid Neutralising

Capacity (s-23Q)

0.02 % S



Page Number Client Work Order	 ∴ 14 of 15 ∴ GOLDER ASS ∴ EB0711439 	OCIATES						
Analytical R	Results	Samı	ple Matrix Ty Sarr	lient Sample ID : /pe / Description : hple Date / Time : atory Sample ID :	TP105_0.50-0.75m SOIL (30 Sep 2007) (15:00)	TP167_0.00-0.25m SOIL (30 Sep 2007) (15:00)	TP167_2.50-2.75m SOIL (30 Sep 2007) (15:00)	
Analyte		CAS number	LOR	Units	EB0711439-026	EB0711439-027	EB0711439-028	
EA029-H: Acid Ba	ase Accounting							
ANC Fineness Fact	tor		0.5		1.5	1.5	1.5	
Net Acidity (sulfur u	inits)		0.02	% S	0.03	<0.02	<0.02	
Net Acidity (acidity	units)		10	mole H+ / t	20	<10	<10	
Liming Rate			1	kg CaCO3/t	2	<1	<1	

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Surrogate Control Limits

l No surrogates present on this report.

Environmental Division



QUALITY CONTROL REPORT

Work Order	: EB0711439	Page	: 1 of 8
Client		Laboratory	: Environmental Division Brisbane
Contact	: MS SILVANA SANTOMARTINO	Contact	: Tim Kilmister
Address	: P O BOX 1734 MILTON QLD AUSTRALIA 4064	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: ssantomartino@golder.com.au	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 3721 5400	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 3721 5401	Facsimile	: +61-7-3243 7218
Project	: 077633062	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: GLADSTONE-FITZROY PIPELINE		
C-O-C number	:	Date Samples Received	: 04-OCT-2007
Sampler	:	Issue Date	: 16-OCT-2007
Order number	:		
		No. of samples received	: 28
Quote number	: BN/240/07	No. of samples analysed	: 28

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA	NATA Accredited Laboratory 825 This document is issued in	<i>Signatories</i> This document has been electronically carried out in compliance with procedures sp	ndicated below. Electronic signing has been		
	accordance with NATA	Signatories	Position	Accreditation Category	
	This document is issued in	Jessica Garwood	Supervisor - Acid Sulphate Soils	Inorganics	
WORLD RECOGNISED					

Environmental Division Brisbane Part of the ALS Laboratory Group 32 Shand Street Stafford QLD Australia 4053 Tel. +61-7-3243 7222 Fax. +61-7-3243 7218 www.alsglobal.com

A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

 Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

 CAS Number = Chemistry Abstract Services number

 LOR = Limit of reporting

 RPD = Relative Percentage Difference

= Indicates failed QC

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Work Order	: EB0711439
Client	: GOLDER ASSOCIATES
Project	: 077633062



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:-No Limit; Result between 10 and 20 times LOR:-0% - 50%; Result > 20 times LOR:-0% - 20%.

ub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%
A029-A: pH Measu	rements (QC Lot: 509221)								
EB0711439-003	TP74_1.00-1.25m	EA029: pH KCI (23A)		0.1	pH Unit	6.8	6.8	0.0	0% - 20%
		EA029: pH OX (23B)		0.1	pH Unit	7.1	7.0	1.4	0% - 20%
EB0711439-018	TP95_2.25-2.50m	EA029: pH KCI (23A)		0.1	pH Unit	6.6	6.6	0.0	0% - 20%
		EA029: pH OX (23B)		0.1	pH Unit	8.2	8.2	0.0	0% - 20%
A029-B: Acidity Tr	rail (QC Lot: 509221)								
EB0711439-003	TP74_1.00-1.25m	EA029: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	0.0	
		EA029: sulfidic - Titratable Peroxide Acidity		0.02	% pyrite S	<0.02	<0.02	0.0	
		(s-23G)							
		EA029: sulfidic - Titratable Sulfidic Acidity		0.02	% pyrite S	<0.02	<0.02	0.0	
		(s-23H)							
		EA029: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	<2	0.0	
		EA029: Titratable Peroxide Acidity (23G)		2	mole H+ / t	<2	<2	0.0	
		EA029: Titratable Sulfidic Acidity (23H)		2	mole H+ / t	<2	<2	0.0	
EB0711439-018	TP95_2.25-2.50m	EA029: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	0.0	
		EA029: sulfidic - Titratable Peroxide Acidity		0.02	% pyrite S	<0.02	<0.02	0.0	
		(s-23G)							
		EA029: sulfidic - Titratable Sulfidic Acidity		0.02	% pyrite S	<0.02	<0.02	0.0	
		(s-23H)							
		EA029: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	<2	0.0	
		EA029: Titratable Peroxide Acidity (23G)		2	mole H+ / t	<2	<2	0.0	
		EA029: Titratable Sulfidic Acidity (23H)		2	mole H+ / t	<2	<2	0.0	
A029-C: Sulfur Tra	ail (QC Lot: 509221)								
EB0711439-003	TP74_1.00-1.25m	EA029: KCI Extractable Sulfur (23Ce)		0.02	% S	0.03	0.03	0.0	No Limit
		EA029: Peroxide Sulfur (23De)		0.02	% S	0.03	0.03	0.0	No Limit
		EA029: Peroxide Oxidisable Sulfur (23E)		0.02	% S	<0.02	<0.02	0.0	
		EA029: acidity - Peroxide Oxidisable Sulfur		10	mole H+ / t	<10	<10	0.0	
		(a-23E)							
EB0711439-018	TP95_2.25-2.50m	EA029: KCI Extractable Sulfur (23Ce)		0.02	% S	<0.02	<0.02	0.0	
		EA029: Peroxide Sulfur (23De)		0.02	% S	<0.02	<0.02	0.0	
		EA029: Peroxide Oxidisable Sulfur (23E)		0.02	% S	<0.02	<0.02	0.0	
		EA029: acidity - Peroxide Oxidisable Sulfur		10	mole H+ / t	<10	<10	0.0	
		(a-23E)							
EA029-D: Calcium V	/alues (QC Lot: 509221)								
EB0711439-003	TP74_1.00-1.25m	EA029: KCI Extractable Calcium (23Vh)		0.02	% Ca	0.14	0.12	12.8	No Limit
		EA029: Peroxide Calcium (23Wh)		0.02	% Ca	0.15	0.14	10.4	No Limit

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Client	: GOLDER ASSOCIATES
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Sub-Matrix: SOIL	ix: SOIL					Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%		
EA029-D: Calcium	Values (QC Lot: 509221)	- continued									
EB0711439-003	TP74_1.00-1.25m	EA029: Acid Reacted Calcium (23X)		0.02	% Ca	<0.02	<0.02	0.0			
		EA029: sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	<0.02	<0.02	0.0			
		EA029: acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	<10	<10	0.0			
EB0711439-018	TP95_2.25-2.50m	EA029: KCI Extractable Calcium (23Vh)		0.02	% Ca	0.05	0.06	0.0	No Limit		
		EA029: Peroxide Calcium (23Wh)		0.02	% Ca	0.06	0.06	0.0	No Limit		
		EA029: Acid Reacted Calcium (23X)		0.02	% Ca	<0.02	<0.02	0.0			
		EA029: sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	<0.02	<0.02	0.0			
		EA029: acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	<10	<10	0.0			
A029-E: Magnesii	um Values (QC Lot: 5092	221)									
B0711439-003	TP74_1.00-1.25m	EA029: KCI Extractable Magnesium (23Sm)		0.02	% Mg	0.12	0.11	0.0	No Limit		
	-	EA029: Peroxide Magnesium (23Tm)		0.02	% Mg	0.14	0.13	0.0	No Limit		
		EA029: Acid Reacted Magnesium (23U)		0.02	% Mg	0.02	0.02	0.0	No Limit		
		EA029: sulfidic - Acid Reacted Magnesium		0.02	% S	0.03	0.03	0.0	No Limit		
		(s-23U)									
		EA029: Acidity - Acid Reacted Magnesium		10	mole H+ / t	17	21	19.4	No Limit		
		(a-23U)									
B0711439-018	TP95_2.25-2.50m	EA029: KCI Extractable Magnesium (23Sm)		0.02	% Mg	0.09	0.10	12.3	No Limit		
		EA029: Peroxide Magnesium (23Tm)		0.02	% Mg	0.12	0.13	0.0	No Limit		
		EA029: Acid Reacted Magnesium (23U)		0.02	% Mg	0.04	0.03	0.0	No Limit		
		EA029: sulfidic - Acid Reacted Magnesium		0.02	% S	0.05	0.04	23.3	No Limit		
		(s-23U)									
		EA029: Acidity - Acid Reacted Magnesium		10	mole H+ / t	31	24	23.3	No Limit		
		(a-23U)									
A029-F: Excess A	cid Neutralising Capacity	v (QC Lot: 509221)									
EB0711439-003	TP74_1.00-1.25m	EA029: Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3	0.31	0.25	22.5	0% - 50%		
		EA029: sulfidic - Excess Acid Neutralising		0.02	% S	0.10	0.08	22.5	No Limit		
		Capacity (s-23Q)									
		EA029: acidity - Excess Acid Neutralising		10	mole H+ / t	62	50	22.5	No Limit		
		Capacity (a-23Q)									
EB0711439-018	TP95_2.25-2.50m	EA029: Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3	0.14	0.19	28.4	No Limit		
		EA029: sulfidic - Excess Acid Neutralising		0.02	% S	0.05	0.06	28.4	No Limit		
		Capacity (s-23Q)									
		EA029: acidity - Excess Acid Neutralising		10	mole H+ / t	29	38	28.4	No Limit		
		Capacity (a-23Q)									
A033-A: Actual A	cidity (QC Lot: 509220)										
EB0711439-001	TP74_0.00-0.25m	EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	0.0			
		EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	11	11	0.0	No Limit		
		EA033: pH KCI (23A)		0.1	pH Unit	5.7	5.6	1.8	0% - 20%		
A033-B: Potential	Acidity (QC Lot: 509220										
B0711439-001	TP74_0.00-0.25m	EA033: Chromium Reducible Sulfur (22B)		0.02	% S	<0.02	<0.02	0.0			
	-)									

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Client	: GOLDER ASSOCIATES
Project	: 077633062



Sub-Matrix: SOIL			Laboratory Duplicate (DUP) Report								
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)		
EA033-B: Potential A	cidity (QC Lot: 509220) - co	ontinued									
EB0711439-001	TP74_0.00-0.25m	EA033: acidity - Chromium Reducible Sulfur		10	mole H+ / t	<10	<10	0.0			
		(a-22B)									



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL		Method Blank (MB) Rep	oort		Laboratory Control Spike (LC	S) Report	
				Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound CAS Numb	er LOR	Unit	Result	Concentration	LCS	Low	High
EA029-B: Acidity Trail (QCLot: 509221)							
	2	mole H+ / t	<2				
EA029: Titratable Peroxide Acidity (23G)	2	mole H+ / t	<2				
EA029: Titratable Sulfidic Acidity (23H) -	2	mole H+ / t	<2				
EA029: sulfidic - Titratable Actual Acidity (s-23F) -	0.02	% pyrite S	<0.02				
EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	0.02	% pyrite S	<0.02				
EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	0.02	% pyrite S	<0.02				
EA029-C: Sulfur Trail (QCLot: 509221)							
EA029: KCI Extractable Sulfur (23Ce)	0.02	% S	<0.02				
EA029: Peroxide Sulfur (23De)	0.02	% S	<0.02				
EA029: Peroxide Oxidisable Sulfur (23E) -	0.02	% S	<0.02				
EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	10	mole H+ / t	<10				
EA029-D: Calcium Values (QCLot: 509221)							
EA029: KCI Extractable Calcium (23Vh) -	0.02	% Ca	<0.02				
EA029: Peroxide Calcium (23Wh) -	0.02	% Ca	<0.02				
EA029: Acid Reacted Calcium (23X) -	0.02	% Ca	<0.02				
EA029: acidity - Acid Reacted Calcium (a-23X) -	10	mole H+ / t	<10				
EA029: sulfidic - Acid Reacted Calcium (s-23X)	0.02	% S	<0.02				
EA029-E: Magnesium Values (QCLot: 509221)							
EA029: KCI Extractable Magnesium (23Sm) -	0.02	% Mg	<0.02				
EA029: Peroxide Magnesium (23Tm)	0.02	% Mg	<0.02				
EA029: Acid Reacted Magnesium (23U)	0.02	% Mg	<0.02				
EA029: Acidity - Acid Reacted Magnesium (a-23U) -	10	mole H+ / t	<10				
EA029: sulfidic - Acid Reacted Magnesium (s-23U) -	0.02	% S	<0.02				
EA029-F: Excess Acid Neutralising Capacity (QCLot: 509221)							
EA029: Excess Acid Neutralising Capacity (23Q)	0.02	% CaCO3	<0.02				
EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	10	mole H+ / t	<10				
EA029: sulfidic - Excess Acid Neutralising Capacity -	0.02	% S	<0.02				
(s-23Q)							
EA029-G: Retained Acidity (QCLot: 509221)							
EA029: Net Acid Soluble Sulfur (20Je)	0.02	% S	<0.02				
EA029: acidity - Net Acid Soluble Sulfur (a-20J) -	10	mole H+ / t	<10				
EA029: sulfidic - Net Acid Soluble Sulfur (s-20J)	0.02	% pyrite S	<0.02				
EA029: HCI Extractable Sulfur (20Be)	0.02	% S	<0.02				
EA033-A: Actual Acidity (QCLot: 509220)							

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Client	: GOLDER ASSOCIATES
Project	: 077633062



Sub-Matrix: SOIL			Method Blank (MB) Re	port	Laboratory Control Spike (LCS) Report					
					Spike	Spike Recovery (%)	Recovery Limits (%)			
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High		
EA033-A: Actual Acidity (QCLot: 509220) - continued										
EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2						
EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02						
EA033-B: Potential Acidity (QCLot: 509220)										
EA033: Chromium Reducible Sulfur (22B)		0.02	% S	<0.02						
EA033: acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	<10						
EA033-C: Acid Neutralising Capacity (QCLot: 509220)										
EA033: Acid Neutralising Capacity (19A1)		0.01	% CaCO3	<0.01						
EA033: acidity - Acid Neutralising Capacity (a-19A1)		10	mole H+ / t	<10						
EA033: sulfidic - Acid Neutralising Capacity (s-19A1)		0.01	% pyrite S	<0.01						



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

• No Matrix Spike (MS) Results are required to be reported.

SAMPLE CHAIN OF CUSTODY DOCUMENTATION - SOIL

Project ID:	07	7633062		Quote/Order	No.:				GOLD	ER ASSO	CIATES	PTY LTD				Pho	ne: (07) 3	3721 5400			AA	
Site Location:	Gladston	e-Fitzroy Pipe	line	Lab Name:			ALS		611 Co	ronation I	rive To	owong, Qi	d 1066			Fax	(07) 3	3721 5401		(Go	lder
	· · · · · · · · · · · · · · · · · · ·	Main Roads					1100		1			-				rax	: (07)2	5/21 5401			Asso	ociates
Sampled By:	Dept			BY:					-1					C, Qld 4064								
Turnaround (Days)	(constant)		2000 B			tion:			-11 -	t Manage		Henry Pa										
Report Format:	HARD	FAX	disk 🔲	EMAIL 🗹	BULLETIN B	OARD L			Contac	t Phone:		07 372154	400					Email:	hparson	s@golder.c	om.au	
Email Format:	PDF 🗹	Excel 🗹	Other	Email Addre	ssantomartin	o@golder.c	om.au			,,					ANA	ALYSIS RI	QUIREI)				
Comments/Special								7														
Please e-mail resul	lts etc. to Silvana Santomartino						RS	HS	m	AS)												
Samples from a de	eclared Fire Ant Area:	N					INE	RA R	(Chromium	5 Q												
	om a known Weed and or Pest A			N			VTV	BLE	C l	029 (SPOCAS)												
	SAMPLE	SAMPLE	SAMPLE	SAMPLE	CONTAINER	1	No CONTAINERS	POSSIBLE HIGH CONCENTRATION	EA-033 Suite)	1 11												
	ID	MATRIX	DATE	TIME	PRESERVAT		Ŷ	55	EA- Suit	EA												
	P74 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N	Х							Marcalan in 1997 - 19						CHICAGO DE LA COMPANY
- <u><u><u></u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>	P74 0.50-0.75m	Soil	Sep-07		Bag	Frozen	1	N	X									Envi	ronm	ental	Division	
	P74 1.00-1.25m	Soil	Sep-07		Bag	Frozen	1	N		X								1 1 V I I		sbane		
	P74 1.50-1.75m	Soil	Sep-07		Bag	Frozen	1	N		X												
	P74 2.25-2.50m	Soil	Sep-07		Bag	Frozen	1	N		X										k Ord		
	P74 2.50-2.75m	Soil	Sep-07		Bag	Frozen	1	N		X								8	n۸	74-	439	
	P79 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N	X									E	ВV	/ / /	433	
	P79 2.00-2.25m P80 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N		X							-					
	P80 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N	X								811 11		81 81 0 18 18		619000 H () 1 H ()	11
	P80 1.00-1.25m P81 0.00-0.25m	Soil	Sep-07 Sep-07		Bag Bag	Frozen Frozen	1	N N	X X													
	P81 0.50-0.75m	Soil	Sep-07	1	Bag	Frozen	1	N	X								— [[]]					II
	P82 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N	· ^	x							—					
	P82 0.50-0.75m	Soil	Sep-07		Bag	Frozen	1	N		X												
	P82 2.00-2.25m	Soil	Sep-07		Bag	Frozen	1	N		X								Teleph	ione :	+ 61-7-	3243 7222	2
	P94 1.25-1.50m	Soil	Sep-07		Bag	Frozen	$\frac{1}{1}$	N		X								1				
17 T	P95 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N		X				-			1		ı "I	1	1 1	1 -
18 T	P95 2.25-2.50m	Soil	Sep-07		Bag	Frozen	1	N		X												
	P98 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N	Х													
	P98 2.75-3.0m	Soil	Sep-07		Bag	Frozen	1	N		X												
	P99 0.00-0.25m	Soil	Sep-07	L	Bag	Frozen	1	N	X													
	2102 0.00-0.25m	Soil	Sep-07		Bag	Frozen	1	N		X												
	2102 2.25-2.50m	Soil	Sep-07	-	Bag	Frozen	1	N		X												
	P104 1.00-1.25m	Soil	Sep-07	-	Bag	Frozen	1	N		X												
	2105 0.00-0.25m	Soil	Sep-07	- ·	Bag	Frozen	1	N		X												
	2105 0.50-0.75m	Soil	Sep-07	_	Bag	Frozen	1	N		X												
	2167 2.50-2.75m	Soil Soil	Sep-07		Bag	Frozen	1	N		X						-						
/ J	107 2.30-2.75m	5011	Sep-07		Bag	Frozen	1	N		X												
SAMPLE MATRIX	a = Soil/Sediment/Fill/Other		<u> </u>	SAMPLE TY	PE = Core(CR)	L	l	1	<u> </u>		i H	IGH CO	NCENTRAT	L ION: Tie	ck box and c	rcle expect	ted parame	ters in and	lysis list		
						, ,																
	Container Type and Preservativ	ve Codes: P = Natur				1 Hydroxide			lvent Wa	shed Acid				ashed Acid R	insed Gla	ss Bottle; V	C = Hydroc	chloric Pres	served Via	l; VS = Su	phuric Acid	
	SIGNATURE		COMPANY		DÀTE _I		TIME					SIGNATI	URE			COMPANY	·	DATE		TIME		ent Method
RELEASED BY	alla	1 1	GOLDER		4/10/1	27	300	Don	RELEA	ASED BY	, T										Shipping I	Ref
	XAT YA.		Δ ;		4 4		il.	1-1-1		100001												
RECEIVED BY			A4S		4/10/0	57	166			VED BY												
RELEASED BY					• • •				To Be I	Filled Out	By Ana	dysing La	boratory			LA	B. BATCH	I NUMBE	R			
RELEASED BY							·					Г	1									
RECEIVED BY									Security	y Seal				Chilled		-		Bill to:				
RELEASED BY									Suitable	e Contain	ers		X	Frozen								
RECERCED DI												F				-		Addres	is 🛛			
RECEIVED BY									Cool Bo)X			1	Ambier	at							

Environmental Division



CERTIFICATE OF ANALYSIS

Work Order	: EB0713257	Page	: 1 of 16
Client		Laboratory	: Environmental Division Brisbane
Contact	: MS SILVANA SANTOMARTINO	Contact	: Tim Kilmister
Address	: P O BOX 1734 MILTON QLD AUSTRALIA 4064	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: ssantomartino@golder.com.au	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 3721 5400	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 3721 5401	Facsimile	: +61-7-3243 7218
Project	: 077633062 GLADSTONE-FITZROY PIPELINE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	:		
C-O-C number	:	Date Samples Received	: 13-NOV-2007
Sampler	: DEPT MAIN ROADS	Issue Date	: 15-NOV-2007
Site	: GLADSTONE-FITZROY PIPELINE		
		No. of samples received	: 32
Quote number	: EN/002/05	No. of samples analysed	: 32

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

accordance with NATA	Signatories	Position	Accreditation Category
accreditation requirements.	Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics

Accredited for compliance with ISO/IEC 17025.

This document is issued in

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes.

 Key :
 CAS Number = Chemistry Abstract Services number

 LOR = Limit of reporting
 * = This result is computed from individual analyte detections at or above the level of reporting

- ANC not required because pH KCI less than 6.5
- Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from kg/t dry weight to kg/m3 in-situ soil, multiply reported results x wet bulk density of soil in t/m3.



Sub-Matrix: SOIL		Cli	ent sample ID	TP69 1.5m	TP70 0.5m	TP71 0.0-0.5m	TP72 0.0-0.2m	TP73 0.0-0.50m
	Cl	ient sampli	ing date / time	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
Compound	CAS Number	LOR	Unit	EB0713257-001	EB0713257-002	EB0713257-003	EB0713257-004	EB0713257-005
EA029-A: pH Measurements								
pH KCI (23A)		0.1	pH Unit	4.6	4.5	4.8		
pH OX (23B)		0.1	pH Unit	4.7	4.4	4.6		
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)		2	mole H+/t	26	37	31		
Titratable Peroxide Acidity (23G)		2	mole H+/t	31	35	31		
Titratable Sulfidic Acidity (23H)		2	mole H+/t	5	<2	<2		
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.04	0.06	0.05		
sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S	0.05	0.06	0.05		
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S	<0.02	<0.02	<0.02		
EA029-C: Sulfur Trail								
KCI Extractable Sulfur (23Ce)		0.02	% S	<0.02	<0.02	<0.02		
Peroxide Sulfur (23De)		0.02	% S	<0.02	<0.02	<0.02		
Peroxide Oxidisable Sulfur (23E)		0.02	% S	<0.02	<0.02	<0.02		
acidity - Peroxide Oxidisable Sulfur		10	mole H+ / t	<10	<10	<10		
(a-23E)								
EA029-D: Calcium Values								
KCI Extractable Calcium (23Vh)		0.02	% Ca	0.07	0.13	0.14		
Peroxide Calcium (23Wh)		0.02	% Ca	0.07	0.14	0.15		
Acid Reacted Calcium (23X)		0.02	% Ca	<0.02	<0.02	<0.02		
acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	<10	<10	<10		
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	<0.02	<0.02	<0.02		
EA029-E: Magnesium Values								
KCI Extractable Magnesium (23Sm)		0.02	% Mg	0.16	0.17	0.16		
Peroxide Magnesium (23Tm)		0.02	% Mg	0.16	0.19	0.16		
Acid Reacted Magnesium (23U)		0.02	% Mg	<0.02	0.02	<0.02		
Acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	<10	16	<10		
sulfidic - Acid Reacted Magnesium (s-23U)		0.02	% S	<0.02	0.03	<0.02		
EA029-H: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5	1.5	1.5		
Net Acidity (sulfur units)		0.02	% S	0.04	0.06	0.05		
Net Acidity (acidity units)		10	mole H+ / t	26	37	31		
Liming Rate		1	kg CaCO3/t	2	3	2		
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit				5.3	5.7
Titratable Actual Acidity (23F)		2	mole H+ / t				20	12



Sub-Matrix: SOIL		Cli	ent sample ID	TP69 1.5m	TP70 0.5m	TP71 0.0-0.5m	TP72 0.0-0.2m	TP73 0.0-0.50m
	Ci	ient sampli	ng date / time	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
Compound	CAS Number	LOR	Unit	EB0713257-001	EB0713257-002	EB0713257-003	EB0713257-004	EB0713257-005
EA033-A: Actual Acidity - Continued								
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S				0.03	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.02	% S				<0.02	<0.02
acidity - Chromium Reducible Sulfur		10	mole H+ / t				<10	<10
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-				1.5	1.5
Net Acidity (sulfur units)		0.02	% S				0.03	<0.02
Net Acidity (acidity units)		10	mole H+ / t				20	12
Liming Rate		1	kg CaCO3/t				2	<1



Sub-Matrix: SOIL		Clie	ent sample ID	TP77 0.0-0.6m	TP78 0.0-0.2m	TP83 0.0-0.2m	TP87 0.3-0.45m	TP88 0.0-0.6m
	Cli	ent sampli	ng date / time	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
Compound	CAS Number	LOR	Unit	EB0713257-006	EB0713257-007	EB0713257-008	EB0713257-009	EB0713257-010
EA029-A: pH Measurements								
pH KCI (23A)		0.1	pH Unit	5.6			4.9	6.2
pH OX (23B)		0.1	pH Unit	3.5			4.0	6.7
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)		2	mole H+ / t	13			29	4
Titratable Peroxide Acidity (23G)		2	mole H+ / t	<2			24	<2
Titratable Sulfidic Acidity (23H)		2	mole H+ / t	<2			<2	<2
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.02			0.05	<0.02
sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S	<0.02			0.04	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S	<0.02			<0.02	<0.02
EA029-C: Sulfur Trail								
KCI Extractable Sulfur (23Ce)		0.02	% S	<0.02			<0.02	<0.02
Peroxide Sulfur (23De)		0.02	% S	0.02			<0.02	<0.02
Peroxide Oxidisable Sulfur (23E)		0.02	% S	0.02			<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur		10	mole H+ / t	13			<10	<10
(a-23E)								
EA029-D: Calcium Values								
KCI Extractable Calcium (23Vh)		0.02	% Ca	0.18			0.22	0.21
Peroxide Calcium (23Wh)		0.02	% Ca	0.21			0.25	0.24
Acid Reacted Calcium (23X)		0.02	% Ca	0.03			0.02	0.03
acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	15			12	14
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	0.02			<0.02	0.02
EA029-E: Magnesium Values								
KCI Extractable Magnesium (23Sm)		0.02	% Mg	0.06			0.10	0.04
Peroxide Magnesium (23Tm)		0.02	% Mg	0.07			0.11	0.04
Acid Reacted Magnesium (23U)		0.02	% Mg	<0.02			<0.02	<0.02
Acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	<10			12	<10
sulfidic - Acid Reacted Magnesium (s-23U)		0.02	% S	<0.02			<0.02	<0.02
EA029-F: Excess Acid Neutralising Capa	city							
Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3					0.32
acidity - Excess Acid Neutralising		10	mole H+ / t					64
Capacity (a-23Q)								
sulfidic - Excess Acid Neutralising		0.02	% S					0.10
Capacity (s-23Q)								
EA029-H: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5			1.5	1.5



Sub-Matrix: SOIL		Cli	ent sample ID	TP77 0.0-0.6m	TP78 0.0-0.2m	TP83 0.0-0.2m	TP87 0.3-0.45m	TP88 0.0-0.6m
	Cl	ient sampli	ing date / time	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
Compound	CAS Number	LOR	Unit	EB0713257-006	EB0713257-007	EB0713257-008	EB0713257-009	EB0713257-010
EA029-H: Acid Base Accounting - Continu	ued							
Net Acidity (sulfur units)		0.02	% S	0.04			0.05	<0.02
Net Acidity (acidity units)		10	mole H+ / t	26			29	<10
Liming Rate		1	kg CaCO3/t	2			2	<1
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit		4.9	5.1		
Titratable Actual Acidity (23F)		2	mole H+ / t		44	23		
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S		0.07	0.04		
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.02	% S		<0.02	<0.02		
acidity - Chromium Reducible Sulfur		10	mole H+ / t		<10	<10		
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-		1.5	1.5		
Net Acidity (sulfur units)		0.02	% S		0.07	0.04		
Net Acidity (acidity units)		10	mole H+ / t		44	23		
Liming Rate		1	kg CaCO3/t		3	2		



Sub-Matrix: SOIL	Client sample ID Client sampling date / time			TP106 1.75-2.0m	TP106 2.25-2.5m	TP107 0.25-0.5m	TP108 0.0-0.25m	TP108 2.75-3.0m
				[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
Compound	CAS Number	LOR	Unit	EB0713257-011	EB0713257-012	EB0713257-013	EB0713257-014	EB0713257-015
EA029-A: pH Measurements								
pH KCI (23A)		0.1	pH Unit	5.6	4.2	6.9		4.9
pH OX (23B)		0.1	pH Unit	2.2	3.6	6.6		4.8
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)		2	mole H+ / t	13	29	<2		24
Titratable Peroxide Acidity (23G)		2	mole H+ / t	557	52	<2		15
Titratable Sulfidic Acidity (23H)		2	mole H+ / t	544	23	<2		<2
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.02	0.05	<0.02		0.04
sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S	0.89	0.08	<0.02		0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S	0.87	0.04	<0.02		<0.02
EA029-C: Sulfur Trail								
KCI Extractable Sulfur (23Ce)		0.02	% S	0.09	0.07	0.02		0.04
Peroxide Sulfur (23De)		0.02	% S	1.06	0.08	0.06		0.04
Peroxide Oxidisable Sulfur (23E)		0.02	% S	0.97	<0.02	0.04		<0.02
acidity - Peroxide Oxidisable Sulfur		10	mole H+ / t	603	<10	23		<10
(a-23E)								
EA029-D: Calcium Values								
KCI Extractable Calcium (23Vh)		0.02	% Ca	0.12	0.09	0.20		0.10
Peroxide Calcium (23Wh)		0.02	% Ca	0.12	0.09	0.26		0.10
Acid Reacted Calcium (23X)		0.02	% Ca	<0.02	<0.02	0.06		<0.02
acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	<10	<10	30		<10
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	<0.02	<0.02	0.05		<0.02
EA029-E: Magnesium Values								
KCI Extractable Magnesium (23Sm)		0.02	% Mg	0.18	0.15	0.18		0.11
Peroxide Magnesium (23Tm)		0.02	% Mg	0.20	0.16	0.23		0.12
Acid Reacted Magnesium (23U)		0.02	% Mg	<0.02	<0.02	0.05		<0.02
Acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	12	<10	39		<10
sulfidic - Acid Reacted Magnesium		0.02	% S	0.02	<0.02	0.06		<0.02
(s-23U)								
EA029-F: Excess Acid Neutralising Capa	city							
Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3			0.45		
acidity - Excess Acid Neutralising		10	mole H+ / t			90		
Capacity (a-23Q)								
sulfidic - Excess Acid Neutralising		0.02	% S			0.14		
Capacity (s-23Q)								
EA029-G: Retained Acidity								
Net Acid Soluble Sulfur (20Je)		0.02	% S		0.03			



Sub-Matrix: SOIL	Client sample ID			TP106 1.75-2.0m	TP106 2.25-2.5m	TP107 0.25-0.5m	TP108 0.0-0.25m	TP108 2.75-3.0m
	Client sampling date / time			[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
Compound	CAS Number	LOR	Unit	EB0713257-011	EB0713257-012	EB0713257-013	EB0713257-014	EB0713257-015
EA029-G: Retained Acidity - Continued								
acidity - Net Acid Soluble Sulfur (a-20J)		10	mole H+ / t		14			
sulfidic - Net Acid Soluble Sulfur (s-20J)		0.02	% pyrite S		0.02			
HCI Extractable Sulfur (20Be)		0.02	% S		0.10			
EA029-H: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5	1.5	1.5		1.5
Net Acidity (sulfur units)		0.02	% S	0.99	0.08	<0.02		0.04
Net Acidity (acidity units)		10	mole H+ / t	616	49	<10		25
Liming Rate		1	kg CaCO3/t	46	4	<1		2
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit				6.0	
Titratable Actual Acidity (23F)		2	mole H+ / t				5	
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S				<0.02	
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.02	% S				<0.02	
acidity - Chromium Reducible Sulfur		10	mole H+ / t				<10	
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-				1.5	
Net Acidity (sulfur units)		0.02	% S				<0.02	
Net Acidity (acidity units)		10	mole H+ / t				<10	
Liming Rate		1	kg CaCO3/t				<1	



Sub-Matrix: SOIL		Cli	ent sample ID	TP109 0.0-0.25m	TP110 0.0-0.25m	TP112 2.25-2.5m	TP114 0.0-0.25m	TP119 0.0-0.25m
	Cli	ient sampl	ing date / time	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
Compound	CAS Number	LOR	Unit	EB0713257-016	EB0713257-017	EB0713257-018	EB0713257-019	EB0713257-020
EA029-A: pH Measurements								
pH KCI (23A)		0.1	pH Unit			5.6		
pH OX (23B)		0.1	pH Unit			6.0		
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)		2	mole H+ / t			9		
Titratable Peroxide Acidity (23G)		2	mole H+ / t			5		
Titratable Sulfidic Acidity (23H)		2	mole H+ / t			<2		
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S			<0.02		
sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S			<0.02		
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S			<0.02		
EA029-C: Sulfur Trail								
KCI Extractable Sulfur (23Ce)		0.02	% S			<0.02		
Peroxide Sulfur (23De)		0.02	% S			0.02		
Peroxide Oxidisable Sulfur (23E)		0.02	% S			0.02		
acidity - Peroxide Oxidisable Sulfur		10	mole H+ / t			13		
(a-23E)								
EA029-D: Calcium Values								
KCI Extractable Calcium (23Vh)		0.02	% Ca			0.11		
Peroxide Calcium (23Wh)		0.02	% Ca			0.11		
Acid Reacted Calcium (23X)		0.02	% Ca			<0.02		
acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t			<10		
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S			<0.02		
EA029-E: Magnesium Values								
KCI Extractable Magnesium (23Sm)		0.02	% Mg			0.26		
Peroxide Magnesium (23Tm)		0.02	% Mg			0.29		
Acid Reacted Magnesium (23U)		0.02	% Mg			0.02		
Acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t			20		
sulfidic - Acid Reacted Magnesium		0.02	% S			0.03		
(s-23U)								
EA029-H: Acid Base Accounting								
ANC Fineness Factor		0.5	-			1.5		
Net Acidity (sulfur units)		0.02	% S			0.03		
Net Acidity (acidity units)		10	mole H+ / t			22		
Liming Rate		1	kg CaCO3/t			2		
EA033-A: Actual Acidity								
рН КСІ (23А)		0.1	pH Unit	5.6	5.6		5.4	5.3
Titratable Actual Acidity (23F)		2	mole H+ / t	13	12		14	10



Sub-Matrix: SOIL		Cli	ent sample ID	TP109 0.0-0.25m	TP110 0.0-0.25m	TP112 2.25-2.5m	TP114 0.0-0.25m	TP119 0.0-0.25m
	Cl	ient sampli	ing date / time	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
Compound	CAS Number	LOR	Unit	EB0713257-016	EB0713257-017	EB0713257-018	EB0713257-019	EB0713257-020
EA033-A: Actual Acidity - Continued								
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.02	<0.02		0.02	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.02	% S	<0.02	<0.02		<0.02	<0.02
acidity - Chromium Reducible Sulfur		10	mole H+ / t	<10	<10		<10	<10
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5	1.5		1.5	1.5
Net Acidity (sulfur units)		0.02	% S	0.02	<0.02		0.02	<0.02
Net Acidity (acidity units)		10	mole H+ / t	13	12		14	10
Liming Rate		1	kg CaCO3/t	<1	<1		1	<1



Sub-Matrix: SOIL		Cli	ent sample ID	TP119 0.5-0.75m	TP123 0.25-0.5m	TP130 0.0-0.25m	TP130 0.5-0.75m	TP131 0.0-0.25m
	Cli	ient sampli	ing date / time	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
Compound	CAS Number	LOR	Unit	EB0713257-021	EB0713257-022	EB0713257-023	EB0713257-024	EB0713257-025
EA029-A: pH Measurements								
pH KCI (23A)		0.1	pH Unit	5.5	5.2		5.3	
pH OX (23B)		0.1	pH Unit	6.7	6.9		4.8	
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)		2	mole H+ / t	9	23		13	
Titratable Peroxide Acidity (23G)		2	mole H+ / t	<2	<2		<2	
Titratable Sulfidic Acidity (23H)		2	mole H+ / t	<2	<2		<2	
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	0.04		0.02	
sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S	<0.02	<0.02		<0.02	
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S	<0.02	<0.02		<0.02	
EA029-C: Sulfur Trail								
KCI Extractable Sulfur (23Ce)		0.02	% S	<0.02	<0.02		<0.02	
Peroxide Sulfur (23De)		0.02	% S	<0.02	<0.02		<0.02	
Peroxide Oxidisable Sulfur (23E)		0.02	% S	<0.02	<0.02		<0.02	
acidity - Peroxide Oxidisable Sulfur		10	mole H+ / t	<10	<10		<10	
(a-23E)								
EA029-D: Calcium Values								
KCI Extractable Calcium (23Vh)		0.02	% Ca	0.24	0.17		0.15	
Peroxide Calcium (23Wh)		0.02	% Ca	0.27	0.21		0.18	
Acid Reacted Calcium (23X)		0.02	% Ca	0.04	0.04		0.04	
acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	18	18		18	
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	0.03	0.03		0.03	
EA029-E: Magnesium Values								
KCI Extractable Magnesium (23Sm)		0.02	% Mg	0.27	0.23		0.14	
Peroxide Magnesium (23Tm)		0.02	% Mg	0.30	0.26		0.17	
Acid Reacted Magnesium (23U)		0.02	% Mg	0.02	0.03		0.03	
Acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	20	21		22	
sulfidic - Acid Reacted Magnesium (s-23U)		0.02	% S	0.03	0.03		0.04	
EA029-F: Excess Acid Neutralising Capa	citv							
Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3	0.34	0.45			
acidity - Excess Acid Neutralising		10	mole H+/t	67	90			
Capacity (a-23Q)								
sulfidic - Excess Acid Neutralising		0.02	% S	0.11	0.14			
Capacity (s-23Q)								
EA029-H: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5	1.5		1.5	
			· · · · · · · · · · · · · · · · · · ·	-		1	-	1



Sub-Matrix: SOIL		Cli	ent sample ID	TP119 0.5-0.75m	TP123 0.25-0.5m	TP130 0.0-0.25m	TP130 0.5-0.75m	TP131 0.0-0.25m
	Cl	ient sampli	ng date / time	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
Compound	CAS Number	LOR	Unit	EB0713257-021	EB0713257-022	EB0713257-023	EB0713257-024	EB0713257-025
EA029-H: Acid Base Accounting - Contin	ued							
Net Acidity (sulfur units)		0.02	% S	<0.02	0.04		0.02	
Net Acidity (acidity units)		10	mole H+ / t	<10	23		13	
Liming Rate		1	kg CaCO3/t	<1	2		<1	
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit			4.7		5.6
Titratable Actual Acidity (23F)		2	mole H+ / t			35		13
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S			0.06		0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.02	% S			<0.02		<0.02
acidity - Chromium Reducible Sulfur		10	mole H+ / t			<10		<10
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-			1.5		1.5
Net Acidity (sulfur units)		0.02	% S			0.06		0.02
Net Acidity (acidity units)		10	mole H+ / t			35		13
Liming Rate		1	kg CaCO3/t			2		<1



Sub-Matrix: SOIL		Cli	ent sample ID	TP132 0.0-0.25m	TP138 0.0-0.25m	TP159 0.0-0.6m	TP160 0.0-0.5m	TP163 0.0-0.9m
	Cl	ient sampli	ing date / time	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
Compound	CAS Number	LOR	Unit	EB0713257-026	EB0713257-027	EB0713257-028	EB0713257-029	EB0713257-030
EA029-A: pH Measurements								
pH KCI (23A)		0.1	pH Unit			6.2	6.1	5.5
pH OX (23B)		0.1	pH Unit			7.2	7.2	4.9
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)		2	mole H+ / t			2	4	12
Titratable Peroxide Acidity (23G)		2	mole H+ / t			<2	<2	<2
Titratable Sulfidic Acidity (23H)		2	mole H+ / t			<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S			<0.02	<0.02	<0.02
sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S			<0.02	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S			<0.02	<0.02	<0.02
EA029-C: Sulfur Trail								
KCI Extractable Sulfur (23Ce)		0.02	% S			<0.02	<0.02	<0.02
Peroxide Sulfur (23De)		0.02	% S			<0.02	<0.02	<0.02
Peroxide Oxidisable Sulfur (23E)		0.02	% S			<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur		10	mole H+ / t			<10	<10	<10
(a-23E)								
EA029-D: Calcium Values								
KCI Extractable Calcium (23Vh)		0.02	% Ca			0.19	0.24	0.64
Peroxide Calcium (23Wh)		0.02	% Ca			0.24	0.31	0.70
Acid Reacted Calcium (23X)		0.02	% Ca			0.05	0.06	0.06
acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t			24	33	32
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S			0.04	0.05	0.05
EA029-E: Magnesium Values								
KCI Extractable Magnesium (23Sm)		0.02	% Mg			0.12	0.10	0.24
Peroxide Magnesium (23Tm)		0.02	% Mg			0.14	0.12	0.26
Acid Reacted Magnesium (23U)		0.02	% Mg			<0.02	0.02	0.02
Acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t			15	17	17
sulfidic - Acid Reacted Magnesium (s-23U)		0.02	% S			0.02	0.03	0.03
EA029-F: Excess Acid Neutralising Capa	city							
Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3			0.39	0.35	
acidity - Excess Acid Neutralising		10	mole H+ / t			77	70	
Capacity (a-23Q)								
sulfidic - Excess Acid Neutralising		0.02	% S			0.12	0.11	
Capacity (s-23Q)								
EA029-H: Acid Base Accounting								
ANC Fineness Factor		0.5	-			1.5	1.5	1.5



Sub-Matrix: SOIL		Cli	ent sample ID	TP132 0.0-0.25m	TP138 0.0-0.25m	TP159 0.0-0.6m	TP160 0.0-0.5m	TP163 0.0-0.9m
	Cl	ient sampli	ing date / time	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]	[13-NOV-2007]
Compound	CAS Number	LOR	Unit	EB0713257-026	EB0713257-027	EB0713257-028	EB0713257-029	EB0713257-030
EA029-H: Acid Base Accounting - Continu	ued							
Net Acidity (sulfur units)		0.02	% S			<0.02	<0.02	<0.02
Net Acidity (acidity units)		10	mole H+ / t			<10	<10	12
Liming Rate		1	kg CaCO3/t			<1	<1	<1
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit	4.7	5.8			
Titratable Actual Acidity (23F)		2	mole H+ / t	24	9			
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.04	<0.02			
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.02	% S	<0.02	<0.02			
acidity - Chromium Reducible Sulfur		10	mole H+ / t	<10	<10			
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5	1.5			
Net Acidity (sulfur units)		0.02	% S	0.04	<0.02			
Net Acidity (acidity units)		10	mole H+ / t	24	<10			
Liming Rate		1	kg CaCO3/t	2	<1			



Sub-Matrix: SOIL		Clie	ent sample ID	TP220 0.0-0.4m	TP220 2.0-3.0m	 	
	Clie	ent sampli	ng date / time	[13-NOV-2007]	[13-NOV-2007]	 	
Compound	CAS Number	LOR	Unit	EB0713257-031	EB0713257-032	 	
EA029-A: pH Measurements	Child Humber						
pH KCI (23A)		0.1	pH Unit		6.1	 	
pH OX (23B)		0.1	pH Unit		6.9	 	
EA029-B: Acidity Trail			P				
Titratable Actual Acidity (23F)		2	mole H+ / t		2	 	
Titratable Peroxide Acidity (23G)		2	mole H+ / t		<2	 	
Titratable Sulfidic Acidity (238)		2	mole H+ / t		<2	 	
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S		<0.02	 	
sulfidic - Titratable Peroxide Acidity		0.02	% pyrite S		<0.02	 	
(s-23G)			, e p je e				
sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S		<0.02	 	
EA029-C: Sulfur Trail			1,5				
KCI Extractable Sulfur (23Ce)		0.02	% S		<0.02	 	
Peroxide Sulfur (23De)		0.02	% S		<0.02	 	
Peroxide Oxidisable Sulfur (23E)		0.02	% S		<0.02	 	
acidity - Peroxide Oxidisable Sulfur		10	mole H+ / t		<10	 	
(a-23E)							
EA029-D: Calcium Values							
KCI Extractable Calcium (23Vh)		0.02	% Ca		0.16	 	
Peroxide Calcium (23Wh)		0.02	% Ca		0.16	 	
Acid Reacted Calcium (23X)		0.02	% Ca		<0.02	 	
acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t		<10	 	
sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S		<0.02	 	
EA029-E: Magnesium Values							
KCI Extractable Magnesium (23Sm)		0.02	% Mg		0.26	 	
Peroxide Magnesium (23Tm)		0.02	% Mg		0.29	 	
Acid Reacted Magnesium (23U)		0.02	% Mg		0.03	 	
Acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t		22	 	
sulfidic - Acid Reacted Magnesium		0.02	% S		0.04	 	
(s-23U)							
EA029-F: Excess Acid Neutralising Capaci	ity						
Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3		0.14	 	
acidity - Excess Acid Neutralising		10	mole H+ / t		28	 	
Capacity (a-23Q)							
sulfidic - Excess Acid Neutralising		0.02	% S		0.04	 	
Capacity (s-23Q)							
EA029-H: Acid Base Accounting							
ANC Fineness Factor		0.5	-		1.5	 	
						1	



Sub-Matrix: SOIL		Clie	ent sample ID	TP220 0.0-0.4m	TP220 2.0-3.0m	 	
	Cli	ent sampli	ng date / time	[13-NOV-2007]	[13-NOV-2007]	 	
Compound	CAS Number	LOR	Unit	EB0713257-031	EB0713257-032	 	
EA029-H: Acid Base Accounting - Continu	ed						
Net Acidity (sulfur units)		0.02	% S		<0.02	 	
Net Acidity (acidity units)		10	mole H+ / t		<10	 	
Liming Rate		1	kg CaCO3/t		<1	 	
EA033-A: Actual Acidity							
pH KCI (23A)		0.1	pH Unit	6.4		 	
Titratable Actual Acidity (23F)		2	mole H+ / t	<2		 	
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02		 	
EA033-B: Potential Acidity							
Chromium Reducible Sulfur (22B)		0.02	% S	<0.02		 	
acidity - Chromium Reducible Sulfur		10	mole H+ / t	<10		 	
(a-22B)							
EA033-E: Acid Base Accounting							
ANC Fineness Factor		0.5	-	1.5		 	
Net Acidity (sulfur units)		0.02	% S	<0.02		 	
Net Acidity (acidity units)		10	mole H+ / t	<10		 	
Liming Rate		1	kg CaCO3/t	<1		 	

Environmental Division



QUALITY CONTROL REPORT

Work Order	: EB0713257	Page	: 1 of 8
Client		Laboratory	: Environmental Division Brisbane
Contact	: MS SILVANA SANTOMARTINO	Contact	: Tim Kilmister
Address	: P O BOX 1734 MILTON QLD AUSTRALIA 4064	Address	: 32 Shand Street Stafford QLD Australia 4053
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Telephone	: +61 07 3721 5400	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 3721 5401	Facsimile	: +61-7-3243 7218
Project	: 077633062 GLADSTONE-FITZROY PIPELINE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: GLADSTONE-FITZROY PIPELINE		
C-O-C number	:	Date Samples Received	: 13-NOV-2007
Sampler	: DEPT MAIN ROADS	Issue Date	: 15-NOV-2007
Order number	:		
		No. of samples received	: 32
Quote number	: EN/002/05	No. of samples analysed	: 32

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA	NATA Accredited Laboratory 825 This document is issued in	Signatories This document has been electronically carried out in compliance with procedures spe		licated below. Electronic signing has been			
INAIA	accordance with NATA	Signatories	Position	Accreditation Category			
accreditation requirements.		Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics			
WORLD RECOGNISED	Accredited for compliance with ISO/IEC 17025.						

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been preformed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

 Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

 CAS Number = Chemistry Abstract Services number

 LOR = Limit of reporting

 RPD = Relative Percentage Difference

= Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:-No Limit; Result between 10 and 20 times LOR:-0% - 50%; Result > 20 times LOR:-0% - 20%.

Sub-Matrix: SOIL						Laboratory	Duplicate (DUP) Report	t	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%
A029-A: pH Measu	rements (QC Lot: 53365	54)							
EB0713257-001	TP69 1.5m	EA029: pH KCI (23A)		0.1	pH Unit	4.6	4.6	0.0	0% - 20%
		EA029: pH OX (23B)		0.1	pH Unit	4.7	4.6	2.2	0% - 20%
EB0713257-018	TP112 2.25-2.5m	EA029: pH KCI (23A)		0.1	pH Unit	5.6	5.6	0.0	0% - 20%
		EA029: pH OX (23B)		0.1	pH Unit	6.0	6.0	0.0	0% - 20%
A029-B: Acidity Tr	ail (QC Lot: 533654)								
EB0713257-001	TP69 1.5m	EA029: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.04	0.04	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity		0.02	% pyrite S	0.05	0.05	0.0	No Limit
		(s-23G)							
		EA029: sulfidic - Titratable Sulfidic Acidity		0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		(s-23H)		0	mala Llu / A	26	07	4.0	00/ 500/
		EA029: Titratable Actual Acidity (23F)		2	mole H+ / t		27	4.9	0% - 50%
		EA029: Titratable Peroxide Acidity (23G)		2	mole H+ / t	31	31	0.0	0% - 50%
		EA029: Titratable Sulfidic Acidity (23H)		2	mole H+ / t	5	4	28.6	No Limit
EB0713257-018 TP112 2.25-2.5m	EA029: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	0.0	No Limit	
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: Titratable Actual Acidity (23F)		2	mole H+ / t	9	8	15.4	No Limit
		EA029: Titratable Peroxide Acidity (23G)		2	mole H+ / t	5	2	66.7	No Limit
		EA029: Titratable Sulfidic Acidity (23H)		2	mole H+ / t	<2	<2	0.0	No Limit
A029-C: Sulfur Tra	il (QC Lot: 533654)								
EB0713257-001	TP69 1.5m	EA029: KCI Extractable Sulfur (23Ce)		0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Peroxide Sulfur (23De)		0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Peroxide Oxidisable Sulfur (23E)		0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)		10	mole H+ / t	<10	<10	0.0	No Limit
B0713257-018	TP112 2.25-2.5m	EA029: KCI Extractable Sulfur (23Ce)		0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Peroxide Sulfur (23De)		0.02	% S	0.02	0.02	0.0	No Limit
		EA029: Peroxide Oxidisable Sulfur (23E)		0.02	% S	0.02	0.02	0.0	No Limit
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)		10	mole H+ / t	13	14	0.0	No Limit

Page	: 4 of 8
Work Order	: EB0713257

Client : GOLDER ASSOCIATES

Project : 077633062 GLADSTONE-FITZROY PIPELINE



Sub-Matrix: SOIL					Laboratory Duplicate (DUP) Report									
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)					
EA029-D: Calcium V	/alues (QC Lot: 533654)													
EB0713257-001	TP69 1.5m	EA029: KCI Extractable Calcium (23Vh)		0.02	% Ca	0.07	0.07	0.0	No Limit					
		EA029: Peroxide Calcium (23Wh)		0.02	% Ca	0.07	0.07	0.0	No Limit					
		EA029: Acid Reacted Calcium (23X)		0.02	% Ca	<0.02	<0.02	0.0	No Limit					
		EA029: sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	<0.02	<0.02	0.0	No Limit					
		EA029: acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	<10	<10	0.0	No Limit					
EB0713257-018	TP112 2.25-2.5m	EA029: KCI Extractable Calcium (23Vh)		0.02	% Ca	0.11	0.11	0.0	No Limit					
		EA029: Peroxide Calcium (23Wh)		0.02	% Ca	0.11	0.12	0.0	No Limit					
		EA029: Acid Reacted Calcium (23X)		0.02	% Ca	<0.02	<0.02	0.0	No Limit					
		EA029: sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	<0.02	<0.02	0.0	No Limit					
		EA029: acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	<10	<10	0.0	No Limit					
EA029-E: Magnesiu	m Values (QC Lot: 53365	4)												
EB0713257-001	TP69 1.5m	EA029: KCI Extractable Magnesium (23Sm)		0.02	% Mg	0.16	0.16	0.0	No Limit					
		EA029: Peroxide Magnesium (23Tm)		0.02	% Mg	0.16	0.18	7.1	No Limit					
		EA029: Acid Reacted Magnesium (23U)		0.02	% Mg	<0.02	<0.02	0.0	No Limit					
		EA029: sulfidic - Acid Reacted Magnesium		0.02	% S	<0.02	<0.02	0.0	No Limit					
		(s-23U) EA029: Acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	<10	11	10.7	No Limit					
EB0713257-018	TP112 2.25-2.5m	EA029: KCI Extractable Magnesium (23Sm)		0.02	% Mg	0.26	0.26	0.0	0% - 50%					
		EA029: Peroxide Magnesium (23Tm)		0.02	% Mg	0.29	0.30	4.1	0% - 50%					
		EA029: Acid Reacted Magnesium (23U)		0.02	% Mg	0.02	0.04	42.9	No Limit					
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)		0.02	% S	0.03	0.05	42.9	No Limit					
		EA029: Acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	20	31	42.9	No Limit					
EA033-A: Actual Aci	idity (QC Lot: 533655)													
EB0713257-004	TP72 0.0-0.2m	EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.03	0.03	0.0	No Limit					
		EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	20	18	13.3	No Limit					
		EA033: pH KCI (23A)		0.1	pH Unit	5.3	5.4	1.9	0% - 20%					
EB0713257-025	TP131 0.0-0.25m	EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.02	0.02	0.0	No Limit					
		EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	13	14	9.5	No Limit					
		EA033: pH KCI (23A)		0.1	pH Unit	5.6	5.5	1.8	0% - 20%					
A033-B: Potential	Acidity (QC Lot: 533655)													
EB0713257-004	TP72 0.0-0.2m	EA033: Chromium Reducible Sulfur (22B)		0.02	% S	<0.02	<0.02	0.0	No Limit					
		EA033: acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	<10	<10	0.0	No Limit					
EB0713257-025	TP131 0.0-0.25m	EA033: Chromium Reducible Sulfur (22B)		0.02	% S	<0.02	<0.02	0.0	No Limit					

Page Work Order Client Project	5 of 8 EB0713257 GOLDER ASSOCIATES 077633062 GLADSTONE	-FITZROY PIPELINE							(ALS)
Sub-Matrix: SOIL			Γ			Laboratory D	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA033-B: Potential	Acidity (QC Lot: 533655) -	continued							
EB0713257-025	TP131 0.0-0.25m	EA033: acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	<10	<10	0.0	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL			Method Blank (MB) Rep	port	Laboratory Control Spike (LCS) Report							
					Spike	Spike Recovery (%)	Recovery	Limits (%)				
d: Compound CAS Numbe		LOR	Unit	Result	Concentration	LCS	Low	High				
EA029-B: Acidity Trail (QCLot: 533654)												
EA029: Titratable Actual Acidity (23F)		2	mole H+ / t	<2								
EA029: Titratable Peroxide Acidity (23G)		2	mole H+ / t	<2								
EA029: Titratable Sulfidic Acidity (23H)		2	mole H+ / t	<2								
EA029: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02								
EA029: sulfidic - Titratable Peroxide Acidity (s-23G)		0.02	% pyrite S	<0.02								
EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)		0.02	% pyrite S	<0.02								
EA029-C: Sulfur Trail (QCLot: 533654)												
EA029: KCI Extractable Sulfur (23Ce)		0.02	% S	<0.02								
EA029: Peroxide Sulfur (23De)		0.02	% S	<0.02								
EA029: Peroxide Oxidisable Sulfur (23E)		0.02	% S	<0.02								
EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)		10	mole H+ / t	<10								
EA029-D: Calcium Values (QCLot: 533654)												
EA029: KCI Extractable Calcium (23Vh)		0.02	% Ca	<0.02								
EA029: Peroxide Calcium (23Wh)		0.02	% Ca	<0.02								
EA029: Acid Reacted Calcium (23X)		0.02	% Ca	<0.02								
EA029: acidity - Acid Reacted Calcium (a-23X)		10	mole H+ / t	<10								
EA029: sulfidic - Acid Reacted Calcium (s-23X)		0.02	% S	<0.02								
EA029-E: Magnesium Values (QCLot: 533654)												
EA029: KCI Extractable Magnesium (23Sm)		0.02	% Mg	<0.02								
EA029: Peroxide Magnesium (23Tm)		0.02	% Mg	<0.02								
EA029: Acid Reacted Magnesium (23U)		0.02	% Mg	<0.02								
EA029: Acidity - Acid Reacted Magnesium (a-23U)		10	mole H+ / t	<10								
EA029: sulfidic - Acid Reacted Magnesium (s-23U)		0.02	% S	<0.02								
A029-F: Excess Acid Neutralising Capacity (QCLot: 5	33654)											
EA029: Excess Acid Neutralising Capacity (23Q)		0.02	% CaCO3	<0.02								
EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)		10	mole H+ / t	<10								
EA029: sulfidic - Excess Acid Neutralising Capacity		0.02	% S	<0.02								
(s-23Q)												
EA029-G: Retained Acidity (QCLot: 533654)												
EA029: Net Acid Soluble Sulfur (20Je)		0.02	% S	<0.02								
EA029: acidity - Net Acid Soluble Sulfur (a-20J)		10	mole H+ / t	<10								
EA029: sulfidic - Net Acid Soluble Sulfur (s-20J)		0.02	% pyrite S	<0.02								
· · · ·		0.02	% S	<0.02								

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Work Order	: EB0713257
Client	: GOLDER ASSOCIATES
Project	: 077633062 GLADSTONE-FITZROY PIPELINE



Sub-Matrix: SOIL		Method Blank (MB) Rep	port	Laboratory Control Spike (LCS) Report							
					Spike	Spike Recovery (%)	Recovery	Limits (%)			
Method: Compound	CAS Number	AS Number LOR Unit Result		Concentration	LCS	Low	High				
EA033-A: Actual Acidity (QCLot: 533655) - continued											
EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2							
EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02							
EA033-B: Potential Acidity (QCLot: 533655)											
EA033: Chromium Reducible Sulfur (22B)		0.02	% S	<0.02							
EA033: acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	<10							



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

• No Matrix Spike (MS) Results are required to be reported.

SAMPLE CHAIN OF CUSTODY DOCUMENTATION - SOIL

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THIS FORM IS TO BE SIGNED BY GOLDER STAFF; COURIER/S; LABORATORY ON RECEIPT OF SAMPLES.

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