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BOREHOLE: BHLRMUR-06

Project:	Pioneer-Burdekin PHES	Position:	Lower Reservoir	Sheet	1 of 5
Location:	Netherdale/Dalrymple Heights	Coords:	657298.7 m E 7661701.7 m N MGA2020-55	Date Started:	27/5/2024
Client:	Queensland Hydro	Surface RL:	215.93 m AHD	Date Completed:	10/6/2024
Job No.:	PS138693	Contractor:	Twin Hills Engineering & Drilling Drill Rig: TH24	Logged:	HF
		Inclination:	-90°		

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		0	215.93	SPT 0.50-0.95 m 1.0,1 N=1 D 0.50-0.95 m			SM	TOPSOIL Silty SAND: medium grained, dark brown, silt is low plasticity; with some roots and organics.	M	MD	TOPSOIL
			0.40									
	F		215.53				CL	Sandy CLAY: low plasticity, red-brown, sand is fine to medium grained.	w-PL	VS	COLLUVIAL SOIL	
			1	1.10					Continued as Cored Borehole			
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

PEPHES LIB_REV0.GLB Log IS AU BOREHOLE 3 BHLRMUR-06_241302_2.GPJ <<DrawingFile>> 2/12/2024 19:12 10.03.00.09 Datagel Lab and In Situ Tool - DGD | Lib: WSP 5.07.2 2023-10-30 Proj: WSP 5.04.1 2023-06-14



BOREHOLE: BHLRMUR-06

Project: Pioneer-Burdekin PHES

Location: Netherdale/Dalrymple Heights

Client: Queensland Hydro

Job No.: PS138693

Position: Lower Reservoir

Coords: 657298.7 m E 7661701.7 m N MGA2020-55

Surface RL: 215.93 m AHD

Contractor: Twin Hills Engineering & Drilling Drill Rig: TH24

Inclination: -90°

Sheet 2 OF 5

Date Started: 27/5/2024

Date Completed: 10/6/2024

Logged: HF

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 L M H VH EH	■ UCS			0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000 1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050 2100 2150 2200 2250 2300 2350 2400 2450 2500 2550 2600 2650 2700 2750 2800 2850 2900 2950 3000
				0								
				1	1.10		Continuation from non-cored borehole					
				214.83			NO CORE 0.48m (1.10-1.58)					
				1.58								
				214.35								
		28	0	2	2.00		Gravelly BOULDERS WITH COBBLES: poorly graded, sub-angular, dark grey, cobbles are <= 200mm, sub-angular; gravel is medium to coarse grained, sub-rounded to sub-angular, mafic igneous origin; (COLLUVIUM).					
				213.93			NO CORE 0.81m (2.00-2.81)					
				2.81								
				213.12								
				3	3.10		SC Clayey SAND: fine to coarse grained, well graded, dark grey, brown, clay is low plasticity; with fine to medium grained, sub-rounded gravel; (COLLUVIUM).					
				212.83								
		86	0		3.55		Gravelly Clayey BOULDERS: sub-angular, dark grey and brown, clay is medium plasticity; gravel is fine to coarse grained, sub-rounded to sub-angular; (COLLUVIUM).					
				212.38								
					3.82		CI Sandy CLAY: medium plasticity, grey, pale brown, sand is fine to medium grained.					
				212.11								
				4	4.10		Gravelly Clayey COBBLES: sub-angular, grey and dark grey, clay is medium plasticity; gravel is fine to coarse grained, sub-angular; with fine to coarse grained sand; (COLLUVIUM).					
				211.83								
					4.50		NO CORE 0.40m (4.10-4.50)					
				211.43								
		69	0				CI-CH Gravelly Sandy CLAY: medium to high plasticity, dark grey, brown, sand is fine to coarse grained; gravel is medium to coarse grained, sub-angular; with sub-angular, up to 150mm boulders; (COLLUVIUM).					
				5	5.47							
				210.46								
				6			CI-CH Gravelly Sandy CLAY: medium to high plasticity, pale brown to brown, sand is fine to coarse grained; gravel is fine grained, sub-angular.	XW				
		100	0									
				7	7.10							
				208.83								
				208.71			CI-CH: pale brown to orange. Brown mottled dark grey.	RS				
				7.47								
				208.46			Pale grey, orange, pale brown.					
		100	0									
				8								
					8.45							
				207.48			Brown to dark orange.	XW				
		100	0									
				9								
				10								

Comments

Checked

GEM

Date

2/12/2024



BOREHOLE: BHLRMUR-06

Project: Pioneer-Burdekin PHES

Location: Netherdale/Dalrymple Heights

Client: Queensland Hydro

Job No.: PS138693

Position: Lower Reservoir

Coords: 657298.7 m E 7661701.7 m N MGA2020-55

Surface RL: 215.93 m AHD

Contractor: Twin Hills Engineering & Drilling Drill Rig: TH24

Inclination: -90°

Sheet 3 OF 5

Date Started: 27/5/2024

Date Completed: 10/6/2024

Logged: HF

Drilling					Field Material Description			Defect Information		
METHOD	WATER	TCR	RQD	DEPTH (metres)	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)
				DEPTH RL				VL-2 J-2 M-6 H-20 H-40 VH-200 EH		0 20 100 300 1000 3000
HO3				10	10.10 205.83	NO CORE 0.50m (10.10-10.60)				
		67	0	11	10.60 205.33	CI-CH Gravelly Sandy CLAY: medium to high plasticity, dark grey, brown, sand is fine to coarse grained; gravel is fine grained, sub-angular.	XW		10.66: J, 10°, clay, gravel CT, UN, RF	
							RS		11.05-11.15: J, 55°, clay, gravel CT, UN, RF 11.16-11.30: J, 45 - 90°, UN, RF	
					11.60 204.33	NO CORE 0.30m (11.60-11.90)				
		73	0	12	11.90 204.03	GRANODIORITE: medium to coarse grained, pink, orange, pale grey, grey brown, crystalline, massive.	XW		12.00-12.28: J, 80 - 90°, Fe SN, UN, RF 12.36: J, 10°, clay VN, UN, RF 12.67-12.83: J, 65°, clay, sand, UN, RF	
				13					13.15-13.26: J, 50 - 90°, clay, CU, RF 13.48: J, 15°, CN, UN, RF	
		100	47	14		14.35-16.20m: red to brown Fe cementation	HW		14.30-14.60: J, 70°, br VN, UN, RF 14.55: J, 10°, SN, IR, RF 14.65: J, 25°, SN, IR, RF 14.76-14.82: J x2, 40°, SN, PR, SM 14.86-14.93: J x2, 45°, SN, PR, RF 15.13: J, 50°, SN, PR, RF 15.17-15.25: J /DB, 5 - 10°, SN, UN, RF 15.46: J, 10°, SN, PR, RF 15.40-15.55: J, 85°, SN, UN, RF 15.67: J, 5°, SN, PR, RF 15.80-15.95: J x3, 30 - 40°, SN, PR, RF	
		100	47	15					16.10-16.25: J X3, 10 - 20°, SN, UN, RF 16.27: J, 20°, PR	
				16			XW		16.78-16.80: IS/J, 30°, CT, PR, RF 16.80: VN, 35°, pk	
		100	0	17	17.00 198.93	Black and grey mottled.			17.50-17.85: J x3, 10 - 20°, Fe SN, IR, RF, 30-100mm spacing	
				18	17.85 18.00 197.93	NO CORE 0.15m (17.85-18.00)				
		93	0			GRANODIORITE: medium to coarse grained, pink, orange, pale grey, grey brown, crystalline, massive.				
				19	19.10 196.83	NO CORE 1.90m (19.10-21.00)				
		0	0	20						

Comments

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Date 2/12/2024

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Sheet 4 OF 5

Date Started: 27/5/2024

Date Completed: 10/6/2024

Logged: HF

PEPPHES LIB_REV.C.GLB Log IS AU CORED BOREHOLE 3 BHLRMUR-06 241202 2.GPJ <<DrawingFile>> 2/12/2024 19:13 10.03.00.09 Datgel Lab and In Situ Tool - DGD | Lib: WSP 5.07.2 2023-10-30 Pj: WSP 5.04.1 2023-06-14



BOREHOLE: BHLRMUR-06

Project: Pioneer-Burdekin PHES

Location: Netherdale/Dalrymple Heights

Client: Queensland Hydro

Job No.: PS138693

Position: Lower Reservoir

Coords: 657298.7 m E 7661701.7 m N MGA2020-55

Surface RL: 215.93 m AHD

Contractor: Twin Hills Engineering & Drilling Drill Rig: TH24

Inclination: -90°

Sheet 5 OF 5

Date Started: 27/5/2024

Date Completed: 10/6/2024

Logged: HF

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)	
				30						29.97: J, 75°, wh CT, PR, SM			
				31									
				32									
				33									
				34									
				35									
				36									
				37									
				38									
				39									
				40									

Comments

Checked GEM

Date 2/12/2024



Pioneer Burdekin Pumped Hydro Energy Storage: Tranche 2 – BHLRMUR-06 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
BHLRMUR-06	10.66				J		10		clay, gravel	CT	UN	RF					
BHLRMUR-06	11.05	11.15			J		55		clay, gravel	CT	UN	RF					
BHLRMUR-06	11.16	11.30			J		45	90			UN	RF			closed		
BHLRMUR-06	12.00	12.28			J		80	90	Fe	SN	UN	RF					
BHLRMUR-06	12.28	12.80			hJ		70	90	rd mi		CU						
BHLRMUR-06	12.36				J		10		clay	VN	UN	RF					
BHLRMUR-06	12.65	13.00			hJ	x4	70	80	rd mi		UN						
BHLRMUR-06	12.67	12.83			J		65		clay, sand		UN	RF					
BHLRMUR-06	13.00	13.20			DB												
BHLRMUR-06	13.15	13.26			J		50	90	clay		CU	RF					
BHLRMUR-06	13.20				DB												
BHLRMUR-06	13.35	13.48			hJ		50	90	gy mi		CU			10			
BHLRMUR-06	13.48				J		15			CN	UN	RF					
BHLRMUR-06	13.54	13.70			hJ		80		gy mi		PR			10			
BHLRMUR-06	14.30	14.60			J		70		br	VN	UN	RF					
BHLRMUR-06	14.55				J		10			SN	IR	RF					
BHLRMUR-06	14.65				J		25			SN	IR	RF					
BHLRMUR-06	14.76	14.82			J	x2	40			SN	PR	SM			open		
BHLRMUR-06	14.86	14.93			J	x2	45			SN	PR	RF			open		
BHLRMUR-06	15.13				J		50			SN	PR	RF			open		
BHLRMUR-06	15.17	15.25			J	/DB	5	10		SN	UN	RF					
BHLRMUR-06	15.40	15.55			J		85			SN	UN	RF					
BHLRMUR-06	15.46				J		10			SN	PR	RF					
BHLRMUR-06	15.67				J		5			SN	PR	RF					
BHLRMUR-06	15.80	15.95			J	x3	30	40		SN	PR	RF					
BHLRMUR-06	16.10	16.25			J	X3	10	20		SN	UN	RF					
BHLRMUR-06	16.27				J		20				PR				open		
BHLRMUR-06	16.34	16.68			hJ		40		br						closed		
BHLRMUR-06	16.48	16.56			hJ		20		br						closed		
BHLRMUR-06	16.78	16.80			IS	/J	30			CT	PR	RF					
BHLRMUR-06	16.80				VN		35		pk								
BHLRMUR-06	17.50	17.85			J	x3	10	20	Fe	SN	IR	RF					30-100mm spacing
BHLRMUR-06	21.10				J		5		clay	CT	PR	RF					
BHLRMUR-06	21.15				J		45		Fe	SN	PR	RF					
BHLRMUR-06	21.20	21.30			J		70		Fe	SN	PR	RF					
BHLRMUR-06	21.26				J		50		Fe	SN	PR	RF					
BHLRMUR-06	21.32	21.70			J	x7	20	30	Fe	SN	PR-UN	RF					
BHLRMUR-06	21.35				J		50		Fe	SN	UN	RF			open		
BHLRMUR-06	21.38				J		5		Fe	SN	UN	RF			open		



Pioneer Burdekin Pumped Hydro Energy Storage: Tranche 2 – BHLRMUR-06 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
BHLRMUR-06	21.45				J		50		Fe	SN	UN	RF	<	5	open		
BHLRMUR-06	21.56				CO		45		Fe	SN	UN	RF			closed		
BHLRMUR-06	21.63	21.76			J		70		Fe	SN	UN	RF	<	5	open		
BHLRMUR-06	21.72				J		35		Fe	SN	UN	RF			open		
BHLRMUR-06	21.93				J		70		Fe	SN	UN	RF			open		
BHLRMUR-06	22.10	22.33			J		75	80	Fe	SN	UN	RF					
BHLRMUR-06	22.20				CO		80		Fe	SN	UN	RF			open		
BHLRMUR-06	22.34				J		30		Fe	SN	UN	RF					
BHLRMUR-06	22.35				J		45		Fe	SN	UN	RF			open		
BHLRMUR-06	22.48				J		10		Fe	SN	UN	RF					
BHLRMUR-06	22.50	22.65			J		75		Fe	SN	PR	RF					
BHLRMUR-06	22.52	22.87			FZ	/Jx6	10	30	Fe	SN	UN	RF			open		
BHLRMUR-06	22.83				J		45		Fe	SN	PR	RF					
BHLRMUR-06	22.98				J		25		Fe	SN	PR	RF			open		
BHLRMUR-06	24.00				J		40		Fe	SN	PR	RF			open		
BHLRMUR-06	24.09				J		40		Fe	SN	PR	RF	>	5			
BHLRMUR-06	24.25				hJ		75		wh		UN	RF					
BHLRMUR-06	24.46				J		10		Fe	SN	UN	RF			open		
BHLRMUR-06	24.53	24.91			J	x3	80		Fe	SN	UN	RF					
BHLRMUR-06	24.60	24.70			J		70		Fe	SN		RF					
BHLRMUR-06	24.68				J		10		Fe	SN	UN	RF			open		
BHLRMUR-06	24.81				J		45		Fe	SN	PR	RF			open		
BHLRMUR-06	25.10	25.21			Js		60	90	Fe	SN	UN	RF					MB on Js, multiple defects, generally high angle
BHLRMUR-06	25.21				J		30		Fe	SN	PR	RF					
BHLRMUR-06	25.22				hJ		60		wh		UN				closed		
BHLRMUR-06	25.23	25.38			hJ		40		bk								
BHLRMUR-06	25.44				hJ		35		pk	SN	PR	RF			open		
BHLRMUR-06	25.45	25.65			J		65		Fe	SN	UN	RF					
BHLRMUR-06	25.60				J		60		yl				<	5	open		
BHLRMUR-06	25.63	25.78			hJ		80		wh		UN						
BHLRMUR-06	26.60				J		15		wh mi		UN			2	open		
BHLRMUR-06	26.70	26.81			J		70		pk		UN	RF			closed		
BHLRMUR-06	27.04				J		45		yl	SN	UN	RF	<	5	open		
BHLRMUR-06	27.14				J		45		pk	SN	PR	RF			open		
BHLRMUR-06	27.20				J		45		pk	SN	PR	RF			open		
BHLRMUR-06	27.25	27.57			VN		75		pk		CU		<	10			
BHLRMUR-06	27.40	27.57			hJ	x5	25		pk		CU						
BHLRMUR-06	27.53				J		45		pk	SN	PR	RF			open		
BHLRMUR-06	27.90				J		45		pk	SN	PR	RF			open		



Pioneer Burdekin Pumped Hydro Energy Storage: Tranche 2 – BHLRMUR-06 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
BHLRMUR-06	27.96				J		45		pk	SN	PR	RF			open		
BHLRMUR-06	28.04	28.36			hJ		45		bk pk		UN		<	5			
BHLRMUR-06	28.30				J		50		Fe	SN	PR	RF			open		
BHLRMUR-06	28.33	28.35			V		25		wh mi		CU			1			30mm pi-br alt halo
BHLRMUR-06	28.75				J		65		Fe	SN	UN	RF	<	5			
BHLRMUR-06	28.95	29.00			J		40		Fe	SN	CU	RF					
BHLRMUR-06	29.20	29.50			hJ		85		wh mi		UN			3			
BHLRMUR-06	29.22	29.30			hJ	x2	50		wh		UN						
BHLRMUR-06	29.42				MB												
BHLRMUR-06	29.49	29.70			hJ		75		pk		PR			7			
BHLRMUR-06	29.65				MB												
BHLRMUR-06	29.73				J		10		br mi	SN	UN	RF			open		
BHLRMUR-06	29.80				hJ		60		gy mi		PR						
BHLRMUR-06	29.97				J		75		wh	CT	PR	SM					

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PointID : BHLRMUR-06 Depth Range: 1.00 - 5.00 m



PointID : BHLRMUR-06 Depth Range: 5.00 - 9.00 m

	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHLRMUR-06	DRAWN RC	DATE 11/11/2024		
		CHECKED GEM	DATE 18/11/2024		
		SCALE Not To Scale			A4
		PROJECT No PS138693		FIGURE No 1/4	

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PointID : BHLRMUR-06 Depth Range: 9.00 - 13.00 m



PointID : BHLRMUR-06 Depth Range: 13.00 - 17.00 m



TITLE
Queensland Hydro
Netherdale/Dalrymple Heights
Pioneer-Burdekin PHES
Core photo - BHLRMUR-06

DRAWN	RC	DATE	11/11/2024
CHECKED	GEM	DATE	18/11/2024
SCALE	Not To Scale		A4
PROJECT No	PS138693		FIGURE No 2/4

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PointID : BHLRMUR-06 Depth Range: 17.00 - 21.00 m



PointID : BHLRMUR-06 Depth Range: 21.00 - 25.00 m

	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHLRMUR-06	DRAWN RC	DATE 11/11/2024		
		CHECKED GEM	DATE 18/11/2024		
		SCALE Not To Scale			A4
		PROJECT No PS138693		FIGURE No 3/4	

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PointID : BHLRMUR-06 Depth Range: 25.00 - 29.00 m



PointID : BHLRMUR-06 Depth Range: 29.00 - 30.00 m

	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHLRMUR-06	DRAWN RC	DATE 11/11/2024
		CHECKED GEM	DATE 18/11/2024
		SCALE Not To Scale	A4
		PROJECT No PS138693	FIGURE No 4/4