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CLIENT:

COORDS: 659139.6 m 7667392.8 m GDA 2020 MGA Zone 55

PROJECT: Pioneer Burdekin PHES GI LOCATION: Dalrymple Heights

SURFACE RL: 874.082 m DATUM: AHD INCLINATION: -88° DIRECTION: 122°

CONTRACTOR: Twin Hills

SHEET: 1 OF 10

LOGGED: ENGEO DATE: 29/6/23

DRILL RIG: HYDRAPOWER SCOUT Mk5

HOLE DEPTH: 42.00 m JOB NO: 23117.000.001 CHECKED: SF DATE: 24/8/23 Drilling Sampling **Field Material Description** MOISTURE CONDITION CONSISTENCY DENSITY **GROUP SYMBO** RECOVERED STRUCTURE AND ADDITIONAL OBSERVATIONS SAMPLE OR GRAPHIC LOG LENGTH (metres) MATERIAL DESCRIPTION WATER FIELD TEST DEPTH RL w < St TOPSOIL CL-CI <u>0.05</u> 874.03 TOPSOIL: CLAY with sand low to medium plasticity, brown, with fine to medium grained sand, trace rootlets RESIDUAL SOIL Clayey SILT with sand low liquid limit, orange-brown, with fine to medium grained sand 0.5 1.0 Coring water returns were not recorded. ENGEO 2.00.2.2 LIB.GLB LQ ENGEO NON-CORED FULL PAGE PIONEER BURDEKIN -MASTERBHT03 REWORK-AUSLAPTOP008.GPJ <-Drawing File>> 30/10/2024 20:59 10.03.00.09 Datgel Tools 1.5 SPT 1.50-1.95 m 5, 7, 9 N=16 2.0 VSt SSA 2.5 w < PL 3.0 U 3.00-3.55 m 3.5 4.0 4.50 869.58 LL = 48% PI = 15% LS = 6.5% MC = 28.0% ECN = 6 Soil Particle Density (t/m²) = 2.54 SPT 4.50-4.95 m 4.5 869.38 St 4.70 m: Becomes orange mottled white, red, and black. This log must be read in conjunction with accompanying symbols and abbreviations used on Geotechnical

Logs. It has been prepared for geotechnical purposes only.



CLIENT: SMEC

SIVIEC

PROJECT: Pioneer Burdekin PHES GI LOCATION: Dalrymple Heights

JOB NO: 23117.000.001

COORDS: 659139.6 m 7667392.8 m GDA 2020 MGA Zone 55

SURFACE RL: 874.082 m DATUM: AHD

INCLINATION: -88° DIRECTION: 122° HOLE DEPTH: 42.00 m

SHEET: 2 OF 10

DRILL RIG: HYDRAPOWER SCOUT Mk5

CONTRACTOR: Twin Hills

LOGGED: ENGEO DATE: 29/6/23

CHECKED: SF DATE: 24/8/23

Dr	lling		Sampling				Field Material Doce	rintio	'n	
	lling		Sampling	T		Ы	Field Material Desc			
SUPPORT PENETRATION RESISTANCE WATER	LENGTH (metres)	<i>DEPTH</i> RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
	5.5 —					ML	Clayey SILT with sand low liquid limit, orange-brown, with fine to medium grained sand	w < PL	St	RESIDUAL SOIL
	6.0	6.00 868.09	SPT 6.00-6.45 m 3, 4, 6 N=10		X	ML	Sandy SILT with clay low liquid limit, brown orange mottled white, black, and red, fine to medium grained sand, with clay			
	6.5 —				× × × × × × × × × × × × × × × × × × ×					
	7.0				× × × × × × × × × × × × × × × × × × ×					
	7.5 —		U 7.50-8.05 m LL = 58% PI = 16% LS = 5.0% ECN = 6 Soil Particle Density (t/m³) = 2.49		× × × × × × × × × × × × × × × × × × ×			w < PL	St	
	8.5 —				× × × × × × × × × × × ×					
	9.0 —		SPT 9.00-9.45 m 3, 4, 5 N=9		× × × × × × × × × × ×					
	9.5 —				× × × × × × × × × × × ×					
	10.0		This log must b	ne re	× × ×	coniu	nction with accompanying symbols and abbreviations used	on G	enter	phnical



CLIENT:

PROJECT: Pioneer Burdekin PHES GI LOCATION: Dalrymple Heights

JOB NO: 23117.000.001 COORDS: 659139.6 m 7667392.8 m GDA 2020 MGA Zone 55

SURFACE RL: 874.082 m DATUM: AHD

INCLINATION: -88° DIRECTION: 122°

HOLE DEPTH: 42.00 m

SHEET: 3 OF 10

DRILL RIG: HYDRAPOWER SCOUT Mk5

CONTRACTOR: Twin Hills

LOGGED: ENGEO DATE: 29/6/23

CHECKED: SF DATE: 24/8/23 Drilling Sampling **Field Material Description** MOISTURE CONDITION CONSISTENCY DENSITY METHOD / SUPPORT PENETRATION RESISTANCE SROUP SYMBOL RECOVERED STRUCTURE AND SAMPLE OR GRAPHIC LOG LENGTH (metres) MATERIAL DESCRIPTION ADDITIONAL OBSERVATIONS WATER FIELD TEST DEPTH RL 10.0 Sandy SILT with clay low liquid limit, brown orange mottled white, black, and red, fine to medium grained sand, with clay × w < PL St × 10.5 SILT with sand low liquid limit, brown orange mottled black, pale red, and white, with fine to medium grained sand, Relict rock structure in SPT sample., (Extremely Weathered Material) MC = 26.9% ECN = 6 EXTREMELY WEATHERED MATERIAL Soil Particle Density  $(t/m^3) = 2.67$ SPT 10.50-10.95 m 2, 4, 6 N=10 11.0 ENGEO 2.00.2.2 LIB.GLB LQ ENGEO NON-CORED FULL PAGE PIONEER BURDEKIN -MASTERBHT03 REWORK-AUSLAPTOP008.GPJ <-Drawing File>> 30/10/2024 20:59 10.03.00.09 Datgel Tools 11.5 12.00 | 862.09 | U 12.00-12.55 m w < PL 12.0 St 12.00 m: Becomes brown-orange mottled black spotted white and SSA 12.5 13.0  $\subseteq$ 13.5 SPT 13.50-13.95 m Top of SPT is wet, inferred groundwater 20, 26, 30 N=56 14.0 w > PL Н 14.5 15.00 15.0 This log must be read in conjunction with accompanying symbols and abbreviations used on Geotechnical

Logs. It has been prepared for geotechnical purposes only.



CLIENT: SMEC

SMEC

PROJECT: Pioneer Burdekin PHES GI LOCATION: Dalrymple Heights

JOB NO: 23117.000.001

COORDS: 659139.6 m 7667392.8 m GDA 2020 MGA Zone 55

SURFACE RL: 874.082 m DATUM: AHD

INCLINATION: -88° DIRECTION: 122° HOLE DEPTH: 42.00 m

SHEET: 4 OF 10

DRILL RIG: HYDRAPOWER SCOUT Mk5

CONTRACTOR: Twin Hills

LOGGED: ENGEO DATE: 29/6/23

CHECKED: SF DATE: 24/8/23

		Dril	ling		Sampling				Field Material Desc	riptio	on	
METHOD / SUPPORT	PENETRATION RESISTANCE		LENGTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL			CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			15.0	859.09	SPT 15.00-15.42 m 3, 4, 7/120mm		× × × × × × × × × × × ×	SM	Clayey Sandy SILT low liquid limit, brown-orange mottled black, white and red., fine to coarse grained sand			
WB			- 15.5 — -				× × × × × × × × × × × × × × ×			w~ LL	н	
			16.0 — -				× × × × × × × × × × × × × × × × × × ×					
,			16.5 —				× × × ×		For Continuation Refer to Sheet 5			
			- - -									
			17.0 —									
			- 17.5 —									
			- 18.0 —									
			-									
			18.5 —									
			19.0 —									
			-									
			19.5 — - -									
			20.0 —		This log must l	be re	ead in o	conju	nction with accompanying symbols and abbreviations used	on G	Seoteo	chnical
					J				t has been prepared for geotechnical purposes only.			



CLIENT: SMEC

D. D. L. DUEGO

PROJECT: Pioneer Burdekin PHES GI LOCATION: Dalrymple Heights

JOB NO: 23117.000.001

COORDS: 659139.6 m 7667392.8 m GDA 2020 MGA Zone 55

SURFACE RL: 874.082 m DATUM: AHD

INCLINATION: -88° DIRECTION: 122° HOLE DEPTH: 42.00 m

SHEET: 5 OF 10

DRILL RIG: HYDRAPOWER SCOUT Mk5

CONTRACTOR: Twin Hills

			Drilli				Field Material Description						Defect Information		
SUPPORT	WATER	TCR	RQD	DRILLED LENGTH (metres)	<i>DEPTH</i> RL	GRAPHIC LOG	MATERIAL DESCRIPTION	DETAILED WEATHERING	STI SI (AS (AS)	FERF RENG 50 (MF 51726:2	RED GTH Pa)	MEASURED STRENGTH: UCS & Isto (A,D.L) (MPa)	DEFECT DESCRIPTION  Mechanical Discontinuities / non-intact defects shown only. See attached Detailed Defect Log for all recorded discontinuities and defects	SP	PAC (mm
		18	0	15.0 —	16.45 857.64 17.47 856.62 17.70 17.75 856.34	+ + + + + + + + + + + + + + + + + + +	Extremely Weathered Microgranite (?) Recovered as sitly CLAY with sand (Extremely Weathered Material) (CL) Low plasticity, brown orange mottled black, pale red and white, with fine to coarse grained sand, w-PL, stiff to very stiff.	xw							
HQ3		86	0	- 18.0 — - - -	10.50	- + + + - + - + - + - + 	CORE LOSS  Extremely Weathered Microgranite (?) Recovered as clayey SILT trace sand (Extremely Weathered Material) (ML) Low plasticity, orange mottled black and orange-red, trace fine to medium grained sand, w-PL, very stiff., Few relict feldspar crystals, completely weathered to clay. MnO common along relict defects, <1 mm thick.						18.12-18.12 m: J, 3°, Und, Ro, Cn  18.34-18.39 m: Cs, 30°, Irr, Ro, Cru parent material FL 18.45-18.51 m: Cs, 20°, Irr, Ro, Cru parent		
		100	54	18.5 —	18.52 855.57	+ + + + - + + - + - + - + - + - + - + -	WEATHERED AND ALTERED MICROGRANITE Fine to medium grained, felsic intrusive. Orange, black, red, and pale red. Crystalline, porphyritic, few white subhedral feldspar (?) phenocrysts (<2 mm), more common in bottom 70 mm of unit., With many (>30/m) MnO coated / filled, healed fractures throughout, moderately to very steeply dipping, typically 1 mm - 5 mm wide.	HW					18.59-18.58 m: J, 3°, Und, Ro, Cly Vr 18.59-18.80 m: J, 15°, Irr, Ro, Cn 18.84-18.86 m: J, 10°, Irr, Ro, Cn		
		100	52	19.5 —	19.73 854.36	- + + + + - + + - + + - + + - + +	19.73 m - 20.10 m: Becomes brown and grey, less weathered than rock above and below, fractures are less common.	MW					19.48-19.49 m: XWS, 2°, Pln, Cly FL  19.75-19.77 m: J, 20°, Irr, Sm, MnO Ct 19.77-19.79 m: J, 20°, Pln, Sm, MnO Ct 19.79-19.81 m: J, 15°, Irr, Sm, MnO Ct 19.82-19.83 m: J, 8°, Und, Ro, MnO Ct		



CLIENT: SMEC

PROJECT: Pioneer Burdekin PHES GI

LOCATION: Dalrymple Heights

JOB NO: 23117.000.001

COORDS: 659139.6 m 7667392.8 m GDA 2020 MGA Zone 55

SURFACE RL: 874.082 m DATUM: AHD

INCLINATION: -88° DIRECTION: 122° HOLE DEPTH: 42.00 m

SHEET: 6 OF 10

DRILL RIG: HYDRAPOWER SCOUT Mk5

CONTRACTOR: Twin Hills

		Drilli				Field Material Description		Defect Information	AVERAG
SUPPORT	TCR	RQD	O (metres)	DEPTH RL	GRAPHIC LOG	MATERIAL DESCRIPTION	DETAILED STRENGTH IS® (Mba) (W21/25/501/2) MEATHER NO. (W21/25/501/2) MEATHER NO. (W21/25/501/25/25/25/25/25/25/25/25/25/25/25/25/25/	tinuities and defects	DEFECT SPACING (mm) (ISO14689:20)
	71	15	20.5 —	20.10 853.99 20.66 853.43	+ + + + - + + + - + + + + +	WEATHERED AND ALTERED MICROGRANITE Fine to medium grained, felsic intrusive. Orange, black, red, and pale red. Crystalline, porphyritic, few white subhedral feldspar (?) phenocrysts (<2 mm), more common in bottom 70 mm of unit., With many (>30/m) MnO coated / filled, healed fractures throughout, moderately to very steeply dipping, typically 1 mm - 5 mm wide. 20.10 - 20.66 m: Becomes orange-brown and pale grey.  CORE LOSS	HW XW	19.89-19.92 m: J, 30°, Pln, Sm, MnO Ct 19.92-19.95 m: J, 20°, Pln, SI, MnO Vr 20.08-20.12 m: J, 34°, Irr, Sm, MnO Ct  20.31-20.33 m: J, 30°, Pln, SI, MnO Ct  20.53-20.57 m: J, 30°, Pln, Ro, MnO Ct, Some evidence of slickenside, however only over part of the joint surface. 20.58-20.61 m: J, 30°, Pln, SI, MnO Ct	ļ
	62	0	21.0	21.14 852.95 21.45	+ + - + + + - +	Extremely Weathered Microgranite (?) Recovered as sandy silty CLAY (CL) Low plasticity, orange mottled black, fine to coarse grained sand, w~PL, very stiff.	xw	21.21-21.24 m: J, 20°, Irr, Ro 21.24-21.28 m: J, 38°, Pln, Ro, Sandy Cly FL 21.25-21.27 m: J, 27°, Irr, Ro, Sandy Cly FL 21.30-21.34 m: J, 35°, Pln, Ro	
	77	0	21.5 —	852.65 21.68 852.42	+ + - + + + - +	CORE LOSS  Extremely Weathered Microgranite (?) Recovered as sandy silty CLAY (CL) Low plasticity, orange mottled black and white, fine to coarse grained sand, w~PL, very stiff. Black MnO staining on relict joints, trace white feldspar (?) phenocrysts typically up to 2 mm.	xw		
			- - - 22.5 —	<u>22.17</u> 851.93	- + + + - + - + - + - + - +	WEATHERED AND ALTERED MICROGRANITE Fine grained, felsic intrusive. Brown and grey. Crystalline, aphanitic groundmass with few white subhedral feldspar (?) phenocrysts (<2 mm). Upper contact at 35°. MnO staining to veneer on defects, typically at 30° - 40°.	MW HW	22.07-22.10 m: J, 35°, Cvd, Sm, MnO Ct 22.07-22.11 m: XWS, Irr, Ro, Sandy Cly FL 22.07-22.10 m: J, 35°, Cvd, Sm, MnO Ct 22.07-22.11 m: XWS, Irr, Ro, Sandy Cly FL 22.09-22.11 m: J, 38°, Cvd, Sm, MnO Ct 22.16-22.20 m: J, 35°, Und, Ro, MnO Ct 22.7-22.31 m: J, 45°, Pln, Sm, MnO Vr 22.30-22.32 m: J, 30°, Und, Ro, MnO Vr 22.33-22.35 m: J, 30°, Und, Ro, MnO Vr, Crushed parent rock inbetween this joint and the previous joint, 40mm, medium to coarse	Ś
	78	11	23.0 —	22.79 851.31 23.00 851.10	+ + + + - + + + - +	CORE LOSS  WEATHERED AND ALTERED MICROGRANITE Fine to medium grained, felsic intrusive. Brown and grey. Crystalline, porphyritic, with many white subhedral feldspar (?) phenocrysts (<2 mm). MnO staining to veneer on defects.	HW XW	grained gravel sized clasts, very angular 22.35 22.35-22.41 m: J, 46°, Und, Ro, MnO Ct 22.48-22.52 m: J, 52°, Und, Ro, MnO Vr, Some evidence of slickenside, however only over part of the joint surface. 22.56-22.60 m: J, 35°, Pln, Sl, MnO Ct 22.68-22.74 m: J, 35°, Pln, Sm, MnO Ct 23.00-23.02 m: J, 20°, Cvd, Ro, Sand FL 23.14-23.20 m: XWS, 25°, Und, Sm, Sandy Cly FL, 1mm MnO on either side of weathered seam. PP: 2 kg/cm^2 (uncorrected).	
			- 23.5 — - -	23.40 850.70 23.52 850.58	+ + - + + + + + - +	CORE LOSS  WEATHERED AND ALTERED MICROGRANITE Fine to medium grained, felsic intrusive. Brown and grey. Crystalline, porphyritic, with many white subhedral feldspar (?) phenocrysts (<2 mm). MnO staining to veneer on defects.	MW	23.75-23.85 m: J, 52°, Pln, Sm, MnO Vr	
	89	17	24.0 — - - -	850.20 24.45	- / > > \ / > > \ / > > \ / > > \	QUARTZ DIORITE Fine to medium grained, igneous intrusive. Grey, dark grey and pale grey. Crystalline, porphyritic, subhedral to anhedral feldspar and quartz phenocrysts. Poorly developed, indistinct foliation., Slight pale green alteration of groundmass, FeO and MnO staining associated with open defects.		23.86-23.92 m: J, 55°, Stp, Ro, MnO Vr 23.92-24.00 m: J, 78°, Pln, Sm, MnO Vr 24.10-24.14 m: J, 48°, Cvd, Ro, MnO Vr 24.12-24.17 m: J, 58°, Cvd, Sm, MnO Vr 24.12-24.17 m: J, 60°, Pln, Sm, MnO Vr 24.16-24.18 m: J, 22°, Pln, Sm, MnO Vr 24.19-24.20 m: J, 22°, Pln, Sm, MnO Vr 24.37-24.40 m: J, 53°, Irr, Sm, MnO Vr	
	100	100	24.5	24.69 849.41	+ + - + + + - + + + + +	ALTERED MICROGRANITE Fine to medium grained, felsic intrusive. Dark grey to greenish-grey. (Full description overleaf). 24.69 m - 24.77 m: Micro-Fault - Quartz vein at ~60° has been displaced ~20 mm by cross cutting vein at 63° (discordant).	SA		
			25.0 —	25.00	- +			24.95-25.03 m: J, 50°, Pln, Sm, MnO Vr	



CLIENT:

PROJECT: Pioneer Burdekin PHES GI

LOCATION: Dalrymple Heights

JOB NO: 23117.000.001 COORDS: 659139.6 m 7667392.8 m GDA 2020 MGA Zone 55

SURFACE RL: 874.082 m DATUM: AHD

INCLINATION: -88° DIRECTION: 122°

HOLE DEPTH: 42.00 m

SHEET: 7 OF 10

DRILL RIG: HYDRAPOWER SCOUT Mk5

CONTRACTOR: Twin Hills

LOGGED: ENGEO DATE: 29/6/23 CHECKED: SF DATE: 24/8/23

Drilling Field Material Description **Defect Information** | NFERRED | STRENGTH | Is<sub>s</sub> (MPa) (AS1726:2017) | NC & & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | C & S | AVFRAGE DEFECT DESCRIPTION LENGT DEFECT SPACING GRAPHIC LOG Mechanical Discontinuities / non-intact METHOD SUPPORT MATERIAL DESCRIPTION (mm) (ISO14689:2017) WATER DRILLED defects shown only. See attached De-C 80 (C 80 ( RQD 7CR tailed Defect Log for all recorded discon-DEPTH RL tinuities and defects 25.0 849.10 ALTERED MICROGRANITE SA Fine to medium grained, felsic intrusive.

Dark grey to greenish-grey.

Crystalline, phaneritic, subhedral to anhedral crystals. 100 100 Poorly developed, indistinct foliation., Pervasive propylitic (?) alteration throughout, frequent fine quartz (?) veinletts / thin veins throughout, 25.35-25.48 m: J, 68°, Pln, Ro, MnO Vr typically <1 mm, randomly orientated. 25.5 25.47-25.64 m: J, 72°, Cvd, Qz Vr 25.50~m - 25.63~m: Micro-Fault - Quartz vein at  ${\sim}40^\circ$  has been displaced  ${\sim}10~mm$  by cross cutting vein at  ${\sim}75^\circ$  (discordant). 26.0 100 100 26.24 847.86 26.22-26.35 m: J, 68°, Pln, Ro, Qz Vr ALTERED GRANITE
Medium to coarse grained, felsic intrusive.
Dark grey and pale grey.
Crystalline, phaneritic, subhedral to anhedral feldspar
and quartz. Poorly developed foliation at 30° - 40°,
defined by segregation of light minerals and
elongation of quartz., Pervasive pale green propylitic
(?) alteration occasional pink potassic (?) alteration
throughout, particularly around defects.
Integral Discontinuities
Vn/ Veinletts: gentle to moderate, (5-10/m), most // to
FOL, most ~2-3 mm wide, some >5 mm. ALTERED GRANITE SA <<Drawng File>> 30/10/2024 18:07 10:03:00:09 Datgel Tools 26.5 26.97-27.01 m: J, 47°, Und, Ro, Cn 27.0 H 27.46-27.51 m: J, 40°, Irr, Sm, Qz Vr 27.5 ENGEO 2.00.2.2 LIB.GLB LOG ENGEO CORED BOREHOLE PIONEER BURDEKIN -MASTERBHT03 REWORK-AUSLAPTOP008.GPJ 100 100 28.0 28.17-28.21 m; J. 50°. Und. Sm. Cn 28.46-28.48 m; J. 32°, Pln. Ro. Cn 28.5 29.0 100 100 29.30 844.80 29.30~m - 29.55~m: Two sub-parallel quartz veins overlapping (~80° and ~75°). Chloritic (?) and potassic (?) alteration halo present. Overall vein thickness between 5 mm and 20 mm. 29.5 100 95



CLIENT: SMEC

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COORDS: 659139.6 m 7667392.8 m GDA 2020 MGA Zone 55

SURFACE RL: 874.082 m DATUM: AHD

INCLINATION: -88° DIRECTION: 122° HOLE DEPTH: 42.00 m

SHEET: 8 OF 10 DRILL RIG: HYDRA

DRILL RIG: HYDRAPOWER SCOUT Mk5

CONTRACTOR: Twin Hills

	Drill				Field Material Description	_	_				Defect Information	A) (ED ( 2
METHOD/ SUPPORT WATER TCR	RQD		<i>DEPTH</i> RL	GRAPHIC LOG	MATERIAL DESCRIPTION	DETAILED WEATHERING	INF STF Is <sub>s</sub> (AS	ERR RENC ₀ (MF 1726:20	RED GTH Pa)	MEASURED STRENGTH: UCS & Isso (A,D,L) (MPa)	DEFECT DESCRIPTION  Mechanical Discontinuities / non-intact defects shown only. See attached De- tailed Defect Log for all recorded discon- tinuities and defects	AVERAG DEFEC SPACING (mm) (ISO14689:20
100	95	30.0		+ + - + - + + + - + - + - + + +	ALTERED GRANITE Medium to coarse grained, felsic intrusive. Dark grey and pale grey. Crystalline, phaneritic, subhedral to anhedral feldspar and quartz. Poorly developed foliation at 30° - 40°, defined by segregation of light minerals and elongation of quartz. Pervasive pale green propylitic (?) alteration occasional pink potassic (?) alteration throughout, particularly around defects. Integral Discontinuities Vn/ Veinletts; gentle to moderate, (5-10/m), most // to FOL, most ~2-3 mm wide, some >5 mm.	SA					30.64-30.69 m: J, 26°, Und, Ro, Cn	١
100	0	-		-								
100	100	31.0		- + + + - + + + - + - +								Ś
100	100	31.5 —		+ + + + + + + + + + + + + + + + + + +								ļ
100	100	33.5 —		- + + + + + + + + + + + + + + + + + + +							34.14-34.17 m: J, 25°, Pln, Ro, Qz Cn	ĺ
100	100	35.0		+ + + - + + + - + + +								



CLIENT: SMEC

PROJECT: Pioneer Burdekin PHES GI

LOCATION: Dalrymple Heights JOB NO: 23117.000.001

COORDS: 659139.6 m 7667392.8 m GDA 2020 MGA Zone 55

SURFACE RL: 874.082 m DATUM: AHD

INCLINATION: -88° DIRECTION: 122° HOLE DEPTH: 42.00 m

SHEET: 9 OF 10

DRILL RIG: HYDRAPOWER SCOUT Mk5

CONTRACTOR: Twin Hills

Drillin	DRILLED LENGTH 60 (metres)		<u> </u>	Field Material Description		2 INF	ERREI	n ii	0 (E	Defect Information  DEFECT DESCRIPTION	AVERAG
٥	D LENGTH		일		2	2 INF	ERRE	±≘اc			
RQD		D <i>EPTH</i> RL	GRAPHIC LOG	MATERIAL DESCRIPTION	DETAILED	STI Is: (AS	FERREI RENGTI (MPa) 1726:2017 2 2 2 2	MEASURED STRENGTH:	UCS & I <sub>s5</sub>	Mechanical Discontinuities / non-intact defects shown only. See attached De- tailed Defect Log for all recorded discon- tinuities and defects	DEFECT SPACING (mm) (ISO14689:201
100	35.0 —	DEPTH RL	as + + + + + + + + + + + + + + + + + + +	ALTERED GRANITE Medium to coarse grained, felsic intrusive. Dark grey and pale grey. Crystalline, phaneritic, subhedral to anhedral feldspar and quartz. Poorly developed foliation at 30° - 40°, defined by segregation of light minerals and elongation of quartz., Pervasive pale green propylitic (?) alteration occasional pink potassic (?) alteration throughout, particularly around defects. Integral Discontinuities Vn/ Veinletts; gentle to moderate, (5-10/m), most // to FOL, most ~2-3 mm wide, some >5 mm.	DEFAN	<u>}</u>         -	3 2 2 6 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	<b>益</b>		tailed Defect Log for all recorded discon-	EC. (EC. (EC. (EC. (EC. (EC. (EC. (EC. (
	-		· + + + + + + + + + + + + + + + + + + +								
	100	37.0 —	36.5 — 37.5 — 38.5 — 39.0 — 39.5 — 100 39.5 —	100 35.5 — + + + + + + + + + + + + + + + + + +	100   35.5		Day gray and pale grey.  Crystalline, phanerilic, subhedral to anhedral feldspar and quartz. Poorly developed foliation at 30° - 40°, defined by segregation of light minerals and elongation of quartz. Porrasive pale green procylitic (?) olientation according play to pale segretarion that the control of the control of the control of quartz. Pervasive pale green procylitic (?) olientation according play to pale segretarion that the control of quartz. Pervasive pale green procylitic (?) olientation according play to pale segretarion that the control of quartz. Pervasive pale green procylitic (?) olientation according play to pale segretarion of quartz. Pervasive pale green procylitic (?) olientation according play to pale segretarion of quartz. Pervasive pale green procylitic (?) olientation according play to pale segretarion of quartz. Pervasive pale green procylitic (?) olientation according play to pale segretarion of quartz. Pervasive pale green procylitic (?) olientation according play to pale segretarion of quartz. Pervasive pale green procylitic (?) olientation according play to pale segretarion of quartz. Pervasive pale green procylitic (?) olientation according play to pale segretarion of quartz. Pervasive pale green procylitic (?) olientation according play to pale segretarion of quartz. Pervasive pale green procylitic (?) olientation according play to pale segretarion processor procylitic (?) olientation according play to pale segretarion processor proce	+ Dark grey and pale grey.  Crystalline, phaneric, subhedral to anhedral feldspar and quartz. Poorly developed foliation at 30" - 40", defined by segregation of light immersts and the segretary of the segretary	Dark grey and pale grey.  Cystallan, phaneric, subhedral to anhedral feldspar and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte and quarte. Poorly developed foliation at 30° - 40°, eloquate and quarte an	Dark grey and pale grey,  100 35.5 -	## Code grey and pair grey  ## Code grey  ## Code grey and pair grey and pair grey  ## Code grey and pair grey and pair grey  ## Code grey and pair grey and pair grey  ## Code grey and pair grey an



PROJECT: Pioneer Burdekin PHES GI

## **BOREHOLE: BQUA-05**

CLIENT: SMEC

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COORDS: 659139.6 m 7667392.8 m GDA 2020 MGA Zone 55

SURFACE RL: 874.082 m DATUM: AHD INCLINATION: -88° DIRECTION: 122°

LOCATION: Dalrymple Heights INCLINATION: -88°

JOB NO: 23117.000.001 HOLE DEPTH: 42.00 m

SHEET: 10 OF 10

DRILL RIG: HYDRAPOWER SCOUT Mk5

CONTRACTOR: Twin Hills

JO	B NO	D:	231	17.000.	.001		HOLE DEPTH: 42.00 m						CHECKED: SF DAT	E: 24/8/23
			Drilli				Field Material Description						Defect Information	
SUPPORT	WATER	TCR	RQD	DRILLED LENGTH (metres)	<i>DEPTH</i> RL	GRAPHIC LOG	MATERIAL DESCRIPTION	DETAILED WEATHERING	INF STF Is: (AS:	ERR RENC (MF 1726:2	RED GTH Pa) <sup>017)</sup>	MEASURED STRENGTH: UCS & Isto (A.D.L) (MPa)	DEFECT DESCRIPTION  Mechanical Discontinuities / non-intact defects shown only. See attached De- tailed Defect Log for all recorded discon- tinuities and defects	AVERAGE DEFECTION (mm) (ISO14689:20
		100	100	40.0 —		+ + + - + + + - + + + + - + + + -	ALTERED GRANITE Medium to coarse grained, felsic intrusive. Dark grey and pale grey. Crystalline, phaneritic, subhedral to anhedral feldspar and quartz. Poorly developed foliation at 30° - 40°, defined by segregation of light minerals and elongation of quartz., Pervasive pale green propylitic (?) alteration occasional pink potassic (?) alteration throughout, particularly around defects. Integral Discontinuities Vn/ Veinletts; gentle to moderate, (5-10/m), most // to FOL, most ~2-3 mm wide, some >5 mm.	SA						
HQ3		100	100	41.0 —  -  41.5 —  -  -  -  -  -  -  -  -  -  -  -  -  -		- + + + - + + + + - + + + + + - + + + +							41.08-41.10 m: J, 25°, Pln, Ro, Cn	ĺ
				-42.0 - - - - - 42.5 - -	42.00 832.11	+ 1	END OF BOREHOLE @ 42.00 m TARGET DEPTH GROUNDWATER ENCOUNTERED @ 13.50 m DEPTH GROUTED Bearing is approximate only. Coring commenced from 16.45 m; only 15.00 m of SPT rods available onsite.							
				- 43.0 — -										
				43.5 — -										
				- 44.0 — -										
				- 44.5 — - -										
				- 45.0 —			og must be read in conjunction with accompanyin							

JOB No.:	30032772
Client:	Queensland Hydro
Site:	Pioneer-Burdekin

Borehole ID:	BQUA-05
Termination Depth:	42.00

	Depth (m)		Туре	Angle (°)	Roughness	Shape	Infill	Weathering	Nature	Comments
From	То	Midpoint	**	Angle ( )	nougililess	зпаре	1111111	weathering	Nature	Comments
18.12	18.12		Joint			Undulating			Clean	
18.34	18.39	18.37	Seam - Crushed	30 F	Rough	Irregular	Crushed parent	Extremely Weathered	Filled	
							material			
18.45	18.51	18.48	Seam - Crushed	20 F	Rough	Irregular	Crushed parent	Extremely Weathered	Filled	
							material			
18.58	18.58		Joint			Undulating	Clay		Veneer	
18.79	18.80		Joint			Irregular			Clean	
18.84	18.85		Joint	10 F		Irregular			Clean	
19.48 19.70	19.49 19.75		Seam - Extremely Weathered	2 30		Planar	Clay	Residual Soil	Filled	V. C 200 H. J. V.
19.70	19.75		8 Vein 5 Joint			Undulating Irregular	Carbonaceous MnO Coated		Coated	V x6, 30°, Und, X
19.77	19.77		3 Joint			Planar	MnO Coated		Coated	
19.79	19.81		Joint			Irregular	MnO Coated		Coated	
19.82	19.83		Joint			Undulating	MnO Coated		Coated	
19.86	19.90		3 Vein			Curved	MnO Coated		Coateu	
19.89	19.92		Joint	30.9		Undulating	MnO Coated		Coated	
19.92	19.95		Joint			Planar	MnO Veneer		Veneer	
20.06	20.08		Vein	30		Undulating	MnO Coated			
20.08	20.12		Joint	34 9		Irregular	MnO Coated		Coated	
20.31	20.33	20.32	Joint			Planar	MnO Coated		Coated	
20.49	20.51	20.50	Vein	20		Planar	MnO Coated			
20.52	20.54	20.53	8 Vein	20		Curved	MnO Coated			
20.53	20.57	20.55	Joint	30 F	Rough	Planar	MnO Coated		Coated	Some evidence of slickenside, however only over part of the joint surface.
20.58	20.61	20.60	Joint			Planar	MnO Coated		Coated	
21.21	21.24		Joint			Irregular				
21.24	21.28		Joint			Planar	Sandy CLAY	Residual Soil	Filled	
21.25	21.27		Joint	27 F		Irregular	Sandy CLAY	Residual Soil	Filled	
21.30	21.34		2 Joint			Planar				
21.68	21.96		Vein	85		Irregular	MnO Coated			
21.81	21.81		Seam - Infilled	5		Planar	Residual Soil			
21.96	21.96		Seam - Infilled	0		Planar	Residual Soil			
22.07	22.10		Joint			Curved	MnO Coated	E. A I. Maratha and	Coated	
22.07	22.11		Seam - Extremely Weathered		-	Irregular	Sandy CLAY	Extremely Weathered	Filled	
22.09 22.16	22.11 22.20		) Joint 3 Joint			Curved Undulating	MnO Coated MnO Coated	Highly Month and (DM)	Coated Coated	
22.10	22.20		Vein	32		Planar	MnO Coated	Highly Weathered (DW) Moderately Weathered (DW)	Coated	
22.23	22.31		Joint			Planar	MnO Veneer	Moderately Weathered (DW)	Veneer	
22.30	22.32		Joint			Undulating	MnO Veneer	Moderately Weathered (DW)	Veneer	
22.33	22.32		Joint			Undulating	MnO Veneer	Moderately Weathered (DW)	Veneer	Crushed parent rock inbetween this joint and the previous joint, 40mm, medium to coarse grained
22.33	22.33		T	30			1	sacrater, readricrea (577)	1	gravel sized clasts, very angular.22.35
22.35	22.41	22.38	Joint	46 F	Rough	Undulating	MnO Coated	Moderately Weathered (DW)	Coated	9 , 311g0101122100
22.48	22.52		Joint			Undulating	MnO Veneer	Moderately Weathered (DW)	Veneer	Some evidence of slickenside, however only over part of the joint surface.
22.53			Crushed Zone					, , , , , , , , , , , , , , , , , , , ,		Estimate nine joints throughout crushed zone. Crushed zone recovered as fine to coarse grained
·										gravel sized clasts of the parent rock. Clasts are angular to very angular. MnO coating and veneers
										are prominent throughout, moderately weathered, clast surfaces are a mixture of smooth and
										rough. Clasts themselves show no change in strength from the parent rock.
· [		l						1	1	
22.56	22.60		Joint			Planar	MnO Coated	Moderately Weathered (DW)	Coated	
22.68	22.74		Joint			Planar	MnO Coated	Moderately Weathered (DW)	Coated	
23.00	23.02		Seam - Crushed			Curved	SAND	Residual Soil	Filled	
23.14	23.20		Seam - Extremely Weathered	25 9	Smooth	Undulating	Sandy CLAY	Extremely Weathered	Filled	1mm MnO on either side of weathered seam. PP: 2 kg/cm^2 (uncorrected).
23.31	23.40	23.36	Crushed Zone					1	1	Estimate four joints throughout crushed zone. Crushed zone recovered as fine to medium grained
. [		l						1	1	gravel sized clasts of the parent rock. Clasts are angular to very angular. MnO coating and veneers
· [		I						1	1	are prominent throughout, moderately weathered, clast surfaces are a mixture of smooth and
		l						1	1	rough. Clasts themselves show no change in strength from the parent rock.
ı			•	ı			1	1	1	ı

	Depth (m)		Time	A = ala (%)	Davishassa	Chana	Infill	Washariaa	Natura	Comments
From	То	Midpoint	Type	Angle (°)	Roughness	Shape	Inilii	Weathering	Nature	Comments
23.52	23.85	23.69	Crushed Zone							Estimate eight joints throughout crushed zone. Crushed zone recovered as fine to coarse grained gravel sized clasts of the parent rock. Clasts are angular to very angular. MnO coating and veneers are prominent throughout, moderately weathered, clast surfaces are a mixture of smooth and rough. Clasts themselves show no change in strength from the parent rock.
23.75	23.85	23.80	Joint	52	Smooth	Planar	MnO Veneer	Moderately Weathered (DW)	Veneer	
23.86	23.92	23.89			Rough	Stepped	MnO Veneer	Moderately Weathered (DW)	Veneer	
23.92	24.00	23.96			Smooth	Planar	MnO Veneer	Moderately Weathered (DW)	Veneer	
24.00	24.08	24.04	Vein	62		Undulating	Quartz	Slightly Weathered		
24.05	24.10	24.08			Rough	Stepped	MnO Veneer	Moderately Weathered (DW)	Veneer	
24.10	24.14	24.12			Rough	Curved	MnO Veneer	Moderately Weathered (DW)	Veneer	
24.12	24.17	24.15		58	Smooth	Curved	MnO Veneer	Moderately Weathered (DW)	Veneer	
24.14 24.16	24.21 24.18	24.18			Smooth	Planar Planar	MnO Veneer MnO Veneer	Moderately Weathered (DW)	Veneer	
24.19	24.18	24.17 24.20			Smooth Smooth	Planar	MnO Veneer	Moderately Weathered (DW) Moderately Weathered (DW)	Veneer Veneer	
24.13	24.40	24.39			Smooth	Irregular	MnO Veneer	Moderately Weathered (DW)	Veneer	
24.53	24.62	24.58		55	5666	Curved	MnO Coated	Slightly Altered	V C.I.C.C.I	
24.69	24.77	24.73		63		Irregular	Quartz	Slightly Altered		
24.82	25.00	24.91		50		Curved	MnO Coated			V x12, 50°, CU, Mn CT, 1-3 mm aperture
24.95	25.03	24.99	Joint	50	Smooth	Planar	MnO Veneer	Moderately Weathered (DW)	Veneer	
25.00	25.29	25.15		14	•	Curved	MnO Veneer			V x14, 65°, CU, Mn VN
25.17	25.37	25.27		78	L	Undulating	MnO Veneer	Slightly Weathered	Hairline	
25.35	25.48	25.42			Rough	Planar	MnO Veneer	Slightly Weathered	Veneer	
25.42 25.42	25.46 25.50	25.44 25.46			Smooth Rough	Planar Curved	MnO Veneer	Slightly Weathered	Veneer Veneer	
25.42	25.64	25.46 25.56		70	Rougn	Curved	MnO Veneer Quartz	Slightly Weathered Slightly Weathered	Veneer	
25.50	25.54	25.52		40		Stepped	Quartz	Slightly Weathered	Filled	
25.58	25.63	25.61		40		Stepped	Quartz	Slightly Weathered	Filled	
25.64	25.75	25.70		60		Planar	MnO Coated	Slightly Weathered	Filled	
25.77	25.87	25.82	Vein	57	1	Irregular	Quartz	Slightly Weathered	Filled	
26.03	26.07	26.05		57	1	Curved	MnO Coated	Slightly Weathered	Filled	
26.04	26.08	26.06		57	1	Curved	MnO Coated	Slightly Weathered	Filled	
26.22	26.35	26.29		68	Rough	Planar	Quartz	Slightly Weathered	Veneer	
26.26	26.34	26.30		62 50		Curved	Quartz	Slightly Weathered	Filled	V 7 500 CU M CT 4 222 224 22
26.71 26.89	26.81 26.96	26.76 26.93		68		Curved Planar	MnO Coated Quartz	Slightly Weathered	Filled	V x7, 50°, CU, Mn CT, 1 mm aperture
26.97	27.01	26.99		47	Rough	Undulating	Quartz	Fresh	Clean	
27.05	27.07	27.06		50	oug.:	Curved	Unknown	Slightly Weathered	Filled	
27.18	27.19	27.19		0			Quartz	Slightly Weathered	Filled	
27.27	27.37	27.33		60		Curved	Quartz	Slightly Weathered	Filled	
27.28	27.38	27.33	Vein	65		Curved	MnO Coated	Slightly Weathered	Filled	
27.46	27.51	27.49			Smooth	Irregular	Quartz	Slightly Weathered	Veneer	
27.55	27.57	27.56		18	1	Stepped	Quartz	Slightly Altered	Filled	
27.58 27.63	27.67	27.63		68 35	1	Curved	Quartz	Fresh	Filled Filled	
27.63	27.65 27.76	27.64 27.75		60		Undulating Curved	Quartz Quartz	Fresh Fresh	Filled	
27.74	27.76	27.75 27.84		65		Curved	Quartz	Fresh	Filled	
27.85	27.91	27.88		60		Curved	Quartz	Fresh	Filled	
27.88	27.95	27.92		55		Curved	Quartz	Fresh	Filled	
28.08	28.18	28.13	Vein	65		Curved	Unknown	Fresh	Filled	
28.17	28.21	28.19		50	Smooth	Undulating		Fresh	Clean	
28.22	28.45	28.34		87		Irregular	Quartz	Fresh	Filled	
28.24	28.31	28.28		54 55		Curved	Quartz	Fresh	Filled	
28.30 28.45	28.35 28.56	28.33 28.51		55		Curved Planar	Quartz	Fresh	Filled Filled	
28.45	28.56 28.48	28.51 28.47			Rough	Planar Planar	Quartz	Fresh Fresh	Clean	
28.64	28.73	28.69		5-10	Nougii	Curved	Quartz	Slightly Altered	Cicuii	V x3, 5-10°, CU, Qz, Feld alteration around veins, pink
28.91	28.98	28.95		60		Planar	Quartz	Fresh	Filled	, z = z , z = , z = arctation around verilly print
29.30	29.50	29.40		80		Irregular	Quartz	Slightly Altered	Filled	K feldspar alteration around vein.
29.32	29.34	29.33		47	1	Curved	Quartz	Fresh	Filled	
29.34	29.45	29.40		80	1	Undulating	Quartz	Fresh	Filled	
29.41	29.55	29.48		75		Irregular	Quartz	Slightly Altered	Filled	Chlorite alteration around vein
29.60	29.70	29.65	Vein	64	1	Undulating	Quartz	Fresh	Filled	ı l

	Depth (m)		Type	Angle (°)	Roughness	Shape	Infill	Weathering	Nature	Comments
From	То	Midpoint	Туре	Aligle ( )	Rougilless	Shape	1111111	weathering	ivature	Comments
29.77	29.85	29.81	Vein	65		Curved	Quartz	Slightly Altered	Filled	K feldspar alteration around vein
29.91	29.93	29.92		55		Curved	Quartz		Filled	K Teluspar arceration around vein
30.06	30.14			60		Curved	Quartz	Slightly Altered	rineu	V::4 C0° C:: O= 3 anathura
30.06	30.14	30.10		67				et	Filled	V x4, 60°, Cu, Qz, 3 mm aperture
						Curved	Quartz	Fresh		
30.64	30.69				Rough	Undulating			Clean	
30.69	30.81	30.75		76		Curved	Quartz	Fresh	Filled	
31.03	31.07	31.05	Vein	50		Curved	Quartz	Fresh	Filled	
31.12	31.18	31.15	Vein	60		Curved	Quartz	Fresh	Filled	
31.15	31.21	31.18	Vein	65		Curved	Quartz	Fresh	Filled	
31.36	31.40	31.38		45		Irregular	Quartz	Fresh	Filled	
31.38	31.50	31.44		62		Irregular	Quartz	Fresh	Filled	
31.47	31.54	31.51		55		Curved	Quartz	Fresh	Filled	
				40				Fresh		
31.65	31.70	31.68				Curved	Quartz		Filled	
31.66	31.71	31.69		56		Curved	Quartz	Fresh	Filled	
31.70	31.74	31.72		44		Curved	Quartz	Slightly Altered	Filled	K feldspar alteration around vein
31.72	31.76	31.74		42		Curved	Quartz	Slightly Altered	Filled	K feldspar alteration around vein
31.78	31.89	31.84	Vein	78		Irregular	Quartz	Fresh	Filled	
31.93	31.98	31.96	Vein	47		Curved	Quartz	Slightly Altered	Filled	K feldspar alteration around vein
32.04	32.07	32.06		55		Curved	Quartz	Fresh	Filled	
32.05	32.13	32.09		75		Undulating	Quartz		Filled	K feldspar alteration around vein
32.36	32.48	32.42		80		Irregular	Quartz	Fresh	Filled	······································
32.38	32.48 32.40	32.42		45		Curved	Quartz	Slightly Altered	Filled	K feldspar alteration around vein
										ix refuspar afteration around vein
32.44	32.50	32.47		60		Curved	Quartz	Fresh	Filled	
32.66	32.73	32.70		65		Curved	Quartz	Fresh	Filled	
32.80	32.85	32.83		65		Curved	Quartz	Fresh	Filled	
32.82	33.12	32.90		80		Irregular	Quartz	Fresh	Filled	
32.85	32.90	32.88	Vein	60		Curved	Quartz	Fresh	Filled	
33.12	33.16	33.14	Vein	40		Undulating	Quartz	Fresh	Filled	
33.16	33.20	33.18	Vein	65		Curved	Quartz	Fresh	Filled	
33.22	33.28		Foliation	60		Curved	Quartz	Fresh	Filled	
33.32	33.34	33.33		35		Curved	Quartz	Fresh	Filled	
33.47	33.53	33.50		55		Planar	Quartz	Fresh	Filled	
33.60	33.70	33.65		80					Filled	
						Curved	Quartz	Fresh		
33.76	33.95	33.86		80		Irregular	Quartz	Fresh	Filled	
34.14	34.17	34.16			Rough	Planar	Quartz	Slightly Weathered	Clean	
34.30	34.31	34.31		30		Curved	Quartz	Fresh	Filled	
34.54	34.56	34.55	Vein	20		Curved	Quartz	Slightly Weathered	Filled	
34.62	34.65	34.64	Vein	70		Curved	Quartz	Fresh	Filled	
34.71	34.90	34.81	Vein	75		Planar	Quartz	Fresh	Filled	
34.78	34.83	34.81	Vein	75		Undulating	Quartz	Fresh	Filled	
34.81	34.83	34.82		20		Curved	Quartz	Fresh	Filled	
34.97	34.99	34.98		35		Planar	Quartz	Fresh	Filled	
35.04	35.17	35.11		85		Planar	Quartz	Fresh	Filled	
35.19	35.23	35.11		70		Planar		Fresh	Filled	
							Quartz			
35.61	35.64	35.63		45		Curved	Quartz	Fresh	Filled	
35.67	35.70			45		Curved	Quartz	Fresh	Filled	
36.22	36.24			45		Curved	Quartz	Fresh	Filled	
36.22	36.48	36.35		80		Irregular	Quartz	Fresh	Filled	
36.50	36.84	36.67	Foliation	40		Curved	Feldspar	l		FL x5, 40°, Cu, Feld, 2 mm aperture
37.10	37.14	37.12		50		Curved	Quartz	Fresh	Filled	
37.22	37.30			57		Planar	Quartz	Fresh	Filled	
37.28	37.31	37.30		47		Curved	Quartz	Fresh	Filled	
37.28	37.31			4/	Pough	Curved	Qual LL	Slightly Weathered	Clean	
					Rough		O a sta			
37.57	37.72			65		Planar	Quartz	Fresh	Filled	
38.07	38.12	38.10		52		Curved	Quartz	Fresh	Filled	
38.79	38.85	38.82		50		Curved	Quartz	Fresh	Filled	
38.90	38.98	38.94		70		Curved	Quartz	Slightly Altered		K feldspar alteration around vein
39.27	39.35	39.31		80		Curved	Quartz		Filled	
39.73	39.84	39.79	Vein	75		Curved	Quartz	Fresh	Filled	
39.79	39.83	39.81		35		Planar	Unknown	Slightly Altered	Filled	
39.92	39.96	39.94		45		Planar	Unknown	Slightly Altered	Filled	
40.15	40.50			85		Undulating	Quartz	Fresh	Filled	
40.72				38		Curved	Unknown		Filled	
40.72	40.70	-0.74		36	•		00WII	ongrey Attered		ı

	Depth (m)		Tuno	Angle (°)	Roughness	Shape	Infill	Weathering	Nature	Comments		
F	rom	To		Midpoint	Туре	Aligie ( )	Kougilless	Silape	""""	Weathering	Nature	Confinents
Π	40.93	3	40.95	40.94	Vein	3		Planar	Unknown	Slightly Altered	Filled	
	41.08	8	41.10	41.09	Joint	25	Rough	Planar		Fresh	Clean	
٠: ا	41.15	5	41.37	41.26	Vein	75		Planar	Unknown	Slightly Altered	Filled	
age.	41.28	8	41.39	41.34	Vein	60		Planar	Unknown	Slightly Altered	Filled	
ba	41.45	5	41.52	41.49	Vein	50		Curved	Unknown	Slightly Altered	Filled	



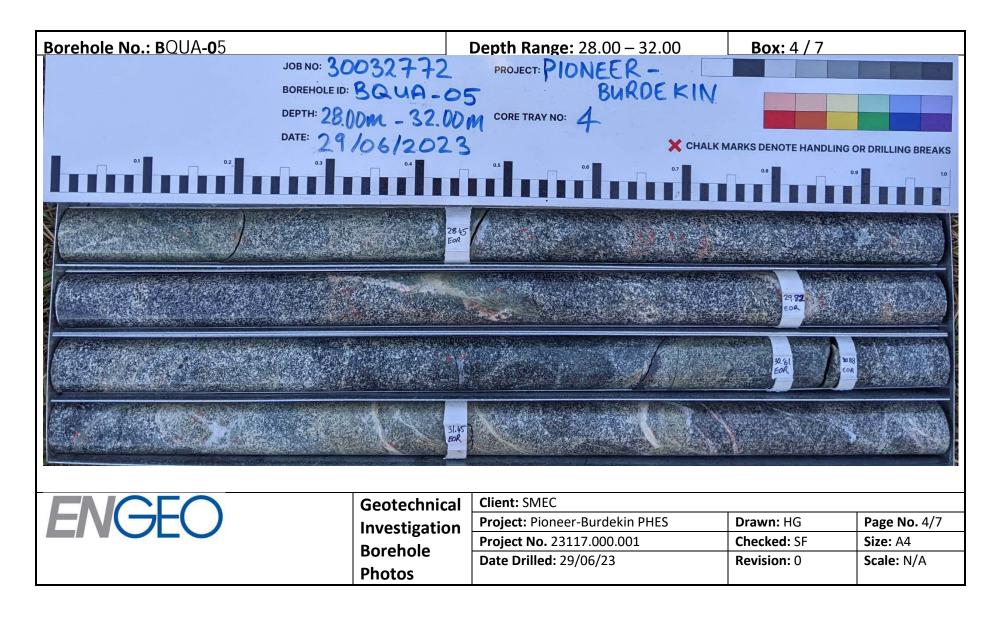




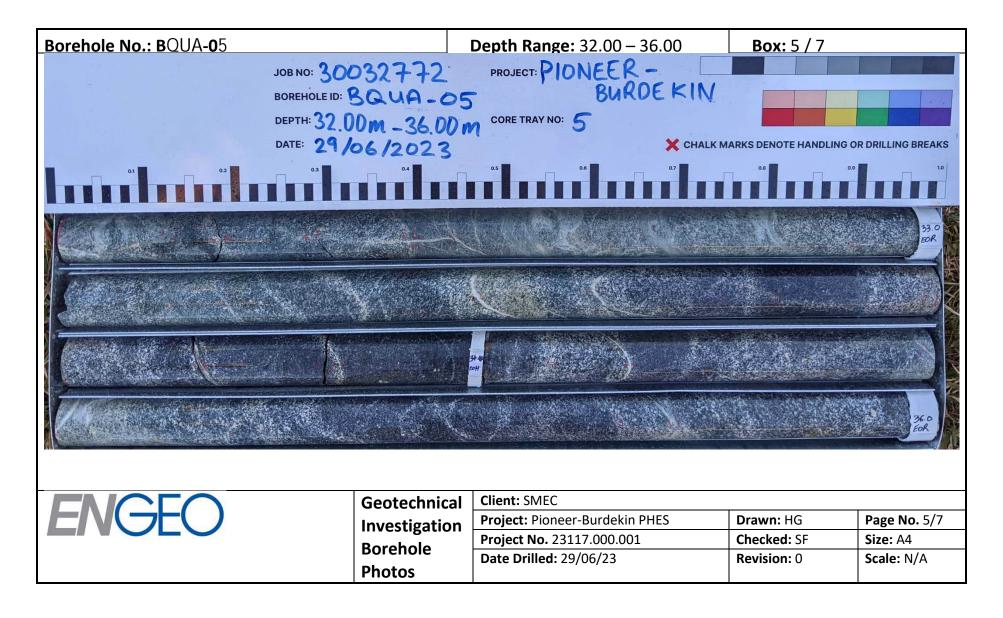








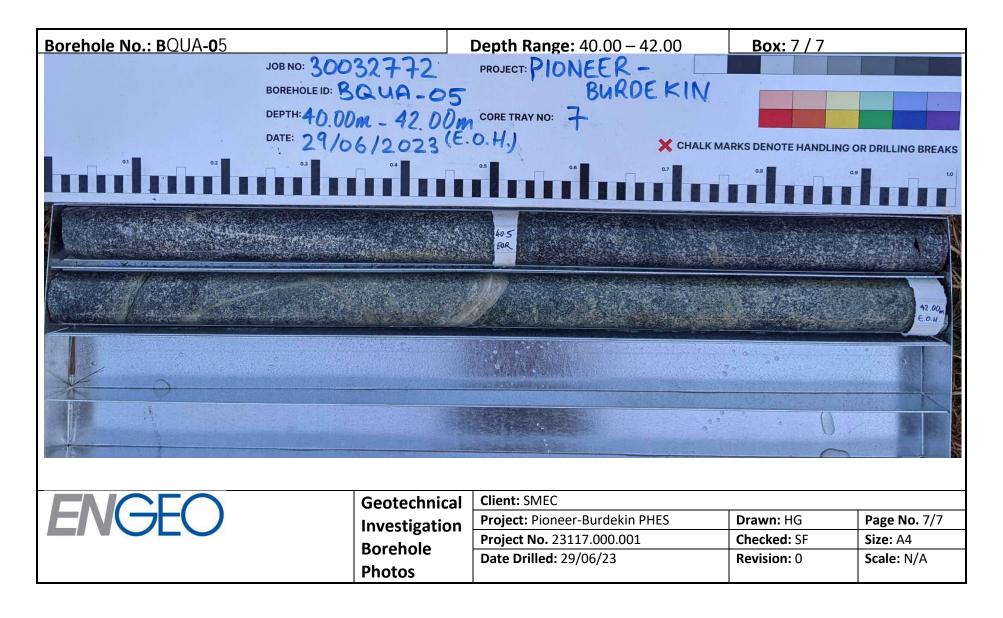














#### **COMPOSITE LOG**





Hole Name BQUA\_05 Drill Depth Grid Name Logging Unit Field EUNGELLA Bit Size 96mm **Collar Easting** 659030m MARTIN ALLUM Log Date 30/06/23 STEEL Collar Northing Client Representative TIM HARTIGAN Casing Type 7667204m Location PIONEER-BURDEKIN Casing Depth 16.45m Reduced Level Service Type Televiewer Interpretation TELEVIEWER LOGS STRUCTURAL LOGS FEATURES & TADPOLES Amplitude ATV Amplitude Image Apparent Dip Feature Picks DIPA Centralised ATV Travel Time Image TT-CENT (Sinusoid Presentation) Closed Fracture Partially Open Fracture Foliation/Banding/Bedding Healed Fracture/Vein 3D TV LOG 3D Televiewer Image True Dip Feature Picks DIPT Caliper TT-CENT Acoustic Travel Time Caliper (Tadpole Presentation) Rose Diagram - Strike Open Fract. OTV Picture Optical Televiewer Image RD - STRIKE (Arrows represent Mean Vector) FULL WAVFORM SONIC LOG & MECHANICAL PROPERTIES Polar Projection - Dip (Schmidt) STC-MP Monopole Slowness-Time-Coherence Projection (Lower Hemisphere) DTC STRUCTURAL ANALYSIS LOGS COMMENTS Shear wave slowness RQD Rock Quality Designation Compressional wave velocity Image and azimuth data are presented oriented to True north. The magnetic declination correction is +8.12 degrees. (Partial) Open Apparent Fracture Density (Partial) Open True Fracture Density vs Shear wave velocity AFD Compressional to Shear wave velocity ratio TFD Rock Quality Designation (RQD) is the (Sum of length of image interval sections of more than 10 cm length unaffected by open fractures, faults & breakouts) divided by the (Total length of the interval) times (100%). RQD has been calculated for one meter intervals. ucs Uniaxial (Unconfined) Compressive Strength RHI Rock Hardness Index Indicator of material elastic deformation Poisson's Ratio GEOPHYSICAL AND VERTICALITY LOGS Bulk Modulus Change in material volume by applied stres

Density Log

Hole Azimuth Mechanical Caliper

GAMMA Tilt

Δzimuth

CALIPER

Natural Gamma Ray

Hole Inclination (0 = Vertical Down)

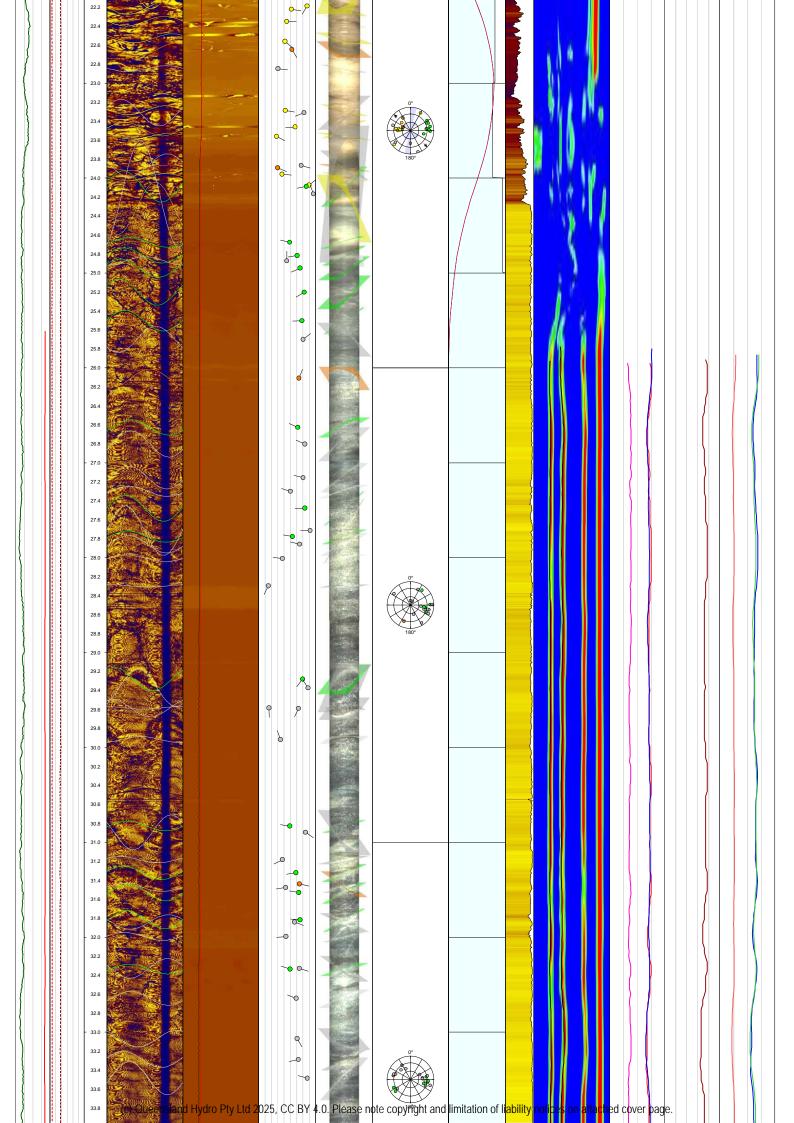
The following interpretations are opinions based upon inferences from borehole logs,

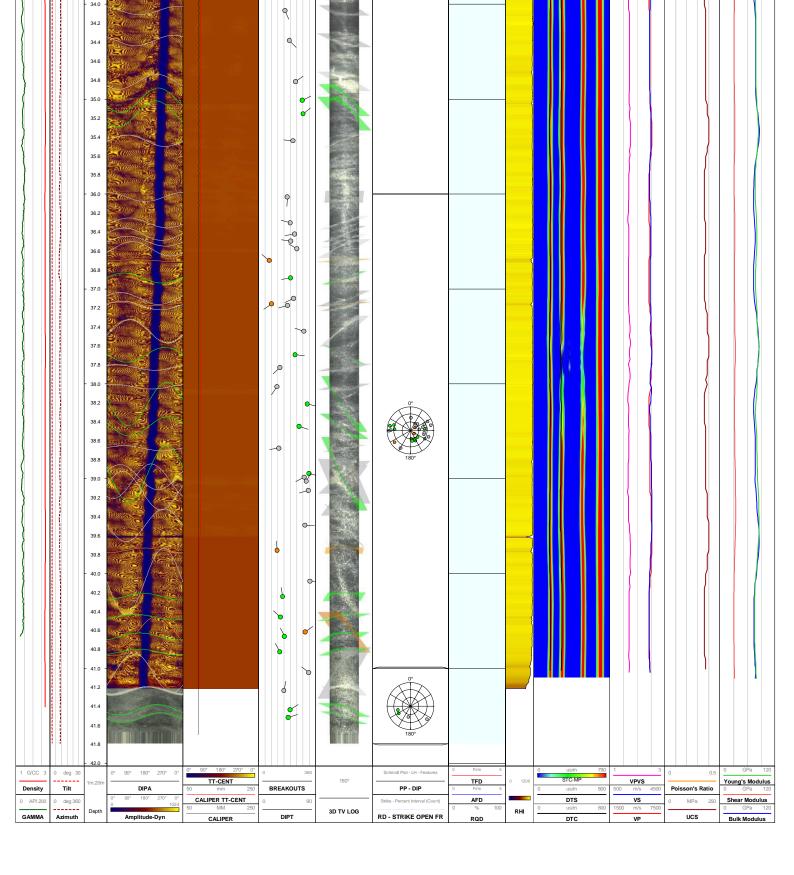
The STC-MP track was produced by processing the RX1-1A (60 cm), RX2-1A (80 cm), RX3-1A (100 cm) and RX4-1A (120 cm) receiver data after applying a moving average filter, stacking and a frequency filter.

Uniaxial Compressive Strength (UCS) was calculated using an exponential trendline between DTC and UCS (McNally, 1987): UCS = 1200 \* exp(-0.036 \* DTC), with UCS in MPa and DTC in µs/m units.

Poisson's Ratio was calculated from DTC, DTS & Density estimated as  $\rho$  = 0.31.Vp exp(1/4)

MMA	Azimuth		Amplitude-Dyn	CALIPER	DIPT		RD - STRIKE OPEN FR	RQD		DTC	VP	ucs	Bulk Modulus
		Depth	0 1024	50 MM 250		3D TV LOG		0 % 100	RHI	0 us/m 800	1500 m/s 7500		0 GPa
API 200	0 deg 360		0° 90° 180° 270° 0°	CALIPER TT-CENT	0 90		Strike - Percent Interval (Count)	AFD		DTS	VS	0 MPa 250	Shear Modulu
nsity	Tilt	1m:20m	DIPA	50 mm 250 TT-CENT	BREAKOUTS	180°	PP - DIP	0 Fr/m 5	0 1200	0 us/m 800 STC-MP	500 m/s 4500 VPVS	Poisson's Ratio	O GPa  Young's Modul
VCC 3	0 deg 30		0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0 360		Schmidt Plot - LH - Features	0 Fr/m 5		0 us/m 790	1 3	0 0.5	0 GPa
		15.4				652							
		15.6				(E)							
	Ä	15.0											
		15.8				1000							
		- 16.0 -	<b>18 10 11</b>										
		16.2		) =		The same							
	1	16.4				The State of the S							
	1									A			
		16.6											
	į	16.8				1000000				Maria Albanda	•		
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				T V V T		1							
		17.2				1							
		17.4		i i						VI III			
		47.0				1							
		17.6		And the second		1000							
	N III	17.8	* 16			F-197							
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		18.4			a	Bar 3							
		40				FA							
		18.6	and the		0								
		18.8	di la		a		180°						
		- 19.0 -				84 m							
						- C							
		19.2		医阴囊结节					R				
		19.4	3			78. ISS							
			1		<b>o</b> —					A I			
		19.6								A			
		19.8		E-1   E-1	<b>O</b>								
		- 20.0 -			0-	-				N A			
										W A A A SH			
		20.2		EL GENTS					Į				
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		00.7				1							
		20.6				//							
		20.8		9-11-16-1		//							
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		21.2			-	17							
		21.4				1							
	3407					21 3							
		21.6	· 3 *			100							
		21.8				100							
		1		d Hy <mark>dro Pty Ltd 2</mark> 0		0 0	l	\	<b></b>				







## **COMPOSITE LOG**

#### **BOREHOLE TELEVIEWER LOGS AND STRUCTURES**

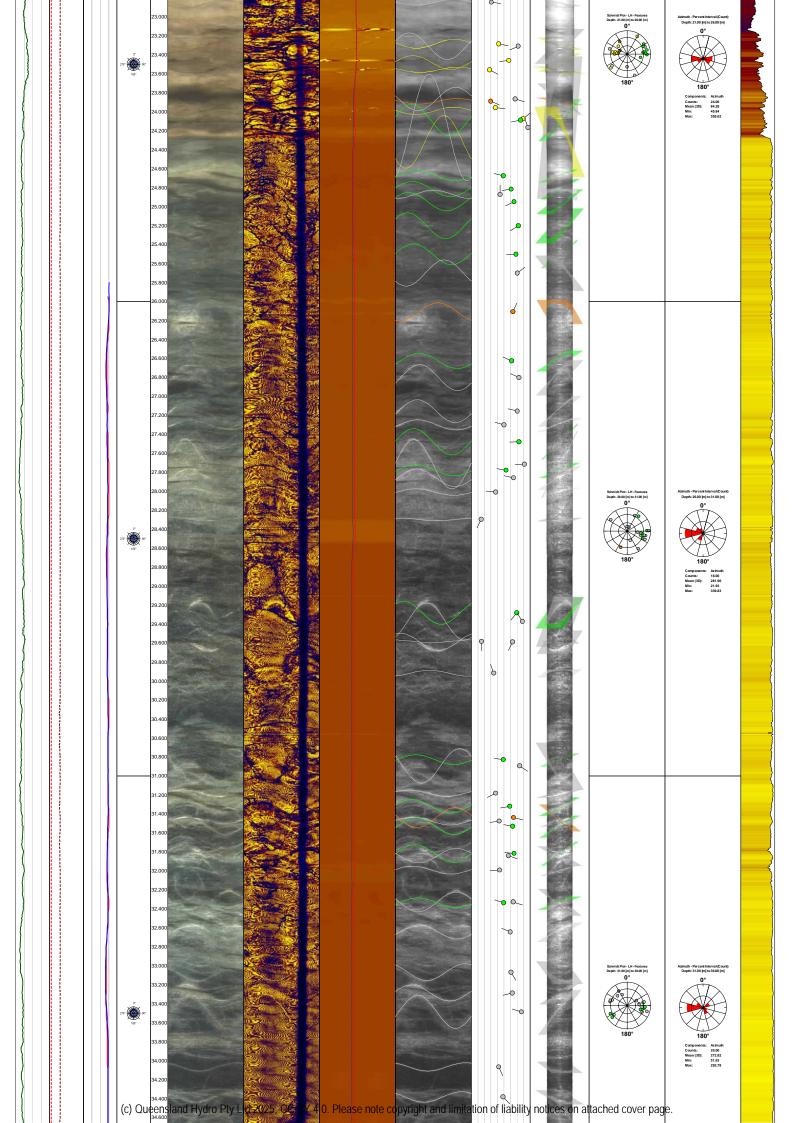
Hole Name Log Date Company Project Location	BQUA_05 30/06/23 SMEC EUNGELLA PIONEER-BURDEKIN	Drill Depth Bit Size Casing Type Casing Depth	41.66m 96mm STEEL 16.45m		Grid Name Collar Easting 659030m Collar Northing 7667204m Reduced Level	Logging Unit Engineer Client Represent Service Type Logging Company	SV013 MARTIN ALLUM TIM HARTIGAN Televiewer Interpretation Epiroc KLS
T	ELEVIEWER LOGS	STRUC	TURAL LOGS		TADPOLES	С	OMMENTS
OTV Picture TT-CENT Amplitude OTV Image	Optical Televiewer Image  Centralised ATV Travel Time Image  ATV Amplitude Image  OTV Float 4 Image	DIPA ( DIPT ( PP - DIP	Apparent Dip Feature Picks Sinusoid Presentation) Frue Dip Feature Picks Tadpole Presentation) Polar Projection - Dip (Schmidt) Lower Hemisphere) Rose Diagram - Azimuth	6	02 - Partially Open Fracture 03 - Closed Fracture 04 - Foliation/Banding/Bedding 05 - Healed Fracture/Vein	magnetic declination correct The True structures (DIPT) and Azimuth from the OTV and DIOg is presented with over the image.	have been corrected using Inclination and/or ATV images.  In the apparent dip structures projected the apparent dip structures projected.
G	EOPHYSICAL LOGS	PROC	ESSED LOGS				
GAMMA Tilt Azimuth Density CALIPER	Natural Gamma Ray Hole Inclination (0 = Vertical Down) Hole Azimuth Density Log Mechanical Caliper	CALIPER TT-CENT RHI CS 3D TV LOG VP VS	Acoustic Travel Time Caliper Rock Hardness Index Borehole Cross Section 3D Televiewer Image P-wave Compressional Velocity S-wave Shear Velocity				

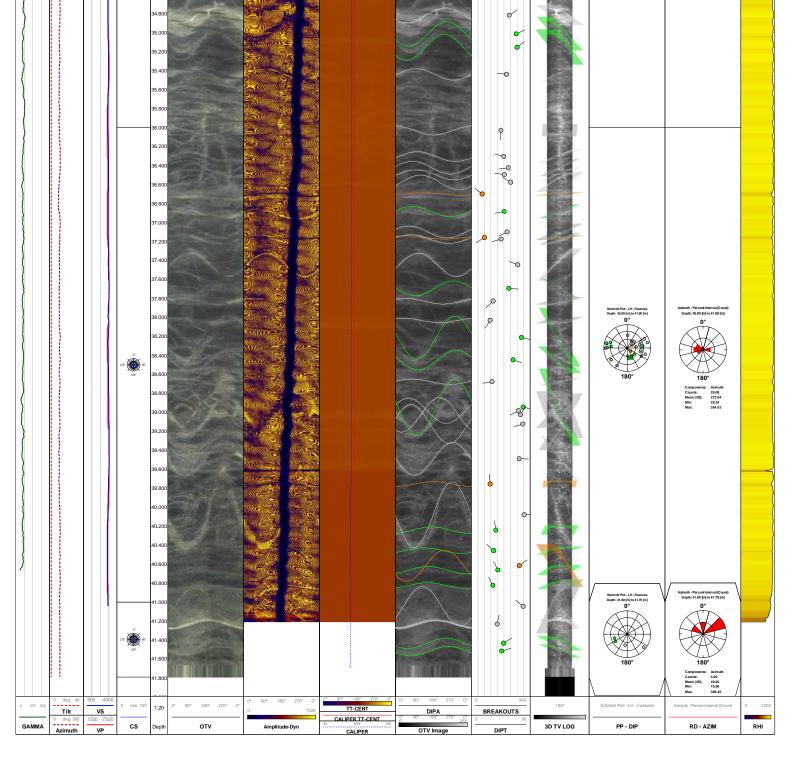
IMPORTANT NOTE

The following interpretations are opinions based upon inferences from borehole logs,

iroc Kinetic Logging Services cannot and does not guarantee the correctness or accuracy of any interpretations.

3D TV LOG RD - AZIM 0. Please note copyright and limitation of liability notices on attached cover page. (c) Queensland Hydro Pty Li







# BQUA\_05

## **SMEC - Pioneer-Burdekin**

Acoustic and Optical Televiewer image log Schmidt Stereonet evaluation for interpreted log interval

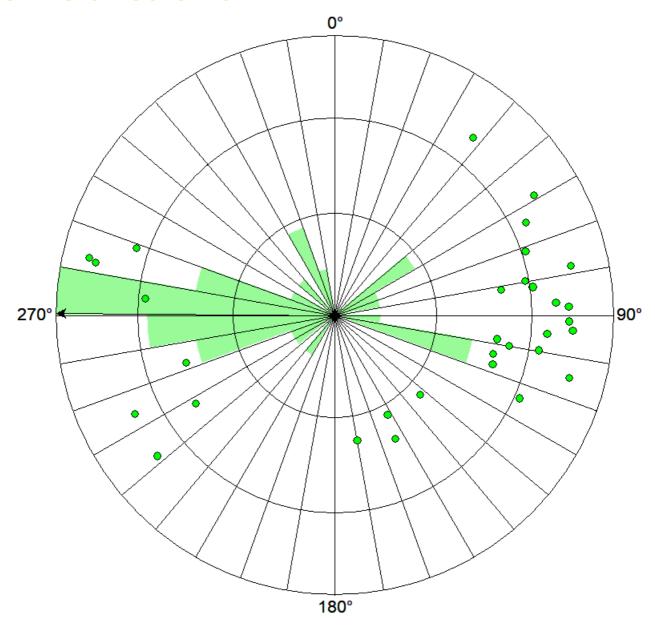
Log Date: 30 June 2023

#### **IMPORTANT NOTE**

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## **FOLIATIONS - 15.3 TO 42.0 M**

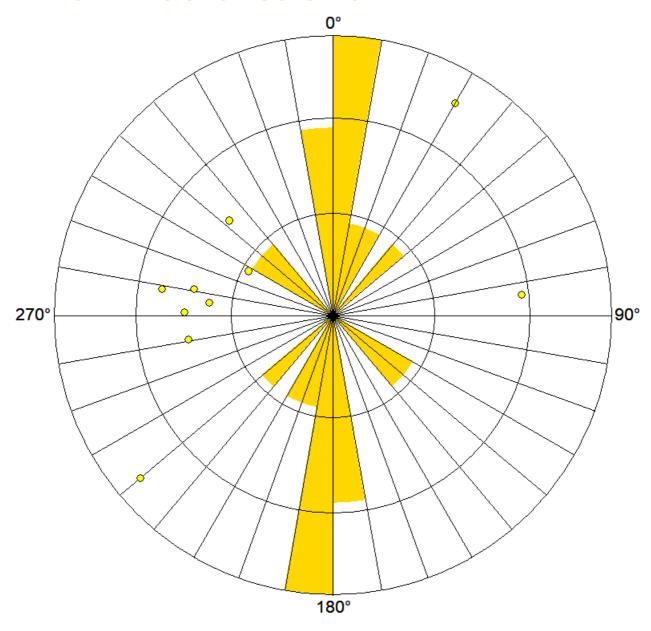


	Counts	Dip [deg]	Azimuth [deg]	Strike [deg]
Mean	32	68.19	270.43	0.43 - 180.43

Foliations: Scattered dip azimuth directions with a preference in the W dip azimuth direction



## PARTIAL OPEN FRACTURES - 15.3 TO 42.0 M

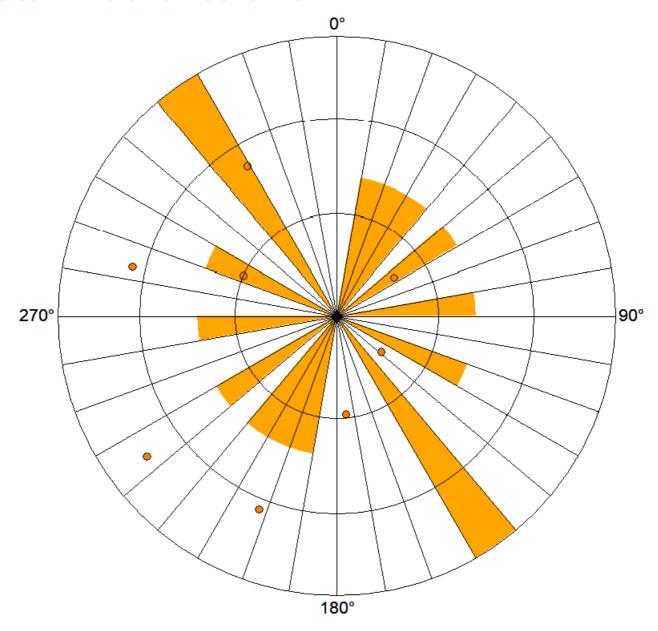


	Counts	Dip [deg]	Azimuth [deg]	Strike [deg]
Mean	10	44.41	93.23	3.23 - 183.23

Partial Open Fractures: Scattered strike directions with a preference in the N to S strike direction



## **CLOSED FRACTURES - 15.3 TO 42.0 M**

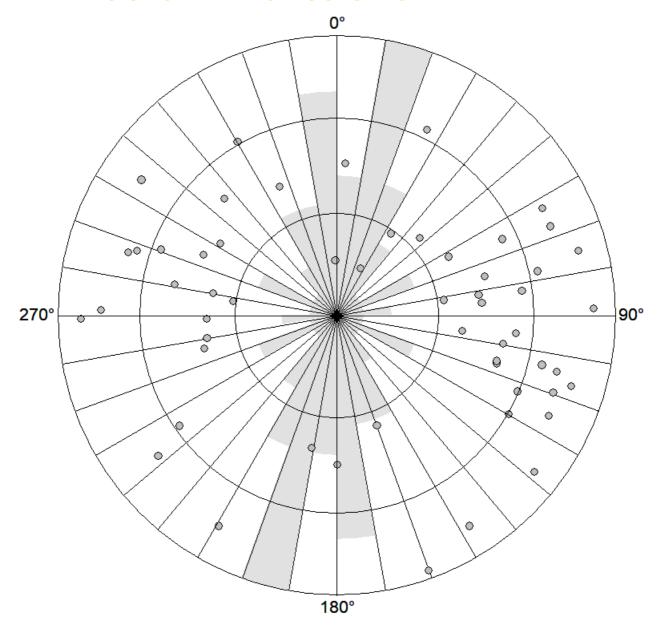


	Counts	Dip [deg]	Azimuth [deg]	Strike [deg]
Mean	8	20.49	70.58	160.58 - 340.58

Closed Fractures: Scattered strike directions with a preference in the SE to NW strike direction



## **HEALED FRACTURES AND VEINS – 15.3 TO 42.0 M**



	Counts	Dip [deg]	Azimuth [deg]	Strike [deg]
Mean	56	66.96	274.94	4.94 - 184.94

Healed Fractures and Veins: Scattered strike directions with a preference in the NNE to SSW strike direction



# **MULTI-RES LOG**

# BQUA\_05

_	OM	IPAN .L	Y	SMI BQI	EC JA_05			IELD OCATION	EUNG PIONE	ELLA ER-BURI	DEKIN	STATE COUN		QLD AUSTR	ALIA
7					LOG ME	ASURED	FROM		GL	EL	EVATI	ONS:		OTHER SE	RVICES:
RDEKIN					DRILLING	3 MEASU	RED FF	ROM	GL	KB			1.		
R-BUF					PERMAN	IENT DAT	UM			DF			2.		
ONEE	EUNGELLA		-05	SMEC	PERMAN	IENT DAT	UM ELI	EVATION		GL			3.		
LOCATION: PIONEER-BURDEKIN		_	BQUA_05		LICEN	ISE	SE	CTION	TOW	NSHIP	ı	RANGE	MA	GNETIC DI	ECLINATION
LOCA	FIELD:	STATE:	WELL:	COMPANY:										8.120	deg
DAT	Έ			29-06-2023					REC	ORDED B	ΥN	//SA			
TIME	E			16-2	8				WIT	NESSED E	3Y				
RUN	NU I	MBEF	₹	1					LOG	GING UNI	T ν	/013			
DEP	PTH-I	DRILL	.ER	41.9	5m				RIG	NUMBER					
DEP	PTH-I	LOGG	ER	41.7	0m				TOC	)L TYPE	9	057A			
BIT :	SIZE			96m	m				TOC	L SERIAL	NO. 2	796			
CAS	SING	TYPE		STE	EL				EAS	TING	6	59030			
CAS	SING	ID		100r	nm				NOF	RTHING	7	667204			
CAS	CASING BOTTOM		ГОМ	16.4	5m				SAN	IPLE INT.	.(	01m			
FLU	ID T	YPE		0					LOG	DIRECTION	ON L	J			
TRU	JCK (	CAL N	10.	0.09	787				FEE	T OR MET	ER N	Л			
WA٦	TER	LEVE	L						SOL	JRCE TYPE	<b>=</b>		SOU	RCE ID	

#### LOGGER COMMENTS:

1.

2.

3.

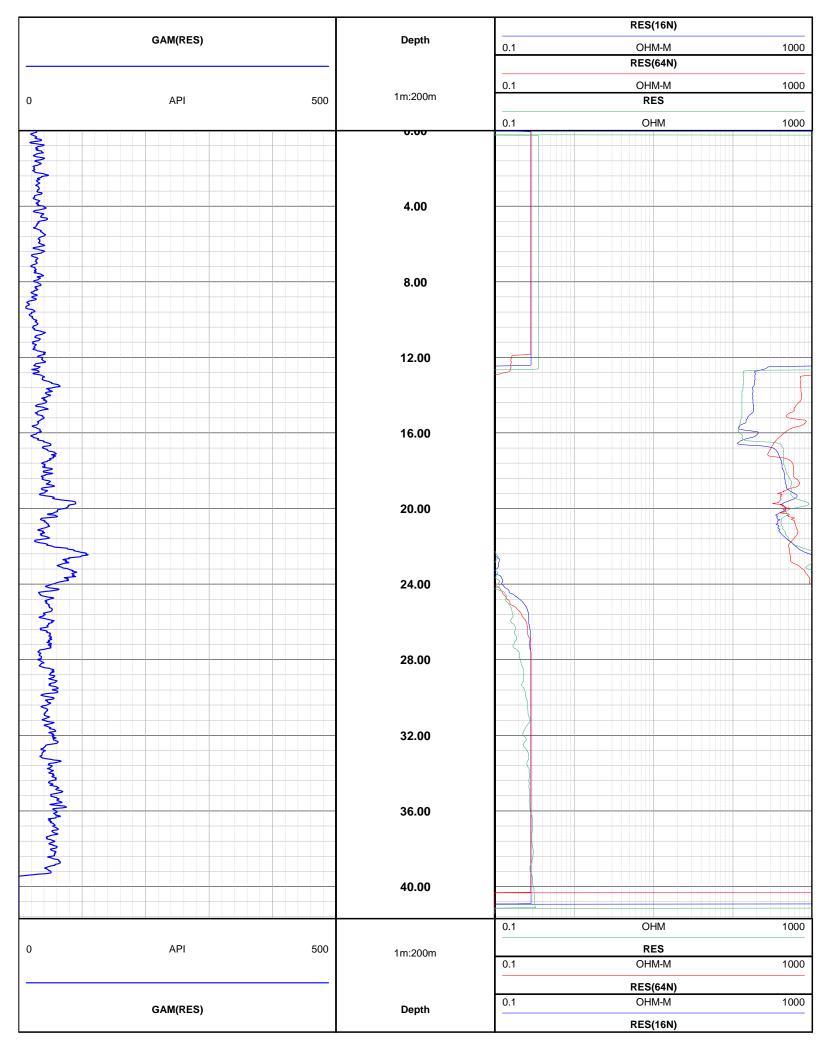
#### **MNEMONICS**

GAM(RES) NATURAL GAMMA FROM MULTI-RES TOOL

RES(16N) 16" NORMAL RESISTIVITY
RES(64N) 64" NORMAL RESISTIVITY
RES SINGLE POINT RESISTIVITY

#### **IMPORTANT NOTE**

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**DEPTH SCALE 1:200** 



# VERTICALITY ANALYSIS BQUA\_05

COMPANY ZWELL	SMEC BQUA_05		FIELD LOCATI		IGELLA NEER-BURDEK	STATE IN COUN		RALIA	
ON: PIONEER-BURDEKIN EUNGELLA QLD BQUA_05 NY: SMEC	PERM LOG N	IANENT DAT IANENT DAT IEASURED F ING MEASUF	JM ELEVATIC ROM GL	ON GL	ELEVA KB DF GL	TIONS:	REMARKS:		
LOCATION: P FIELD: EUNGE STATE: QLD WELL: BQUA_ COMPANY: SA	LICENSE	SECTION	TOWNSHIP	RANGE	MAG DECL. 8.12deg		2.		
DATE	29-06-2023			R	ECORDED BY	MSA			
TIME	16-10			V	VITNESSED BY				
RUN NUMBER	1			LC	OGGING UNIT	V013			
DEPTH-DRILLER	41.95m			R	IG NUMBER				
DEPTH-LOGGER	41.66m			Т	OOL TYPE	9702A			
BIT SIZE	96mm			Т	OOL SERIAL NO.	2798			
CASING TYPE	STEEL			E	ASTING	659030			
CASING ID				N	IORTHING	7667204			
CASING BOTTOM	16.45m			S	AMPLE INT.	.01m			
FLUID TYPE	0			L	OG DIRECTION	U			
TRUCK CAL NO.	0.09787			F	EET OR METER	M			
WATER LEVEL				S	OURCE TYPE		SOURCE ID		

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## **DEVIATION LIST**

#### **MNEMONIC DESCRIPTORS**

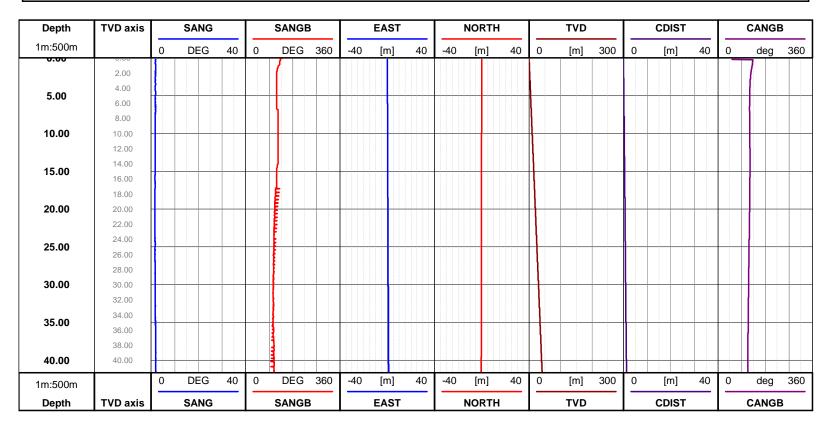
SANGBSAMPLE ANGLE BEARINGNORTHBOREHOLE NORTH DEVIATIONSANGSAMPLE SLANT ANGLE (0 DEG = VERTICAL DOWN)CDISTDEVIATED CLOSURE DISTANCETVDTRUE VERTICAL DEPTHCANGBDEVIATED CLOSURE ANGLE BEARINGEASTBOREHOLE EAST DEVIATION

ALL CO-ORDINATES ARE PRESENTED ORIENTED TO TRUE NORTH

MAGNETIC DECLINATION 8.12deg

Depth	SANG	SANGB	EAST	NORTH	TVD	CDIST	CANGB
m	DEG	DEG	[m]	[m]	[m]	[m]	deg
0.00	-999.25	139.68	-999.25	-999.25	-999.25	-999.25	-999.25
1.00	1.86227	126.72	0.0199755	-0.0168814	0.99958	0.0261535	130.201
2.00	1.85648	118.08	0.0476915	-0.0338351	1.99905	0.0584747	125.354
3.00	1.781	118.08	0.075848	-0.0488566	2.99854	0.0902213	122.787
4.00	1.80512	118.08	0.103683	-0.0637069	3.99804	0.121691	121.568
5.00	1.81165	118.08	0.131855	-0.0787365	4.99753	0.153575	120.843
6.00	1.83191	118.08	0.159954	-0.0937273	5.99703	0.185392	120.369
7.00	(c) Queen Spand Hydro	Pty Ltd 12092954, CC B	Y 4.0. <b>Please</b> note c	opyrigh?-3992411fmitation	n of liab¶¶¶¶fotices o	on attac <del>het/689</del> er page.	120.197
8.00	1.76002	123.84	0.214396	-0.127102	7 996	0.24924	120 661

9.00	1.74162	123.84	0.240002	-0.14427	8.99553	0.280027	121.011
10.00	1.70744	123.84	0.265013	-0.161038	9.99507	0.310105	121.285
11.00	1.70547	123.84	0.289875	-0.177707	10.9946	0.340011	121.51
12.00	1.7262	123.84	0.314751	-0.194385	11.9942	0.369938	121.699
13.00	1.73987	123.84	0.339771	-0.21116	12.9937	0.400041	121.86
14.00	1.69522	123.84	0.364534	-0.227762	13.9933	0.429838	121.997
15.00	1.71471	118.08	0.39036	-0.242622	14.9928	0.459615	121.862
16.00	1.66782	118.08	0.416335	-0.25648	15.9924	0.488995	121.635
17.00	1.74818	118.08	0.442313	-0.270339	16.992	0.518386	121.433
18.00	1.65713	113.165	0.468241	-0.282835	17.9915	0.547033	121.134
19.00	1.64047	111.687	0.494062	-0.294329	18.9911	0.575089	120.784
20.00	1.6269	111.531	0.520143	-0.304987	19.9907	0.602964	120.385
21.00	1.57342	110.996	0.54632	-0.315331	20.9903	0.630793	119.993
22.00	1.57978	109.423	0.571625	-0.324996	21.99	0.657555	119.62
23.00	1.63337	109.781	0.597807	-0.334394	22.9896	0.684976	119.221
24.00	1.67671	108.432	0.62492	-0.343686	23.9891	0.713193	118.809
25.00	1.66099	108.066	0.653095	-0.35333	24.9887	0.742547	118.414
26.00	1.70192	105.512	0.680686	-0.362289	25.9883	0.771095	118.024
27.00	1.70316	106.797	0.708306	-0.370947	26.9879	0.799562	117.641
28.00	1.70959	106.315	0.736749	-0.379592	27.9874	0.828788	117.259
29.00	1.73648	106.225	0.765463	-0.38808	28.987	0.858219	116.884
30.00	1.77174	105.32	0.794602	-0.396365	29.9865	0.887974	116.511
31.00	1.75633	104.249	0.823895	-0.404489	30.986	0.917832	116.149
32.00	1.74824	105.593	0.853414	-0.412652	31.9856	0.947943	115.805
33.00	1.76032	105.261	0.883128	-0.421211	32.9851	0.978435	115.499
34.00	1.79082	104.955	0.913328	-0.429567	33.9846	1.0093	115.189
35.00	1.82858	106.123	0.944069	-0.437678	34.9841	1.04059	114.873
36.00	1.86912	108.334	0.975343	-0.446032	35.9836	1.07249	114.575
37.00	1.92693	106.269	1.00719	-0.454806	36.983	1.10511	114.302
38.00	1.91175	108.7	1.03913	-0.464548	37.9825	1.13825	114.087
39.00	1.94217	107.538	1.07121	-0.474474	38.9819	1.17158	113.89
40.00	1.96123	108.354	1.10364	-0.484341	39.9813	1.20524	113.695
41.00	1.98519	107.242	1.13621	-0.494751	40.9807	1.23925	113.53



## **NOTES ON VERTICALITY PLOTS**

- 1. The following verticality plots are scaled automatically to obtain the best visual effect within the default page size.
- 2. All co-ordinates are presented oriented to True North.

# **DEVIATION PLOT**

