BOREHOLE: BHL-10

Project:	Pioneer-Burdekin PHES	Position:	Lower Reservoir	Sheet	1 of 5
Location:	Netherdale/Dalrymple Heights	Coords:	660230.8 m E 7660541.5 m N MGA2020-55		
Client:	Queensland Hydro	Surface RL:	199.6 m AHD	Date Started:	27/9/2023
Job No.:	PS138693	Contractor:	Twin Hills Engineering & Drilling Drill Rig: Hanjin D&B-8DTM	Date Completed:	3/10/2023
		Inclination:	87° Direction: 028°	Logged:	SB

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	F	Groundwater Not Encountered	0	199.56				SC	Clayey SAND: medium grained, pale brown, clay is medium plasticity; with coarse gravel.			Inferred RESIDUAL SOIL 0.00-1.50: the depth interval was not logged due to installing outer drilling casing during establishment of the borehole.
			1									
				1.50								
				201.06	SPT 1.50-1.77 m 30,20/120mm HB N=R D 1.50-1.68 m PB-BHL-10-001 SPTLS 1.50-1.68 m PB-BHL-10-001			SC	Clayey SAND: medium grained, pale brown, clay is low to medium plasticity; with coarse gravel.			
			2									
				3.00								
			3	202.56	SPT 3.00-3.11 m 33/110mm HB N=R D 3.00-3.11 m PB-BHL-10-002 SPTLS 3.00-3.11 m PB-BHL-10-002			SM	Silty SAND: medium grained, pale brown, with low plasticity clay; with medium gravel.	D		
			4									
				4.50								
WB	E	Groundwater Not Observed		204.05					Sand is medium to coarse grained.			
				5.00								
			5	204.55	SPT 5.00-5.13 m 50/130mm HB N=R D 5.00-5.13 m PB-BHL-10-003 SPTLS 5.00-5.13 m PB-BHL-10-003				Yellow brown, sand is fine to coarse grained, with fine gravel.		VD	
				6.00								
			6	205.55	SPT 6.00-6.14 m 50/140mm HB N=R D 6.00-6.14 m PB-BHL-10-004 SPTLS 6.00-6.14 m PB-BHL-10-004			SP	Gravelly SAND: coarse grained, yellow brown, gravel is fine, sub-angular; with low plasticity clay.			
			7									
				7.58								
									Continued as Cored Borehole			
			8									
			9									
			10									

Comments

Checked GEM

Date 19/10/2024

BOREHOLE: BHL-10

		Position:	Lower Reservoir	Sheet	2 OF 5
Project:	Pioneer-Burdekin PHES	Coords:	660230.8 m E 7660541.5 m N MGA2020-55		
Location:	Netherdale/Dalrymple Heights	Surface RL:	199.6 m AHD	Date Started:	27/9/2023
Client:	Queensland Hydro	Contractor:	Twin Hills Engineering & Drilling Drill Rig: Hanjin D&B-8DTM	Date Completed:	3/10/2023
Job No.:	PS138693	Inclination:	87° Direction: 028°	Logged:	SB

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH (MPa) ■ - UCS VL 2 L 6 M 20 H 60 VH 200 EH	DEFECT DESCRIPTION & Additional Observations (Core partings shown - refer to Detailed Defect Descriptions table for all logged features)	AVERAGE DEFECT SPACING (mm) 10 30 100 300 1000 3000
				0							
				1							
				2							
				3							
				4							
				5							
				6							
				7							
					7.58		Continuation from non-cored borehole				
HQ3	Groundwater Not Observed	65	0	8	207.13 *7.96* 207.51		NO CORE 0.38m (7.58-7.96) SW Gravelly SAND: medium to coarse grained, brown orange, gravel is fine; (RESIDUAL SOIL). very dense.				
		100	0	9	*8.65* 208.23		ML Sandy SILT: non plastic, orange brown grey, sand is fine grained; with low plasticity clay; trace fine gravel; (RESIDUAL SOIL). stiff. SW Gravelly SAND: medium to coarse grained, brown orange, gravel is fine; with low plasticity clay; (EXTREMELY WEATHERED MATERIAL). very dense.				
				10							

Comments

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Date 19/10/2024

BOREHOLE: BHL-10

Project:	Pioneer-Burdekin PHES	Position:	Lower Reservoir	Sheet	3 OF 5
Location:	Netherdale/Dalrymple Heights	Coords:	660230.8 m E 7660541.5 m N MGA2020-55		
Client:	Queensland Hydro	Surface RL:	199.6 m AHD	Date Started:	27/9/2023
Job No.:	PS138693	Contractor:	Twin Hills Engineering & Drilling Drill Rig: Hanjin D&B-8DTM	Date Completed:	3/10/2023
		Inclination:	87° Direction: 028°	Logged:	SB

Drilling						Field Material Description					Defect Information	
METHOD	WATER	TCR	RQD	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH (MPa) ■ - UCS VL -2 L -6 M -20 H -60 VH -200 EH	DEFECT DESCRIPTION & Additional Observations (Core partings shown - refer to Detailed Defect Descriptions table for all logged features)	AVERAGE DEFECT SPACING (mm) 10 30 100 300 1000 3000
HQ3	Groundwater Not Observed	100	0	10	10.18						
					209.73		NO CORE 0.57m (10.18-10.75)				
					10.75						
		62	0	11	210.30		SW Gravelly SAND: medium to coarse grained, brown orange with dark brown, gravel is fine to medium; with low plasticity clay; (EXTREMELY WEATHERED MATERIAL). very dense.				
					11.85						
		100	0	12	211.39		Coarse.				
					12.10						
					211.64		NO CORE 0.30m (12.10-12.40)				
					12.40						
		72	0		211.94		SW Gravelly SAND: medium to coarse grained, brown orange with dark brown, gravel is fine; trace medium plasticity clay; (EXTREMELY WEATHERED MATERIAL). very dense.				
					12.72						
				13	212.26		With medium plasticity clay.				
					13.10						
					13.18		Trace low plasticity clay.				
					212.72						
		62	0		13.41		NO CORE 0.23m (13.18-13.41)				
					212.95		SW Gravelly SAND: medium to coarse grained, brown orange and dark brown, gravel is fine; with low plasticity clay; (EXTREMELY WEATHERED MATERIAL). very dense.				
					13.78						
				14	213.32		Coarse, brown orange and dark brown with red-brown, trace low plasticity clay.				
		100	0								
					14.68						
					214.22		Medium to coarse, brown orange and dark brown.				
		100	0	15							
				16							
		100	0	17							
					17.37						
					17.50		QUARTZ LATITE: fine to medium grained, dark grey with pale grey, crystalline, massive.	SW		17.38-17.48: J, 35 - 55°, PR, RF, very closely spaced 17.48: J, 55°, PR 17.53: J, 60°, PR 17.55: J, 55°, PR 17.57-17.66: CS, recovered as fine to medium angular gravel	
					217.04		GRANITE: medium grained, dark grey with mottled pale grey and pink, crystalline, massive, slight hematite alteration.				
		100	100	18						18.42: J, 60°, CN, PR, SM 18.58: J, 60°, CN, PR, SM	
		100	100	19						19.05: J, 35°, wh mi, PR	
		100	95							19.50: J, 60°, wh mi with rd or alt CT, PR, RF 19.54: J, 60°, PR, slight or rd weathering 19.57: J, 70°, rd mi CN, PR, rd alteration halo <1mm	
				20	20.00						

Comments

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Date 19/10/2024

BOREHOLE: BHL-10

Project:	Pioneer-Burdekin PHES	Position:	Lower Reservoir	Sheet	4 OF 5
Location:	Netherdale/Dalrymple Heights	Coords:	660230.8 m E 7660541.5 m N MGA2020-55		
Client:	Queensland Hydro	Surface RL:	199.6 m AHD	Date Started:	27/9/2023
Job No.:	PS138693	Contractor:	Twin Hills Engineering & Drilling Drill Rig: Hanjin D&B-8DTM	Date Completed:	3/10/2023
		Inclination:	87° Direction: 028°	Logged:	SB

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH (MPa) ■ - UCS	DEFECT DESCRIPTION & Additional Observations (Core partings shown - refer to Detailed Defect Descriptions table for all logged features)	AVERAGE DEFECT SPACING (mm)
HQ3	Groundwater Not Observed	100	95	20	219.53		GRANITE: medium grained, dark grey with mottled pale grey and pink, crystalline, massive, slight hematite alteration.	SW		20.18: J, 30°, CN, PR, SM 20.36: J, 35°, CN, PR, SM 20.55: J, 60°, wh mi with gr alt VN, PR, RF, alteration halo up to 3mm	
		100	100								
		100	100	21							
					21.90						
				22	221.43		Dark grey with grey, alteration halo with darker minerals along some defects.	FR		22.56: J, 45°, CN, PR, RF	
		100	100		23.00						
				23	222.53		Fine to medium grained, dark grey and with mottled pale grey and pink, slight hematite alteration.			23.22: J, 45°, CN, PR, RF 23.28: J, 30°, CN, IR, RF 23.40-24.00: PLT (A) Is 50 = 0.52MPa (W) : PLT (D) Is 50 = 0.55MPa (W) 23.39: J, 45°, CN, PR 23.64: J, 10°, CN, PR, SM	
		100	100		24.00						
				24	223.53		Dark grey with grey, dark mineral alteration halos around some defects.			24.05: J, 15°, CN, PR, RF 24.30: J, 75°, wh mi CT, PR	
		100	100								
				25						24.81: J, 45°, wh mi VN, IR	
					25.15						
					224.68		Medium to coarse grained, dark grey mottled with pale grey and pink.			25.23: J, 40°, wh mi VN, PR, RF 25.34: J, 20°, CN, PR, SM	
		100	93	26						25.78: J, 10°, IR, RF 26.04: J, 40°, CN, PR, SM	
										26.34: J, 5°, CN, PR, RF 26.41: J, 30°, CN, PR, RF	
				27						26.84: J, 10°, PR, RF 27.12: J, 50°, wh mi VN, PR, RF	
		100	100							27.37: J, 50°, wh mi VN, PR, RF 27.50: J, 40°, CN, IR	
				28						27.76: J, 40°, wh mi VN, PR, RF	
					28.50					28.30: J, 60°, VN, PR, RF 28.36: J, 60°, wh mi VN, PR, RF 28.52: J, 50°, wh mi CT, PR, RF	
					228.02		Dark grey with mottled grey green and yellow brown, grey green-yellow brown alteration minerals.				
					28.80						
		100	87	29	228.32		Dark grey mottled with pale grey and pink, pink alteration mineral along some defects, green alteration mineral present.	SW		28.82: Jx2, 20 - 30°, dk mi SN, IR, RF 29.36: J, 10°, IR 29.56: J, 50°, wh and pk mi with gr-gy alt CT, PR, RF, alteration up to 12mm 29.78: J, 5°, CN, PR, RF	
		100	100								
				30	30.00						

Comments

Checked GEM

Date 19/10/2024

BOREHOLE: BHL-10

Project:	Pioneer-Burdekin PHES	Position:	Lower Reservoir	Sheet	5 OF 5
Location:	Netherdale/Dalrymple Heights	Coords:	660230.8 m E 7660541.5 m N MGA2020-55		
Client:	Queensland Hydro	Surface RL:	199.6 m AHD	Date Started:	27/9/2023
Job No.:	PS138693	Contractor:	Twin Hills Engineering & Drilling Drill Rig: Hanjin D&B-8DTM	Date Completed:	3/10/2023
		Inclination:	87° Direction: 028°	Logged:	SB

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH (MPa) ■ - UCS	DEFECT DESCRIPTION & Additional Observations (Core partings shown - refer to Detailed Defect Descriptions table for all logged features)	AVERAGE DEFECT SPACING (mm)
HQ3	Groundwater Not Observed	100	100	30	229.52		GRANITE: medium to coarse grained, dark grey mottled with pale grey and pink, pink alteration mineral along some defects, green alteration mineral present.	SW		29.92: J, 60°, CN, PR, SM, fractured in aplite vein 29.95: J, 60°, CN, PR, SM, fractured in aplite vein 30.00-30.35: PLT (A) Is 50 = 2.00MPa (W) : PLT (D) Is 50 = 8.00MPa (M) 30.35: J, 30°, CN, PR, RF	
		100	100								
				31	*31.18*						
					230.70		Grey black, red alteration.	FR			
		100	95	32							
										32.66: J, 25°, CN, PR, RF 32.72: J, 25°, CN, CU, SM 32.77: J, 70°, CN, IR, SM 32.98: J, 60°, CN, PR, SM 33.10-33.15: J, 60°, SN, ST, SM, very closely spaced 33.20: J, 45°, CT, UN, SM, minor veining oblique to contact 33.40: J, 70°, CN, ST, RF	
		100	100	33							
										33.77: J, 75°, CT, UN, SM, minor cross qtz veining	
				34						33.95: J, 45°, PR, SM, qtz vein on contact 10mm 34.05: J, 60°, CN, PR, SM 34.15: J, 50°, CN, UN, SM 34.30: J, 30°, CN, UN, SM 34.45: J, 50°, CN, CU, SM	
										34.65: J, 25°, VN, UN, SM	
				35						34.95: J, 50°, CU, SM, qtz infill 1mm 35.10: J, 70°, CN, PR, SM 35.20-35.70: PLT (A) Is 50 = 6.20MPa (W) : PLT (D) Is 50 = 6.80MPa (M)	
		100	95								
										35.55: J, 25°, CN, UN, SM	
				36	*36.08*					35.75: J, 30°, CN, CU, SM, 1mm qtz infill trace Fs	
					235.59		Hole Terminated at 36.08 m Target depth. Standpipe Piezometer Installed.				
				37							
				38							
				39							
				40							

Comments

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Date 19/10/2024

Pioneer-Burdekin Pumped Hydro Energy Scheme: Tranche 1 – BHL-10 Defects List

Refer to Explanatory Notes sheets for abbreviation definitions

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
BHL-10	14.70	17.37															Relict joints observed in extremely weathered material
BHL-10	17.38	17.48			J		35	55			PR	RF				very closely	
BHL-10	17.48				J		55				PR						
BHL-10	17.53				J		60				PR						
BHL-10	17.55				J		55				PR						
BHL-10	17.57	17.66			CS												recovered as fine to medium angular gravel
BHL-10	17.75				hJ		75		wh mi		PR						
BHL-10	18.01				hJ		35			CN	PR	SM					
BHL-10	18.42				J		60			CN	PR	SM					
BHL-10	18.58				J		60			CN	PR	SM					
BHL-10	18.66				HB												
BHL-10	19.05				J		35		wh mi		PR						
BHL-10	19.18	20.00			hJ		90		wh mi		PR						
BHL-10	19.24				hJ		50		wh mi		PR						
BHL-10	19.41				hJ		90		wh mi		PR						
BHL-10	19.50				J		60		wh mi with rd or alt	CT	PR	RF					
BHL-10	19.54				J		60				PR						slight or rd weathering
BHL-10	19.57				J		70		rd mi	CN	PR						rd alteration halo <1mm
BHL-10	19.62				hJ		75		wh mi		PR						
BHL-10	19.70				HB												
BHL-10	19.94				hJ		75		wh mi		PR						
BHL-10	20.11				hJ		90		wh mi		PR						
BHL-10	20.18				J		30			CN	PR	SM					
BHL-10	20.19				hJ						PR						
BHL-10	20.30				HB												
BHL-10	20.32				hJ		90		wh mi		PR						
BHL-10	20.36				J		35			CN	PR	SM					
BHL-10	20.41				hJ		60		wh mi		PR						
BHL-10	20.52				hJ		50		wh mi		PR						
BHL-10	20.54				hJ		90		wh mi		PR						
BHL-10	20.55				J		60		wh mi with gr alt	VN	PR	RF					alteration halo up to 3mm
BHL-10	20.58				hJ		50		wh mi		PR						
BHL-10	20.64				hJ		65		wh mi		PR						
BHL-10	20.80				hJ		65				PR						
BHL-10	20.89				hJ		40				PR						
BHL-10	21.53				hJ		45		dk mi		PR						alteration halo up to 3mm
BHL-10	21.96				V		55		dk gy mi		PR	RF					weathered infill
BHL-10	22.06				hJ		55		wh mi		PR						
BHL-10	22.10				hJ		85		wh mi		PR						
BHL-10	22.13				hJ		80		wh mi		IR						
BHL-10	22.15				hJ				wh mi		IR						
BHL-10	22.18				hJ		60		wh mi		PR						
BHL-10	22.23	24.80			hJ		60		wh mi		IR						
BHL-10	22.25				hJ		90		wh mi		PR						
BHL-10	22.40				hJ		70		wh mi		PR						
BHL-10	22.50				hJ		50		wh mi		PR						
BHL-10	22.55				hJ		45				PR						
BHL-10	22.56				J		45			CN	PR	RF					
BHL-10	22.83				hJ		85				PR						
BHL-10	22.88				hJ		70				PR						
BHL-10	22.90				hJ		70				PR						
BHL-10	22.98				DB												
BHL-10	23.12				hJ		60		wh mi with dk mi alt		PR						alteration halo up to 2mm.
BHL-10	23.13	23.38			hJ		85		dk mi with wh alt		PR						alteration halo up to 3mm.
BHL-10	23.22				J		45			CN	PR	RF					
BHL-10	23.28				J		30			CN	IR	RF					
BHL-10	23.39				J		45			CN	PR						
BHL-10	23.40	23.57			hJ		90				PR						
BHL-10	23.64				J		10			CN	PR	SM					
BHL-10	23.67				hJ		65				PR						
BHL-10	23.70				hJ		20				PR						
BHL-10	23.73				hJ		20				PR						
BHL-10	23.86				hJ		70				PR						
BHL-10	23.95				hJ		80				PR						
BHL-10	24.05				J		15			CN	PR	RF					
BHL-10	24.18				hJ		50		wh mi		PR						
BHL-10	24.20				hJ				pk and wh mi alt		IR						incipient, alteration halo, up to 2mm.
BHL-10	24.22				hJ		55				PR						
BHL-10	24.23				hJ		55		wh mi		PR						
BHL-10	24.26				hJ		40		wh mi with dk mi halo		PR						dark mineral halo up to 2mm
BHL-10	24.30				J		75		wh mi	CT	PR						
BHL-10	24.40	24.54			hJ		80				PR						incipient
BHL-10	24.42				hJ		40				PR						
BHL-10	24.45				hJ		50		dk mi		PR						
BHL-10	24.50				hJ		50				PR						
BHL-10	24.54				hJ		30				PR						
BHL-10	24.64				HB												
BHL-10	24.66				hJ		40		dk mi		PR						
BHL-10	24.67				hJ		20				PR						

Pioneer-Burdekin Pumped Hydro Energy Scheme: Tranche 1 – BHL-10 Defects List

Refer to Explanatory Notes sheets for abbreviation definitions

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
BHL-10	24.74				hJ		20		wh mi		PR						
BHL-10	24.78				hJ		40		wh mi		PR						
BHL-10	24.81				J		45		wh mi	VN	IR						
BHL-10	25.00	25.07			V		50		pk and wh mi		PR	RF					coarse grain mineral up to 20 mm, aplite.
BHL-10	25.08				hJ		40				PR						
BHL-10	25.14				hJ						PR						
BHL-10	25.23				J		40		wh mi	VN	PR	RF					
BHL-10	25.34				J		20			CN	PR	SM					
BHL-10	25.57				hJ		40				PR						
BHL-10	25.64				hJ		50		dk mi		PR						
BHL-10	25.78				J		10				IR	RF					
BHL-10	25.78	29.00			hJ		80		wh mi		PR						
BHL-10	26.04				J		40			CN	PR	SM					
BHL-10	26.15				hJ		70				PR						
BHL-10	26.34				J		5			CN	PR	RF					
BHL-10	26.36				hJ		15				PR						
BHL-10	26.41				J		30			CN	PR	RF					
BHL-10	26.52				hJ		40				PR						
BHL-10	26.56				hJ						IR						incipient
BHL-10	26.67				hJ		50		dk mi		PR						
BHL-10	26.84				J		10				PR	RF					
BHL-10	27.12				J		50		wh mi	VN	PR	RF					
BHL-10	27.19				hJ		60				PR						
BHL-10	27.23				hJ		50				PR						
BHL-10	27.24				hJ		50				PR						
BHL-10	27.26				hJ		40				PR						
BHL-10	27.30				hJ		50				PR						
BHL-10	27.33				hJ		40				PR						
BHL-10	27.35				hJ		60				PR						
BHL-10	27.37				J		50		wh mi	VN	PR	RF					
BHL-10	27.41				hJ		50				PR						
BHL-10	27.42				hJ		40		dk mi	SN	PR	RF					
BHL-10	27.45				hJ		30				PR						
BHL-10	27.46				hJ		50				PR						
BHL-10	27.47				hJ		50		wh mi		PR						
BHL-10	27.50				J		40			CN	IR						
BHL-10	27.55				hJ		50				PR						
BHL-10	27.57				hJ		50				PR						
BHL-10	27.60				hJ		50				PR						
BHL-10	27.65				hJ		70				PR						
BHL-10	27.71				hJ		80				PR						
BHL-10	27.76				J		40		wh mi	VN	PR	RF					
BHL-10	27.80				hJ		60										
BHL-10	27.83				hJ		60		wh mi		PR						
BHL-10	28.07				hJ		60		wh mi		PR						
BHL-10	28.16				hJ		5		dk mi	CN	PR	SM					
BHL-10	28.25				hJ		45				PR						
BHL-10	28.30				J		60			VN	PR	RF					
BHL-10	28.35				hJ		40				PR						
BHL-10	28.36				J		60		wh mi	VN	PR	RF					
BHL-10	28.39				hJ		40				PR						
BHL-10	28.42				hJ		50		dk mi		PR						
BHL-10	28.45				hJ		20		wh mi		PR						
BHL-10	28.48				hJ		70		wh mi		PR						
BHL-10	28.52				J		50		wh mi	CT	PR	RF					
BHL-10	28.54	28.67			hJ		80		wh mi		PR						
BHL-10	28.54	28.81			hJ		70		wh mi		PR						
BHL-10	28.64	28.76			hJ		70				PR						
BHL-10	28.82				J	x2	20	30	dk mi	SN	IR	RF					
BHL-10	28.82	29.00			hJ		70				PR						
BHL-10	29.06				hJ		70				PR						
BHL-10	29.08				hJ		80		pk alt		PR						
BHL-10	29.10				hJ		70		pk alt		PR						
BHL-10	29.15				hJ		70		pk alt		PR						
BHL-10	29.21				hJ		40				PR						
BHL-10	29.24				hJ		50		wh mi		PR						
BHL-10	29.25	29.36			hJ		90				UN						
BHL-10	29.36				J		10				IR						
BHL-10	29.40				hJ		70		wh mi		PR						
BHL-10	29.45				hJ		70		wh mi		PR						
BHL-10	29.50				V		60		wh mi		PR						up to 3mm
BHL-10	29.56				J		50		wh and pk mi with gr-gy alt	CT	PR	RF					alteration up to 12mm
BHL-10	29.60				hJ		80				PR						
BHL-10	29.67				hJ		80		wh mi		PR						
BHL-10	29.71				hJ		50				PR						
BHL-10	29.78				J		5			CN	PR	RF					
BHL-10	29.87				hJ		60				PR						
BHL-10	29.90				V		60		wh and pk alt		PR	RF					Aplite vein, fractured coarse
BHL-10	29.92				J		60			CN	PR	SM					fractured in aplite vein

Pioneer-Burdekin Pumped Hydro Energy Scheme: Tranche 1 – BHL-10 Defects List

Refer to Explanatory Notes sheets for abbreviation definitions

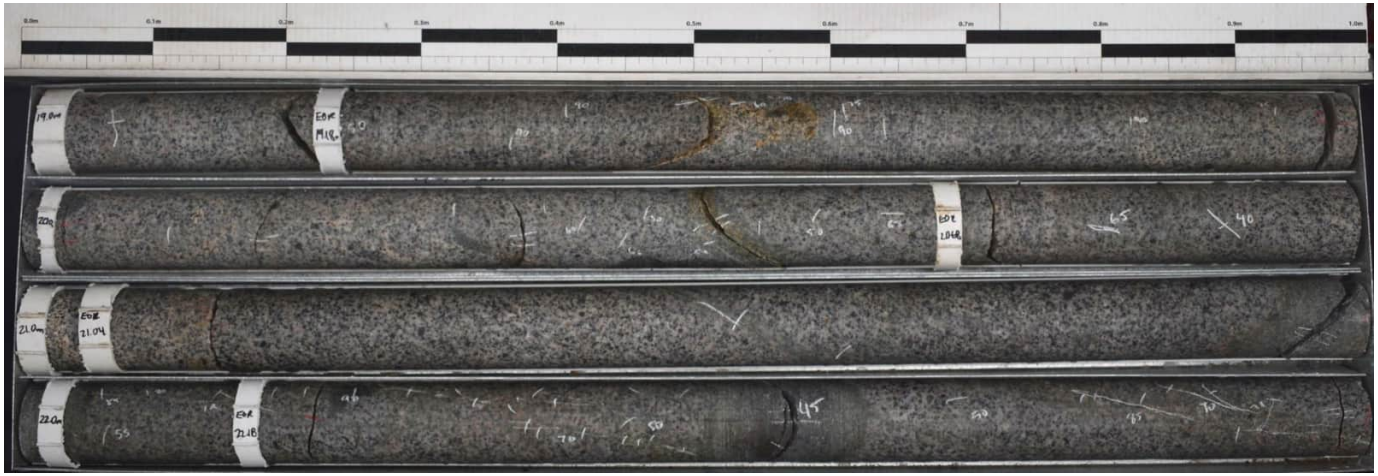
PointID	Depth	Bottom	Fracture Set	Defect Number	Type	Type Suffix	Dip Minimum (degrees)	Dip Maximum (degrees)	Infilling Material	Aperture Observation	Planarity	Roughness	Aperture Measurement Sign	Aperture Measurement	Aperture	Spacing	Remark
BHL-10	29.95				J		60			CN	PR	SM					fractured in aplite vein
BHL-10	29.97				hJ		50				PR						
BHL-10	30.00	30.13			hJ		90				PR						
BHL-10	30.11				hJ		60				PR						
BHL-10	30.24				hJ		40		dk mi with pk alt		PR						
BHL-10	30.25				hJ		60				PR						
BHL-10	30.30				hJ		50		wh mi with pk alt		PR						
BHL-10	30.34				hJ		60		wh mi		PR						
BHL-10	30.35				J		30			CN	PR	RF					
BHL-10	30.35	30.53			V		60		wh mi with pk alt		PR						Aplite vein, alteration up to 16mm
BHL-10	30.55				hJ		40				PR						
BHL-10	30.61				hJ		30				PR						
BHL-10	30.65				hJ		70				PR						
BHL-10	30.71				hJ		70				PR						
BHL-10	30.74				hJ		70				PR						
BHL-10	30.82				hJ		70				PR						
BHL-10	30.92				V		70		wh mi with gr alt		PR						alteration up to 3mm
BHL-10	31.00	31.23			V		70		wh mi with gr alt		PR	RF					alteration mineral up to 3mm
BHL-10	31.05				hJ		5				PR						
BHL-10	31.10				hJ		50				PR						
BHL-10	31.18				hJ		70				PR						
BHL-10	31.20				hJ		40				PR						
BHL-10	31.28				hJ		60				PR						
BHL-10	31.40				V		70				PR						
BHL-10	31.48				hJ		65				PR						
BHL-10	31.55				hJ		60		wh mi		PR						
BHL-10	31.60				hJ		30				PR						
BHL-10	31.67				hJ		5				PR						
BHL-10	31.87				hJ		30				PR						
BHL-10	31.93	32.06			HB												manual breaks
BHL-10	32.12				hJ		60				PR						
BHL-10	32.24				hJ		55				PR						
BHL-10	32.27				hJ		75										
BHL-10	32.44				hJ		60				PR						
BHL-10	32.50				hJ		20				PR						
BHL-10	32.66				J		25			CN	PR	RF					
BHL-10	32.70				hJ		70				PR						
BHL-10	32.72				J		25			CN	CU	SM					
BHL-10	32.75				hJ		30				PR						
BHL-10	32.77				J		70			CN	IR	SM					
BHL-10	32.80				hJ		60				PR						
BHL-10	32.98				J		60			CN	PR	SM					
BHL-10	33.10	33.15			J		60			SN	ST	SM				very closely	
BHL-10	33.20				J		45			CT	UN	SM					minor veining oblique to contact
BHL-10	33.20	33.40			V		10				UN	SM					quartz vein from J contact
BHL-10	33.40				J		70			CN	ST	RF					
BHL-10	33.77				J		75			CT	UN	SM					minor cross qtz veining
BHL-10	33.95				J		45				PR	SM					qtz vein on contact 10mm
BHL-10	34.05				J		60			CN	PR	SM					
BHL-10	34.15				J		50			CN	UN	SM					
BHL-10	34.30				J		30			CN	UN	SM					
BHL-10	34.45				J		50			CN	CU	SM					
BHL-10	34.65				J		25			VN	UN	SM					
BHL-10	34.95				J		50				CU	SM					qtz infill 1mm
BHL-10	35.10				J		70			CN	PR	SM					
BHL-10	35.16						25			CN	UN	SM					
BHL-10	35.20	35.40					40			CN	PR	SM					
BHL-10	35.55				J		25			CN	UN	SM					
BHL-10	35.75				J		30			CN	CU	SM					1mm qtz infill trace Fs

PointID : BHL-10 Depth Range: 7.58 - 11.00 m

PointID : BHL-10 Depth Range: 11.00 - 15.00 m

wsp	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core Photo - BHL-10	DRAWN RC	DATE 2/10/2024
		CHECKED GEM	DATE 7/10/2024
		SCALE Not To Scale	A4
		PROJECT No PS138693	FIGURE No 1/4

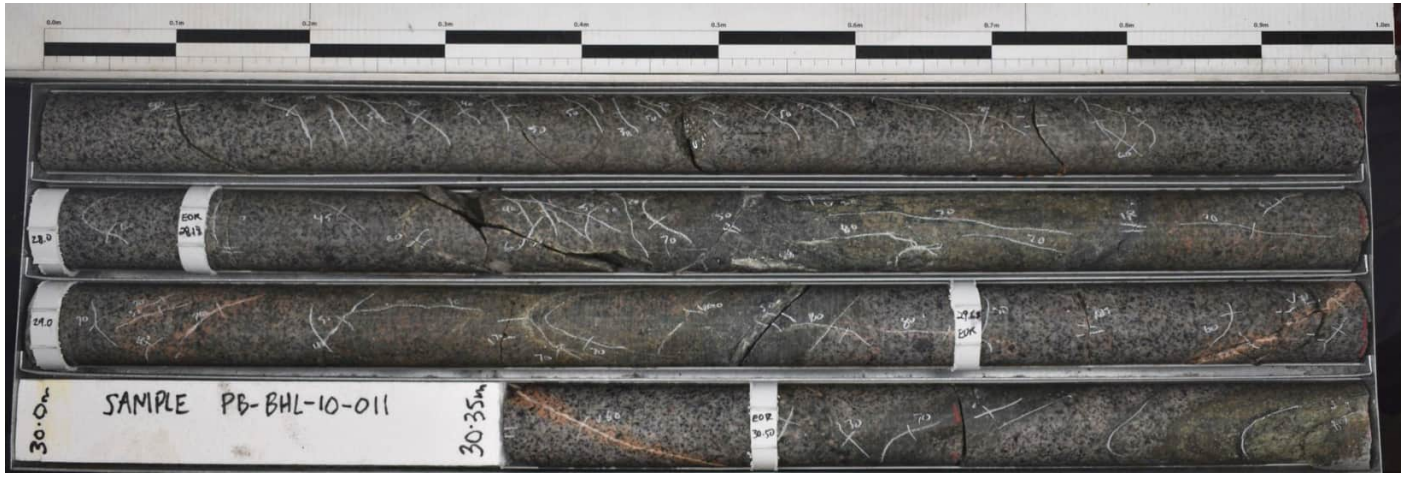
PointID : BHL-10 Depth Range: 15.00 - 19.00 m



PointID : BHL-10 Depth Range: 19.00 - 23.00 m

wsp	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core Photo - BHL-10	DRAWN RC	DATE 2/10/2024
		CHECKED GEM	DATE 7/10/2024
		SCALE Not To Scale	A4
		PROJECT No PS138693	FIGURE No 2/4

PointID : BHL-10 Depth Range: 23.00 - 27.00 m



PointID : BHL-10 Depth Range: 27.00 - 31.00 m

wsp	TITLE: Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core Photo - BHL-10	DRAWN: RC	DATE: 2/10/2024
		CHECKED: GEM	DATE: 7/10/2024
		SCALE: Not To Scale	A4
		PROJECT No: PS138693	FIGURE No: 3/4

PointID : BHL-10 Depth Range: 31.00 - 35.00 m

PointID : BHL-10 Depth Range: 35.00 - 36.08 m

TITLE: Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core Photo - BHL-10	DRAWN: RC	DATE: 2/10/2024	
	CHECKED: GEM	DATE: 7/10/2024	
	SCALE: Not To Scale		A4
	PROJECT No: PS138693	FIGURE No: 4/4	

BHL-10 Structural Log

WSP Australia Pty Limited
Level 12, 900 Ann Street
Fortitude Valley
QLD 4006
Australia

GEOPHYSICAL RECORD OF BOREHOLE: BHL-10

PROJECT: Pioneer-Burdekin PHES JOB # PS138693

CLIENT: Queensland Hydro DATE: 07/11/2023

BOREHOLE DETAILS

LOCATION:	Lower Reservoir	BH DEPTH:	36.08
EASTING:	660230.825 m E	BH DIAMETER:	96 mm (HQ)
NORTHING:	7660541.477 m N	BH AZIMUTH:	028°
ELEVATION:	199.561 m	BH PLUNGE:	-87°
COORD SYSTEM:	MGA2020-55	CASING DEPTH:	16.51 m
LOGGING DATUM:	Ground Level	CASING TYPE:	HWT

DOCUMENT DETAILS

LOGGED BY:	G Hay
LOGGED DATE:	3-4/10/2023
DRAWN BY:	SB
REVIEWED BY:	GH
FILE:	BHL-10_Structure_RevC
LOGGED DEPTH:	35.40 m

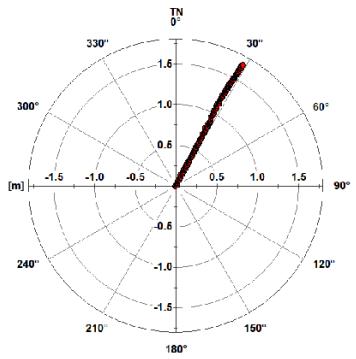
NOTES

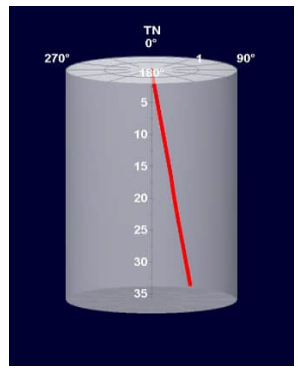
Image logs are oriented relative to high side. Final structures corrected to true north using magnetic declination of 8.2 deg East.

Mechanical calliper log used for structure dip corrections.

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

BOREHOLE DEVIATION



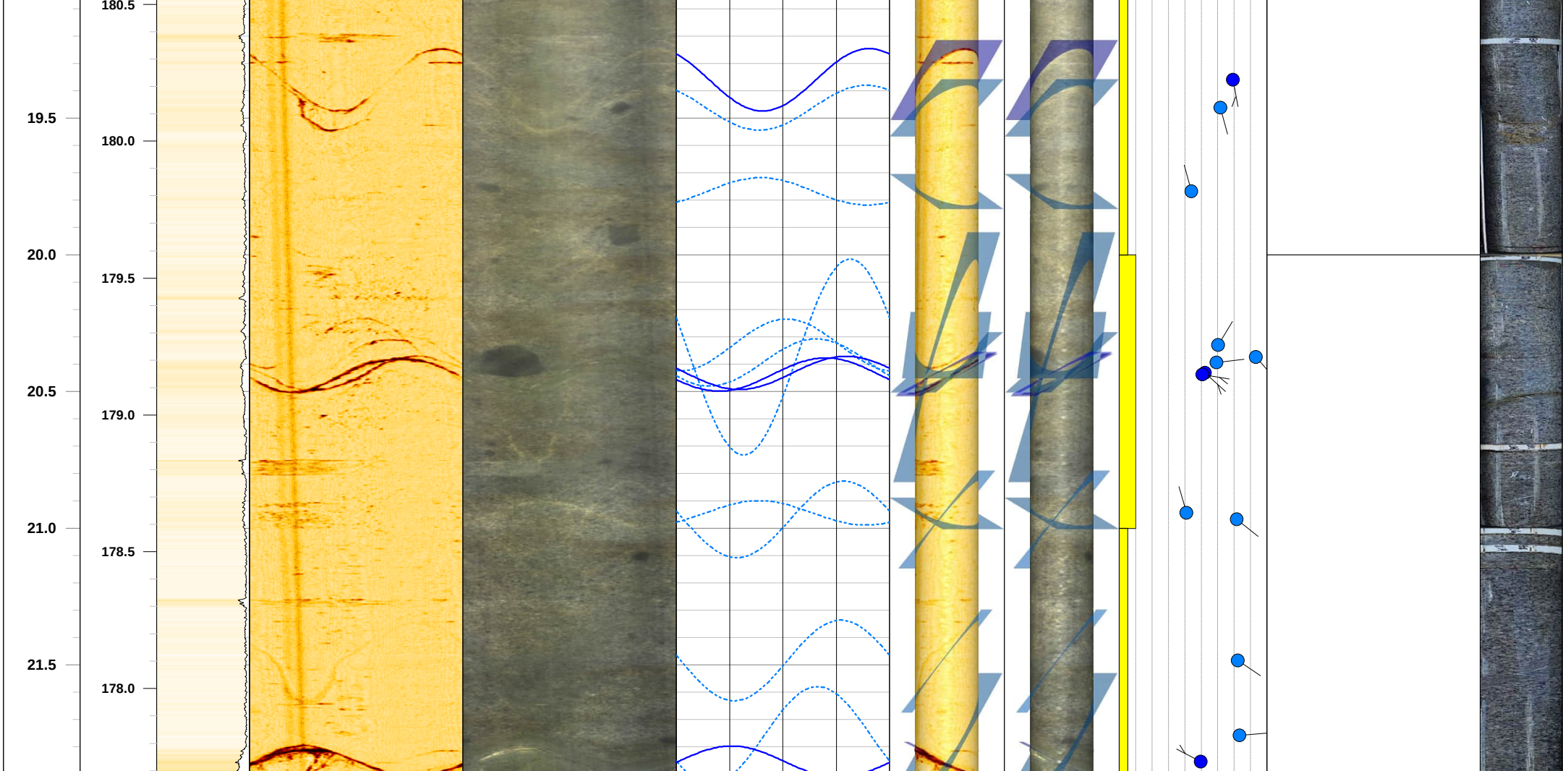


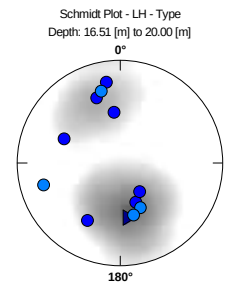
INTERPRETED STRUCTURES

Fracture Zone · Joint · Shear Seam · Vein · Healed Joint

BHL-10

Depth		Image Logs			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	0 9000	0 6000 0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	-0°	-0°	0 90 Freq/metre 0 counts/m 18	Schmidt Plot - LH - Type	





	Counts	Dip[deg]	Azi[deg]
Mean	12	42.53	356.76
	7	37.80	152.89
	1	44.52	351.44
	4	48.02	354.05

Depth		Image Logs			Structural Data					Core
1m:20m	AHD	0 9000	0° 90° 180° 270° 0° 0 6000	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	-0°	-0°	0 counts/m 18 Freq/metre 0 90	Schmidt Plot - LH - Type	
Depth	RL m	Reflectivity	Amplitude-HS HPF	Image-HS	Apparent Structures	3D ATV	3D OTV	Structures - TN	Stereoplots	Core Photo

BHL-10

BHL-10

Depth		Image Logs			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	0 9000	0 6000	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	-0°	-0°	0 90 Freq/metre 0 counts/m 18	Schmidt Plot - LH - Type	

22.0 / 177.5
22.5 / 177.0
23.0 / 176.5
23.5 / 176.0
24.0 / 175.5
24.5 / 175.0
25.0 / 174.5
25.5 / 174.0
26.0 / 173.5
26.5 / 173.0
27.0 / 172.5
27.5 / 172.0
28.0 / 171.5
28.5 / 171.0
29.0

Schmidt Plot - LH - Type
Depth: 20.00 [m] to 25.00 [m]
0°
180°

	Counts	Dip[deg]	Azi[deg]
Mean	30	37.53	33.89
	22	48.92	56.38
	7	15.71	90.50
	1	57.06	341.56

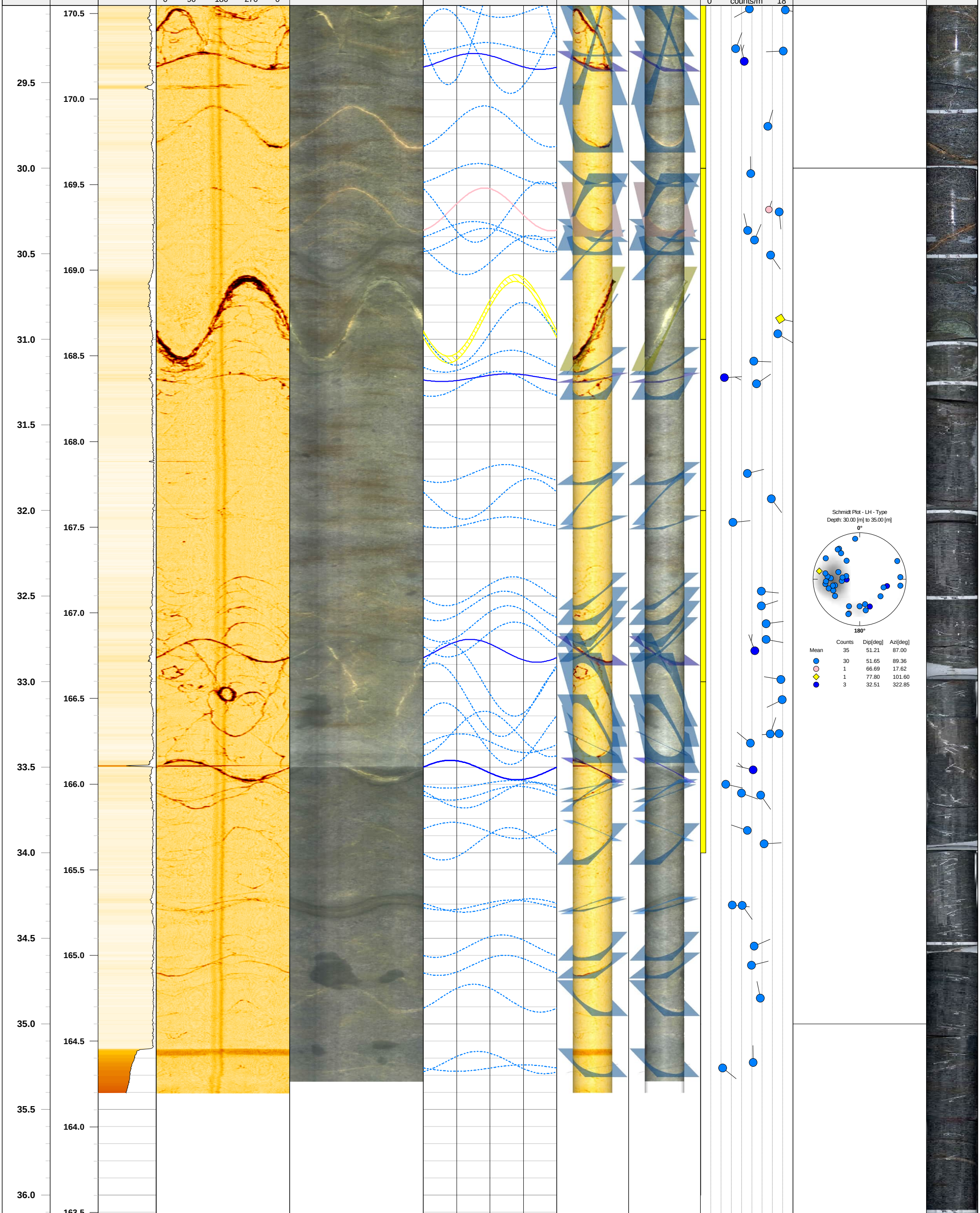
Schmidt Plot - LH - Type
Depth: 25.00 [m] to 30.00 [m]
0°
180°

	Counts	Dip[deg]	Azi[deg]
Mean	32	4.71	299.46
	6	28.47	332.41
	25	24.47	238.48
	1	53.64	347.07

1m:20m AHD Depth RL m Reflectivity Amplitude-HS HPF Image-HS Apparent Structures 3D ATV 3D OTV Structures - TN Stereoplots Core Photo
Depth Image Logs Structural Data Core
BHL-10

BHL-10

Depth		Image Logs			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	0 9000	0 6000	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	-0°	-0°	0 90 Freq/metre 0 counts/m 18	Schmidt Plot - LH - Type	



Depth		Image Logs			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	0 9000	0 6000	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	-0°	-0°	0 90 Freq/metre 0 counts/m 18	Schmidt Plot - LH - Type	

BHL-10

BHL-10 Composite Log

WSP Australia Pty Limited
Level 12, 900 Ann Street
Fortitude Valley
QLD 4006
Australia

GEOPHYSICAL RECORD OF BOREHOLE: BHL-10

PROJECT: Pioneer-Burdekin PHES JOB # PS138693

CLIENT: Queensland Hydro DATE: 07/11/2023

BOREHOLE DETAILS

LOCATION:	Lower Reservoir	BH DEPTH:	36.08
EASTING:	660230.825 m E	BH DIAMETER:	96 mm (HQ)
NORTHING:	7660541.477 m N	BH AZIMUTH:	028°
ELEVATION:	199.561 m	BH PLUNGE:	-87°
COORD SYSTEM:	MGA2020-55	CASING DEPTH:	16.51 m
LOGGING DATUM:	Ground Level	CASING TYPE:	HWT

DOCUMENT DETAILS

LOGGED BY:	GH
LOGGED DATE:	3-4/10/2023
DRAWN BY:	SB
REVIEWED BY:	GH
FILE:	BHL-10_Composite_RevC
LOGGED DEPTH:	35.40 m

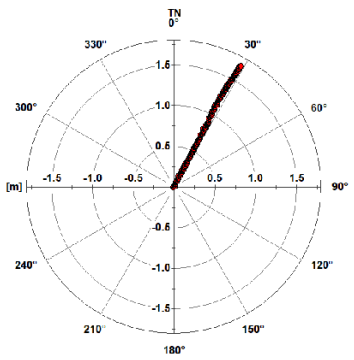
NOTES

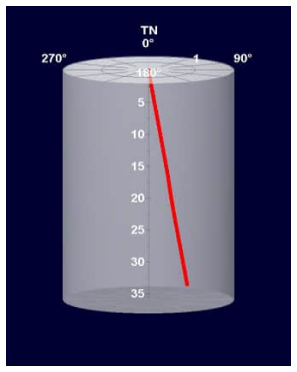
Image logs are oriented relative to high side. Final structures corrected to true north using magnetic declination of 8.2 deg East.

Mechanical calliper log used for structure dip corrections.

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

BOREHOLE DEVIATION



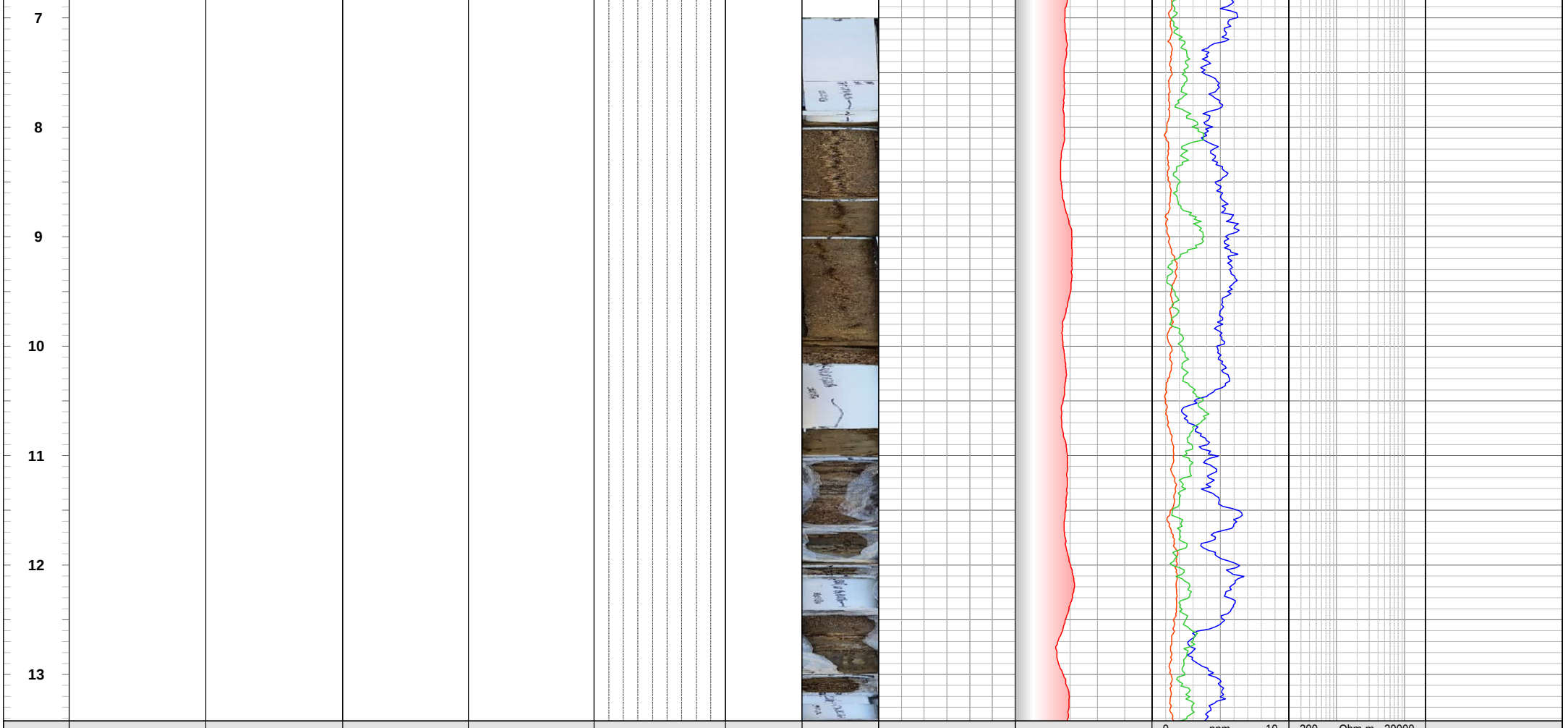


INTERPRETED STRUCTURES

Fracture Zone · Joint · Shear Seam · Vein · Healed Joint

BHL-10

Depth	Image Logs			Calliper	Structural Logs			Sonic Logs	Gamma Logs	Electrical Logs		
Depth	Amplitude-HS HPF	Image-HS	Reflectivity	CAL	Structures - TN	3D ATV	Core	Vs	GR	K	N16	Ma64
1m:50m	500 6000	0° 90° 180° 270° 0°	0 9000	80 mm 160	0 90	-0°		1000 m/s 7000	0 API 250	0 % 10	200 Ohm.m 20000	0 ms 50
	0° 90° 180° 270° 0°				Freq/metre			Vp		Th	N32	Ma16
					0 counts/m 9			1000 m/s 7000		0 ppm 20	200 Ohm.m 20000	0 ms 50
								Vs		U	N8	Ma64
					0 90					0 ppm 10	200 Ohm.m 20000	
										K	N16	
										0 % 10	200 Ohm.m 20000	

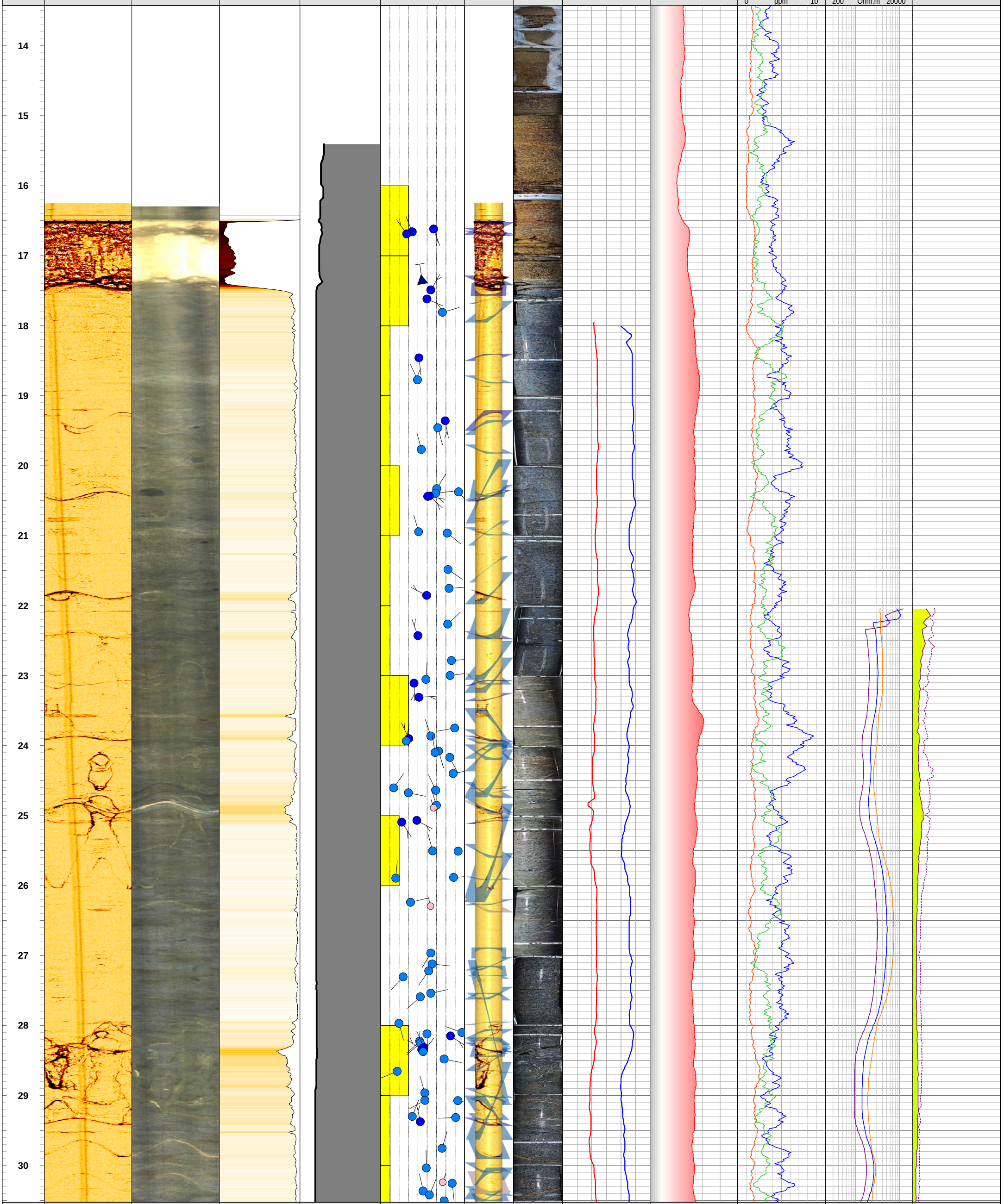


Depth	Image Logs			Calliper	Structural Logs			Sonic Logs	Gamma Logs	Electrical Logs		
Depth	Amplitude-HS HPF	Image-HS	Reflectivity	CAL	Structures - TN	3D ATV	Core	Vs	GR	K	N16	Ma64
1m:50m	500 6000	0° 90° 180° 270° 0°	0 9000	80 mm 160	0 90	-0°		1000 m/s 7000	0 API 250	0 % 10	200 Ohm.m 20000	0 ms 50
	0° 90° 180° 270° 0°				Freq/metre			Vp		Th	N32	Ma16
					0 counts/m 9			1000 m/s 7000		0 ppm 20	200 Ohm.m 20000	0 ms 50
								Vs		U	N8	Ma64
					0 90					0 ppm 10	200 Ohm.m 20000	
										K	N16	
										0 % 10	200 Ohm.m 20000	

BHL-10

BHL-10

Depth	Image Logs			Calliper	Structural Logs			Sonic Logs	Gamma Logs		Electrical Logs	
Depth	Amplitude-HS HPF	Image-HS	Reflectivity	CAL	Structures - TN	3D ATV	Core	Vs	GR	K	N16	Ma64
1m:50m	500 6000	0° 90° 180° 270° 0°	0 9000	80 mm 160	0 90	-0°		1000 m/s 7000	0 API 250	0 % 10	200 Ohm.m 20000	0 ms 50
	0° 90° 180° 270° 0°				Freq/metre			Vp		Th	N32	Ma16
					0 counts/m 9			1000 m/s 7000		0 ppm 20	200 Ohm.m 20000	0 ms 50
										U	N8	
										0 ppm 10	200 Ohm.m 20000	



Depth	Image Logs			Calliper	Structural Logs			Sonic Logs	Gamma Logs		Electrical Logs	
Depth	Amplitude-HS HPF	Image-HS	Reflectivity	CAL	Structures - TN	3D ATV	Core	Vs	GR	K	N16	Ma64
1m:50m	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0 9000	80 mm 160	0 90	-0°		1000 m/s 7000	0 API 250	0 ppm 10	200 Ohm.m 20000	0 ms 50
	500 6000				Freq/metre			Vp		Th	N32	Ma16
					0 counts/m 9			1000 m/s 7000		0 ppm 20	200 Ohm.m 20000	0 ms 50
										U	N8	
										0 % 10	200 Ohm.m 20000	

BHL-10