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BOREHOLE: BHUA-21

Project: Pioneer-Burdekin PHES

Location: Netherdale/Dalrymple Heights

Client: Queensland Hydro

Job No.: PS138693

Position: Upper Reservoir

Coords: 658112.8 m E 7667931.9 m N MGA2020-55

Surface RL: 905.99 m AHD

Contractor: Twin Hills Engineering & Drilling Drill Rig: TH24

Inclination: -89° Direction: 018°

Sheet 1 of 6

Date Started: 12/6/2024

Date Completed: 4/7/2024

Logged: PT

Drilling				Sampling		Field Material Description															
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION		MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS								
AD/V	E-F	Groundwater Not Observed	0	905.99				CL-CH	Silty Sandy CLAY: medium plasticity, pale grey and orange, sand is fine grained; silt is low plasticity.		M	St to VSt	RESIDUAL SOIL 0.00-5.10: soil composition, consistency/density and moisture content was estimated from auger cuttings to 5.1m depth								
			1																		
			2																		
			3																		
			4																		
			5	5.10																	
			Continued as Cored Borehole																		
			6																		
			7																		
			8																		
9																					
10																					

Comments

Checked GEM

Date 2/12/2024

PPHES LIB_REV0.GLB Log IS AU BOREHOLE 3 BHUA-21_241202_2.GPJ <<DrawingFiles>> 3/12/2024 00:27 10.03.00.09 Dargal Lab and In Situ Tool - DGD | Lib: WSP 5.07.2 2023-10-30 Pjt: WSP 5.04.1 2023-06-14



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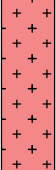
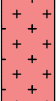
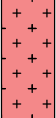
Inclination: -89° Direction: 018°

Sheet 2 OF 6

Date Started: 12/6/2024

Date Completed: 4/7/2024

Logged: PT

Drilling					Field Material Description					Defect Information				
METHOD	WATER	TCR	RQD	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH (MPa)	DEFECT DESCRIPTION & Additional Observations (Core partings shown - refer to Detailed Defect Descriptions table for all logged features)			AVERAGE DEFECT SPACING (mm)	
									VL-2 J M H VH EH				10 30 100 300 1000 3000	
					0									
					1									
					2									
					3									
					4									
					5									
					5.10		Continuation from non-cored borehole							
					900.89		NO CORE 0.70m (5.10-5.80) NO CORE.							
					5.80									
		55	55	6	900.19		METAGRANITE: medium to coarse grained, pale brown, white and grey, crystalline, massive, fabric shows metamorphic crystal reorientation, moderately to highly altered granite.	XW to HW						
		100	22	7	7.00		CI Sandy CLAY: medium plasticity, light brown, sand is coarse grained; trace fine grained gravel. stiff.			6.65-6.80: J x3, rd br SN, PR, RF 6.85: J, 50°, br, wh gy VN, PR, RF 6.95-7.00: EW				
					898.99									
					7.47									
		86	86	8	898.52		METAGRANITE: medium to coarse grained, red-brown and pale brown, crystalline, fabric shows metamorphic crystal reorientation, moderately to highly altered granite.	XW to HW		7.55: P, 30°, bl-mi VN, PR, RF 7.85: J, 30°, SN, PR, RF 8.00: J, 30°, bl-mi SN, PR, RF				
					8.26									
					897.73		NO CORE 0.21m (8.26-8.47)							
					8.47									
					897.52		METAGRANITE: medium to coarse grained, red-brown and pale brown, crystalline, massive, fabric shows metamorphic crystal reorientation, moderately to highly altered granite.	XW to HW						
				9										
		93	87							9.10-9.20: CS, 20 - 30°, clay and XW rock, 100 mm				
				10	10.00									

Comments

Checked GEM

Date 2/12/2024

PEPHES LIB - REVQ GLB Log IS AU CORED BOREHOLE 3 BHUA-21_241202_2.GPJ <DrawingFile>> 3/12/2024 00:29 10.03.00.09 Dargal Lab and in Silu Tool - DGO | Lib: WSP 5.07.2 2023-10-30 Pjt: WSP 5.04.1 2023-06-14



BOREHOLE: BHUA-21

Project:	Pioneer-Burdekin PHES	Position:	Upper Reservoir	Sheet	3 OF 6
Location:	Netherdale/Dalrymple Heights	Coords:	658112.8 m E 7667931.9 m N MGA2020-55	Date Started:	12/6/2024
Client:	Queensland Hydro	Surface RL:	905.99 m AHD	Date Completed:	4/7/2024
Job No.:	PS138693	Contractor:	Twin Hills Engineering & Drilling Drill Rig: TH24	Logged:	PT
		Inclination:	-89° Direction: 018°		

Drilling					Field Material Description				Defect Information		
METHOD	WATER	TCR	RQD	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH (MPa)	DEFECT DESCRIPTION & Additional Observations (Core partings shown - refer to Detailed Defect Descriptions table for all logged features)	AVERAGE DEFECT SPACING (mm)
									VL-2 J M H V L-2 M-2 H-2 V-2 EH		10 30 100 300 1000 3000
HQ3				10	895.89	+	NO CORE 0.10m (10.00-10.10)	XW to HW		10.12: J, 20°, yl-mi SN, UN, RF	
		84	83	11	894.63		METAGRANITE: medium to coarse grained, pale brown and pale pink, crystalline, massive, fabric shows metamorphic crystal reorientation, moderately to highly altered granite.			10.60-10.62: CS, 10 - 25°, clay and XW rock, 50 mm	
					11.36	+	NO CORE 0.24m (11.36-11.60)			10.81: P, yl-mi VN, PR, VR	
				12	894.39		METAGRANITE: medium to coarse grained, pale grey and pale brown, crystalline, massive, fabric shows metamorphic crystal reorientation, moderately to highly altered granite.			11.94: J, 50°, rd-mi SN, PR, SM	
		100	87	13		+		XW to HW		12.20: P, yl-mi VN, ST, RF	
				14	14.25					12.43: J, 10°, bl-mi VN, UN, VR	
					14.45	+	CL-CI CLAY: low to medium plasticity, pale grey and pale brown, with fine to coarse grained sand; with fine to medium grained gravel.	XW		12.90-13.10: CS, clay and XW rock, 20 mm	
				15	14.60					14.25-14.45: CS, clay and XW rock, 30 mm	
					15.46	+	NO CORE 0.15m (14.45-14.60)	XW		15.26-15.45: CS, clay and XW rock, 20 mm	
		86	44	16	15.89		METAGRANITE: medium to coarse grained, pale grey and pale brown, crystalline, massive, fabric shows metamorphic crystal reorientation, moderately to highly altered granite.			15.53: J, 10°, bl-mi VN, PR, VR	
					17.00	+	Clayey SAND: coarse grained, pale grey and brown, clay is medium plasticity; trace fine grained gravel.	RS		15.75: J, 10°, bl-mi SN, UN, RF	
				17	17.50		NO CORE 1.11m (15.89-17.00)				
					18.85	+	METAGRANITE: medium to coarse grained, pale brown and pale grey, crystalline, massive, fabric shows metamorphic crystal reorientation, moderately to highly altered granite.	HW		17.50: J, 10°, yl-mi SN, UN, RF	
				18	18.85						
					19.35	+	Sandy CLAY: low to medium plasticity, brown, sand is fine to coarse grained; trace fine grained gravel.	RS			
				19	19.70		NO CORE 1.25m (17.60-18.85)				
					19.70	+	CL-CI CLAY: low to medium plasticity, brown, with fine to coarse grained sand; trace gravel; (RS Lamprophyre).	RS			
				20	19.70						
		89	23		19.70	+	METAGRANITE: medium to coarse grained, pale brown and pale grey, crystalline, massive, fabric shows metamorphic crystal reorientation, moderately to highly altered granite.	HW			
					19.70						

Comments	Checked	GEM
	Date	2/12/2024

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BOREHOLE: BHUA-21

Project: Pioneer-Burdekin PHES

Position: Upper Reservoir

Sheet 4 OF 6

Location: Netherdale/Dalrymple Heights

Coords: 658112.8 m E 7667931.9 m N MGA2020-55

Client: Queensland Hydro

Surface RL: 905.99 m AHD

Date Started: 12/6/2024

Job No.: PS138693

Contractor: Twin Hills Engineering & Drilling Drill Rig: TH24

Date Completed: 4/7/2024

Inclination: -89° Direction: 018°

Logged: PT

Drilling					Field Material Description				Defect Information			
METHOD	WATER	TCR	RQD	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH (MPa)	DEFECT DESCRIPTION & Additional Observations (Core partings shown - refer to Detailed Defect Descriptions table for all logged features)	AVERAGE DEFECT SPACING (mm)	
		89	23	20			CL-CI CLAY: low to medium plasticity, brown, grey, trace fine to coarse grained sand; trace fine grained, sub-angular gravel; (RS Lamprophyre).	RS				
				20.44								
				20.60			NO CORE 0.16m (20.44-20.60)					
				20.72								
				885.27			CLAY: medium plasticity, pale grey with orange.	XW		20.72-20.80: J x2, 40°, br-mi VN, PR, RF		
				21			LAMPROPHYRE: fine to medium grained, dark brown and grey, porphyritic, massive.	XW to HW				
		93	80									
				22								
				22.00								
				22.10			NO CORE 0.10m (22.00-22.10)			22.10-22.90: FZ		
				883.89			LAMPROPHYRE: fine to medium grained, dark brown and dark grey, porphyritic, massive, phenocrysts to 2 mm diameter.	XW to HW				
		60	7									
				23								
				23.00			NO CORE 0.60m (23.00-23.60)					
				23.60								
				23.80			LAMPROPHYRE: fine to medium grained, dark brown and dark grey, porphyritic, massive, phenocrysts to 2 mm diameter.	XW to HW				
				882.19			METAGRANITE: medium to coarse grained, pale brown and grey, crystalline, massive, fabric shows metamorphic crystal reorientation, moderately to highly altered granite.			24.11: J, 10°, bl-mi SN, PR, RF 24.13: J, 10°, SN, PR, RF 24.13-24.52: FZ		
		60	33									
				24								
				24.55			NO CORE 0.55m (24.55-25.10)					
				881.44								
				25								
				25.10			LAMPROPHYRE: fine to medium grained, red brown and green grey, porphyritic, massive, phenocrysts to 2 mm in diameter.	HW		25.13-25.17: FZ, rd-mi, 100 mm		
				880.89								
		85	61									
				26						25.67-25.92: FZ		
				26.38								
				879.61			NO CORE 0.27m (26.38-26.65)					
				26.65								
				879.34			LAMPROPHYRE: fine to medium grained, red brown and green grey, porphyritic, massive, phenocrysts to 2 mm in diameter.	HW		26.60-27.00: FZ		
				27								
				27.00			METAGRANITE: medium to coarse grained, red brown, pale brown and dark grey, crystalline, massive, fabric shows metamorphic crystal reorientation, moderately to highly altered granite.			27.27: J, 30°, br-mi VN, PR, RF 27.33: J, 85°, br, or-mi VN, CU, VR 27.46: J, 60°, br-mi VN, PR, RF 27.63: J, 20°, br-mi VN, UN, RF 27.75: J, 40°, br-mi VN, PR, RF 27.83: J, 30°, br-mi VN, PR, RF 27.90-28.10: FZ/J, 60°, br VN, PR, RF		
				878.99								
		100	51							28.20-28.25: FZ, rd-mi, 100 mm 28.20-28.30: J x2, 60°, br-mi VN, UN, RF		
				28								
				27.90			LAMPROPHYRE: fine to medium grained, red brown and green grey, porphyritic, massive, phenocrysts to 2 mm in diameter.					
				878.09								
				29						28.80-29.10: FZ, recovered as gravel		
		100	77									
										29.40-29.45: Jx2, 10°, bl-mi SN, PR, RF		
				30								

Comments

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GEM

Date

2/12/2024



BOREHOLE: BHUA-21

Project:	Pioneer-Burdekin PHES	Position:	Upper Reservoir	Sheet	5 OF 6
Location:	Netherdale/Dalrymple Heights	Coords:	658112.8 m E 7667931.9 m N MGA2020-55	Date Started:	12/6/2024
Client:	Queensland Hydro	Surface RL:	905.99 m AHD	Date Completed:	4/7/2024
Job No.:	PS138693	Contractor:	Twin Hills Engineering & Drilling Drill Rig: TH24	Logged:	PT
		Inclination:	-89° Direction: 018°		

Drilling					Field Material Description				Defect Information		
METHOD	WATER	TCR	RQD	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH (MPa)	DEFECT DESCRIPTION & Additional Observations (Core partings shown - refer to Detailed Defect Descriptions table for all logged features)	AVERAGE DEFECT SPACING (mm)
								VL-2 J M H VH-200 EH	■ UCS		0 100 200 300 1000 3000
HO3		100	0	30			LAMPROPHYRE: fine to medium grained, red brown and green grey, porphyritic, massive, phenocrysts to 2 mm in diameter.	XW to HW		29.60-30.52: FZ, recovered as gravel 30.25-30.29: J x2, 10°, VN, PR, SM	
				31						30.56: J, 30°, VN, UN, RF 30.62: J, 25°, br-mi VN, PR, RF 30.70: J, 10°, br-mi VN, PR, RF 30.77: J, 10°, br-mi SN, PR, RF 30.83: J, 35°, br-mi VN, PR, RF 30.61-31.10: FZ 30.88: J, 20°, br-mi VN, UN, RF 31.06-31.12: FZ, recovered as gravel 31.45: J, 10°, or-br VN, IR, RF 31.60: J, 10 - 15°, or-br VN, UN, RF 31.71-31.81: CS, rd, or and wh mi, 100 mm 31.93: J, 30°, SN, PR, RF	
		100	90	31.80 874.19			METAGRANITE: medium to coarse grained, pale brown to red brown, grey, white, crystalline, massive.	HW		32.55-32.63: FZ, recovered as gravel 32.65: J, 10°, SN, PR, SM 32.79: J, bl-mi SN, UN, RF	
				33				MW		33.22: J, 30°, bl-mi SN, PR, RF 33.44: J, 5°, bl-mi SN, PR, RF 33.49: J, 20°, bl-mi VN, PR, RF	
		100	93	34						34.12-34.18: J x2, 30°, or-mi SN, PR, RF 34.32-34.53: SZ, dark red mi SN, PR-IR, RF, iron stained surfaces 34.70: J, 10°, or-mi SN, ST, RF 34.95: J, 5°, VN, PR, RF 35.09: J, 5°, or-mi VN, RF 35.35: J, 15°, or-mi VN, PR, RF 35.49: J, 30°, or SN, PR, SM 35.55: J, 5°, or-mi SN, PR, RF 35.75: J, 20°, CN, PR, RF 35.91: J, 20°, br-mi SN, PR, RF 36.00-36.04: CS, or, br-mi, 50 mm 36.00-36.62: Jx2, 20°, or-mi SN, PR, RF 36.52: J, 5°, br, or-mi VN, IR, VR	
		100	93	35						36.93: J, 5°, or-mi VN, PR, RF 37.04: J, 10°, SN, PR, RF 37.00-37.42: J x2, 20°, bl, or-mi SN, PR, RF 37.00-37.75: Jx3, 5°, SN, PR, RF 37.66: J, 20°, or-mi VN, PR, RF	
				36						38.17: J, 30°, VN, PR, RF 38.40-38.51: J x3, 10°, gr, br-mi VN, PR, RF	
		100	84	37						39.10: J, 5°, bl, or-mi SN, PR, RF 39.36-39.43: Jx2, 10 - 20°, bl, or-mi CN, PR, RF 39.62: J, 10°, bl, or-mi SN, UN, RF 39.77: J, 5°, br, or-mi SN, PR, RF 39.91: J, 40°, br, or-mi VN, IR, VR	
				38							
		100	80	39							
				40							
		100	95								

Comments

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Date 2/12/2024

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BOREHOLE: BHUA-21

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Location: Netherdale/Dalrymple Heights

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Contractor: Twin Hills Engineering & Drilling Drill Rig: TH24

Inclination: -89° Direction: 018°

Sheet 6 OF 6

Date Started: 12/6/2024

Date Completed: 4/7/2024

Logged: PT

Drilling						Field Material Description				Defect Information			
METHOD	WATER	TCR	RQD	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH (MPa)	DEFECT DESCRIPTION & Additional Observations (Core partings shown - refer to Detailed Defect Descriptions table for all logged features)		AVERAGE DEFECT SPACING (mm)	
				40	865.90		Hole Terminated at 40.10 m Target depth. Backfilled			40.08: J, 5°, br, gr-mi SN, ST, RF			
				41									
				42									
				43									
				44									
				45									
				46									
				47									
				48									
				49									
				50									

Comments

Checked GEM

Date 2/12/2024



Pioneer Burdekin Pumped Hydro Energy Storage: Tranche 2 – BHUA-21
Defects List

PointID	Depth	Bottom	Fracture Set	Defect Number	Type	Type Suffix	Dip Minimum (degrees)	Dip Maximum (degrees)	Infilling Material	Aperture Observation	Planarity	Roughness	Aperture Measurement Sign	Aperture Measurement	Aperture	Spacing	Remark
BHUA-21	6.65	6.80			J	x3			rd br	SN	PR	RF					
BHUA-21	6.85				J		50		br, wh gy	VN	PR	RF					
BHUA-21	6.95	7.00			EW												
BHUA-21	7.55				P		30		bl-mi	VN	PR	RF					
BHUA-21	7.85				J		30			SN	PR	RF					
BHUA-21	8.00				J		30		bl-mi	SN	PR	RF					
BHUA-21	9.10	9.20			CS		20	30	clay and XW rock					100			
BHUA-21	9.11	9.22			DB	x2											
BHUA-21	9.84				DB												
BHUA-21	10.12				J		20		yl-mi	SN	UN	RF					
BHUA-21	10.31				DB												
BHUA-21	10.37				DB												
BHUA-21	10.45				DB												
BHUA-21	10.60	10.62			CS		10	25	clay and XW rock					50			
BHUA-21	10.73				DB												
BHUA-21	10.81				P				yl-mi	VN	PR	VR					
BHUA-21	10.83				DB												
BHUA-21	11.06				DB												
BHUA-21	11.20				DB												
BHUA-21	11.26				DB												
BHUA-21	11.87				DB												
BHUA-21	11.94				J		50		rd-mi	SN	PR	SM					
BHUA-21	12.10				DB												
BHUA-21	12.20				P				yl-mi	VN	ST	RF					
BHUA-21	12.43				J		10		bl-mi	VN	UN	VR					
BHUA-21	12.60				DB												
BHUA-21	12.90	13.10			CS				clay and XW rock					20			
BHUA-21	13.34				hJ		5		bl-mi	VN	PR						
BHUA-21	13.45				hJ		70		bl, yl-mi	SN	UN						
BHUA-21	13.58				DB												
BHUA-21	13.72				hJ		70		br-mi	SN	PR						
BHUA-21	13.75				DB												
BHUA-21	13.95				DB												
BHUA-21	14.00	15.00			DB	x4											
BHUA-21	14.05				hJ		65		br-mi								
BHUA-21	14.25	14.45			CS				clay and XW rock					30			
BHUA-21	14.60	15.00			DB	x4											
BHUA-21	15.26	15.45			CS				clay and XW rock					20			
BHUA-21	15.53				J		10		bl-mi	VN	PR	VR					
BHUA-21	15.75				J		10		bl-mi	SN	UN	RF					
BHUA-21	17.30				DB												
BHUA-21	17.50				J		10		yl-mi	SN	UN	RF					
BHUA-21	19.60				DB												
BHUA-21	19.66	21.90			HB												
BHUA-21	20.72	20.80			J	x2	40		br-mi	VN	PR	RF					
BHUA-21	20.86	21.10			hJ	x3	40		br-mi	SN	PR						
BHUA-21	22.10	22.90			FZ												
BHUA-21	24.11				J		10		bl-mi	SN	PR	RF					
BHUA-21	24.13				J		10			SN	PR	RF					
BHUA-21	24.13	24.52			FZ												
BHUA-21	24.73				hJ		40		bl-mi	VN	PR	RF					
BHUA-21	25.13	25.17			FZ				rd-mi					100			
BHUA-21	25.25				hJ		70		br-mi								
BHUA-21	25.26				hJ		30		br-mi	SN	UN						
BHUA-21	25.53				DB												
BHUA-21	25.67	25.92			FZ												
BHUA-21	26.00	26.38			HB												
BHUA-21	26.60	27.00			FZ												
BHUA-21	27.20				DB												
BHUA-21	27.27				J		30		br-mi	VN	PR	RF					
BHUA-21	27.33				J		85		br, or-mi	VN	CU	VR					
BHUA-21	27.43				hJ		40		bl-mi	VN	PR						
BHUA-21	27.45				hJ		5		br-mi	SN	PR	RF					
BHUA-21	27.46				J		60		br-mi	VN	PR	RF					
BHUA-21	27.47				DB												
BHUA-21	27.48				hJ		60		bl-mi	VN	PR						
BHUA-21	27.63				J		20		br-mi	VN	UN	RF					
BHUA-21	27.75				J		40		br-mi	VN	PR	RF					
BHUA-21	27.83				J		30		br-mi	VN	PR	RF					
BHUA-21	27.90	28.10			FZ	/J	60		br	VN	PR	RF					
BHUA-21	28.00	28.67			hJ				br-mi								
BHUA-21	28.20	28.25			FZ				rd-mi					100			
BHUA-21	28.20	28.30			J	x2	60		br-mi	VN	UN	RF					
BHUA-21	28.40				DB												
BHUA-21	28.41	28.68			hJ	x3			bl, or - mi	VN	PR						
BHUA-21	28.50				hJ		45		br-mi	SN	PR						
BHUA-21	28.54	28.70			hJ		15		or-mi	SN	PR						
BHUA-21	28.65				hJ		55		br-mi	VN	PR						
BHUA-21	28.67	28.69			hJ	x2	10	20	br-mi	VN	PR						



Pioneer Burdekin Pumped Hydro Energy Storage: Tranche 2 – BHUA-21
Defects List

PointID	Depth	Bottom	Fracture Set	Defect Number	Type	Type Suffix	Dip Minimum (degrees)	Dip Maximum (degrees)	Infilling Material	Aperture Observation	Planarity	Roughness	Aperture Measurement Sign	Aperture Measurement	Aperture	Spacing	Remark
BHUA-21	28.80	29.10			FZ												recovered as gravel
BHUA-21	29.20	29.35			hJ		10		or, br-mi	SN	PR						
BHUA-21	29.20	29.61			hJ	x6	10	20	br-mi	VN	PR	RF					
BHUA-21	29.40	29.45			J	x2	10		bl-mi	SN	PR	RF					
BHUA-21	29.60	30.52			FZ												recovered as gravel
BHUA-21	30.25	30.29			J	x2	10			VN	PR	SM					
BHUA-21	30.56				J		30			VN	UN	RF					
BHUA-21	30.61	31.10			FZ												
BHUA-21	30.62				J		25		br-mi	VN	PR	RF					
BHUA-21	30.70				J		10		br-mi	VN	PR	RF					
BHUA-21	30.77				J		10		br-mi	SN	PR	RF					
BHUA-21	30.83				J		35		br-mi	VN	PR	RF					
BHUA-21	30.88				J		20		br-mi	VN	UN	RF					
BHUA-21	31.06	31.12			FZ												recovered as gravel
BHUA-21	31.15	31.22			hJ				br-mi	VN	IR						highly fractured and jointed at various orientation
BHUA-21	31.30				hJ		65		br-mi	VN	UN	RF					
BHUA-21	31.33	31.64			hJ	x2	40		br-mi	SN	IR						
BHUA-21	31.45				J		10		or-br	VN	IR	RF					
BHUA-21	31.58	31.66			hJ	x2	20		br-mi	SN	PR						
BHUA-21	31.60				J		10	15	or-br	VN	UN	RF					
BHUA-21	31.65				hJ		70		rd-br	VN	PR	RF					
BHUA-21	31.71	31.81			CS				rd, or and wh mi					100			
BHUA-21	31.82	32.60			hJ		10					RF					
BHUA-21	31.93				J		30			SN	PR	RF					
BHUA-21	32.00	32.97			hJ	x3	30		bl-mi		PR	RF					
BHUA-21	32.55	32.63			FZ												recovered as gravel
BHUA-21	32.65				J		10			SN	PR	SM					
BHUA-21	32.65	33.00			hJ				br	VN	UN						numerous healed joints at various orientations
BHUA-21	32.79				J				bl-mi	SN	UN	RF					
BHUA-21	33.00	33.09			hJ				or-mi								
BHUA-21	33.22				J		30		bl-mi	SN	PR	RF					
BHUA-21	33.44				J		5		bl-mi	SN	PR	RF					
BHUA-21	33.49				J		20		bl-mi	VN	PR	RF					
BHUA-21	33.70				hJ		70		or-mi		CU						
BHUA-21	33.78	33.95			hJ		10		br-mi		PR						
BHUA-21	34.00	34.70			hJ	x3	70		or-mi		CU						
BHUA-21	34.12	34.18			J	x2	30		or-mi	SN	PR	RF					
BHUA-21	34.32	34.53			SZ				dark red mi	SN	PR-IR	RF					iron stained surfaces
BHUA-21	34.70				J		10		or-mi	SN	ST	RF					
BHUA-21	34.74	34.79			hJ	x4	10		br-mi		PR						
BHUA-21	34.95				J		5			VN	PR	RF					
BHUA-21	35.00	35.66			hJ												
BHUA-21	35.09				J		5		or-mi	VN		RF					
BHUA-21	35.35				J		15		or-mi	VN	PR	RF					
BHUA-21	35.49				J		30		or	SN	PR	SM					
BHUA-21	35.55				J		5		or-mi	SN	PR	RF					
BHUA-21	35.63	35.70			hJ		40		br-mi		PR						
BHUA-21	35.67				hJ		30		bl-mi		PR						
BHUA-21	35.75				J		20			CN	PR	RF					
BHUA-21	35.91				J		20		br-mi	SN	PR	RF					
BHUA-21	36.00	36.04			CS				or, br-mi					50			
BHUA-21	36.00	36.22			hJ		20		x4, br-mi		PR						
BHUA-21	36.00	36.62			J	x2	20		or-mi	SN	PR	RF					
BHUA-21	36.52				J		5		br, or-mi	VN	IR	VR					
BHUA-21	36.58	36.97			hJ	x7	20		or-mi		PR						
BHUA-21	36.93				J		5		or-mi	VN	PR	RF					
BHUA-21	37.00	37.42			J	x2	20		bl, or-mi	SN	PR	RF					
BHUA-21	37.00	37.75			J	x3	5			SN	PR	RF					
BHUA-21	37.04				J		10			SN	PR	RF					
BHUA-21	37.20	37.21			hJ	x2	5		br-mi		PR						
BHUA-21	37.42	38.00			hJ		90		br-mi		CU						
BHUA-21	37.66				J		20		or-mi	VN	PR	RF					
BHUA-21	38.00	38.02			hJ		40		br-mi		PR						
BHUA-21	38.17				J		30			VN	PR	RF					
BHUA-21	38.40	38.51			J	x3	10		gr, br-mi	VN	PR	RF					
BHUA-21	38.63	38.64			hJ	x2	25				PR						
BHUA-21	38.78	38.85			hJ		25		bl, or-mi		PR	RF					
BHUA-21	39.00	39.26			hJ		10		br-mi		PR						
BHUA-21	39.00	39.60			hJ	x2	20		br-mi		PR						
BHUA-21	39.10				J		5		bl, or-mi	SN	PR	RF					
BHUA-21	39.32				hJ		65		br-mi		ST						
BHUA-21	39.36	39.43			J	x2	10	20	bl, or-mi	CN	PR	RF					
BHUA-21	39.62				J		10		bl, or-mi	SN	UN	RF					
BHUA-21	39.77				J		5		br, or-mi	SN	PR	RF					
BHUA-21	39.91				J		40		br, or-mi	VN	IR	VR					
BHUA-21	40.08				J		5		br, gr-mi	SN	ST	RF					

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PointID : BHUA-21 Depth Range: 5.00 - 9.00 m



PointID : BHUA-21 Depth Range: 9.00 - 13.00 m

	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHUA-21	DRAWN RC	DATE 18/11/2024
		CHECKED GEM	DATE 4/12/2024
		SCALE Not To Scale	A4
		PROJECT No PS138693	FIGURE No 1/5

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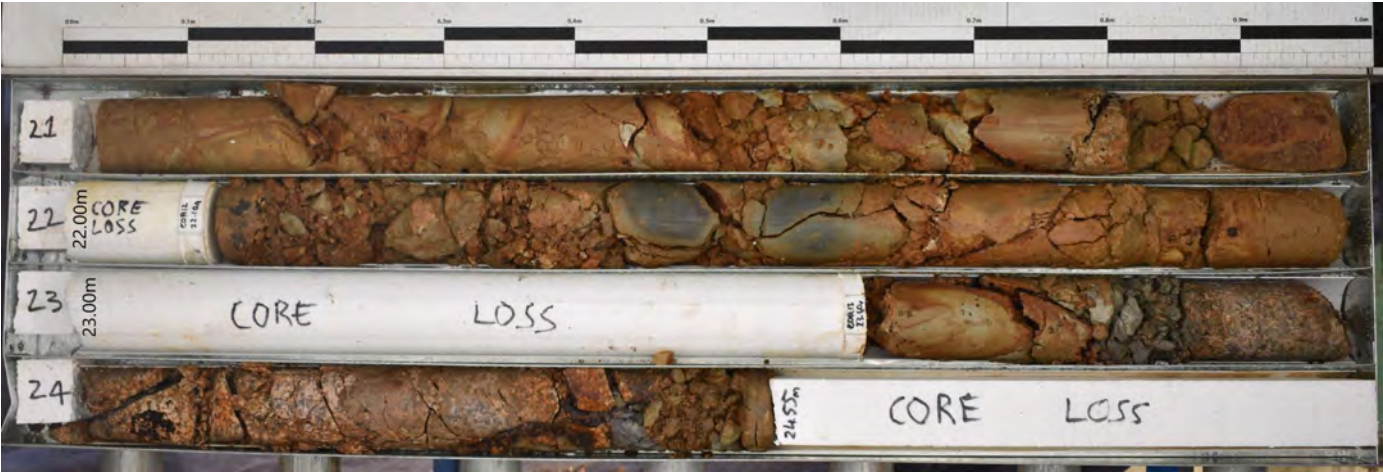
PointID : BHUA-21 Depth Range: 13.00 - 17.00 m



PointID : BHUA-21 Depth Range: 17.00 - 21.00 m

	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHUA-21	DRAWN RC	DATE 18/11/2024
		CHECKED GEM	DATE 4/12/2024
		SCALE Not To Scale	A4
		PROJECT No PS138693	FIGURE No 2/5

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PointID : BHUA-21 Depth Range: 21.00 - 25.00 m



PointID : BHUA-21 Depth Range: 25.00 - 29.00 m

	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHUA-21	DRAWN RC	DATE 18/11/2024
		CHECKED GEM	DATE 4/12/2024
		SCALE Not To Scale	A4
		PROJECT No PS138693	FIGURE No 3/5

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PointID : BHUA-21 Depth Range: 29.00 - 33.00 m

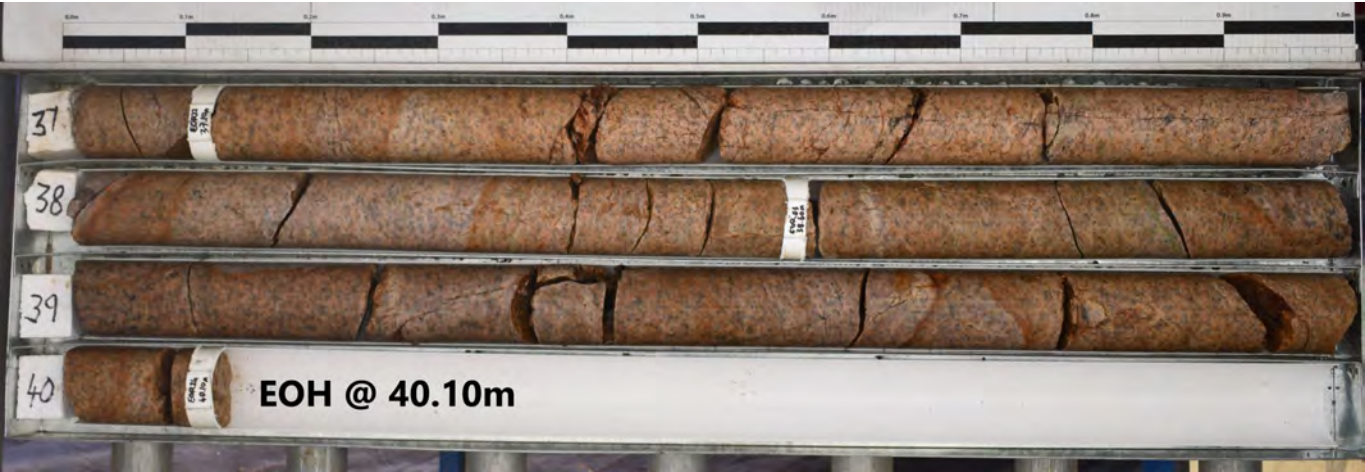


PointID : BHUA-21 Depth Range: 33.00 - 37.00 m



TITLE
Queensland Hydro
Netherdale/Dalrymple Heights
Pioneer-Burdekin PHES
Core photo - BHUA-21

DRAWN	RC	DATE	18/11/2024
CHECKED	GEM	DATE	4/12/2024
SCALE	Not To Scale		A4
PROJECT No	PS138693		FIGURE No 4/5

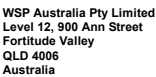


PointID : BHUA-21 Depth Range: 37.00 - 40.10 m

	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHUA-21	DRAWN	RC	DATE	18/11/2024
		CHECKED	GEM	DATE	4/12/2024
		SCALE	Not To Scale		A4
		PROJECT No	PS138693		FIGURE No 5/5



BHUA-21 Structural Logs



PROJECT:	Pioneer-Burdekin PHES	JOB #	PS138693
CLIENT:	Queensland Hydro	DATE:	18/11/2024

PROJECT: Pioneer-Burdekin PHES

CLIENT: Queensland Hydro

JOB # PS138693
DATE: 18/11/2024

BOREHOLE DETAILS

LOCATION:	Upper Reservoir A	BH DEPTH:	40 m
EASTING:	658113 m E	BH DIAMETER:	HQ (96 mm)
NORTHING:	7667931 m N	BH AZIMUTH:	018° TN
ELEVATION:	905.96 m	BH PLUNGE:	-89° TN
COORD SYSTEM:	MGA2020-55	CASING DEPTH:	7.15 m
LOGGING DATUM:	Ground Level	CASING TYPE:	HWT Steel

DOCUMENT DETAILS

LOGGED BY: JH
LOGGED DATE: 17/06/2024
DRAWN BY: JH
REVIEWED BY: GH
FILE: BHUA-21_Struct_Rev
LOGGED DEPTH: 40 m

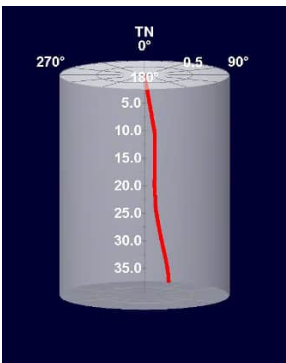
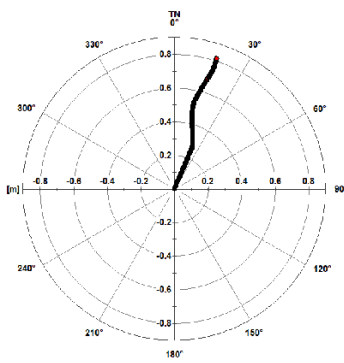
NOTES

Image logs are oriented relative to borehole magnetic north. Final structure log is oriented relative to true north using magnetic declination of 8.2° East.

Mechanical calliper log used for structure dip corrections.

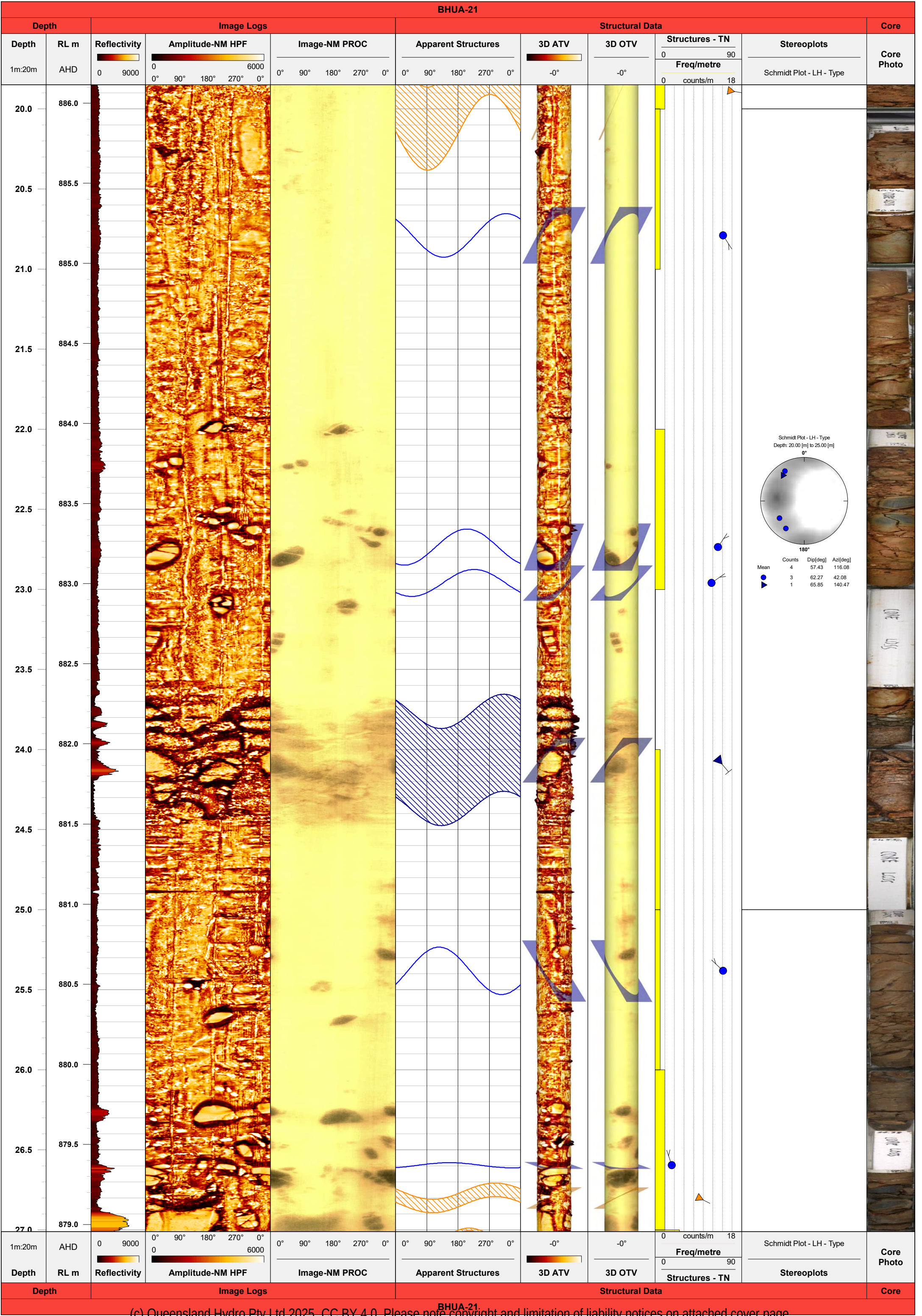
All logs zeroed to ground level. Cased section assumed straight for deviation calculations.

BOREHOLE DEVIATION



INTERPRETED STRUCTURES

[illegible]





BHUA-21 Composite Logs



PROJECT:	Pioneer-Burdekin PHES	JOB #	PS138693
CLIENT:	Queensland Hydro	DATE:	18/11/2024

PROJECT: Pioneer-Burdekin PHES

CLIENT: Queensland Hydro

JOB # PS138693
DATE: 18/11/2024

BOREHOLE DETAILS

LOCATION:	Upper Reservoir A	BH DEPTH:	40 m
EASTING:	658113 m E	BH DIAMETER:	HQ (96 mm)
NORTHING:	7667931 m N	BH AZIMUTH:	018° TN
ELEVATION:	905.96 m	BH PLUNGE:	-89° TN
COORD SYSTEM:	MGA2020-55	CASING DEPTH:	7.15 m
LOGGING DATUM:	Ground Level	CASING TYPE:	HWT Steel

DOCUMENT DETAILS

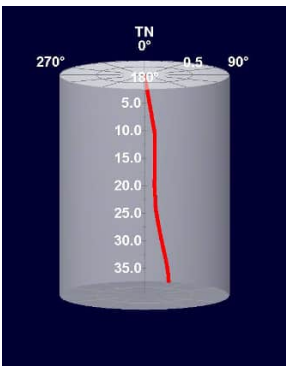
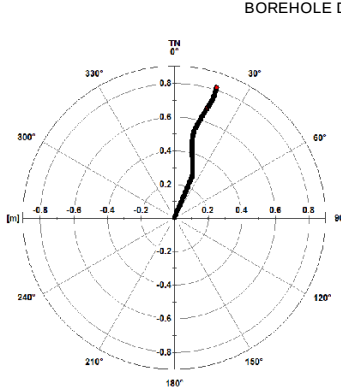
LOGGED BY: JH
LOGGED DATE: 17/06/2024
DRAWN BY: JH
REVIEWED BY: GH
FILE: BHUA-21_Comp_Rev
LOGGED DEPTH: 40 m

NOTES

Image logs are oriented relative to borehole magnetic north. Final structure log is oriented relative to true north using magnetic declination of 8.2° East.

Mechanical calliper log used for structure dip corrections.

All logs zeroed to ground level. Cased section assumed straight for deviation calculations.



INTERPRETED STRUCTURES



BHUA-21																																	
Depth	Image Logs			Calliper	Structural Logs			Sonic Logs	Gamma Logs			Electrical Logs																					
Depth	Amplitude-NM HPF	Image-NM PROC	Reflectivity	CAL	Structures - TN	3D ATV	Core Photo	Vp	GR	U	N16	Ma16																					
					0			90		1000	m/s	7000	0	ppm	10	10	Ohm.m	10000	0	ms	1000												
1m:50m	500	6200	0	9000	80	mm	160	Freq/metre	0	counts/m	18	-0°	0	API	250	Th	0 <th>ppm</th> <th>20</th> <th>10<th>Ohm.m</th><th>10000</th><th>0<th>ms</th><th>1000</th></th></th>	ppm	20	10 <th>Ohm.m</th> <th>10000</th> <th>0<th>ms</th><th>1000</th></th>	Ohm.m	10000	0 <th>ms</th> <th>1000</th>	ms	1000								
	0°	90°	180°	270°	0°																												
0																																	
1																																	
2																																	
3																																	
4																																	
5																																	
6																																	
7																																	
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9																																	
10																																	
11																																	
12																																	
13																																	
1m:50m	0°	90°	180°	270°	0°	0	9000	80	mm	160	0	counts/m	18	-0°			1000	m/s	7000	0	API	250	Th	0	ppm	20	10	Ohm.m	10000	0	ms	1000	
	500	6200																															
Depth	Amplitude-NM HPF	Image-NM PROC	Reflectivity	CAL	Structures - TN	3D ATV	Core Photo	Vp	GR	U	N16	Ma16																					
Depth	Image Logs	Calliper	Structural Logs	Sonic Logs	Gamma Logs	Electrical Logs																											

