

Appendices

Appendix A Bore logs (2019 drilling program)



BOREHOLE LOG

MONITORING WELL PB01

ENVIRONMENTAL-GROUNDWATER

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Client FI Joint Venture Pty Ltd Project Yogi – Environmental Approvals Project No. 6137117 Site Yogi Magnetite Mine Location Date Drilled 18/03/2019 - 20/03/2019	Drill Co. Welldrill Driller Sam Rig Type Fraste 400, Rig 4 Drill Method WB 12.25 inch Total Depth (m) 78.00 Diameter (mm) 320	Easting, Northing 486988, 6867409 Grid Ref GDA94_MGA_zone_50 Elevation 340 Collar RL 340 Logged By AP Checked By DB
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Casing 200 mm Class 18 PVC (0-70m) **Screen** 1mm slots (52-70m) **Surface Completion** Lockable steel, concrete plinth

Depth (m)	Drilling Method	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	COMMENTS/ ENVIRONMENTAL CONDITIONS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
5	WB 12.25"		Drill cuttings Depth: 0 - 10m		SAND, fine grained, cream to light brown, minor calcrete, dry		335
10			Slow release bentonite pellets Depth: 10 - 15m		Silty SAND, fine grained, with cemented sands/calcrete, brown, dry.		330
15					Silty SAND / Clayey SAND, as above, increasing fine content, silt and clay to 20%, moist.		325
20					CALCRETE, well cemented calcrete and clay, grey to brown, calcrete is mottled dark red to white, iron stained. clay very stiff.		320
25					Silty SAND, fine grained, light brown, with significant cream calcrete, moist		315
30					CALCETE / FERRICRETE, well cemented, fine grained sands, dark brown, iron cementing, mottled grey to cream, with significant cream calcrete and clay, wet.		310
35					Silty SAND, fine grained sand, cream to light brown, minor clay and cemented sands/calcrete, wet	Minor flow (slop) at 36m. Flow to 0.2 L/s at 42m, EC 10,100µS.	305
40							300
45			Gravel pack: 3.2-6.4 mm. Depth: 15 - 74m		Silty SAND, As above, increasing sand content, minor clay at 55-60m, gravel rich at 61m.	Flow increasing from 59m to >1L/s.	295
50							290
55							285
60							280
65					SAND, medium to fine grained, sub angular, light grey, quartz dominant	Increasing flow.	275
70							270
75			Drill cuttings Depth: 74 - 78m		Sandy CLAY, light grey, with 20-50% fine to medium sands, occasionally cemented, lithic texture increasing.	Drop in flow from 68m.	265
80					GRANITE, coarse grained, cream to white, porphyritic, indistinct, highly weathered	Final air lift of 1.2 L/s. EC 14,900µS/m, pH 7.7 - Target depth achieved (78m) - terminated in fresh rock.	260
85					Termination Depth at: 78.00 m		255

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

MONITORING WELL MB_AC04

ENVIRONMENTAL-GROUNDWATER

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Client FI Joint Venture Pty Ltd Project Yogi – Environmental Approvals Project No. 6137117 Site Yogi Magnetite Mine Location Date Drilled 26/03/2019 - 26/03/2019	Drill Co. Welldrill Driller Sam Rig Type Fraste 400, Rig 4 Drill Method AH 7 inch Total Depth (m) 78.00 Diameter (mm) 180	Easting, Northing 486983, 6867438 Grid Ref GDA94_MGA_zone_50 Elevation 340 Collar RL 340 Logged By DB Checked By DB
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Casing 50 mm Class 12 PVC (0-73m)	Screen 1mm slots (55-73m)	Surface Completion Lockable steel, concrete plinth
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Depth (m)	Drilling Method	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	COMMENTS/ ENVIRONMENTAL CONDITIONS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
5	AH 7"		Drill cuttings Depth: 0 - 10m		SAND, fine grained, cream to light brown, minor calcrete, dry		335
10			Slow release bentonite pellets Depth: 10 - 15m		Silty SAND, fine grained, with cemented sands/calcrete, brown, dry.		330
15					Silty SAND / Clayey SAND, as above, increasing fine content, silt and clay to 20%, moist.		325
20					CALCRETE, well cemented calcrete and clay, grey to brown, calcrete is mottled dark red to white, iron stained. clay very stiff.		320
25					Silty SAND, fine grained, light brown, with significant cream calcrete, moist		315
30					CALCETE / FERRICRETE, well cemented, fine grained sands, dark brown, iron cementing, mottled grey to cream, with significant cream calcrete and clay, wet.		310
35					Silty SAND, fine grained sand, cream to light brown, minor clay and cemented sands/calcrete, wet	Minor flow (slop) at 36m. Flow to 0.2 L/s at 42m, EC 10,100µS/m.	305
40			Gravel pack: 3.2-6.4 mm. Depth: 15 - 73m				300
45					Silty SAND, As above, increasing sand content, minor clay at 55-60m, gravel rich at 61m.	Flow increasing from 59m to >1L/s.	295
50							290
55							285
60							280
65					SAND, medium to fine grained, sub angular, light grey, quartz dominant	Increasing flow.	275
70							270
75			Drill cuttings Depth: 73 - 78m		Sandy CLAY, light grey, with 20-50% fine to medium sands, occasionally cemented, lithic texture increasing.	Drop in flow from 68m.	265
80					GRANITE, coarse grained, cream to white, porphyritic, indistinct, highly weathered Termination Depth at: 78.00 m	Final air lift of 1.2 L/s. EC 14900, pH 7.7. - Target depth achieved (78m) - monitoring bore.	260

Notes

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Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

MONITORING WELL PB02

ENVIRONMENTAL-GROUNDWATER

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Client FI Joint Venture Pty Ltd Project Yogi – Environmental Approvals Project No. 6137117 Site Yogi Magnetite Mine Location Date Drilled 23/03/2019 - 25/03/2019	Drill Co. Welldrill Driller Sam Rig Type Fraste 400, Rig 4 Drill Method WB 12.25 inch Total Depth (m) 62.00 Diameter (mm) 320	Easting, Northing 485597, 6864634 Grid Ref GDA94_MGA_zone_50 Elevation 332 Collar RL 332 Logged By DB Checked By DB
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Casing 200 mm Class 18 PVC (0-52m)			Screen 1mm slots (34-52m)		Surface Completion Lockable steel, concrete plinth		
Depth (m)	Drilling Method	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	COMMENTS/ ENVIRONMENTAL CONDITIONS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
5	WB 12.25"				SAND / Silty SAND, fine grained, brown, with minor gravel and silt, cemented calcrete, moist.		330
10					SAND / Silty SAND, as above, increase in cemented sands.		325
15							320
20					CALCRETE / SANDSTONE, fine grained, cream to brown, cemented, minor clay, increasing with depth.	Minor flow at 24m, EC 6,000µS/m.	315
25					Silty SAND / SANDSTONE, fine grained, with silt, grey to cream, cemented		310
30					Silty SAND , as above, sand increasing, medium coarse, light brown	Flow increase at 30m.	305
35			Gravel pack: 3.2-6.4 mm. Depth: 15 - 55m		Sandy CLAY, grey firm clay, with up to 40% fine to medium sands, yellow to brown, sandy at 34 and 36m.	Flow at 35m, EC 6,080µS/m.	300
40					Sandy CLAY, as above, decrease in sands. brown to dark brown, grey with depth.		295
45							290
50							285
55					280		
60			Drill cuttings Depth: 55 - 62m		CLAY, light brown to yellow clay, brown to grey and firm 56-60m.	End of hole due to hard clays. Final air lift of 1.5 L/s, EC 6,080µS/m, pH 7.4. - Target depth achieved (60m) - reduction in groundwater flow.	275
65					Termination Depth at: 62.00 m		270
							265

Notes

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Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense	Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

MONITORING WELL MB_AC09

ENVIRONMENTAL-GROUNDWATER

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Client FI Joint Venture Pty Ltd Project Yogi – Environmental Approvals Project No. 6137117 Site Yogi Magnetite Mine Location Date Drilled 22/03/2019 - 23/03/2019				Drill Co. Welldrill Driller Sam Rig Type Fraste 400, Rig 4 Drill Method AH 7 inch Total Depth (m) 60.00 Diameter (mm) 180		Easting, Northing 485586, 6864636 Grid Ref GDA94_MGA_zone_50 Elevation 332 Collar RL 332 Logged By AP & DB Checked By DB	
Casing 50 mm Class 12 PVC (0-52m)				Screen 1mm slots (34-52m)		Surface Completion Lockable steel, concrete plinth	
Depth (m)	Drilling Method	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	COMMENTS/ ENVIRONMENTAL CONDITIONS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
5	AH 7"		Drill cuttings Depth: 0 - 10m		SAND / Silty SAND, fine grained, brown, with minor gravel and silt, cemented calcrete, moist.		330
10			Slow release bentonite pellets Depth: 10 - 15m		SAND / Silty SAND, as above, increase in cemented sands.		325
15					CALCRETE / SANDSTONE, fine grained, cream to brown, cemented, minor clay, increasing with depth.	Minor flow at 24m, EC 6,000µS/m.	320
20					SAND / Silty SAND, as above, increase in cemented sands.		315
25					SAND / Silty SAND, as above, increase in cemented sands.		310
30					SAND / Silty SAND, as above, increase in cemented sands.		305
35			Gravel pack: 3.2-6.4 mm. Depth: 15 - 52m		SAND / Silty SAND, as above, increase in cemented sands.		300
40					SAND / Silty SAND, as above, increase in cemented sands.		295
45					SAND / Silty SAND, as above, increase in cemented sands.		290
50					SAND / Silty SAND, as above, increase in cemented sands.		285
55			Drill cuttings Depth: 52 - 60m		CLAY, light brown to yellow clay, brown to grey and firm 56-60m.	Final air lift of 1.5 L/s, EC 6,080µS/m, pH 7.4. - Target depth achieved (60m) - monitoring bore.	280
60					Termination Depth at: 60.00 m		275
							270
Notes This log is not intended for geotechnical purposes.							
Drilling Abbreviations AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler				Moisture Abbreviations D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated		Consistency Abbreviations Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard	



BOREHOLE LOG

MONITORING WELL PB03

ENVIRONMENTAL-GROUNDWATER

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Client FI Joint Venture Pty Ltd	Drill Co. Welldrill	Easting, Northing 480615, 6877088
Project Yogi – Environmental Approvals	Driller Rah	Grid Ref GDA94_MGA_zone_50
Project No. 6137117	Rig Type Fraste 400, Rig 4	Elevation 364
Site Yogi Magnetite Mine	Drill Method AH 12.25 inch	Collar RL 364
Location	Total Depth (m) 174.00	Logged By DB
Date Drilled 04/03/2019 - 16/03/2019	Diameter (mm) 320	Checked By DB

Casing 200 mm Class 18 PVC (0-64m) **Screen** 1mm slots (34-64m) **Surface Completion** Lockable steel, concrete plinth

Depth (m)	Drilling Method	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	COMMENTS/ ENVIRONMENTAL CONDITIONS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)			
10	AH 12.25"				TOPSOIL, very fine, poorly sorted, red		360			
REGOLITH, gravel sized, well rounded to sub rounded, dark brown, extremely weathered parent material, trace clay, dark green, plastic						350				
BIF/GOETHITE, highly weathered, medium strength, non-magnetic, blue/grey.						340				
REGOLITH, gravel sized, well rounded to sub rounded, dark brown, extremely weathered parent material, trace clay, dark green, plastic					Flow 4L/s, EC 1,330µS/m, pH 7.74.	340				
REGOLITH/BIF, highly weathered, medium strength, blue/grey, minor amphibolite?					Increased flow 15 L/s, Ec 1,366µS/m, pH 7.93.	330				
AMPHIBOLITE, porphyritic, highly weathered, medium strength, black, drilled as large clasts, minor green mineral clasts present					Same yield as above.	320				
AMPHIBOLITE/BIF, as above, highly fractured, non-magnetic					Minor fracture 50m increase flow to 20L/s.	310				
BIF, Fresh, extremely high strength, blue/grey, minor fracture at 50m					Same yield as above.	300				
BIF/QUARTZ VEIN, as above, with trace translucent quartz, coarse, sub rounded, quartz banding 92-94m						290				
						280				
						270				
BIF/QUARTZ VEIN, as above, with pyrite deposition on schist, highly weathered, low strength, black, Schist 98-100m					Same yield as above.	260				
BIF/CHERT, extremely high strength, fresh, blue grey, strongly magnetic (94-134m)						250				
						240				
FLOURITE/MUSCOVITE, purple, moderately weathered to fresh, very high strength, flourite, purple, with muscovite as translucent sheets, fractured, increased water flow					Fracture zone increased flow to 25L/s, EC 1,371µS/m, pH 8.16.	230				
BIF, transition from above flourite back to BIF, fresh, extremely high strength, strongly magnetic, blue/grey					25L/s.	220				
BIF, extremely high strength, fresh, blue grey, interbedded with chert/quartz, beds 0.1-0.5mm, occasional green crystals, porphyritic.					25L/s, very slow drilling - Target depth achieved (174m) - depth of pit.	210				
						200				
						190				
Termination Depth at: 174.00 m										

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense	Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

MONITORING WELL MB03

ENVIRONMENTAL-GROUNDWATER

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Client FI Joint Venture Pty Ltd	Drill Co. Welldrill	Easting, Northing 480621.912, 6877097
Project Yogi – Environmental Approvals	Driller Sam	Grid Ref GDA94_MGA_zone_50
Project No. 6137117	Rig Type Fraste 400, Rig 4	Elevation 364
Site Yogi Magnetite Mine	Drill Method AH 7 inch	Collar RL 364
Location	Total Depth (m) 70.00	Logged By AP
Date Drilled 16/03/2019 - 17/03/2019	Diameter (mm) 180	Checked By DB

Casing 50 mm Class 12 PVC (0-70m)	Screen 1mm slots (40-70m)	Surface Completion Lockable steel, concrete plinth
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Depth (m)	Drilling Method	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	COMMENTS/ ENVIRONMENTAL CONDITIONS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
5	AH 7"		Drill cuttings Depth: 0 - 15m		TOPSOIL, very fine, poorly sorted, red		360
10					REGOLITH, gravel sized, well rounded to sub rounded, dark brown, relic BIF derived, trace dark green clay	Regolith, extremely weathered.	355
15			Slow release bentonite pellets Depth: 15 - 20m		BIF/GOETHITE, highly weathered, medium strength, non-magnetic, blue/grey.		350
20					REGOLITH, gravel sized, well rounded to sub rounded, dark brown, relic BIF derived, trace dark green clay		345
25					REGOLITH/BIF, highly weathered, medium strength, blue/grey, minor amphibolite? porphyritic	Flow 4L/s.	340
30					AMPHIBOLITE, porphyritic, highly weathered, medium strength, black, drilled as large clasts, minor green mineral clasts present	Increased flow to 15L/s.	335
35					AMPHIBOLITE/BIF, as above, highly fractured, non-magnetic	Same yield as above.	330
40							325
45			Gravel pack: 3.2-6.4 mm. Depth: 20 - 70m		BIF, extremely high strength, fresh, blue/grey, minor fracture at 50m.	Minor fracture @ 50m increase flow to 20L/s. EC 1440µS/m, pH 7.67 - Target depth achieved (70m) - monitoring bore.	320
50							315
55							310
60							305
65							300
70					Termination Depth at: 70.00 m		295
							290

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

MONITORING WELL MB01

ENVIRONMENTAL-GROUNDWATER

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Client FI Joint Venture Pty Ltd Project Yogi – Environmental Approvals Project No. 6137117 Site Yogi Magnetite Mine Location Date Drilled 08/03/2019 - 12/03/2019				Drill Co. Welldrill Driller Sam Rig Type Fraste 400, Rig 4 Drill Method AH 7 inch Total Depth (m) 228.00 Diameter (mm) 180		Easting, Northing 479556, 6878274 Grid Ref GDA94_MGA_zone_50 Elevation 374 Collar RL 374 Logged By DB Checked By DB	
Casing 50 mm Class 12 PVC (0-226.6m)				Screen 1mm slots (166.6-226.6m)		Surface Completion Lockable steel, concrete plinth	
Depth (m)	Drilling Method	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	COMMENTS/ ENVIRONMENTAL CONDITIONS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
10	AH 7"		<div>Drill cuttings Depth: 0 - 15m</div> <div>Slow release bentonite pellets Depth: 15 - 20m</div> <div>Gravel pack: 3.2-6.4 mm. Depth: 20 - 226m</div> <div>Drill cuttings Depth: 226 - 228m</div>		TOPSOIL, very fine to fine, very soft, red, poorly sorted, high silt and clay content	Surface casing to 6m.	370
20					FELSIC VOLCANICS?, highly weathered to extremely weathered, medium strength, grey brown, Amorphous, drilled as 3-6mm, sub rounded chips,	Clay zone.	360
30					FELSIC VOLCANICS?, as above, drilled as larger 10-20mm, sub rounded chips.	Saprolitic clay zone.	350
40					BIF/HAEMATITE, grey, slightly weathered, medium strength, weakly magnetic		340
50					CLAY, green/brown, plastic, saprolite	Water strike at 48m, first Wet sample at 50m.	330
60					SAPROLITE CLAY, as above, high clay and silt content, minimal sand, some rock fragments from above, moist due to addition of water	Flow 0.1-0.2L/s.	320
70					BIF, highly weathered, medium strength, strongly magnetic, grey/blue, drilled as fine powder		310
80					BIF, as above, with trace felsic and green waxy? rock	Same yield as above.	300
90					AMPHIBOLITE/BIF, coarse grained, white phenocrysts (plagioclase?), non-magnetic, very high strength, fresh, grey/black, minor felsic intrusives from above	Flow @ 210m 1L/s. EC 1,674µS/m, pH 8.01.	290
100					FELSIC VOLCANICS?, very high strength, slightly weathered to fresh, brown, non-magnetic	Minor EC increase (146-150m) - Target depth achieved (228m) - depth of pit.	280
110					AMPHIBOLITE, very high strength, fresh, non-magnetic, grey/black, with minor pyrite deposition on trace schist, foliated, highly weathered, black		270
120							260
130							250
140							240
150							230
160							220
170							210
180							200
190							190
200							180
210							170
220							160
230							150
Termination Depth at: 228.00 m							140
Notes This log is not intended for geotechnical purposes.							
Drilling Abbreviations AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler				Moisture Abbreviations D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated		Consistency Abbreviations Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard	



BOREHOLE LOG

MONITORING WELL MB02

ENVIRONMENTAL-GROUNDWATER

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Client FI Joint Venture Pty Ltd Project Yogi – Environmental Approvals Project No. 6137117 Site Yogi Magnetite Mine Location Date Drilled 02/03/2019 - 04/03/2019				Drill Co. Welldrill Driller Sam Rig Type Fraste 400, Rig 4 Drill Method AH 7 inch Total Depth (m) 170.00 Diameter (mm) 180		Easting, Northing 480117, 6877732 Grid Ref GDA94_MGA_zone_50 Elevation 376 Collar RL 376 Logged By DB Checked By DB	
Casing 50 mm Class 12 PVC (0-169.5m)				Screen 1mm slots (109.5-169.5m)		Surface Completion Lockable steel, concrete plinth	
Depth (m)	Drilling Method	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	COMMENTS/ ENVIRONMENTAL CONDITIONS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
10	AH 7"				TOPSOIL, very fine, sub rounded, poorly sorted, red, with gravel sized BIF fragments, extremely weathered	No water in sample.	370
20					BIF/REGOLITH, extremely weathered, medium strength, regolith with BIF fragments, brown, trace silt and clay		360
30					BIF/REGOLITH, extremely weathered, medium strength, green/brown regolith with BIF fragments, trace silt and clay		350
40					BIF, slightly weathered, very high strength, grey/blue, drilled as small 1-4mm sub angular chips	Water strike.	340
50					BIF, as above, magnetic		330
60					BIF, very high strength, fresh, variably magnetic, blue/grey	1L/s (possible fracture). Flow 1L/s.	320
70					BIF/QUARTZ VEIN, very high strength, fresh, blue/grey, minor quartz veins and pyrite deposits, with trace possibly felsic volcanic rocks, light brown, non-magnetic, some evidence of weathering		310
80					BIF, variably magnetic, extremely high strength, fresh, blue/grey		300
90					BIF, as above with higher quartz content	Flow 1L/s - Target depth achieved (170m) - depth of pit.	290
100					BIF, very high strength, fresh, blue/grey, trace soft green mineral, sub rounded, some platy and elongated, .3-.5mm		280
110					BIF/FELSIC VOLCANICS, extremely high strength, fresh, blue/grey, trace felsic volcanics, light brown, sub rounded chips		270
120					BIF, extremely high strength, fresh, variably magnetic, blue/grey		260
130							250
140							240
150							230
160							220
170							
Notes This log is not intended for geotechnical purposes.							
Drilling Abbreviations AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler				Moisture Abbreviations D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated		Consistency Abbreviations Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard	



BOREHOLE LOG

MONITORING WELL PB04

ENVIRONMENTAL-GROUNDWATER

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Client FI Joint Venture Pty Ltd Project Yogi – Environmental Approvals Project No. 6137117 Site Yogi Magnetite Mine Location Date Drilled 27/03/2019 - 28/03/2019				Drill Co. Welldrill Driller Sam Rig Type Fraste 400, Rig 4 Drill Method AH 12.25 inch Total Depth (m) 100.00 Diameter (mm) 320		Easting, Northing 481040, 6876439 Grid Ref GDA94_MGA_zone_50 Elevation 361 Collar RL 343 Logged By DB Checked By DB	
Casing 200 mm Class 18 PVC (0-47m)				Screen 1mm slots (23-47m)		Surface Completion Lockable steel, concrete plinth	
Depth (m)	Drilling Method	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	COMMENTS/ ENVIRONMENTAL CONDITIONS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
5	AH 12.25"				SILTY GRAVEL, very fine to very coarse, sub rounded, brown/red, relic BIF/Regolith, dry	Water strike at 44m. Flow approx 1 L/s. EC 2.86mS, pH 7.90.	360
10					GRAVELLEY SILT, with coarse sand, some grey clay, poorly sorted, sub rounded, red, slightly moist		355
15					GRAVEL, coarse to very coarse gravel, sub rounded, minor silt and clay, red, slightly moist		350
20					GRAVELLEY SILT, some coarse sand, poorly sorted, sub rounded, red, trace clay, grey, slightly moist		345
25					GRAVELLEY CLAY, poorly sorted, sub rounded to sub angular, dark red, minor clay, green/grey, moist		340
30					SANDY GRAVEL, medium sand to coarse gravel, rounded to sub rounded, red and grey, trace clay		335
35					SILTY, GRAVELLEY CLAY, coarse gravel, poorly sorted, sub rounded gravel at 38m, red, moist		330
40					GRAVEL, fine to coarse, silt and clay, moderatley sorted, sub rounded to rounded, red, grey, black, wet		325
45					GRAVELLEY SILT, pale red, fine to very coarse gravel, pale red, Trace sand, poorly sorted, rounded to sub rounded, wet		320
50					AH 7"		
55			310				
60			305				
65			300				
70			295				
75			290				
80			285				
85			280				
90			275				
95			270				
100					AMPHIBOLITE, very high strength, fresh, non magentic, black.	Flow approx 12 L/s. EC 1832µS/m, pH 8.23. - Target depth achieved (100m) - terminated in fresh rock.	265
105					Termination Depth at: 100.00 m		260
							255
Notes This log is not intended for geotechnical purposes.							
Drilling Abbreviations AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler				Moisture Abbreviations D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated		Consistency Abbreviations Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard	



BOREHOLE LOG

MONITORING WELL MB04

ENVIRONMENTAL-GROUNDWATER

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Client FI Joint Venture Pty Ltd Project Yogi – Environmental Approvals Project No. 6137117 Site Yogi Magnetite Mine Location Date Drilled 02/04/2019 - 03/04/2019				Drill Co. Welldrill Driller Sam Rig Type Fraste 400, Rig 4 Drill Method AH 7 inch Total Depth (m) 54.00 Diameter (mm) 180		Easting, Northing 480976, 6876431 Grid Ref GDA94_MGA_zone_50 Elevation 361 Collar RL 361 Logged By AP Checked By DB	
Casing 50 mm Class 12 PVC (0-44m)				Screen 1mm slots (32-44m)		Surface Completion Lockable steel, concrete plinth	
Depth (m)	Drilling Method	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	COMMENTS/ ENVIRONMENTAL CONDITIONS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
5	AH 7"				SILTY GRAVEL, poorly sorted, sub rounded, brown/red, Dry		360
10					GRAVELLEY SILT, poorly sorted, sub rounded, red, trace coarse sand and grey clay, moist		355
15					GRAVEL, coarse to very coarse gravel, sub rounded, red, with minor silt and clay, slightly moist		350
20					GRAVELLEY SILT, poorly sorted, sub rounded, red, some coarse sand and grey clay, slightly moist		345
25					GRAVELLEY CLAY, poorly sorted gravel, sub rounded to sub angular, dark red, with minor grey and green clay, moist		340
30					SANDY GRAVEL, medium grained sand to coarse grained gravel, rounded to sub rounded, red/grey, trace clay.	Increased clay content at 28m.	335
35					SILTY, GRAVELLEY CLAY, coarse sand to coarse gravel, poorly sorted, sub rounded gravel at 38m, red, moist		330
40					GRAVEL, fine to coarse, sub rounded to rounded, moderatley sorted, red/grey/black, trace silt and clay, wet		320
45					GRAVELLEY SILT, fine to very coarse gravel, poorly sorted, rounded to sub rounded, pale red, trace sand, wet		315
50					SILTY GRAVEL, fine to very coarse gravel with pebbles/cobbles, 2-8cm size, cream/grey/red, poorly sorted, sub-rounded, wet	Flow 5L/s. Ec 1920µS/m, pH 7.45 - Target depth achieved (54m) - monitoring bore.	310
55					Termination Depth at: 54.00 m		305
Notes This log is not intended for geotechnical purposes.							
Drilling Abbreviations AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler				Moisture Abbreviations D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated		Consistency Abbreviations Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard	



BOREHOLE LOG

MONITORING WELL EH01

ENVIRONMENTAL-GROUNDWATER

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Client FI Joint Venture Pty Ltd Project Yogi – Environmental Approvals Project No. 6137117 Site Yogi Magnetite Mine Location Date Drilled 29/03/2019 - 29/03/2019			Drill Co. Welldrill Driller Sam Rig Type Fraste 400, Rig 4 Drill Method AH 7 inch Total Depth (m) 78.00 Diameter (mm) 180			Easting, Northing 480962, 6877164 Grid Ref GDA94_MGA_zone_50 Elevation 361 Collar RL 361 Logged By DB Checked By DB		
Casing 50 mm Class 12 PVC (0-23m)			Screen 1mm slots (5-23m)			Surface Completion Steel riser		
Depth (m)	Drilling Method	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	COMMENTS/ ENVIRONMENTAL CONDITIONS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)	
5	AH 7"		 Drill cuttings Depth: 0 - 23m		REGOLITH, extremely weathered to highly weathered haematite, poorly sorted, medium to gravel sized, red/orange, dry		360	
10					REGOLITH, as above, moisture increasing, colour darkening, soil content increasing, relic haematite, extremely weathered to highly weathered		355	
15					REGOLITH, relic haematite, variably magnetic, 1-5mm, sub rounded to rounded chips, trace silt and clay		350	
20					GRAVEL, as above, grading into gravel, sub rounded to rounded haematite, medium strength, with trace brown silt and clay		345	
25					GRAVEL, as above, colour change to brick red, with silt and clay		340	
30					GRAVEL, as above, colour change to dark brown, with silt and clay		335	
35					GRAVEL, as above, with clay, white, plastic		330	
40					GRAVEL, haematite gravel, variably magentic, fine to coarse, sub rounded, wet		325	
45							320	
50							315	
55							310	
60							305	
65							300	
70							295	
75							290	
						285		
					Termination Depth at: 78.00 m			
Notes This log is not intended for geotechnical purposes.								
Drilling Abbreviations AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler				Moisture Abbreviations D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated		Consistency Abbreviations Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard		



BOREHOLE LOG

MONITORING WELL EH02

ENVIRONMENTAL-GROUNDWATER

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Client FI Joint Venture Pty Ltd Project Yogi – Environmental Approvals Project No. 6137117 Site Yogi Magnetite Mine Location Date Drilled 29/03/2019 - 29/03/2019			Drill Co. Welldrill Driller Sam Rig Type Fraste 400, Rig 4 Drill Method AH 7 inch Total Depth (m) 80.00 Diameter (mm) 180			Easting, Northing 481037, 6877321 Grid Ref GDA94_MGA_zone_50 Elevation 359 Collar RL 359 Logged By DB Checked By DB		
Casing 50 mm Class 12 PVC (0-64.5m)			Screen 1mm slots (46.5-64.5m)			Surface Completion Steel riser		
Depth (m)	Drilling Method	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	COMMENTS/ ENVIRONMENTAL CONDITIONS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)	
5	AH 7"				GRAVEL, brown/orange, very fine to very coarse, with silt and clay, with angular, elongated fragments, cemented, dry		355	
10					GRAVEL, as above, colour change to red/brown, dry		350	
15					SILTY GRAVEL, highly weathered to extremely weathered, haematite derived gravel, variably magnetic, medium strength, with silt and clay, coarseness increasing with depth, quartz band at 20-22m, dry		345	
20							340	
25					CLAYEY GRAVEL, highly weathered to extremely weathered, haematite derived gravel, variably magnetic, medium strength, clay bands at 32-34m, red plastic, moist	First saturated samples @ 44m.	335	
30							330	
35							325	
40							320	
45					CLAYEY GRAVEL, as above, with increased clay content, red, plastic clay	Flow @ 54m 1.5 L/s, Ec 2.08mS, pH 7.91.	315	
50							310	
55					CLAYEY GRAVEL, as above, with calcrete layers, white, moderately cemented, sub angular to sub rounded chips, moderately sorted cuttings		305	
60							300	
65							295	
70					CLAYEY GRAVEL, As above, with yellow clay bands from 68-72m flow 3.5L/s. EC 2.08mS, pH 7.9	Flow 3.5 L/s, Ec 2.24mS, 8.04 - Target depth achieved (80m) - terminated in fresh rock.	290	
75							285	
80					MAFIC Schist, phaneritic, fresh to slightly weathered, very high strength, green		280	
					Termination Depth at: 80.00 m		275	
Notes This log is not intended for geotechnical purposes.								
Drilling Abbreviations AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler				Moisture Abbreviations D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated		Consistency Abbreviations Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard		



BOREHOLE LOG

MONITORING WELL EH03

ENVIRONMENTAL-GROUNDWATER

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Client FI Joint Venture Pty Ltd Project Yogi – Environmental Approvals Project No. 6137117 Site Yogi Magnetite Mine Location Date Drilled 29/03/2019 - 29/03/2019				Drill Co. Welldrill Driller Sam Rig Type Fraste 400, Rig 4 Drill Method AH 7 inch Total Depth (m) 40.00 Diameter (mm) 180		Easting, Northing 481826, 6875419 Grid Ref GDA94_MGA_zone_50 Elevation 344 Collar RL 344 Logged By DB Checked By DB					
Casing 50 mm Class 12 PVC (0-38m)				Screen 1mm slots (20-38m)		Surface Completion Steel riser					
Depth (m)	Drilling Method	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	COMMENTS/ ENVIRONMENTAL CONDITIONS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)				
2	AH 7"				REGOLITH, highly weathered, red/orange, haematite parent rock		342				
4					MAFIC SCHIST, moderately weathered, medium strength, foliated, non magnetic, grey, drilled as small elongated chips, trace pyrite deposition at 12m, hard drilling		340				
6							338				
8							336				
10							334				
12							332				
14							330				
16							328				
18							326				
20							324				
22							322				
24							320				
26					MAFIC SCHIST, as above, silt/clay transition zone, green	Water strike at 28m ~ 0.3L/s. EC 1114µS/m, pH 8.9.	318				
28							316				
30					MAGNETITE BIF, very high strength, strongly magnetic from to 34m, moderately to weakly magnetic 34 to 40m, fresh, black.	0.3L/s - Target depth (40m) - terminated in fresh rock.	314				
32							312				
34							310				
36							308				
38							306				
40							304				
					Termination Depth at: 40.00 m						
Notes											
This log is not intended for geotechnical purposes.											
Drilling Abbreviations				Moisture Abbreviations		Consistency Abbreviations					
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler				D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated		Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard					



BOREHOLE LOG

MONITORING WELL EH04

ENVIRONMENTAL-GROUNDWATER

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Client FI Joint Venture Pty Ltd Project Yogi – Environmental Approvals Project No. 6137117 Site Yogi Magnetite Mine Location Date Drilled 28/03/2019 - 28/03/2019	Drill Co. Welldrill Driller Sam Rig Type Fraste 400, Rig 4 Drill Method AH 7 inch Total Depth (m) 44.00 Diameter (mm) 180	Easting, Northing 482155, 6875472 Grid Ref GDA94_MGA_zone_50 Elevation 343 Collar RL Logged By DB Checked By DB
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Casing			Screen		Surface Completion Flush, no headworks			
Depth (m)	Drilling Method	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	COMMENTS/ ENVIRONMENTAL CONDITIONS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)	
2	AH 7"				GRAVEL/ALLUVIUM , sub rounded to sub angular, very fine to gravel, poorly sorted, with trace silt, orange	5L/s from 28m, 2.02mS, pH 8.24.	342	
4					Water strike @ 28m.		340	
6							GRAVEL/ALLUVIUM , as above, colour change to red	338
8					MAFIC SCHIST, porphyritic, foliated, slightly weathered, high strength, black/green, with translucent quartz, minor red (metasedimentary?) water strike at 28m		6L/s at 40m - Target depth (44m) - terminated in fresh rock.	336
10								334
12								332
14								330
16								328
18								326
20								324
22								322
24								320
26								318
28								316
30								314
32								312
34								310
36								308
38					306			
40					304			
42					MAFIC SCHIST, as above but Fresh		6L/s at 40m - Target depth (44m) - terminated in fresh rock.	302
44								300
Termination Depth at: 44.00 m								

Notes This log is not intended for geotechnical purposes.			
Drilling Abbreviations AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler		Moisture Abbreviations D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Consistency Abbreviations Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

Air-core drilling

SOIL BORE AC01

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Client FI Joint Venture Pty Ltd	Drill Co. Ranger	Easting 488360
Project Surface Water Assessment	Driller Brian	Northing 6867459
Project No. 6137117	Rig Type Austex350, Rig 15	Grid Ref GDA94_MGA_zone_50
Site Yogi Magnetite Mine	Total Depth (m) 61.00	Elevation 317
Location	Diameter (mm) 100	Logged By AO
Date Drilled 03/03/2019 - 03/03/2019		Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
5						Silty SAND. Brown to light brown, fine grained. Minor iron stained calcrete cement. Slightly moist 1-3m.				315
10										310
15										305
20						Sandy SILT. Light brown to cream, silt to fine grained sand. Minor calcrete. Trace coarse grained sand, sub angular, quartz. Dry.			Seepage at 24m.	300
25										295
30						Silty SAND. Light brown, fine grained sand. With up to 40% medium to coarse sand/gravel, quartz and cemented calcrete, sub angular. Moist to saturated.				290
35										285
40						Sandy SILT. Light brown, as above, increase in fines, possible minor clay/silt to 30%.			Seepage at 36m.	280
45										275
50						Sandy CLAY. Light brown to cream, clay content increasing from above. Significant cemented calcrete, very fine grained. Moist to saturated.				270
55										265
60						Sandy SILT. Light brown, silt with sand and minor clay. Dry.				260
						Silty CLAY. Brown to orange brown mottled clay. With and gravel to 3 mm to 5%, quartz and dark brown fine grained lithic fragments. Stiff with depth.			End of hole - clay, possible weathered basement. Bit getting blocked. Final air lift 0.3 to 0.4 L/s, pH 7.7, EC OR.	255
						Termination Depth at:61.00 m				255

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

SOIL BORE AC02

Air-core drilling

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Client FI Joint Venture Pty Ltd	Drill Co. Ranger	Easting 488307
Project Surface Water Assessment	Driller Brian	Northing 6869973
Project No. 6137117	Rig Type Austex350, Rig 15	Grid Ref GDA94_MGA_zone_50
Site Yogi Magnetite Mine	Total Depth (m) 66.00	Elevation 326
Location	Diameter (mm) 100	Logged By AO
Date Drilled 03/03/2019 - 04/03/2019		Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
5						Silty SAND. Light brown, fine grained. Minor calcrete/cemented sands, increasing with depth. Moist 10-12m.				325
10										320
15						Silty SAND/CALCRETE. Light brown to cream, fine grained. Calcrete generally poorly cemented. Drilling method - hard to determine calcrete proportion.				315
20										310
25						SILT. Cream to light brown silt to fine sand. Minor calcrete/cementing. Moist.				305
30						Silty SAND. Light brown to cream, fine grained. Minor medium grained, quartz and calcrete cemented sands. Moist.				300
35										295
40										290
45						Sandy SILT/CLAY. Cream to grey plastic clay. Clay content increasing with depth. With up to 10% quartz sand/minor gravel, sun angular. Wet.				285
50						CLAY. Grey firm clay. Stiffer with depth, minor fabric/extremely weathered granite. Quartz sands and gravel to 5-10%. Moist.			End of hole at 66m, increasingly stiff clay. Bit getting clogged. Flows reducing.	280
55										275
60										270
65										265
						Termination Depth at: 66.00 m				260

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

Air-core drilling

SOIL BORE AC03

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Client FI Joint Venture Pty Ltd	Drill Co. Ranger	Easting 488306
Project Surface Water Assessment	Driller Brian	Northing 6872219
Project No. 6137117	Rig Type Austex350, Rig 15	Grid Ref GDA94_MGA_zone_50
Site Yogi Magnetite Mine	Total Depth (m) 36.00	Elevation 340
Location	Diameter (mm) 100	Logged By AO
Date Drilled 04/03/2019 - 04/03/2019		Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
2						SAND/Silty SAND. Brown to light brown medium sands. Minor calcrete. Iron cemented sands, trace quartz gravel. Moist 2-3m.				338
4										336
6										334
8										332
10										330
12										328
14						Silty SAND/CALCRETE. Light brown, occasionally cream. Calcrete generally poorly cemented.				326
16										324
18										322
20										320
22						Silty SAND/CALCRETE. As above. More iron cemented.			Seepage at 24m. EC 3700 US in slop.	318
24										316
26										314
28										312
30						Silty SAND . Orange to light brown fine grained sand and silt. Some cemented calcrete, iron mottled to white.				310
32						Sandy SILT. Pale brown to cream. With minor coarse quartz gravel, sub angular.				308
34										306
36						GRANITE. Possible extremely weathered granite. Coarse grained. Very hard.			Seepage only at 36 end air lift. End of hole due to refusal on basement.	304
38						Termination Depth at:36.00 m				302

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

































BOREHOLE LOG

SOIL BORE AC04

Air-core drilling

Page 1 of 1

Client FI Joint Venture Pty Ltd Project Surface Water Assessment Project No. 6137117 Site Yogi Magnetite Mine Location Date Drilled 04/03/2019 - 04/03/2019				Drill Co. Ranger Driller Brian Rig Type Austex350, Rig 15 Total Depth (m) 78.00 Diameter (mm) 100				Easting 486992 Northing 6867434 Grid Ref GDA94_MGA_zone_50 Elevation 314 Logged By AO Checked By			
Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)	
5				IV		SAND. Cream to light brown fine grained sand. Minor calcrete. Dry				310	
					Silty SAND. Brown fine grained sand and silt. With cemented sands/calcrete. Dry.	305					
10					Silty SAND / Clayey SAND. As above, increase in fines. Silt and clay to 20%. Moist.	300					
					CALCRETE. Well cemented calcrete and clay, grey to brown (possibly from drilling). Calcrete is mottled dark red to white, iron stained. Clay very stiff.	295					
15					Silty SAND. Light brown fine grained sand. With significant cream calcrete. Moist	290					
					CALCETE / FERRICRETE. Dark brown well cemented fine grained sands. Iron cementing. Mottled grey to cream. With significant cream calcrete and clay. Wet.	285					
20						280					
					Silty SAND. Cream to light brown fine grained sand. Minor clay and cemented sands/calcrete. Wet.	275					
25						270					
						265					
30					260						
					255						
35					250						
					245						
40					240						
					235						
45											
											
50											
											
55											
											
60											
											
65											
											
70											
											
75											
											



BOREHOLE LOG

Air-core drilling

SOIL BORE AC05

Page 1 of 1

Client FI Joint Venture Pty Ltd	Drill Co. Ranger	Easting 489148
Project Surface Water Assessment	Driller Brian	Northing 6865772
Project No. 6137117	Rig Type Austex350, Rig 15	Grid Ref GDA94_MGA_zone_50
Site Yogi Magnetite Mine	Total Depth (m) 32.00	Elevation 320
Location	Diameter (mm) 100	Logged By AO
Date Drilled 05/03/2019 - 05/03/2019		Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
2						Silty SAND. Light brown fine grained sand. With minor calcrete, grey, weakly cemented. Dry.				318
4						Silty SAND. As above, brown. Moist.				316
6										314
8										312
10										310
12										308
14										306
16										304
18						Silty SAND / CALCRETE. As above, light brown. Increase in calcrete / cemented sands. Weakly cemented. Moist.			Seepage at 22m.	302
20										300
22										298
24						Sandy CLAY / CALCRETE. Grey clay. With up to 40% medium sands, partly cemented to well cemented.				296
26										294
28										292
30										290
32						Sandy CLAY / CALCRETE. As above, becoming more cemented, iron stained.			Minor flow at 31m. EC of 12400uS.	288
34						GRANITE. Extremely weathered, iron stained granite, coarse grained. Very hard. Termination Depth at:32.00 m			Final airlift of 0.2 L/s, EC 16800uS, pH 7.4.	286

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

SOIL BORE AC06

Air-core drilling

Page 1 of 1

Client FI Joint Venture Pty Ltd	Drill Co. Ranger	Easting 488653
Project Surface Water Assessment	Driller Brian	Northing 6865226
Project No. 6137117	Rig Type Austex350, Rig 15	Grid Ref GDA94_MGA_zone_50
Site Yogi Magnetite Mine	Total Depth (m) 60.00	Elevation 314
Location	Diameter (mm) 100	Logged By AO
Date Drilled 05/03/2019 - 05/03/2019		Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
5						SAND. Brown fine grained sand. Dry.				310
10						Silty SAND. As above. With minor cemented sands / calcrete. Moist.				305
15						Silty SAND / CALCRETE. Light brown to grey fine to medium sand, partly cemented. With minor clay, mottled white/grey.				300
20										295
25						CLAY / CALCRETE. Grey clay, stiff, partly cemented. With significant sand, medium to coarse, quartz and calcrete.			Water seepage at 23m.	290
30						Silty SAND. light grey fine grained sand and silt. Possibly weakly cemented.				285
35						CLAY / SANDSTONE. Iron stained cemented sands. With up to 50% silt and clay.				280
40						Sandy SILT / SILT. Alternating bands of cream to yellow/grey silt and fine grained sands. Up to 20% clay. Partly cemented. Occasional angular quartz gravel.			Water flow increase at 45m.	275
45										270
50										265
55						Silty CLAY. As above. Increase in fines / clay. Cream to yellow. Brown from 58m.				260
60						GRANITE. Extremely weathered, iron stained granite, coarse grained. Very hard.			End of hole at 60m. Final air lift of 0.3 L/s. EC >20,000uS. pH 7.4.	255
						Termination Depth at:60.00 m				250

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Push tube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

Air-core drilling

SOIL BORE AC07

Page 1 of 1

Client FI Joint Venture Pty Ltd	Drill Co. Ranger	Easting 486607
Project Surface Water Assessment	Driller Brian	Northing 6864804
Project No. 6137117	Rig Type Austex350, Rig 15	Grid Ref GDA94_MGA_zone_50
Site Yogi Magnetite Mine	Total Depth (m) 36.00	Elevation 306
Location	Diameter (mm) 100	Logged By AO
Date Drilled 05/03/2019 - 05/03/2019		Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
2						Gravelly SAND. Brown medium to fine sand. With calcrete / gravel, angular. Moist from 6m.				304
4										302
6										300
8										298
10										296
12										294
14						Silty SAND / CALCRETE. Pale brown to grey silty sand. With significant (up to 40%) cemented sands. Including dark brown fine grained cemented. Up to 30% medium to coarse gravel and cemented calcrete.				292
16										290
18						CALCRETE / SANDSTONE. As above. Cemented sands. Grey to pink, more cemented (possibly iron cemented). Wet.			Seepage at 24m.	288
20										286
22										284
24						Sandy CLAY . Brown medium grained sands. With up to 40% clays and cemented sands/silt.			Flow increasing at 29m. Seepage at 30m, slop EC 8600uS.	282
26										280
28										278
30										276
32										274
34									End of hole at 60m. Final air lift of 0.4 L/s. Large volume of sand in airlift. EC12600uS. pH 7.4.	272
36						GRANITE. Extremely weathered, iron stained granite, coarse grained. Very hard.				270
38						Termination Depth at:36.00 m				268

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

Air-core drilling

SOIL BORE AC08

Page 1 of 1

Client FI Joint Venture Pty Ltd	Drill Co. Ranger	Easting 487603
Project Surface Water Assessment	Driller Brian	Northing 6867443
Project No. 6137117	Rig Type Austex350, Rig 15	Grid Ref GDA94_MGA_zone_50
Site Yogi Magnetite Mine	Total Depth (m) 62.00	Elevation 317
Location	Diameter (mm) 100	Logged By AO
Date Drilled 06/03/2019 - 06/03/2019		Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
5						Silty SAND. Brown fine grained sand. With significant cemented sands / calcrete. Grey with depth. Moist.				315
10						Silty SAND. Light brown fine grained sand. With silty and clay/cemented calcrete. Moist				310
15										305
20						Silty SAND /CALCRETE. light brown fine sands / silt and iron cemented sands. More cemented from 18-20m, generally poorly cemented.			Seepage at 24m.	300
25						Silty SAND. Light brown to yellow, fine grained sand. Silty in parts. Bands of well cemented sand/iron cemented. Sands at 25, 28, 37-38 and 46m. Clay/fines increasing at 48-49m.			Minor flow at 48 m, EC 15,700uS.	295
30										290
35										285
40										280
45										275
50										270
55						Clayey SILT. Light brown to yellow silt and fine grained sand. Increasing clays.				265
60						Sandy SILT. Light brown to orange brown silt.				260
						Silty SAND. Light brown fine grained sand. Minor clay.			End of hole at 62m. Final air lift of 0.3 L/s. Large volume of sand in airlift. EC18300uS. pH 7.8.	255
						GRANITE. Extremely weathered, iron stained granite, coarse grained. Very hard.				

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

Air-core drilling

SOIL BORE AC09

Page 1 of 1

Client FI Joint Venture Pty Ltd	Drill Co. Ranger	Easting 485598
Project Surface Water Assessment	Driller Brian	Northing 6864635
Project No. 6137117	Rig Type Austex350, Rig 15	Grid Ref GDA94_MGA_zone_50
Site Yogi Magnetite Mine	Total Depth (m) 60.00	Elevation 313
Location	Diameter (mm) 100	Logged By AO
Date Drilled 06/03/2019 - 06/03/2019		Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
5						SAND / Silty SAND. Brown fine grained sand. With minor gravel and silt, cemented calcrete. Moist.				310
10						SAND / Silty SAND. As above. Increase in cemented sands.				305
15										300
20						CALCRETE / SANDSTONE. Cream to brown cemented fine grained sands. Minor clay, increasing with depth.			Minor flow at 24m, EC 6000uS.	295
25						Silty SAND / SANDSTONE. Grey to cream cemented fine grained sands. With silt.				290
30						Silty SAND . As above. Sand increasing. Light brown, medium coarse.			Flow increase at 30m.	285
35						Sandy CLAY. Grey firm clay. With up to 40% fine to medium sands, yellow to brown. Sandy at 34 and 36m.			Flow at 35m, EC 6080uS.	280
40										275
45						Sandy CLAY. As above, decrease in sands. Brown to dark brown, grey with depth.				270
50										265
55						CLAY. Light brown to yellow clay. Brown to grey and firm 56-60m.			End of hole due to hard clays. Final air lift of 1.5 L/s, EC 6080uS, pH 7.4.	260
60						Termination Depth at:60.00 m				255
										250

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

SOIL BORE AC10

Air-core drilling

Page 1 of 1

Client FI Joint Venture Pty Ltd	Drill Co. Ranger	Easting 485981
Project Surface Water Assessment	Driller Brian	Northing 6864732
Project No. 6137117	Rig Type Austex350, Rig 15	Grid Ref GDA94_MGA_zone_50
Site Yogi Magnetite Mine	Total Depth (m) 59.00	Elevation 313
Location	Diameter (mm) 100	Logged By AO
Date Drilled 06/03/2019 - 07/03/2019		Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
5						SAND. Light brown, fine grained sand. Dry.				310
10						SAND. Light brown, fine grained sand. Moist.				305
15						Silty SAND. Dark brown, moderately cemented fine grained sands. Moist.				300
20						Silty SAND. Brown, fine grained sands. Trace cemented sands / calcrete. Moist.				295
25						Sandy SILT / CALCRETE. Grey partly cemented silts and minor sand.			Minor flow at 24m.	290
30						Silty SAND. Grey fine grained sand and silt. Partly cemented. Minor clays.				285
35						Sandy CLAY / Clayey SAND. Brown clay and sands. Sand 10-50%, medium to coarse. With grey stuff clays.				280
40						Clayey SAND. Brown fine grained sand. With clay 10-50%.				275
45						CLAY. Light brown to cream clay. Occasionally stiff. Brown and firmer with depth. Partly silty.			Flow at 42 m, EC 5740.	270
50										265
55										260
60						CLAY. Grey stiff clay. Darker and firmer than above.			End of hole at 60m. Final air lift of 0.6 L/s. Large volume of sand in airlift.	255
						GRANITE. Extremely weathered granite, coarse grained. Very hard.			EC6490uS. pH 7.6.	250
						Termination Depth at: 59.00 m				

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

produced by ESlog.ESdat.net on 12 Mar 2019

Appendix B Chip tray photography (2019 drilling program)

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E	479,556
N	6,878,274

[illegible]

E	480,117
N	6,877,732

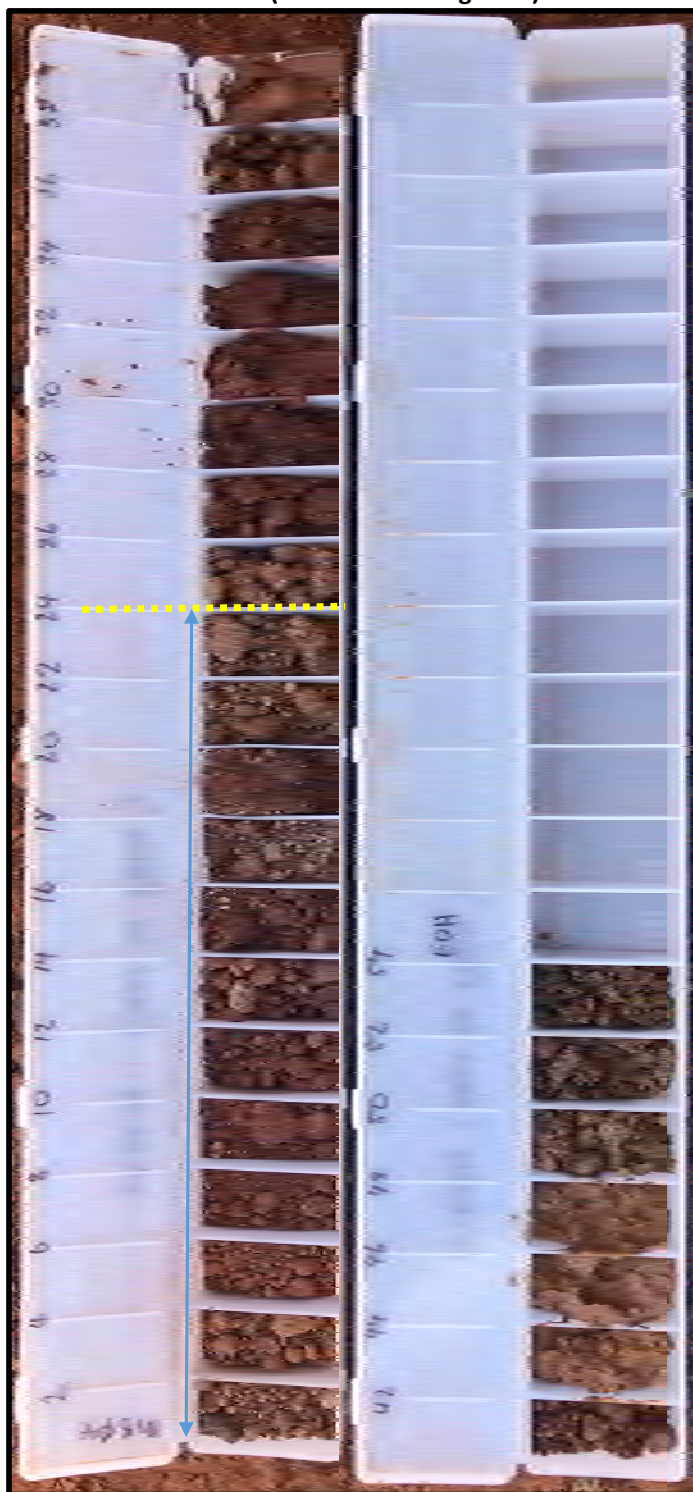
MB03 (Pit) - 174m



E	480,613
N	6,877,095

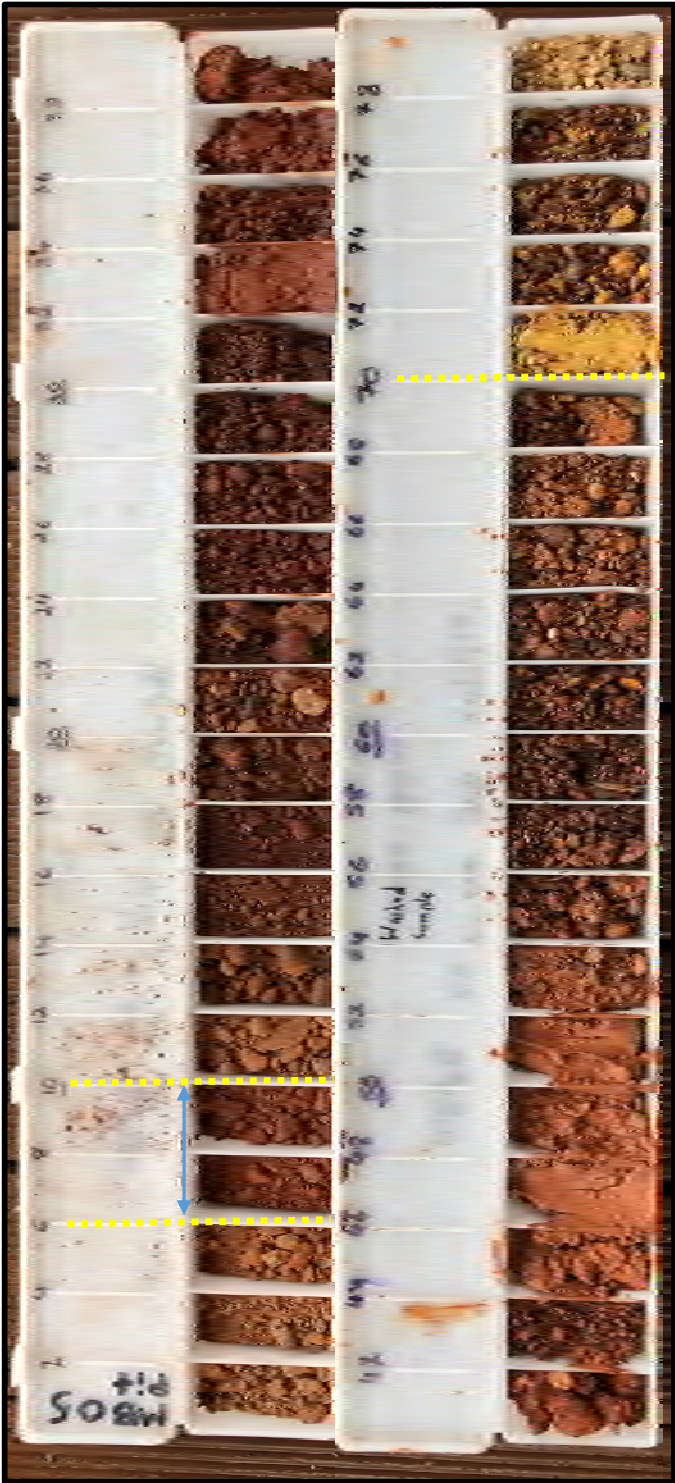
E	480,962
N	6,877,164

MB04 (PB04 Monitoring Bore) - 54m



E	480,976
N	6,876,431

MB05 (Exploratory Hole - NE Pit) - 78m



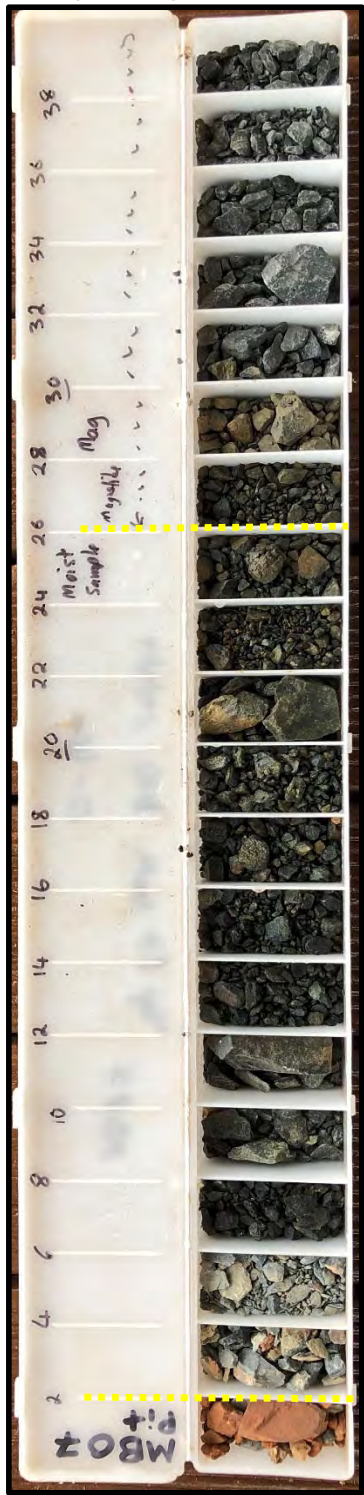
E	481,033
N	6,877,316

MB06 (Exploratory Hole - South Pit) - 100m



E	481,040
N	6,876,439

MB07 (Exploratory Hole - SE Pit) - 40m



E	481,827
N	6,875,415

The image displays three sediment sample trays used for stratigraphic analysis. Each tray is divided into multiple compartments, each containing a different sediment sample.

Left Tray:

- Compartment 8: Labeled "Mg".
- Compartment 6: Labeled "Mag".
- Compartment 4: Labeled "Mag".
- Compartment 10: Labeled "gray color black matrix".
- Compartment 12: Labeled "clayey".
- Compartment 18: Labeled "Washed sample.". Below this label, there are handwritten notes: "brown", "yellow", and "black".
- Compartment 20: Labeled "water stable!".
- Compartment 28: Labeled "water stable!".
- Compartment 30: Labeled "water stable!".

Middle Tray:

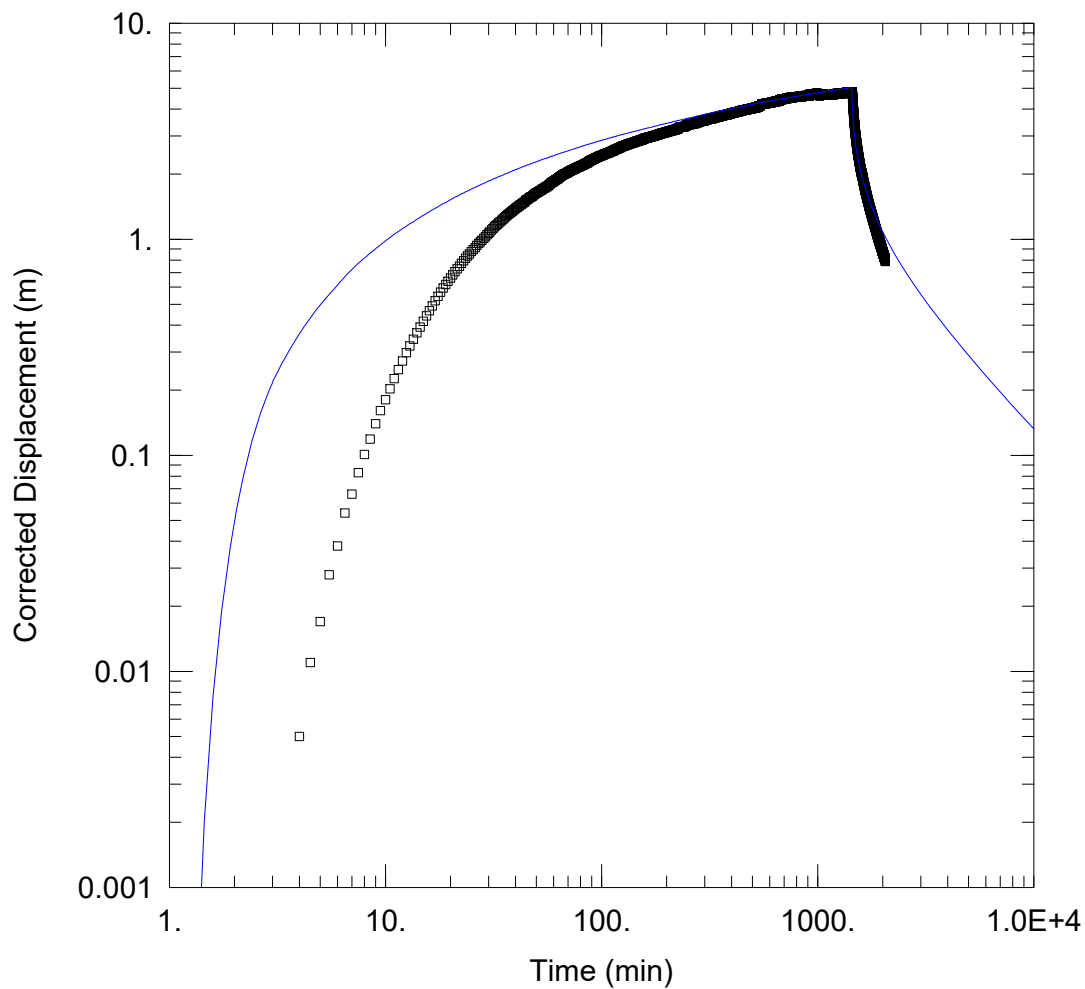
- Section 47: Contains samples ranging from coarse reddish-brown pebbles to very fine dark material.
- Section 44mm: Labeled "EOH" and "T.D.", containing very fine dark material.

Right Tray:

- This tray shows a continuous sequence of sediment samples, starting from coarse pebbles at the bottom and transitioning through various grain sizes to fine dark material at the top.

E	482,155
N	6,875,472

Appendix C Aquifer testing evaluation – Aqtesolve outputs



PB01 CRT

Data Set: \...\PB01 20190503 Theis Uncon.aqt

Date: 05/03/19

Time: 08:42:54

PROJECT INFORMATION

Company: GHD

Client: FIJV

Project: 6137117

Test Well: PB01

Test Date: 1/4/2019

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
PB01	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ PB01 MB	36	0

SOLUTION

Aquifer Model: Unconfined

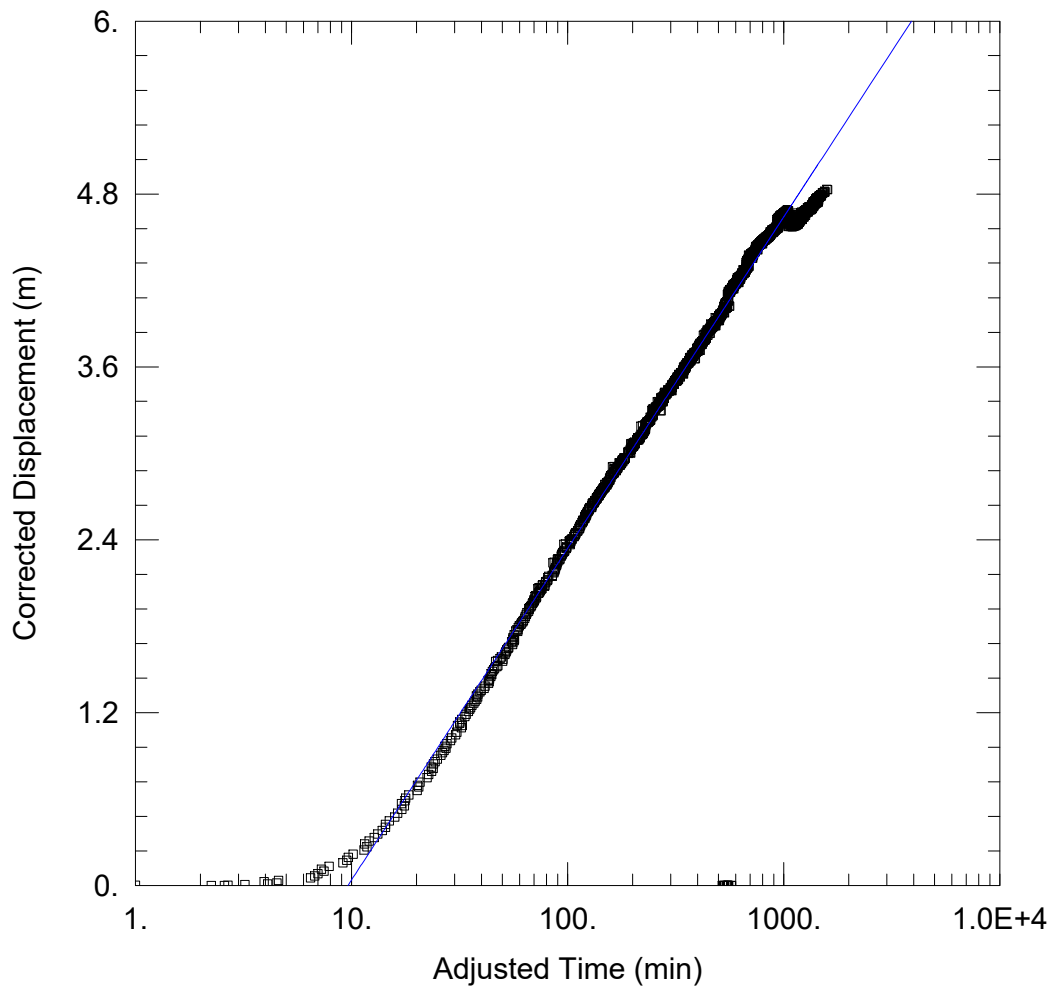
Solution Method: Theis

T = 23.6 m²/day

S = 0.0001053

Kz/Kr = 1.

b = 57. m



PB01 CRT

Data Set: \...\PB01 20190503 Copper Jacob Uncon.aqt

Date: 05/03/19

Time: 08:50:32

PROJECT INFORMATION

Company: GHD

Client: FIJV

Project: 6137117

Test Well: PB01

Test Date: 1/4/2019

AQUIFER DATA

Saturated Thickness: 57. m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
PB01	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ PB01 MB	36	0

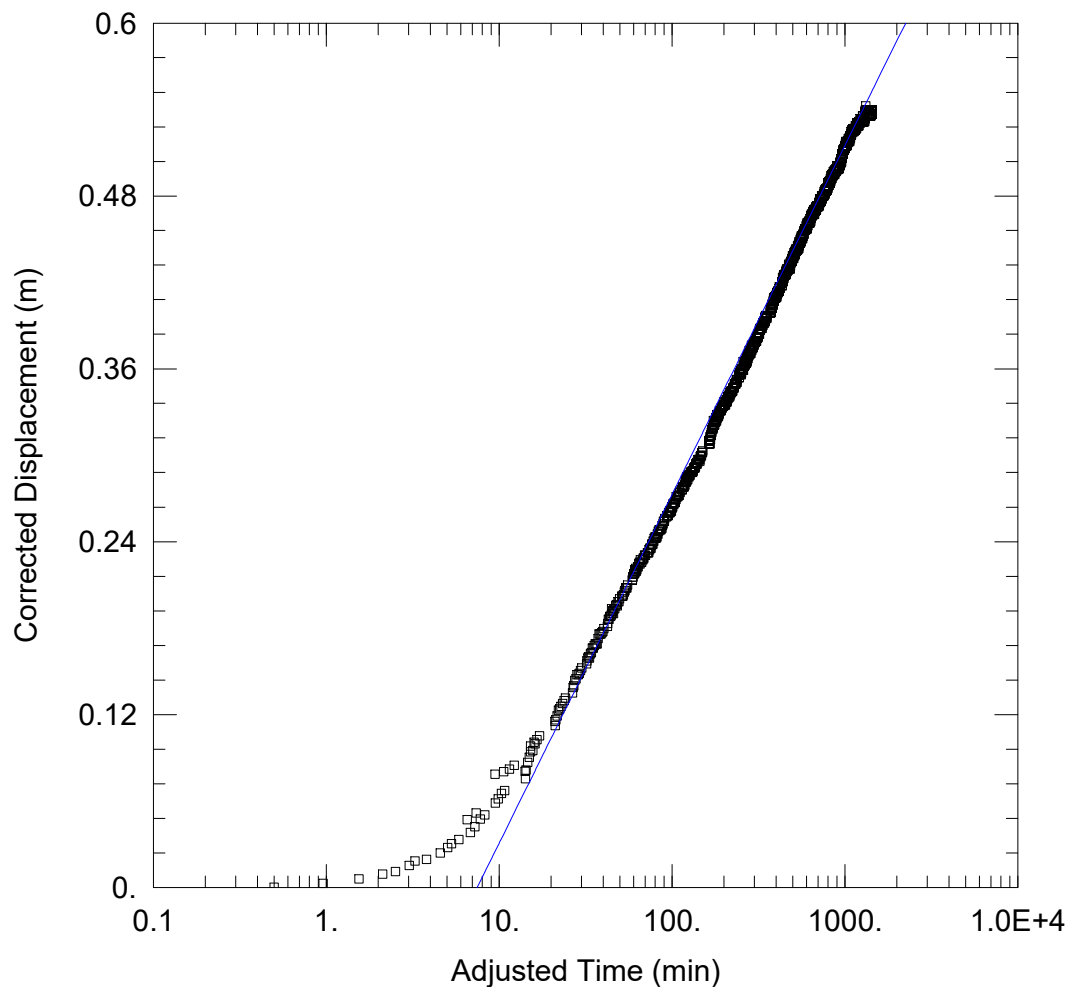
SOLUTION

Aquifer Model: Unconfined

Solution Method: Cooper-Jacob

T = 19.76 m²/day

S = 0.0002292



WELL TEST ANALYSIS

Data Set: \...\PB02 20190503.aqt
Date: 05/03/19

Time: 08:47:01

PROJECT INFORMATION

Company: GHD
Client: FIJV
Project: 6137117
Test Well: PB02
Test Date: 3/4/2019

AQUIFER DATA

Saturated Thickness: 42. m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
PB02	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ PB02 MB	30.5	0

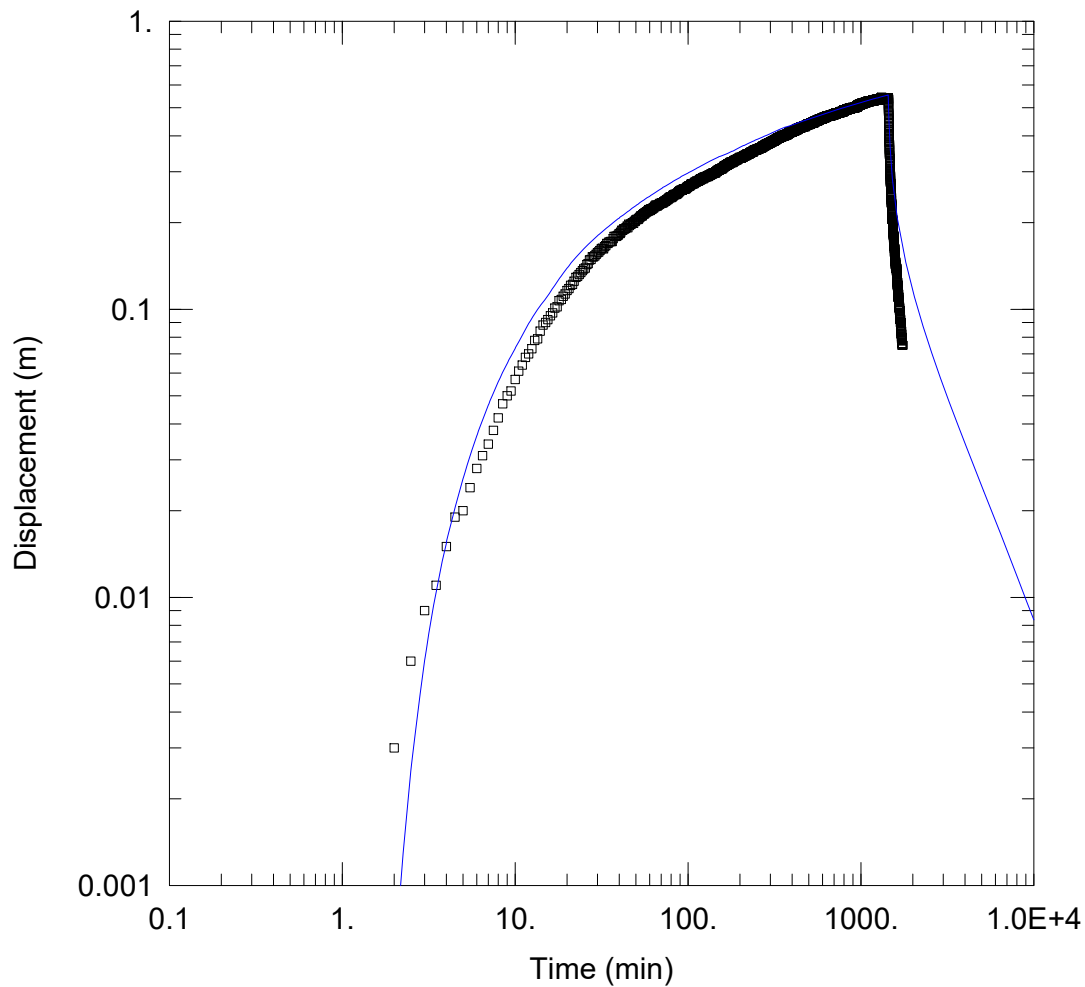
SOLUTION

Aquifer Model: Unconfined

Solution Method: Cooper-Jacob

T = 163.5 m²/day

S = 0.00205



WELL TEST ANALYSIS

Data Set: \...\PB02 20190503 Tartakovsky Neuman.aqt

Date: 05/03/19

Time: 09:07:37

PROJECT INFORMATION

Company: GHD

Client: FIJV

Project: 6137117

Test Well: PB02

Test Date: 3/4/2019

AQUIFER DATA

Saturated Thickness: 42. m

Anisotropy Ratio (Kz/Kr): 0.001

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
PB02	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ PB02 MB	30.5	0

SOLUTION

Aquifer Model: Unconfined

Solution Method: Tartakovsky-Neuman

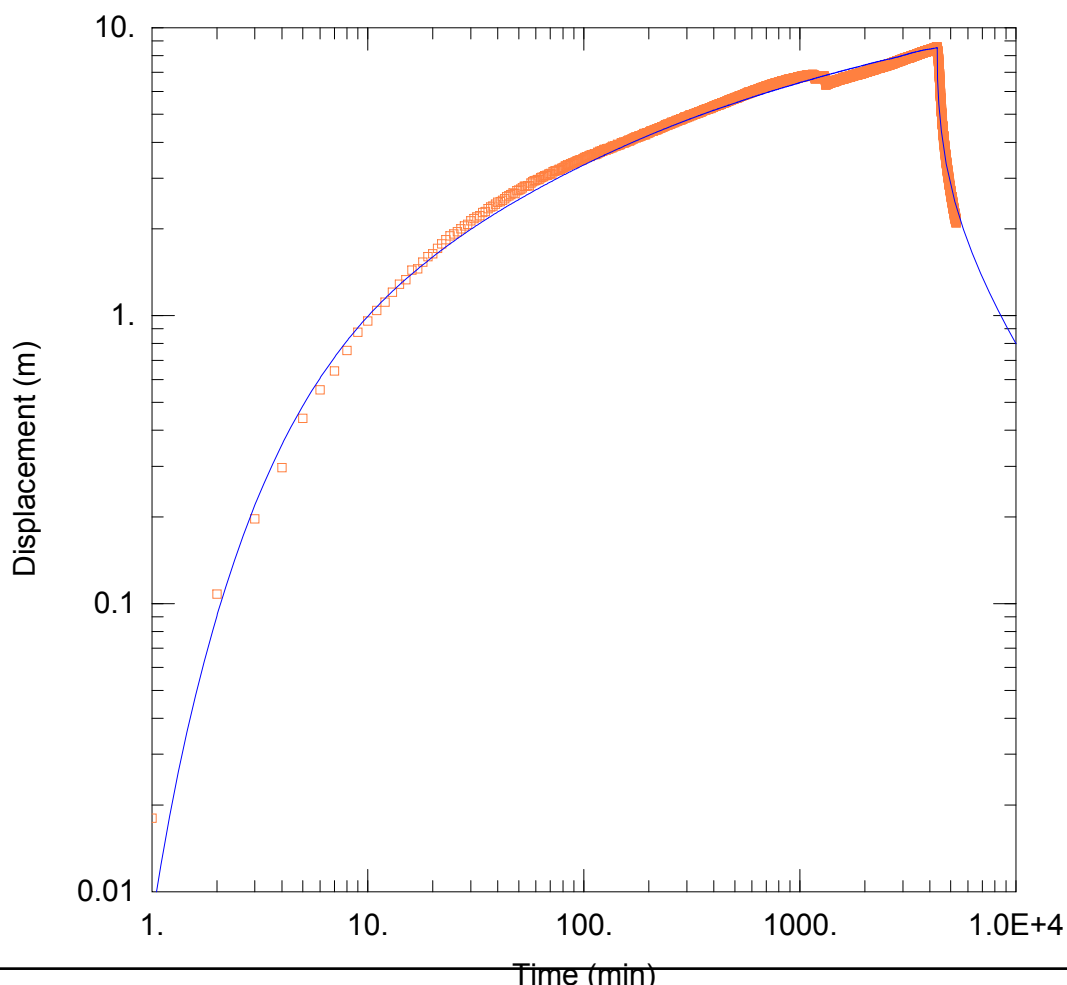
T = 152.8 m²/day

S = 0.001769

Sy = 0.1

Kz/Kr = 0.001

kD = 5.



WELL TEST ANALYSIS

Data Set: \...\PB03 20190502 moench unconf.aqt

Date: 05/23/19

Time: 08:42:37

PROJECT INFORMATION

Company: GHD

Client: FIJV

Project: 6137117

Test Well: PB03

Test Date: 9/4/2019

AQUIFER DATA

Saturated Thickness: 58. m

Anisotropy Ratio (Kz/Kr): 37.38

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
PB03	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ PB03 MB	3	0

SOLUTION

Aquifer Model: Unconfined

Solution Method: Moench

T = 121.9 m²/day

S = 0.121

Sy = 0.1

β = 0.1

Sw = 0.

r(w) = 0.095 m

r(c) = 0.095 m

alpha = 1.0E+30 min⁻¹