

COPYRIGHT NOTICE

This geotechnical log and its associated data (the Document) is licensed by Queensland Hydro Pty Ltd under the [Creative Commons Attribution 4.0 Licence](#) (CC BY 4.0). When reusing the Document, in whole or in part, please attribute as follows: "(c) *Queensland Hydro Pty Ltd 2025, licensed under the CC BY 4.0 Licence, prepared by WSP*". This licence does not apply to logos or trademarks.

LIMITATION OF LIABILITY

The CC BY 4.0 Licence contains a comprehensive Disclaimer of Warranties and Limitation of Liability. In addition, please note that this Document was prepared for Queensland Hydro Pty Ltd use only. Reuse of the Document by anyone for any other purpose could result in error and/or loss. You should obtain professional advice before making decisions based on the contents of the Document.

When reproducing any part of this Document, you must also reproduce this limitation of liability notice in addition to the italicised attribution statement above.

Retrieved from the Queensland Geotechnical Database <http://ggd.org.au/>



BOREHOLE: BHLRMUR-04

Project: Pioneer-Burdekin PHES

Location: Netherdale/Dalrymple Heights

Client: Queensland Hydro

Job No.: PS138693

Position: Lower Reservoir

Coords: 658121.8 m E 7660996.9 m N MGA2020-55

Surface RL: 209.40 m AHD

Contractor: Twin Hills Engineering & Drilling Drill Rig: TH24

Inclination: -90° Direction: 000°

Sheet 1 of 5

Date Started: 24/6/2024

Date Completed: 12/9/2024

Logged: HF

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/T	E	Groundwater Not Observed	0	209.40				SC	Clayey SAND: fine to medium grained, pale brown, clay is low plasticity; with sporadic roots and organics.		L - MD	RESIDUAL SOIL
			208.90	SPT 0.50-0.95 m 5,5,11 N=16 D 0.50-0.95 m			Dark brown, medium plasticity; sporadic relict granitic structures are visible.		MD			
	F		1									
	H		2		SPT 2.00-2.45 m 10,13,17 N=30 D 2.00-2.45 m							
			3									
	3.50		205.90	SPT 3.50-3.95 m 13,5,24 N=29 D 3.50-3.95 m			Pale brown to grey.	M	D			
	4											
	5			SPT 5.00-5.45 m 7,10,19 N=29 D 5.00-5.45 m								
	6											
	7									VD		
			7					Continued as Cored Borehole				
			8									
			9									
			10									

Comments

Checked GEM
Date 2/12/2024



Sheet 2 OF 5

Date Started: 24/6/2024

Date Completed: 12/9/2024

Logged: HF

A large, light gray watermark reading "Preliminary" is oriented diagonally from the bottom-left to the top-right, spanning across the center of the page.

GEM

2/12/2024



BOREHOLE: BHLRMUR-04

Project: Pioneer-Burdekin PHES

Location: Netherdale/Dalrymple Heights

Client: Queensland Hydro

Job No.: PS138693

Position: Lower Reservoir

Coords: 658121.8 m E 7660996.9 m N MGA2020-55

Surface RL: 209.40 m AHD

Contractor: Twin Hills Engineering & Drilling Drill Rig: TH24

Inclination: -90° Direction: 000°

Sheet 3 OF 5

Date Started: 24/6/2024

Date Completed: 12/9/2024

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 J M H VH EH	■ - UCS		10 30 100 300 1000 3000		
HQ3		67	0	10	199.40		NO CORE 1.00m (10.00-11.00)							
				11	11.00 198.40		SC Clayey SAND: medium to coarse grained, brown to grey, clay is low plasticity, very dense; moist.							
		67	0		11.45 197.95 11.68 197.72		Brown to dark red.							
							Brown to grey.							
				12	12.25 197.15		NO CORE 0.50m (12.25-12.75)							
		100	0		12.75 196.65		Clayey SAND: medium grained, pale grey mottled brown, clay is low plasticity, very dense.	XW						
				13										
				14	14.00 195.40		NO CORE 1.00m (14.00-15.00)							
				15	15.00 194.40		Clayey SAND: medium grained, pale grey mottled brown, clay is low plasticity, very dense.	XW						
					15.50		NO CORE 0.10m (15.50-15.60)							
			16	193.80	Clayey SAND: medium grained, pale grey mottled brown, clay is low plasticity, very dense.		XW							
SPT		93	0		16.30 193.10		16.30-18.00m: dark brown mottled grey and orange.							
				17										
				18	18.00 191.40		18.00-18.68m: pale grey mottled brown.							
				19	18.68 190.72 18.91 190.49		DIORITE: fine to medium grained, dark grey mottled brown, crystalline, massive.	HW						
						GRANODIORITE: fine to medium grained, pale grey mottled brown, crystalline, massive.	HW							
		100	87											
				20										
	Comments													
												19.59: J, 15°, sand, gravel, IR, RF, <=10 mm		
												19.75: J, 10°, sand, gravel, IR, RF, <=10 mm		

SPT 12.00m: 48/50/50 N=R

19.59: J, 15°, sand, gravel, IR, RF, <=10 mm
19.75: J, 10°, sand, gravel, IR, RF, <=10 mm

Checked GEM

Date 2/12/2024



BOREHOLE: BHLRMUR-04

Project: Pioneer-Burdekin PHES

Location: Netherdale/Dalrymple Heights

Client: Queensland Hydro

Job No.: PS138693

Position: Lower Reservoir

Coords: 658121.8 m E 7660996.9 m N MGA2020-55

Surface RL: 209.40 m AHD

Contractor: Twin Hills Engineering & Drilling Drill Rig: TH24

Inclination: -90° Direction: 000°

Sheet 4 OF 5

Date Started: 24/6/2024

Date Completed: 12/9/2024

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 J M H VH EH	2-20 2-6 2-30 2-40 2-200 2-200 2-200		0 20 50 100 300 1000 3000
Groundwater Not Observed		100	63	20			GRANODIORITE: fine to medium grained, pale grey mottled brown, crystalline, massive.	HW		20.02-20.16: J, 70°, Fe SN, PR, RF 20.33: J, 10°, Fe SN, PR, RF	
				21				XW			
				22				HW			
		80	55	22						21.60-21.65: EW, 50 mm 21.70: J, 10°, Fe SN, UN, RF 21.73-21.95: J, 80°, wh mi CT, PR, SM 21.93: J, 0°, CN, UN, RF	
				22.70	186.70		NO CORE 1.80m (22.70-24.50)				
		0	0	23							
				24							
				24.50	184.90		GRANODIORITE: medium to coarse grained, grey to white mottled dark grey, crystalline, massive.	SW		24.50: J, 0°, Fe SN, UN, RF 24.62: J, 0°, Fe SN, PR, SM 24.62-24.67: FZ, Fe SN, IR, RF, low strength rock rubble by drilling 24.74: J, 0°, CN, UN, RF 24.82-24.84: FZ, CN, IR, RF, Fe SN on upper and lower defect surfaces, possible mafic intrusion rubble by drilling	
		100	55	25						25.10: J, 45°, Fe SN, ST, RF 25.40-25.53: J x4, 0 - 15°, Fe SN, UN, RF	
				25.10	184.30		NO CORE 0.30m (25.10-25.40)				
				25.40	184.00		GRANODIORITE: medium to coarse grained, grey to white mottled dark grey, crystalline, massive.	SW			
		80	72	26						26.38: J, 25°, CN, PR, RF	
				26.60	182.70		NO CORE 0.10m (26.60-26.70)				
				27			GRANODIORITE: medium to coarse grained, grey to white mottled dark grey, crystalline, massive.	SW		26.92-27.21: J, 30°, SN, UN, RF 27.20: J, 15°, CN, PR, SM	
		100	83	28						27.76: J, 45°, Fe SN, ST, RF 27.91: J, 55°, SN, PR, RF 27.88-28.04: J, 60°, Fe SN, PR, RF	
				29						28.45: J, 45°, CN, PR, RF 28.64: J, 50°, pk mi SN, PR, SM, 15mm pi mi alt halo 28.76: J, 15°, CN, PR, RF	
		100	100	30						29.21: J, 25°, PR-CU, RF	

Comments

Checked GEM

Date 2/12/2024



BOREHOLE: BHLRMUR-04

Project:	Pioneer-Burdekin PHES	Position:	Lower Reservoir	Sheet	5 OF 5
Location:	Netherdale/Dalrymple Heights	Coords:	658121.8 m E 7660996.9 m N MGA2020-55	Date Started:	24/6/2024
Client:	Queensland Hydro	Surface RL:	209.40 m AHD	Date Completed:	12/9/2024
Job No.:	PS138693	Contractor:	Twin Hills Engineering & Drilling Drill Rig: TH24	Logged:	HF
		Inclination:	-90° Direction: 000°		

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)	
		100	100	30	30.13	+	Hole Terminated at 30.13 m Target depth. Standpipe Piezometer Installed.							
					179.27	+								
				31										
				32										
				33										
				34										
				35										
				36										
				37										
				38										
				39										
				40										



Pioneer Burdekin Pumped Hydro Energy Storage: Tranche 2 – BHLRMUR-04 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-04	12.75	13.25			V		85		wh mi		UN		<	5			
BHLRMUR-04	13.22				hJ		30		wh mi		PR						
BHLRMUR-04	13.30				hJ		10		wh mi		PR						
BHLRMUR-04	13.48				hJ		25		wh mi		PR						
BHLRMUR-04	13.52				hJ		15		wh mi		PR						
BHLRMUR-04	17.34				hJ		45		wh mi		CU						
BHLRMUR-04	17.48				hJ		45		wh mi		CU						
BHLRMUR-04	18.70				CO		40				PR						
BHLRMUR-04	18.91				CO		20				PR						
BHLRMUR-04	19.20				hJ		25		br-rd mi		PR						
BHLRMUR-04	19.25				hJ		10		br-rd mi		PR						
BHLRMUR-04	19.25	19.35			hJ	x2	10		br-rd mi		UN						
BHLRMUR-04	19.59				J		15		sand, gravel		IR	RF	<=	10			
BHLRMUR-04	19.75				J		10		sand, gravel		IR	RF	<=	10			
BHLRMUR-04	20.02	20.16			J		70		Fe	SN	PR	RF					
BHLRMUR-04	20.33				J		10		Fe	SN	PR	RF					
BHLRMUR-04	21.60	21.65			EW									50			
BHLRMUR-04	21.70				J		10		Fe	SN	UN	RF					
BHLRMUR-04	21.73	21.95			J		80		wh mi	CT	PR	SM					
BHLRMUR-04	21.93				J		0			CN	UN	RF					
BHLRMUR-04	21.98	22.10			hJ		60		wh mi		PR						
BHLRMUR-04	22.35	22.60			hJ		45		br-wh mi		CU						
BHLRMUR-04	22.44				hJ		55		br-wh mi		PR						
BHLRMUR-04	22.46	22.65			hJ		80		br-wh mi		PR						
BHLRMUR-04	22.61				hJ		55		br-wh mi		PR						
BHLRMUR-04	24.50				J		0		Fe	SN	UN	RF					
BHLRMUR-04	24.62				J		0		Fe	SN	PR	SM					
BHLRMUR-04	24.62	24.67			FZ				Fe	SN	IR	RF					low strength rock rubbed by drilling
BHLRMUR-04	24.74				J		0			CN	UN	RF					
BHLRMUR-04	24.82	24.84			FZ					CN	IR	RF					Fe SN on upper and lower defect surfaces, possible mafic intrusion rubbed by drilling
BHLRMUR-04	24.92				hJ		5		bk mi		UN						
BHLRMUR-04	24.92	25.00			hJ		50		bk mi		UN						
BHLRMUR-04	24.94				hJ		45		bk mi		UN						
BHLRMUR-04	24.95				hJ		50		bk mi		UN						
BHLRMUR-04	25.10				J		45		Fe	SN	ST	RF					
BHLRMUR-04	25.40	25.53			J	x4	0	15	Fe	SN	UN	RF					
BHLRMUR-04	25.63				hJ		65		bk mi		UN						
BHLRMUR-04	26.05	26.25			hJ		50				PR						
BHLRMUR-04	26.38				J		25			CN	PR	RF					



Pioneer Burdekin Pumped Hydro Energy Storage: Tranche 2 – BHLRMUR-04 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-04	26.41				hJ		25		bk mi		PR						
BHLRMUR-04	26.79				V		35			VN	UN						
BHLRMUR-04	26.89	27.13			hJ	x4	20		bk mi		UN						
BHLRMUR-04	26.92	27.21			J		30			SN	UN	RF					
BHLRMUR-04	27.20				J		15			CN	PR	SM					
BHLRMUR-04	27.31	27.67			hJ	x3	35		bk mi		UN						
BHLRMUR-04	27.76				J		45		Fe	SN	ST	RF					
BHLRMUR-04	27.88	28.04			J		60		Fe	SN	PR	RF					
BHLRMUR-04	27.91				J		55			SN	PR	RF					
BHLRMUR-04	28.15	28.28			hJ	x2	50		bk mi		UN						
BHLRMUR-04	28.45				J		45			CN	PR	RF					
BHLRMUR-04	28.64				J		50		pk mi	SN	PR	SM					15mm pi mi alt halo
BHLRMUR-04	28.76				J		15			CN	PR	RF					
BHLRMUR-04	28.80	29.10			hJ		80		wh mi		UN						
BHLRMUR-04	29.08				hJ		10		wh mi		PR						
BHLRMUR-04	29.21				J		25				PR-CU	RF					
BHLRMUR-04	29.21	29.64			hJ	x4	45		wh mi		UN						
BHLRMUR-04	29.70				DB												
BHLRMUR-04	29.83				V		50		gy mi		PR		=	10			

(c) Queensland Hydro Pty Ltd 2025, CC BY 4.0. Please note copyright and limitation of liability notices on attached cover page.



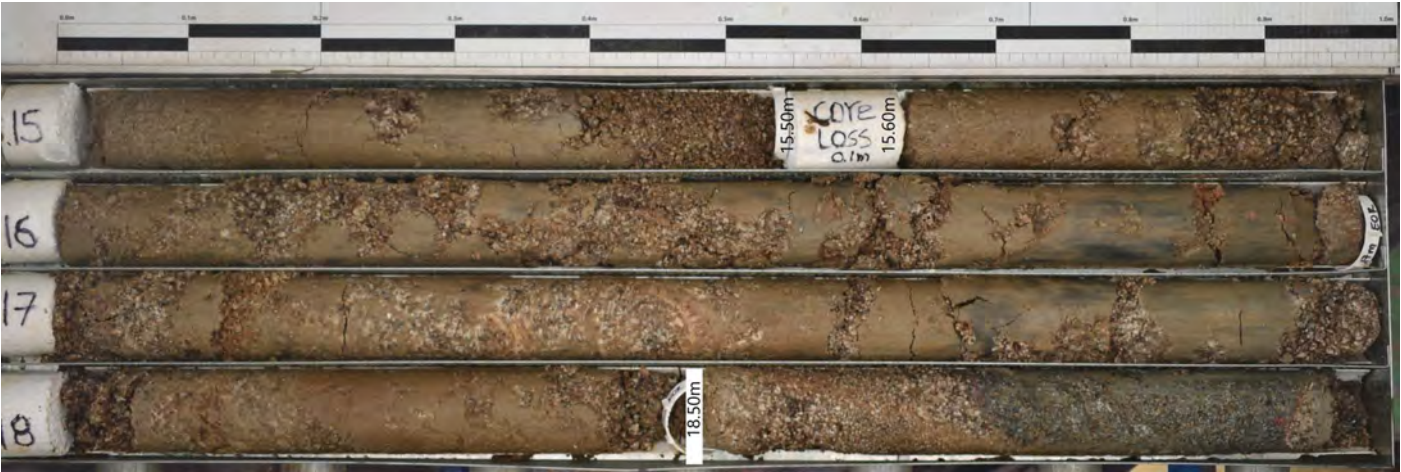
PointID : BHLRMUR-04 Depth Range: 7.00 - 11.00 m



PointID : BHLRMUR-04 Depth Range: 11.00 - 15.00 m

	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHLRMUR-04	DRAWN RC	DATE 2/12/2024
		CHECKED GEM	DATE 4/12/2024
		SCALE Not To Scale	A4
		PROJECT No PS138693	FIGURE No 1/3

(c) Queensland Hydro Pty Ltd 2025, CC BY 4.0. Please note copyright and limitation of liability notices on attached cover page.



PointID : BHLRMUR-04 Depth Range: 15.00 - 19.00 m

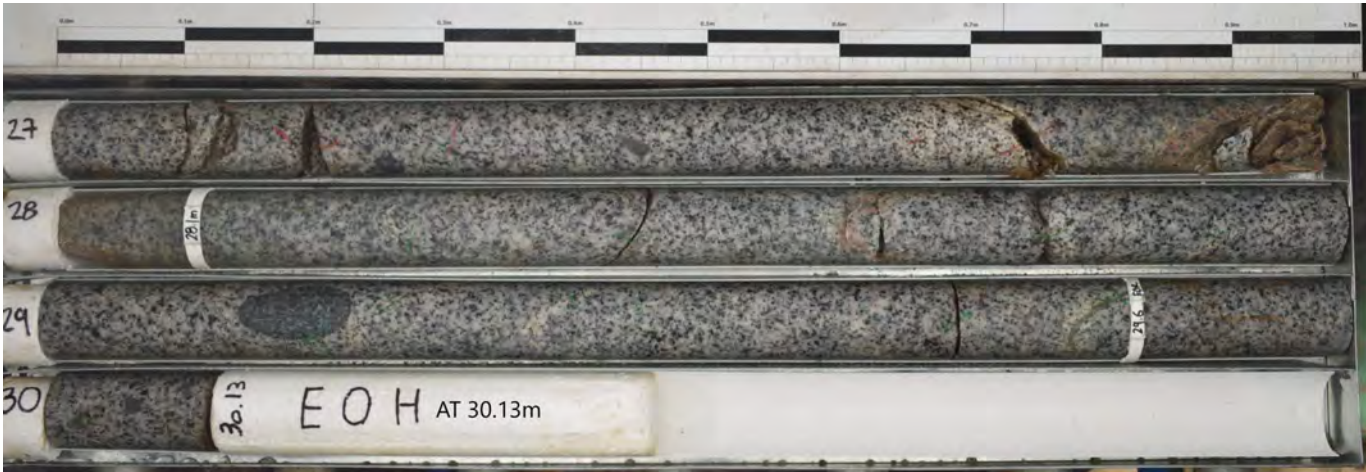


PointID : BHLRMUR-04 Depth Range: 19.00 - 23.00 m

	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHLRMUR-04	DRAWN	RC	DATE	2/12/2024
		CHECKED	GEM	DATE	4/12/2024
		SCALE	Not To Scale		A4
		PROJECT No	PS138693		FIGURE No 2/3



PointID : BHLRMUR-04 Depth Range: 23.00 - 27.00 m



PointID : BHLRMUR-04 Depth Range: 27.00 - 30.13 m

	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHLRMUR-04	DRAWN RC	DATE 2/12/2024		
		CHECKED GEM	DATE 4/12/2024		
		SCALE Not To Scale			A4
		PROJECT No PS138693		FIGURE No 3/3	