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BOREHOLE: BHUA-23

Project: Pioneer-Burdekin PHES

Location: Netherdale/Dalrymple Heights

Client: Queensland Hydro

Job No.: PS138693

Position: Upper Reservoir

Coords: 658226.1 m E 7668027.2 m N MGA2020-55

Surface RL: 902.16 m AHD

Contractor: Twin Hills Drilling

Inclination:

-84°

-85°

 Direction: 081°

Sheet 1 of 5

Date Started: 11/6/2024

Date Completed: 4/7/2024

Logged: NW

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
ADV	E	F	Groundwater Not Encountered	0			ML	TOPSOIL SILT: non plastic, black and dark brown, trace fine to medium grained sand.	w<PL S	TOPSOIL
				0.10 902.06			ML	Sandy SILT: non to low plastic, orange brown, sand is coarse grained; trace medium plasticity clay; trace fine gravel.		RESIDUAL SOIL
WB	F-E			4.93 897.25			SM	Silty SAND: medium to coarse grained, uniform, pale brown.	w<PL St	
				6.43					W MD-D	
				7				Continued as Cored Borehole		
				8						
				9						
				10						



Sheet 2 OF 5

Date Started: 11/6/2024

Date Completed: 4/7/2024

Logged: NW

Drilling					Field Material Description					Defect Information				
METHOD	WATER	TCR	RQD	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH (MPa)	DETECT DESCRIPTION & Additional Observations (Core partings shown - refer to Detailed Defect Descriptions table for all logged features)	AVERAGE DEFECT SPACING (mm)			
									VL -2 L -6 M -8 H -10 VH -20 EH		10 30 100 300 1000 3000			
				0										
				1										
				2										
				3										
				4										
				5										
				6										
				6.43			Continuation from non-cored borehole							
				895.75			NO CORE 0.45m (6.43-6.88)							
				6.88										
				895.31			METAGRANITE: coarse grained, pale brown orange, crystalline, massive, moderately altered at most, pink brown alteration, fabric shows metamorphic crystal reorientation.	HW		7.18: J, 80°, PR 7.45: J, 15°, PR				
				8.00										
				894.19			NO CORE 0.50m (8.00-8.50)							
				8.50										
				893.69			METAGRANITE: medium to coarse grained, pale brown orange, crystalline, massive, highly altered, pink brown alteration, fabric shows metamorphic crystal reorientation.	HW		8.55-8.82: Jx7, 5°, br, PR 9.00-9.15: J/BD x2, 10°, UN, RF 9.46: J, 5°, br, PR, RF 9.65: J, 50°, br, PR, RF 9.80-9.90: Jx5, 65°, br, PR				
				9										
				10										
Comments														
										Checked	GEM			
										Date	3/12/2024			



BOREHOLE: BHUA-23

Project:	Pioneer-Burdekin PHES	Position:	Upper Reservoir	Sheet	3 OF 5
Location:	Netherdale/Dalrymple Heights	Coords:	658226.1 m E 7668027.2 m N MGA2020-55	Date Started:	11/6/2024
Client:	Queensland Hydro	Surface RL:	902.16 m AHD	Date Completed:	4/7/2024
Job No.:	PS138693	Contractor:	Twin Hills Drilling Drill Rig: Hanjin D&B-8D(D)	Logged:	NW
		Inclination:	-85° Direction: 081°		

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 L M H VH EH	■ UCS -2 -6 -30 -60 -100 -200		0 50 100 300 1000 3000
Groundwater Not Observed	79	77		10			METAGRANITE: medium to coarse grained, pale brown orange, crystalline, massive, highly altered, pink brown alteration, fabric shows metamorphic crystal reorientation.	HW		10.05-10.27: Jx11, 55°, br, PR	
				10.64	891.56		NO CORE 0.29m (10.64-10.93)				
	53	0		10.93	891.27		SM Gravelly SAND: medium to coarse grained, poorly graded, pale pink brown, gravel is medium to coarse grained. dense.	XW			
				11.75	890.45		NO CORE 0.68m (11.75-12.43)				
				12							
				12.43	889.64		SM Gravelly SAND: medium to coarse grained, poorly graded, pale pink brown, gravel is medium to coarse grained. very dense.	XW		12.43-12.57: FZ, recovered as gravel	
	9	0		12.57	889.64		NO CORE 1.36m (12.57-13.93)				
				13							
	51	20		13.93	888.28		METAGRANITE: medium to coarse grained, pink, pale brown to brown, crystalline, massive, fabric shows metamorphic crystal reorientation.	HW		14.10-14.53: Jx5, 5 - 10°, bn SN, PR, RF	
				14.70	887.52		NO CORE 2.23m (14.70-16.93)				
				15							
	0	0		16							
				16.93	885.22		SM Silty SAND: medium to coarse grained, poorly graded, pale brown, silt is low plasticity. medium dense to dense.	XW			
	5	0		17			NO CORE 1.43m (17.00-18.43)				
				18							
	37	0		18.43	883.80		SM Silty SAND: medium to coarse grained, poorly graded, brown, silt is low plasticity. dense.	XW			
				18.82	883.41		NO CORE 1.41m (18.82-20.23)				
				19							
	50	0		20							

Comments

Checked GEM
Date 3/12/2024



BOREHOLE: BHUA-23

Project: Pioneer-Burdekin PHES

Position: Upper Reservoir

Sheet 4 OF 5

Location: Netherdale/Dalrymple Heights

Coords: 658226.1 m E 7668027.2 m N MGA2020-55

Client: Queensland Hydro

Surface RL: 902.16 m AHD

Date Started: 11/6/2024

Job No.: PS138693

Contractor: Twin Hills Drilling Drill Rig: Hanjin D&B-8D(D)

Date Completed: 4/7/2024

Inclination: -85° Direction: 081°

Logged: NW

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)
				20	20.23		NO CORE 1.41m (18.82-20.23)					
			50	882.01			METAGRANITE: coarse grained, mottled pale orange and pale brown, crystalline, massive, fabric shows metamorphic crystal reorientation.	HW		20.23-20.47: Jx6, 5°, SN, PR, RF		
				21	20.98		NO CORE 0.34m (20.98-21.32)			20.63-20.70: CZ 20.67-20.83: J, 80°, open SN, PR, SM 20.75: J, 5°, wh/br, UN, RF 20.82-20.85: J, 35°, PR, RF		
			77	881.26			NO CORE 0.34m (20.98-21.32)					
				22	21.32		METAGRANITE: coarse grained, mottled pale orange and pale brown, crystalline, massive, fabric shows metamorphic crystal reorientation.	HW		21.40-21.75: Jx5, 50°, bk, PR		
				23	880.92		METAGRANITE: coarse grained, mottled pale orange and pale brown, crystalline, massive, fabric shows metamorphic crystal reorientation.	HW		21.88: J, 90°, br, PR 22.00-22.18: FZ, highly fractured 22.24: J, 30°, SN, PR, RF 22.33: J, 35°, SN, PR, RF 22.38: J, 45°, SN, PR, RF		
				24	22.43		NO CORE 0.42m (22.43-22.85)					
			72	879.82			NO CORE 0.42m (22.43-22.85)					
				25	22.85		METAGRANITE: coarse grained, pale grey, pink, white, brown, crystalline, massive, fabric shows metamorphic crystal reorientation.	HW		23.00-23.17: Jx3, 20 - 30°, br SN, PR, RF 23.27: J, 45°, br SN, PR, RF 23.32: J, 20°, br SN, PR, RF 23.50: J, 25°, br SN, IR, RF 23.54-23.61: SS, recovered as Gravelly SAND, fine to medium grained, fine to coarse gravel, well sorted. 23.65: J, 50°, br SN, IR, RF 23.83: J, 10°, br SN, IR, RF 23.96: J, 10°, br SN, UN, RF 24.00-24.35: Jx6, 10 - 20°, br SN, IR, RF		
				26	879.40		METAGRANITE: coarse grained, pale grey, pink, white, brown, crystalline, massive, fabric shows metamorphic crystal reorientation.	HW				
			100	24.65			Pale brown and white, highly altered with numerous microfractures.			24.52: J, 50°, br SN, UN, RF 24.54: J, 20°, br SN, UN, RF 24.56: J, 10°, br SN, IR, RF 24.60: J, 45°, br SN, PR, RF 24.67-24.72: CS, possible drilling induced 24.73-24.85: Jx4, 50°, br SN, UN, RF 24.87-24.96: Jx2, 10 - 20°, br SN, UN, RF 25.00-25.20: CS, highly deformed, recovered as gravel 25.25: J, 30°, br SN, UN, RF 25.30: J, 40°, br SN, PR, RF 25.37-25.40: Jx2, 10 - 2°, br SN, UN, RF 25.45: J, 5°, br SN, UN, RF 25.57: J, 40°, br SN, PR, RF 25.79-25.84: CS 25.80-25.85: CS, highly fractured 25.95: J, 50°, open SN, PR, RF 26.00-26.40: Jx4, 10°, br SN, PR, RF		
				27	24.95		SM Gravelly SAND: medium to coarse grained, poorly graded, pale brown and white, gravel is medium to coarse grained, very dense to hard.	XW		26.50: J, 55°, br SN, PR, RF 26.55: J, 25°, br SN, PR, RF 26.57: J, 20°, br SN, PR, RF 26.60: J, 65°, br SN, PR, RF 26.72-26.76: Jx2, 20°, br SN, PR, RF 26.95: J, 50°, br SN, PR, RF 27.00-27.04: CS 27.13-27.17: CS 27.43-27.46: CS		
				28	25.20		METAGRANITE: coarse grained, pale orange brown pale grey, crystalline, massive, fabric shows metamorphic crystal reorientation.	HW				
			100	877.06			METAGRANITE: coarse grained, pale orange brown pale grey, crystalline, massive, fabric shows metamorphic crystal reorientation.	MW				
				29	26.95		Pale grey, pink, brown, highly deformed, with numerous fractures.	HW				
				30	27.45		SM Gravelly SAND: medium to coarse grained, poorly graded, pale orange brown, gravel is medium to coarse, recovered as sub-angular gravel. medium dense.	XW				
			0	874.81			NO CORE 0.37m (27.76-28.13)					
				31	27.76		METAGRANITE: medium to coarse grained, brown, pale grey to dark grey, crystalline, massive, with numerous microfractures, orange alteration, some pale green alteration along defects, fabric shows metamorphic crystal reorientation.	MW		28.13-28.18: CS 28.18-28.30: J, 10 - 20°, br SN, PR, RF 28.30: J, 60°, UN, RF 28.45: J, 30°, bk SN, PR 28.52-28.56: Jx2, 20 - 30°, SN, IR, RF 28.57: J, 10°, IR, RF 28.72: J, 30° 28.84-28.86: AZ, pale gn 28.90: J, 40°, br SN, PR, RF 28.92: J, 40°, IR, RF 29.29-29.31: Jx4, 5°, bk, RF 29.30-29.35: Jx2, 5 - 10°, br SN, UN, RF 29.34: J, 30°, PR, RF 29.35: J, 30°, wh, br VN, PR, RF 29.47: J, 50° 29.50: J, 30°, SN, PR, RF		
				32	28.13		NO CORE 0.37m (27.76-28.13)					
			100	874.14			METAGRANITE: medium to coarse grained, brown, pale grey to dark grey, crystalline, massive, with numerous microfractures, orange alteration, some pale green alteration along defects, fabric shows metamorphic crystal reorientation.	MW				
				33	29.33		Dark green grey, pink and brown, highly altered, with numerous microfractures, minor orange alteration, some pale green alteration along defects, fabric shows metamorphic crystal reorientation.	SW - FR				
				34	872.94		Dark green grey, pink and brown, highly altered, with numerous microfractures, minor orange alteration, some pale green alteration along defects, fabric shows metamorphic crystal reorientation.					
				35	30.00		Dark green grey, pink and brown, highly altered, with numerous microfractures, minor orange alteration, some pale green alteration along defects, fabric shows metamorphic crystal reorientation.					

Comments

Checked GEM

Date 3/12/2024



BOREHOLE: BHUA-23

Project: Pioneer-Burdekin PHES

Position: Upper Reservoir

Sheet 5 OF 5

Location: Netherdale/Dalrymple Heights

Coords: 658226.1 m E 7668027.2 m N MGA2020-55

Client: Queensland Hydro

Surface RL: 902.16 m AHD

Date Started: 11/6/2024

Job No.: PS138693

Contractor: Twin Hills Drilling Drill Rig: Hanjin D&B-8D(D)

Date Completed: 4/7/2024

Inclination: -85° Direction: 081°

Logged: NW

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			
HQ3	Groundwater Not Observed	100	89	30	872.27		METAGRANITE: medium to coarse grained, dark green grey, pink and brown, crystalline, massive, highly altered, with numerous microfractures, minor orange alteration, some pale green alteration along defects, fabric shows metamorphic crystal reorientation.	SW · FR		29.57: J, 25°, PR, RF 29.58: J, 10°, RF 29.65-29.67: AZ, pale gn, IR 29.75-29.90: Jx3, 60°, PR, RF 30.04: J, 25°, UN 30.15-30.23: AZ, pale gn 30.27: J, 55°, PR, RF 30.43: J, 35°, PR 30.82: J, 45°, PR 30.87: J, 45°, PR 31.12: J, 25°, IR, RF 31.18: J, 50° 31.31: J, RF 31.46: J, RF 31.50-31.60: CS 31.55: J, 60°, PR 31.60: J, 5°, IR, RF 31.65-31.74: AZ, yl-wh 31.80-31.90: FZ 31.98: J, 90°, PR, RF 32.01-32.05: FZ 32.25-32.30: J, 75°, x3, PR, RF 32.50: J, 90°, IR, RF 32.58: J, 85°, IR, RF 32.74: J, 60°, rd/or, PR, RF, red/orange/brown alteration 30mm either side of defect, iron staining 32.96-32.98: Jx2, 35°, PR			
		100	65	31						33.28: J, 80°, PR 33.35: J, 10°, PR, RF 33.60: J, 5°, IR, RF			
		100	85	33						33.94-33.96: J, 5°, IR, RF 34.08-34.13: J, 35°, x4, RF 34.25: J, 35°, RF, iron staining			
		100	82	35						34.58: J, 5°, UN, RF 34.68: J, 35°, PR, iron staining 34.90: J, 35° 34.97: J, 5°, RF 35.19: J, 65°, RF, iron staining 35.30-35.35: Jx20, yl, irregular joints iron staining 35.47: J, 15°, RF, iron staining 35.51: J, 35°, PR, RF, iron staining			
		100	100	36	36.00 866.30 36.20 866.10		Pale yellow green, pale brown and grey, highly altered. Dark green grey, pink and brown.	MW		35.85-36.00: J, 70°, PR, iron staining 36.10-36.18: J, 70°, PR 36.00-36.50: AZ, gn-or 36.38: J, 70° 36.50: J, 5°, IR, RF			
		100	100	37	36.70 865.60		Heavy iron staining	MW · SW		37.18: J, 5°, IR, RF, iron staining 37.31: J, 10°, ST, RF 37.42: J, 55°, PR 37.54: J, 55°, PR			
		100	72	38						37.85: J, 55°, PR, RF 37.95: J, 55°, open, PR, RF 38.21: J, 45°, UN 38.00-38.72: AZ, yl 38.45-38.70: J, 50°, x4, PR 38.56-38.67: J, 140°, x2, PR, RF 38.77: J, 15° 38.90: J, 5°, RF 38.86-38.98: AZ, yl 39.04: J, 40°, IR 39.22: J, 40°			
		100	100	39	39.20 863.11		Pale yellow green, pale brown and grey, highly altered, pale orange green alteration.			39.02-39.90: AZ, yl 39.75: J, 55°, RF			
		100	100	40	39.65 862.66 39.90 862.41		Dark green grey, pink and brown.						
		Comments						Hole Terminated at 39.90 m Target depth. Backfilled				Checked GEM Date 3/12/2024	



Pioneer Burdekin Pumped Hydro Energy Storage: Tranche 2 – BHUA-23
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-23	6.88	7.00			DB												recovered as fragmented rock
BHUA-23	7.18				J		80				PR						
BHUA-23	7.20				MB		10										
BHUA-23	7.45				J		15				PR						
BHUA-23	7.63	7.83			hJs	x8	70		br		PR						
BHUA-23	8.55	8.82			J	x7	5		br		PR						
BHUA-23	8.60				hJ		85		br		PR						
BHUA-23	8.90	8.95			hJ		80		br		PR						
BHUA-23	9.00	9.15			J	/BD x2	10				UN	RF					
BHUA-23	9.46				J		5		br		PR	RF					
BHUA-23	9.65				J		50		br		PR	RF					
BHUA-23	9.80	9.90			J	x5	65		br		PR						
BHUA-23	10.05	10.27			J	x11	55		br		PR						
BHUA-23	10.33				hJ		5				PR						
BHUA-23	10.50				hJ		90		br								
BHUA-23	12.43	12.57			FZ												recovered as gravel
BHUA-23	14.04				hJ		25		bk		PR						
BHUA-23	14.10	14.53			J	x5	5	10	bn	SN	PR	RF					
BHUA-23	14.53	14.70															recovered as gravel
BHUA-23	20.23	20.47			J	x6	5			SN	PR	RF					
BHUA-23	20.63	20.70			CZ												
BHUA-23	20.67	20.83			J		80		open	SN	PR	SM					
BHUA-23	20.75				J		5		wh/br		UN	RF					
BHUA-23	20.82	20.85			J		35				PR	RF					
BHUA-23	21.40	21.75			J	x5	50		bk		PR						
BHUA-23	21.88				J		90		br		PR						
BHUA-23	22.00	22.18			FZ												highly fractured
BHUA-23	22.24				J		30			SN	PR	RF					
BHUA-23	22.33				J		35			SN	PR	RF					
BHUA-23	22.38				J		45			SN	PR	RF					
BHUA-23	22.86	23.00			hJ		75			SN	UN						
BHUA-23	23.00	23.17			J	x3	20	30	br	SN	PR	RF					
BHUA-23	23.27				J		45		br	SN	PR	RF					
BHUA-23	23.32				J		20		br	SN	PR	RF					
BHUA-23	23.50				J		25		br	SN	IR	RF					
BHUA-23	23.54	23.61			SS												recovered as Gravelly SAND, fine to medium grained, fine to coarse gravel, well sorted.
BHUA-23	23.65				J		50		br	SN	IR	RF					
BHUA-23	23.70	27.82			hJ	x2	70	90	br	SN	UN						
BHUA-23	23.83				J		10		br	SN	IR	RF					
BHUA-23	23.93	25.43			hJ												mix of joints and healed joints at various dips. Material is fractured and broken. Intact pieces have many irregular and intersecting healed joints
BHUA-23	23.96				J		10		br	SN	UN	RF					
BHUA-23	24.00	24.35			J	x6	10	20	br	SN	IR	RF					
BHUA-23	24.52				J		50		br	SN	UN	RF					
BHUA-23	24.54				J		20		br	SN	UN	RF					
BHUA-23	24.56				J		10		br	SN	IR	RF					
BHUA-23	24.60				J		45		br	SN	PR	RF					
BHUA-23	24.67	24.72			CS												possible drilling induced
BHUA-23	24.73	24.85			J	x4	50		br	SN	UN	RF					
BHUA-23	24.87	24.96			J	x2	10	20	br	SN	UN	RF					
BHUA-23	25.00	25.20			CS												highly deformed, recovered as gravel
BHUA-23	25.25				J		30		br	SN	UN	RF					
BHUA-23	25.30				J		40		br	SN	PR	RF					
BHUA-23	25.37	25.40			J	x2	10	2	br	SN	UN	RF					
BHUA-23	25.43	26.93			hJ												mix of joints and healed joints at various dips. Material is fractured and broken. Intact pieces have many irregular and intersecting healed joints
BHUA-23	25.45				J		5		br	SN	UN	RF					
BHUA-23	25.57				J		40		br	SN	PR	RF					
BHUA-23	25.67				hJ		60		br	SN	UN						
BHUA-23	25.79	25.84			CS												
BHUA-23	25.80	25.85			CS												highly fractured
BHUA-23	25.95				J		50		open	SN	PR	RF					
BHUA-23	26.00	26.40			J	x4	10		br	SN	PR	RF					
BHUA-23	26.50				J		55		br	SN	PR	RF					
BHUA-23	26.55				J		25		br	SN	PR	RF					
BHUA-23	26.57				J		20		br	SN	PR	RF					
BHUA-23	26.60				J		65		br	SN	PR	RF					
BHUA-23	26.72	26.76			J	x2	20		br	SN	PR	RF					
BHUA-23	26.93	27.44			hJ	x3											
BHUA-23	26.95				J		50		br	SN	PR	RF					
BHUA-23	27.00	27.04			CS												
BHUA-23	27.13	27.17			CS												
BHUA-23	27.43	27.46			CS												
BHUA-23	27.50	27.76															recovered as gravel
BHUA-23	28.13	28.18			CS												
BHUA-23	28.18	28.30			J		10	20	br	SN	PR	RF					
BHUA-23	28.30				J		60				UN	RF					
BHUA-23	28.37	29.44			hJ												many healed joints at various dips. Irregular and intersecting. Pale green, orange,
BHUA-23	28.45				J		30		bk	SN	PR						



Pioneer Burdekin Pumped Hydro Energy Storage: Tranche 2 – BHUA-23
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-23	28.52	28.56			J	x2	20	30		SN	IR	RF					
BHUA-23	28.57				J		10				IR	RF					
BHUA-23	28.60	28.90			hJ	x10	20	45		SN	PR	RF					
BHUA-23	28.72				J		30										
BHUA-23	28.84	28.86			AZ				pale gn								
BHUA-23	28.90				J		40		br	SN	PR	RF					
BHUA-23	28.92				J		40				IR	RF					
BHUA-23	29.00	29.22			hJ	x5	30	50	br	SN	PR	RF					
BHUA-23	29.00	29.68			hJ		30		bk		IR						
BHUA-23	29.00	29.95			hJ	x3	25		bk		PR						
BHUA-23	29.23				hJ		20		wh	SN	UN	RF					
BHUA-23	29.29	29.31			J	x4	5		bk			RF					
BHUA-23	29.30	29.35			J	x2	5	10	br	SN	UN	RF					
BHUA-23	29.34				J		30				PR	RF					
BHUA-23	29.35				J		30		wh, br	VN	PR	RF					
BHUA-23	29.37	29.51			hJ	x6	15		pale gn								
BHUA-23	29.39				hJ		70		bk wh		PR						
BHUA-23	29.47				J		50										
BHUA-23	29.50				J		30			SN	PR	RF					
BHUA-23	29.54				hJ		70		pale gn		IR						
BHUA-23	29.56	30.10			hJ	x20	80		bk								
BHUA-23	29.57				J		25				PR	RF					
BHUA-23	29.58				J		10					RF					
BHUA-23	29.60				hJ		45		bk		PR						
BHUA-23	29.65	29.67			AZ				pale gn		IR						
BHUA-23	29.75	29.90			J	x3	60				PR	RF					
BHUA-23	30.04				J		25				UN						
BHUA-23	30.07	30.17			hJ	x7	10				PR						
BHUA-23	30.15	30.23			AZ				pale gn								
BHUA-23	30.27				J		55				PR	RF					
BHUA-23	30.35				hJ	x6	45		yl								
BHUA-23	30.38				hJ		90		yl		UN						
BHUA-23	30.42				hJ		30		wh								
BHUA-23	30.43				J		35				PR						
BHUA-23	30.46	30.79			hJ	x16	50		bk								
BHUA-23	30.50				hJ	x7	85		wh								
BHUA-23	30.82				J		45				PR						
BHUA-23	30.87				J		45				PR						
BHUA-23	30.90	31.16			hJ	x17	35		bk								
BHUA-23	31.00				hJ	x3	75		wh		IR						
BHUA-23	31.12				J		25				IR	RF					
BHUA-23	31.18				J		50										
BHUA-23	31.20	31.25			hJ	x3	80		wh								
BHUA-23	31.24	31.45			hJ	x17	50		bk								
BHUA-23	31.31				J							RF					
BHUA-23	31.40	31.41			hJ	x2	65		wh		PR						
BHUA-23	31.46				J							RF					
BHUA-23	31.50	31.60			CS												
BHUA-23	31.55				J		60				PR						
BHUA-23	31.60				J		5				IR	RF					
BHUA-23	31.65	31.74			AZ				yl-wh								
BHUA-23	31.80	31.90			FZ												
BHUA-23	31.90				hJ		45		wh		IR						
BHUA-23	31.95				hJ	x2	85		wh								
BHUA-23	31.98				J		90				PR	RF					
BHUA-23	32.01	32.05			FZ												
BHUA-23	32.05	32.30			hJ	x13	65		wh-bk		PR						
BHUA-23	32.06	32.07			hJ	x2	80		wh								
BHUA-23	32.15				hJ		25		bk		PR						
BHUA-23	32.25	32.30			J		75		x3		PR	RF					
BHUA-23	32.42	32.44			hJ	x2	65		wh		PR						
BHUA-23	32.45	32.47			hJ	x4	50		wh								
BHUA-23	32.47				hJ		25		wh		PR						
BHUA-23	32.50				J		90				IR	RF					
BHUA-23	32.58				J		85				IR	RF					
BHUA-23	32.64	32.80			hJ	x12	50		bk-yl		PR						
BHUA-23	32.74				J		60		rd/or		PR	RF					red/orange/brown alteration 30mm either side of defect, iron staining
BHUA-23	32.76	32.78			hJ	x4	35										
BHUA-23	32.82	32.83			hJ	x4	35		yl								
BHUA-23	32.96	32.98			J	x2	35				PR						
BHUA-23	32.97				hJ		70		yl		PR						
BHUA-23	33.04				hJ		35		yl		PR						
BHUA-23	33.09				hJ		85		yl								
BHUA-23	33.17	33.27			hJ	x15	60		pale gn, >15, intersecting								intersecting
BHUA-23	33.28				J		80				PR						
BHUA-23	33.35				J		10				PR	RF					
BHUA-23	33.41	33.59			hJ	x10	30		bk		PR						
BHUA-23	33.60				J		5				IR	RF					
BHUA-23	33.65	33.78			hJ	x4	65		bk		PR						



Pioneer Burdekin Pumped Hydro Energy Storage: Tranche 2 – BHUA-23
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-23	33.67				hJ		55		bk		PR						
BHUA-23	33.78				hJ		55		yl		PR						
BHUA-23	33.86				hJ		75		bk								
BHUA-23	33.88				hJ		20		yl		PR						
BHUA-23	33.90	33.94			hJ	x5	65		bk		PR						
BHUA-23	33.91				hJ		35		bk,		PR						
BHUA-23	33.94	33.96			J		5				IR	RF					
BHUA-23	33.96				hJ		50		yl								
BHUA-23	34.07				hJ		75		bk		IR						iron staining
BHUA-23	34.08	34.13			J		35		x4			RF					
BHUA-23	34.12				hJ		85		bk-yl		IR						
BHUA-23	34.20				hJ		90		bk								
BHUA-23	34.24	34.26			hJ	x3	25		yl		PR						
BHUA-23	34.25				J		35					RF					iron staining
BHUA-23	34.25	34.31			hJ	x4	55		bk-yl		PR						
BHUA-23	34.45	34.50			hJ	x6	85		bk								
BHUA-23	34.50				hJ		35		yl		PR						
BHUA-23	34.58				J		5				UN	RF					
BHUA-23	34.67	34.71			hJ	x5	55		yl								
BHUA-23	34.68				J		35				PR						iron staining
BHUA-23	34.80				hJ		20		yl								
BHUA-23	34.84	34.86			hJ	x3	55		yl		PR						
BHUA-23	34.90				J		35										
BHUA-23	34.95				hJ		55		yl		IR						
BHUA-23	34.96	34.99			hJ	x4	20		or								
BHUA-23	34.97				J		5					RF					
BHUA-23	34.98				hJ		80		bk		PR						
BHUA-23	35.05				hJ		25		yl								
BHUA-23	35.05	35.19			hJ	x8	40		bk		PR						
BHUA-23	35.08				hJ		70		yl								
BHUA-23	35.19				J		65					RF					iron staining
BHUA-23	35.24				hJ	x3	70		yl		PR						
BHUA-23	35.30	35.35			J	x20			yl								irregular joints iron staining
BHUA-23	35.47				J		15					RF					iron staining
BHUA-23	35.51				J		35				PR	RF					iron staining
BHUA-23	35.55				hJ		90		bk								
BHUA-23	35.56				hJ		40		bk		PR						
BHUA-23	35.61				hJ		40		bk								
BHUA-23	35.63				hJ		35		bk		IR						
BHUA-23	35.64	35.67			hJ	x2	30		bk		PR						
BHUA-23	35.77				hJ		90		bk		IR						
BHUA-23	35.80				hJ		90		bk		IR						
BHUA-23	35.85	36.00			J		70				PR						iron staining
BHUA-23	35.86	35.90			hJ	x8	40		bk								
BHUA-23	36.00	36.50			AZ				gn-or								
BHUA-23	36.10	36.18			J		70				PR						
BHUA-23	36.38				J		70										
BHUA-23	36.50				J		5				IR	RF					
BHUA-23	36.53				hJ		30		gn								
BHUA-23	36.55				hJ		80		gn		IR						
BHUA-23	36.55	36.95			hJ	x25	50		gn		PR						iron staining
BHUA-23	36.75				hJ	x5	90		bk								iron staining
BHUA-23	36.90				hJ		75		bk								
BHUA-23	37.00	37.03			hJ		55		gn		IR						
BHUA-23	37.05				hJ		70		gn		IR						
BHUA-23	37.10				hJ		80		or-br		IR						
BHUA-23	37.12				hJ		70		gn								
BHUA-23	37.18				J		5				IR	RF					iron staining
BHUA-23	37.20	37.40			hJ	x9	50		or-gn								iron staining
BHUA-23	37.31				J		10				ST	RF					
BHUA-23	37.40				hJ		60		or								
BHUA-23	37.42				J		55				PR						
BHUA-23	37.45	37.97			hJ	x41	55		bk-yl		PR						
BHUA-23	37.48				hJ		55		bk		PR						
BHUA-23	37.49				hJ		90		bk		IR						
BHUA-23	37.54				J		55				PR						
BHUA-23	37.65				hJ		60		bk		PR						
BHUA-23	37.78				hJ		40		wh-bk								
BHUA-23	37.85				J		55				PR	RF					
BHUA-23	37.95				J		55		open		PR	RF					
BHUA-23	38.00	38.35			hJ	x30	30		bk-yl								
BHUA-23	38.00	38.72			AZ				yl								
BHUA-23	38.15				hJ		60		bk-wh		PR						
BHUA-23	38.21				J		45				UN						
BHUA-23	38.27				hJ		75		bk-wh		PR						
BHUA-23	38.45	38.70			J		50		x4		PR						
BHUA-23	38.56	38.67			J		140		x2		PR	RF					
BHUA-23	38.77				J		15										
BHUA-23	38.81	38.86			hJ	x4	60		yl								



Pioneer Burdekin Pumped Hydro Energy Storage: Tranche 2 – BHUA-23
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-23	38.86	38.98			AZ				yl								
BHUA-23	38.90				J		5					RF					
BHUA-23	39.02	39.90			AZ				yl								
BHUA-23	39.04				J		40				IR						
BHUA-23	39.22				J		40										
BHUA-23	39.75				J		55					RF					

Preliminary

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PointID : BHUA-23 Depth Range: 6.00 - 10.00 m



PointID : BHUA-23 Depth Range: 10.00 - 14.00 m

	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHUA-23	DRAWN RC	DATE 25/11/2024
		CHECKED GEM	DATE 4/12/2024
		SCALE Not To Scale	A4
		PROJECT No PS138693	FIGURE No 1/5

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PointID : BHUA-23 Depth Range: 14.00 - 18.00 m



PointID : BHUA-23 Depth Range: 18.00 - 22.00 m

	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHUA-23	DRAWN RC	DATE 25/11/2024
		CHECKED GEM	DATE 4/12/2024
		SCALE Not To Scale	A4
		PROJECT No PS138693	FIGURE No 2/5

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PointID : BHUA-23 Depth Range: 22.00 - 26.00 m



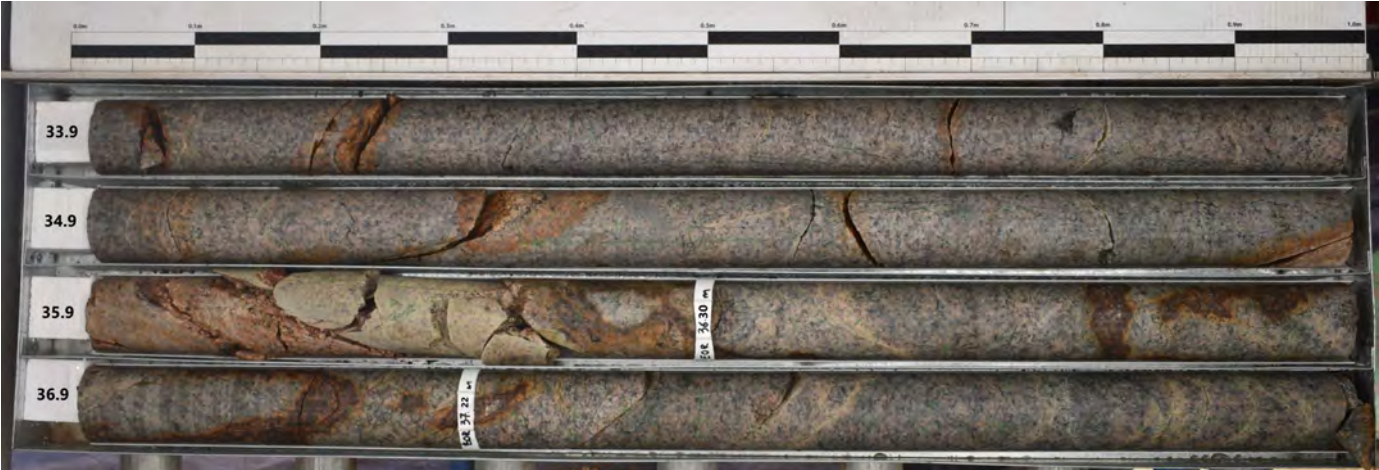
PointID : BHUA-23 Depth Range: 26.00 - 29.90 m

	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHUA-23	DRAWN RC	DATE 25/11/2024
		CHECKED GEM	DATE 4/12/2024
		SCALE Not To Scale	A4
		PROJECT No PS138693	FIGURE No 3/5

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PointID : BHUA-23 Depth Range: 29.90 - 33.90 m



PointID : BHUA-23 Depth Range: 33.90 - 37.90 m

	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHUA-23	DRAWN RC	DATE 25/11/2024		
		CHECKED GEM	DATE 4/12/2024		
		SCALE Not To Scale			A4
		PROJECT No PS138693		FIGURE No 4/5	



PointID : BHUA-23 Depth Range: 37.90 - 39.90 m

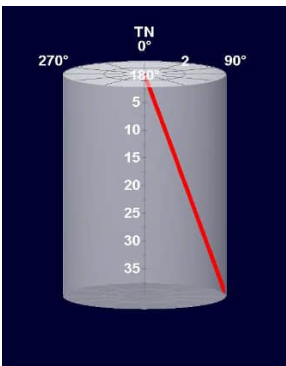
	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHUA-23	DRAWN RC	DATE 25/11/2024
		CHECKED GEM	DATE 4/12/2024
		SCALE Not To Scale	A4
		PROJECT No PS138693	FIGURE No 5/5



BHUA-23 Structural Logs



PROJECT:	Pioneer-Burdekin PHES	JOB #	PS138693
CLIENT:	Queensland Hydro	DATE:	19/11/2024



NOTES

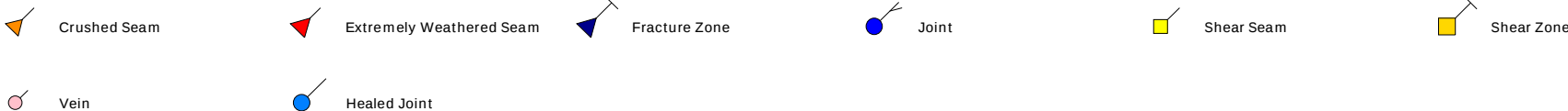
LOGGED BY: JH
LOGGED DATE: 18/06/2024
DRAWN BY: GH/JH
REVIEWED BY: GH
FILE: BHUA-23_Struct_Rev
LOGGED DEPTH: 39.8 m

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

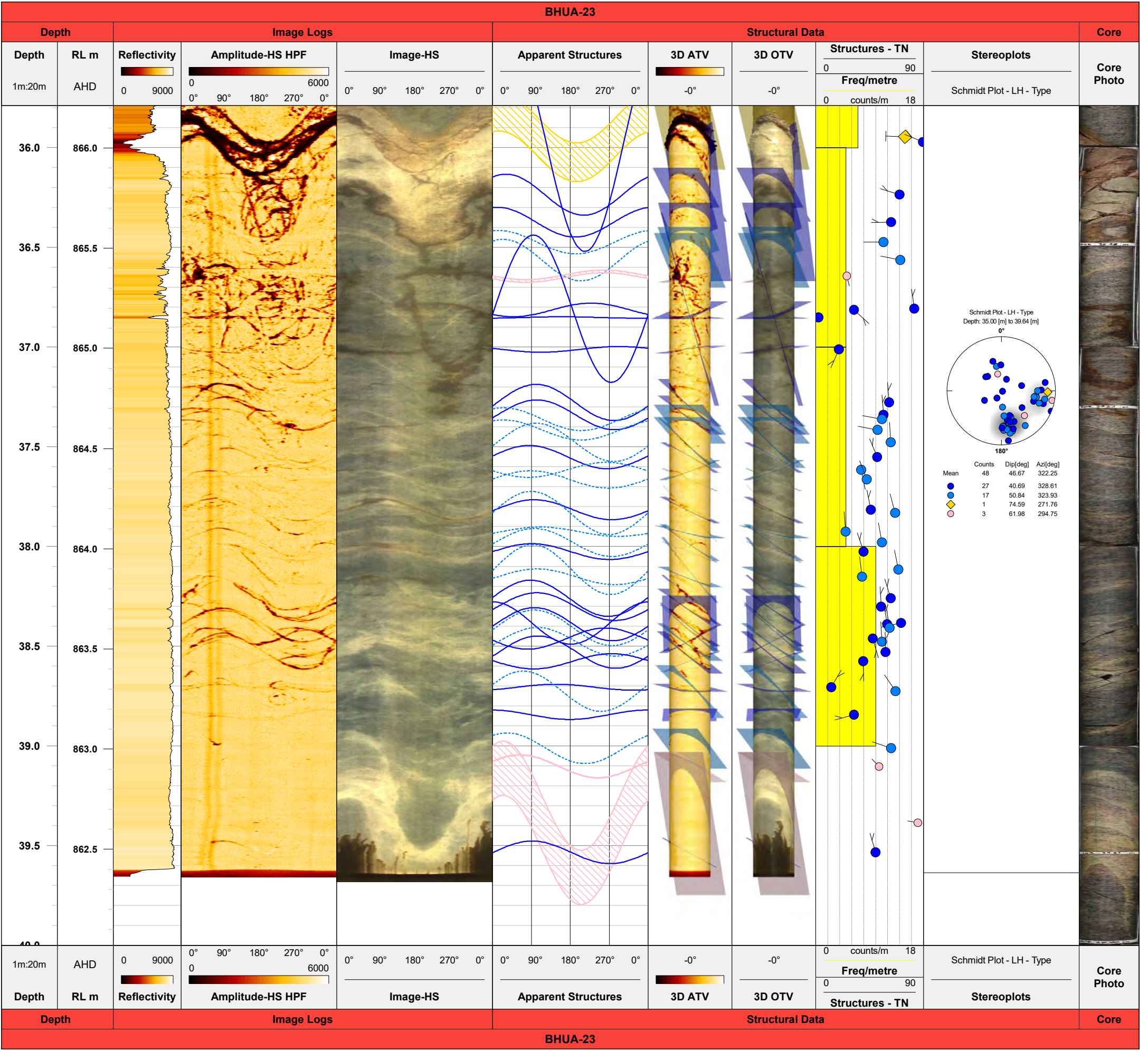
Mechanical calliper log used for structure dip corrections.

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

INTERPRETED STRUCTURES



Depth		Image Logs			BHUA-23							Structural Data		Core
Depth	RL m	Reflectivity	Amplitude-HS HPF	Image-HS	Apparent Structures	3D ATV	3D OTV	Structures - TN	Stereoplots	Core Photo				
1m:20m	AHD	09000	06000	0°90°180°270°0°	0°90°180°270°0°	-0°	-0°	090	Schmidt Plot - LH - Type	Core Photo				
								018						
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Depth

Depth

1m:20m

RL m

AHD

Reflectivity

09000

Amplitude-HS HPF

06000

Image-HS

0°90°180°270°0°

Apparent Structures

0°90°180°270°0°

3D ATV

-0°

3D OTV

-0°

Structures - TN

090

Freq/metre

0counts/m18

Stereoplots

Schmidt Plot - LH - Type

Core

Core Photo

Depth

Depth

1m:20m

RL m

AHD

Reflectivity

09000

Amplitude-HS HPF

06000

Image-HS

0°90°180°270°0°

Apparent Structures

0°90°180°270°0°

3D ATV

-0°

3D OTV

-0°

Structures - TN

090

Freq/metre

0counts/m18

Stereoplots

Schmidt Plot - LH - Type

Core

Core Photo



BHUA-23 Composite Logs



PROJECT:	Pioneer-Burdekin PHES	JOB #	PS138693
CLIENT:	Queensland Hydro	DATE:	19/11/2024

JOB # PS138693

DATE: 19/11/2024

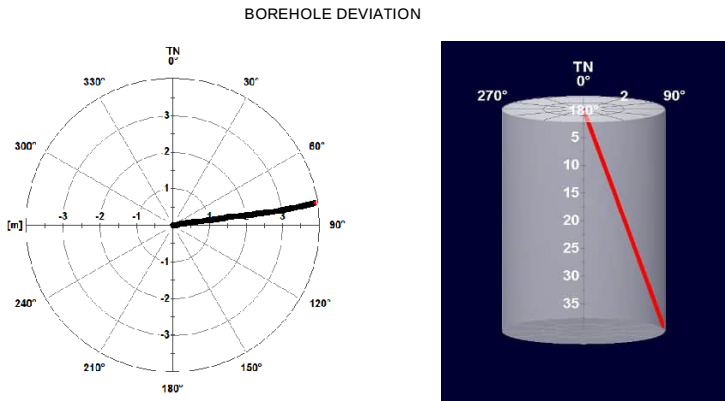
NOTES

Image logs are oriented relative to borehole high side. 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.

P-wave velocity assessed using first principles due to low semblance values in slow formations.



Crushed Seam Extremely Weathered Seam Fracture Zone Joint Shear Seam Shear Zone

Vein Healed Joint

BHUA-23														
Depth	Image Logs			Calliper	Structural Logs			Sonic Logs	Gamma Logs			Electrical Logs		
Depth	Amplitude-HS HPF 5006000 0° 90° 180° 270° 0°	Image-HS 0° 90° 180° 270° 0°	Reflectivity 09000	CAL 80mm160	Structures - TN	3D ATV	Core	Vp (Rx1-Rx3) 1000m/s7000	GR 0API250	U	N16	Ma16		
					Freq/metre 0counts/m18	-0° 		0ppm10		100Ohm.m10000	0ms100			
1m:50m								Vs 1000m/s7000		0%10	100Ohm.m10000	Ma64 0ms100		
										0ppm20	100Ohm.m10000			
16														
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26														
27														
28														
1m:50m	0° 90° 180° 270° 0° 5006000	0° 90° 180° 270° 0°	09000	80mm160	0counts/m18 Freq/metre	-0°		1000m/s7000 Vs	0API250	Th 0ppm20 K 0%10 U 0ppm10	N8 100Ohm.m10000 N32 100Ohm.m10000 N16 100Ohm.m10000	Ma64 0ms100 Ma16 0ms100		
Depth	Image Logs	Calliper	Structural Logs	Sonic Logs	Gamma Logs	Electrical Logs								

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