William C. Cromer Pty. Ltd. Environmental, engineering and groundwater geologists

Engineering log – Cored borehole

Incorporating the Unified Rock Classification System (URCS)

DDH – SF3

Sheet 1 of 1

Project HYDRO TASMANIA DUNGROVE SCHEME **Location** Southernfield (W embankment dam)

Coordinates		**Drill type**	Hydra Power Scout	**Hole started**	7 February 2008
489954.1mE 5320434.4mN		**Equipment**	120mm hollow auger NQTT triple tube core drilling	**Hole finished**	7 February 2008
Datum	GDA94			**Drilled by**	D. Roberts KMR Drilling Pty. Ltd.
RL	Approx. 546m ASL				
Inclination	84°	**Drill fluid(s)**	Water	**Logged by**	D. Bear
Bearing	160°M			**Checked by**	W. Cromer

Drilling information: Bit type/size; Case type/size/lift; Fluid loss/water; Notes (Samples, tests, unit weight (UW, g/cc)); Core recovery (20% 40% 60% 80%); RQD (20% 40% 60% 80%); metres – Vertical depth, Inclined depth

Rock substance: Graphic log; Substance description (rock type, grain characteristics, colour, structure, minor components); Weathering (A B C D E); Est. strength (A B C D E)

Rock mass defects: Nature of defects (A B C D E); Defect spacing (mm) (30 100 300 1000 3000); Defect description (thickness, type, inclination, planarity, roughness, coating) – Significant / General

Geol interp

Inclined depth	Substance description	Defect description	Geol interp
	SAND: Fine silty; moist; loose; refusal at 0.2m		Soil
Casing advancer			
1	DOLERITE: fine to medium grained; dark grey-brown oxide staining.	Highly fractured 1-5mm joints with brown clay infill	Highly fractured Jurassic dolerite
2		Very highly fractured vertical and horizontal joints, 1-5mm wide	
3		Very highly fractured 1-5mm angular joints with brown stained infill – slightly clayey	
		$I_{s(50)}$ = 18MPa axial	
		Highly fractured 1-5mm joints – as above	
4		$I_{s(50)}$ = 18MPa diametral	
		As above	
5		1mm joints along visible flow banding	
		1-2mm joints clean, planar sub-horiz and some angular ~40° along flow banding	
6	becoming less fractured and jointed - massive.		
7		Highly fractured and fragmented joints, 1-5mm planar smooth along flow banding, approx 45°	
		$I_{s(50)}$ = 29MPa diametral	
8	massive.	Massive intact rock Joints 1mm clean	
9	End of hole at 8.7m		

Packer test 1.54 to 5.10m Lugeons = 1.4

Packer test 5.04 to 8.70 Lugeons = 3.7

Drilling
T = Triple tube coring
B = Blades
R = Roller/Tricone
A = Auger
W = Wash boring
DT = Double tube coring
HAM = Rotary hammer

Case lift: Casing used; Barrel withdrawn
Fluid loss: No loss; 50% loss; 100% loss

RQD (Rock Quality Designation Index) The sum of the lengths of sound core pieces >100mm in a drilling run is divided by the total core run length. Expressed as %. Core length measured along centreline. Core drilling breaks not included

Water Level Inflow Outflow

Unit weight (UW, g/cc)
A = >2.55 B = 2.40-2.55 C = 2.25-2.40
D = 2.10-2.25 E = <2.10

Strength	Approx. point load strength index Is(50), MPa	Approx UCS MPa
Hammer impact test		
A = rebound (RQ)	>4	>103
B = pit (PQ)	2-4	55-103
C = dent (DQ)	1-2	21-55
D = crater (CQ)	0.25-1	7-21
E = moldable, friable (MQ)	<0.25	<7

Note X on log is test result. Otherwise, strength is visually estimated. US = Unconfined Compressive Strength

Samples and Notes
R = SPT penetration refusal
D = Disturbed sample
N = Standard Penetration Test
pp = Hand penetrometer test
SV = In-situ Shear Vane test
CS = Core Sample
Ux = Undisturbed tube sample (x mm diameter)
Nd = SPT and Disturbed Sample

Weathering
A = Micro fresh state (MFS)
B = Visually fresh state (VFS)
C = Stained state(STS)
D = Partly decomposed state (PDS)
E = Completely decomposed state (CDS)

Soil consistency
Fine grained soils
VS = Very Soft
S = Soft
F = Firm
St = Stiff
VSt = Very stiff
H = Hard

Soil density index
Coarse grained soils
Fb = Friable
VY = Very Loose
L = Loose
MD = Medium Dense
D = Dense
VD = Very Dense

Defects
Joint, Vein, Shear zone, Crush zone, Infill seam, EW seam
A = Solid random breaks (SRB)
B = Solid preferential breaks (SPB)
C = Solid latent breaks (SLB)
D = Non intersecting planes (2-D)
E = Intersecting open planes (3-D)

Core loss
Core loss (interval known)
Core loss (interval unknown) Loss is shown in Graphic log column at top of run