HOLE No: VBA 9A

Sheet 1 of 2

ROCK FABRIC
MF -massive
BF -bedded
FF -foliated
CF -cleaved
SF -schistose
GF -gneissose
LF -laminated

ROCK FABRIC
GRAIN SIZE
FG -fine grained
MG -medium grain
CG -coarse grain
VCJ-very close space
CJ -close space
CJ -clos

JOINT SPACING VCJ-very close spacg CJ -close spacing MJ -medium spacing WJ -wide spacing

RJ -rough

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered WEATHERING GRAPH
100%-completely weathered
75%-highly weathered
50%-moderately weathered
25%-slightly weathered
0% -unweathered



DWA MCWAP FEASIBILITY STUDY HOLE No: VBA 9A Sheet 1 of 2

SII	eet 1 of 2		CF -cleaved	CG -coarse gr		KJ -rougn	25	%-moderater %-slightly we	y weatnered eathered ed					\mathbb{U}	rec		MICWAP FEASIBILITY STUDY	Sheet 1 of 2
JOB NUM	<i>IBER</i> : 1041	94	SF -schistose GF -gneissose LF -laminated	JOINT SPACI VCJ-very clos CJ -close spac MJ -medium s WJ -wide spac VWJ-very wid	se spacg cing spacing	JOINT INFIL CLN-clean ST-stained CLY-clay fille SND-sand fil	ed	5 -unweather	ed								VLIEEPOORT JOB ABSTRACTION WEIR	NUMBER: 104194
46	0	0		vwJ-very wia	ie spacng	GVL-graver	Tilled					- Sc - 1	cale :/ 1:75 -/		0.00		brown, sandy <u>clay</u> becoming clay from 1,45 – 5,24m then reddish – 7,54 m.	brown <u>san</u> d fro
122	0	0		_ N. 00								£ '				Alluv	ium.	
56	0	0		N=20								2						
78	0	0											1/					
64	0	0		N=28								_3						
42	0	0			N/A	N/A	N/A	N/A	N/A	N/A		_4						
53	0	0	_	N=22								5						
28	0	0										5.80m_	<u> </u>					
71	0	0	_	N=32								-	 					
62	0	0										['			7.54			
41	0	0		-								. 8	+ /		7.34	Angu band Alluv	ular, coarse <u>gravels</u> to <u>cobbles</u> (diameter of 30 – 100 mm) of modeled ironstone in a matrix of clayey silty <u>sand.</u> rium.	erately weather
9	7	0			N/A	N/A	N/A	N/A	N/A	N/A		_ 10	19					
46	34	0	>20									1						
68	0	0	15									11.36m	' ⊣ .		11.36			
54 30	154 80	34										-	2			spac	erately to highly weathered, very closely to closely jointed (<1 ing), red-black-orange HARD ROCK, banded ironstone. cciated in places, faulted, re-cemented).	00 mm averag
53 54	53 113	0	>20		Not		Measure	able					3 = 			Red,	ferruginized zone, hard rock, from 12,20 – 13,60m, with zone obetween 13,03 – 13,27m.	of highly fractu
48 76	37	19 76	>20										4		4400			
90	90	49	19								-	7	* [14.00	Sligh	ntly weathered, very closely to closely jointed (spacing 6 black-orange banded, VERY HARD ROCK banded ironstone.	0 – 150 mr
84 94 82 65	84 94 82 53	0 55 0 19	14		FG LF	3	0-10° 60-70° 80-90°	CJ MJ MJ	RJ RJ RJ	ST/CL ST/CL ST/CL		- - - - - - - - - - - - - - - - - - -	5 <u>1</u>				e 16,10 – 16,40m with re-cemented fractures (veining) cross-cutting	bedding.
aterial covery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	SPT-N Is50 (D/A)	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGH- NESS	JOINT FILLING	WEATH- ERING	DEPTH Scale 1:75						

HOLE No: VBA 9A Sheet 2 of 2

JOB NUMBER: 104194

FG -fine grained MG -medium grain

ROCK FABRIC
MF -massive
BF -bedded
FF -foliated
CF -cleaved
SF -schistose
GF -gneissose
LF -laminated
GRAIN SIZE
FG -fine graine
MG -medium g
GG -coarse gra
VCJ-very close
CJ -close space
LF -laminated
ML -medium g CG -coarse grain JOINT SPACING VCJ-very close spacg CJ-close spacing MJ-medium spacing

RJ -rough JOINT INFILL CLN-clean ST-stained CLY-clay filled

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered 100%-completely weathered 75%-highly weathered 50%-moderately weathered 25%-slightly weathered 0% -unweathered



DWA MCWAP FEASIBILITY STUDY

VLIEEPOORT ABSTRACTION WEIR HOLE No: VBA 9A Sheet 2 of 2

JOB NUMBER: 104194

. 0		WJ -wide sp VWJ-very w	pacing S vide spacng (SND-sand fill GVL-gravel fi	ed lled	1		ı	tecese =1	F.	- I/ (· / I		
	-									-			
											NOTES		
											1) Water table at	5,80m.	
											2) Rockhead at 1	1,36m.	
RQD (%)	FRAC. FREQ.	SPT-N Is50 (D/A)	ROCK FABRIC AND	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGH- NESS	JOINT FILLING	WEATH- ERING	DEPTH Scale 1:75	CONTRACTOR: WEPPELMAN MACHINE: D 90 R DRILLED BY: STUMI	INCLINATION : VERTICAL DIAM : DATE : 08/05/2009 - 13/05/2009	ELEVATION: X-COORD: 2 725 441 Y-COORD: -32 036
			GRAIN								PROFILED BY : G.D / C.A TYPE SET BY : C.A	DATE: 03/05/2009 DATE: 03/06/2009 DATE: 02/11/09 12:08	HOLE No: VBA 9
	Q RQD (%)	RQD FRAC.	RQD FRAC. SPT-N (%) FREQ. IS50	RQD FRAC. SPT-N ROCK (%) FREQ. Is50 FABRIC	RQD FRAC. SPT-N ROCK JOINT (%) FREQ. ISTO FABRIC NOT OF AND SETS	, RQD FRAC. SPT-N ROCK JOINT JOINT (%) FREQ. ISSO FABRIC NO OF INCLING (B/A) AND SETS (deg)	, RQD FRAC. SPT-N ROCK JOINT JOINT JOINT (%) FREQ. ISSO FABRIC NO OF INCLIN SPACING (D/A) AND SETS (deg)	, RQD FRAC. SPT-N ROCK JOINT JOINT JOINT JOINT (%) FREQ. ISSO FABRIC NO OF INCLIN SPACING ROUGH. NESS (Seg.) NESS (Seg.) NESS (Seg.)	RQD FRAC. SPT-N ROCK JOINT JOINT JOINT JOINT JOINT (%) FREQ. (55) FABRIC NO OF INCLIN SPACING ROUGH- FILLING (50) AND SETS (deg) NESS NESS	ROD FRAC. SPT-N ROCK JOINT J	ROD FRAC. SPT-N ROCK JOINT JOINT JOINT WEATH- DEPTH (%) FREO. ISSO ROCK JOINT JOINT JOINT WEATH- DEPTH (%) FREO. ISSO ROCK JOINT JOINT SPACING ROUGH- FILLING ERING Scale (DA) AND SETS (dus) SPACING ROUGH- FILLING Scale	ROD FRIC SOTA ROOK JOINT J	END OF HOLE NOTES 1) Water table at 5,80m. 2) Rockhoad at 11,36m. 2) Rockhoad at 11,36m.

SETUP FILE: Y.SET

TEXT: ..C:\DOT5000\104194~1.DOC

HOLE No: VBH 1 Sheet 1 of 2

ROCK FABRIC
MF -massive
BF -bedded
FF -foliated
CF -cleaved
SF -schistose
GF -gneissose
LF -laminated

ROCK FABRIC
FG -fine graine
MG -medium SIZE
FG -fine graine
GG -coarse gra
CG -coarse gra
VCJ-very close
CJ -close space
MI -medium size

FG -fine grained MG -medium grain CG -coarse grain JOINT SPACING
VCJ-very close spacg
CJ -close spacing
MJ -medium spacing
WJ -wide spacing

RJ -rough

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered WEATHERING GRAPH
100%-completely weathered
75%-highly weathered
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0% -unweathered



DWA MCWAP FEASIBILITY STUDY HOLE No: VBH 1 Sheet 1 of 2

04194 0 0 0 0 0 0 0))))	sose VCJ-vo ated CJ -clo MJ -m WJ -w	SPACING ry close space see spacing dium spacing de spacing eny wide space N//	SND-sar ng GVL-gra	n dd filled d filled el filled	N/A	N/A	N/A		Sca 1:7 1		0	VLIEEPOORT ABSTRACTION WEIR Town clay.	JOB NUMBER: 1041
0 0 0 0 0 0))))	- 35				N/A	N/A	N/A		Sca. 1:7	0.0	Grey br		
0 0 0 0 0)))		N/A	A N/#	N/A	N/A	N/A	N/A		_ 1	1//			
0 0 0 0 0)))		N/A	A N/#	N/A	N/A	N/A	N/A		'	1///			
0 0 0 0 0)		N//	A N/A	N/A	N/A	N/A	N/A			1///			
0 0 0 0)	- 57	N//	A N/A	. N/A	N/A	N/A	N/A		2				
0 0 0)	- 57								-2	1///			
0 0)	- 57								3				
0	 1	57									1///			
			-							4	3.9	2		
0											000	Sub-rou	unded to sub-angular, medium to coarse gravels, (diar	meter of 10-60mn
)									5	16/2/9	HARD F	ROCK banded ironstone in matrix of sandy clay. Alluvium.	
0										F	19/3/91	Matrix g	generally lost.	
0										6				
											1/2/2			
0)									7				
									7.	7.39m_ ▼	7/0/:/01			
										E	16/2/9			
0)	55									12/0/21			
			N//	A N/A	. N/A	N/A	N/A	N/A		- 0				
0)									- 9	1624/61			
0		12								10	VO 77 /O I			
0	,									- 10				
										11				
0)									E ''	16/0/0			
										12	600			
0)									- 12	700			
0										13	600			
0									<i>\////////</i> 13.	3.10m	13		ately weathered, very closely to closely jointed (spacing	ug generally <60 u
87	7 7 20+									14	1///	80mm),	, grey brown to purple, VERY HARD ROCK occasiona	ally to MEDIUM HA
0)									F '-	1 ////	ROCK <u>l</u> Include:	<u>banded ironstone.</u> s minor horizons of brecciated material. also some au	uartz veining, poss
	20+1	·								15		indicatir	ng proximity to fault.	5 3, 1, 300
29	9									- 13	1000	Recove	ered in places as angular gravel.	
	20+1	?	FG	. 2			SJ	ST		16				
10	I		BH		90°	?	SJ	51		- 10				
	QD FRAC	C. SPT-		K JOIN	T JOINT	JOINT	JOINT	JOINT	WEATH- L	E DEPTH				
ery (%)	6) FREC	ρ.	AN	SET.	F INCLIN (deg)	SPACING	ROUGH- NESS	FILLING		Scale 1:75				
e	(((((((((((((((((((0 0 0 0 0 0 0 0 0 0 0 20+ 10 20+ RQD FRAC	0 55 0 0 12 0 0 12 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 55 N/A 0 12 0 0 0 12 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 55 N/A N/A 0 12 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0

HOLE No: VBH 1 Sheet 2 of 2

JOB NUMBER: 104194

ROCK FABRIC
MF -massive
BF -bedded
FF -foliated
CF -cleaved
SF -schistose
GF -gneissose
LF -laminated

ROCK FABRIC GRAIN SIZE

FG -fine grained MG -medium grain CG -coarse grain JOINT SPACING VCJ-very close spacg CJ-close spacing MJ-medium spacing WJ -wide spacing

RJ -rough JOINT INFILL CLN-clean ST-stained

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered 100%-completely weathered 75%-highly weathered 50%-moderately weathered 25%-slightly weathered 0% -unweathered



DWA MCWAP FEASIBILITY STUDY

VLIEEPOORT ABSTRACTION WEIR

DATE: 02/11/09 12:11

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HOLE No: VBH 1 Sheet 2 of 2

JOB NUMBER: 104194

1			F -laminated	CJ -close spacing MJ -medium spacing WJ -wide spacing VWJ-very wide spacng	ST-stained CLY-clay fille SND-sand fil G GVL-gravel i	ed lled filled	ı	ı	1	 	-1 E	- 1/. ∕. :∠.1	ABSTRACTION WEIR	10m2_1: 10 110
76 33	57 16	0	20+?								_ 17			
			_										END OF HOLE NOTES 1) Rockhead at a depth of 13,10m.	
													2) Water table at a depth of 7,39m.	
rial very)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	SPT-N ROCK FABRII AND GRAIN	C NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGH- NESS	JOINT FILLING	WEATH- ERING	DEPTH Scale 1:75	CONTRACTOR: DWA MACHINE: SECO DRILLED BY: N.V.d PROFILED BY: G.D TYPE SET BY: E.R	INCLINATION : VERTICAL ELEVATION DIAM : X-COOF DATE : 10/06/2009 DATE : 02/11/09 12:11	N : RD : 2 725 590 RD : -31 910 NOLE No: VBH

TYPE SET BY : E.R

SETUP FILE: Y.SET

HOLE No: VBH 2 Sheet 1 of 2

JOB NUMBER: 104194

ROCK FABRIC GRAIN SIZE MF -massive BF -bedded FF -foliated

CF -cleaved SF -schistose GF -gneissose LF -laminated

FG -fine grained MG -medium grain CG -coarse grain JOINT SPACING VCJ-very close spacg CJ-close spacing

SLJ-slickensided SJ -smooth RJ -rough JOINT INFILL CLN-clean ST-stained

JOINT ROUGHNESS WEATHERING GRAPH 100%-completely weathered 75%-highly weathered 50%-moderately weathered 25%-slightly weathered 0% -unweathered



DWA **MCWAP FEASIBILITY STUDY**

Sheet 1 of 2

JOB NUMBER: 104194

HOLE No: VBH 2

VLIEEPOORT ABSTRACTION WEIR

MJ -medium spacing
WJ -wide spacing
VWJ-very wide spacng
GCLY-clay filled
SND-sand filled
GVL-gravel filled Scale 9 Grey to brown, silty clay with occasional rounded gravels. 1:75 Alluvium. 69 0 2 30 3 67 0 0 38 89 0 5 25 6 87 0 7.85m ▼ 55 84 0 10 100 0 0 11 56 12 72 0 0 13 N/A N/A N/A N/A N/A N/A 29 14 69 0 15 62 16 0 15 RQD FRAC. SPT-N ROCK JOINT JOINT JOINT JOINT Material JOINT WEATH-DEPTH Core FREQ. **FABRIC** NO OF SPACING ROUGH-**FILLING ERING** Recovery Recovery (%) **INCLIN** Scale AND SETS NESS 1:75 (%) (%) (deg) GRAIN

HOLE No: VBH 2 Sheet 2 of 2

ROCK FABRIC GRAIN SIZE ROCK FABRIC
MF -massive
BF -bedded
FF -foliated
CF -cleaved
SF -schistose
GF -gneissose
LF -laminated

FG -fine grained MG -medium grain

CG -coarse grain JOINT SPACING VCJ-very close spacg CJ -close spacing MJ -medium spacing WJ -wide spacing

RJ -rough

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered 100%-completely weathered 75%-highly weathered 50%-moderately weathered 25%-slightly weathered 0% -unweathered



DWA MCWAP FEASIBILITY STUDY

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HOLE No: VBH 2 Sheet 2 of 2

31	neet 2 of 2		CF -cleaved	CG -coarse	•	KJ -rougn	. 25	0%-moderate 5%-slightly we % -unweather	eathered	'			AUTECON MCWAP FEASIBILITY STUDY	Sheet 2 of 2
JOB NUI	MBER: 1041	94	SF -schistose GF -gneissose LF -laminated	CJ -close sp MJ -medium	ose spacg pacing n spacing	JOINT INFILI CLN-clean ST-stained CLY-clay fille SND-sand fill	ed	% -unweather	red				VLIEEPOORT ABSTRACTION WEIR	JOB NUMBER: 104194
0	0	0	_	VWJ-very w.	ide spacng	SND-sand fill GVL-gravel fi	illed					17	0.00	
36	0	0		35 29	<u> </u>							19		
32	0	0										_21		
30	0	0		57 41								23	Sub-rounded gravels and cobbles of banded ironstoclayey sand, grit. Alluvium.	ne (diameter 10-70mm) in matrix
28	0	0		41								25	Matrix generally lost. Highly occasionally moderately weathered, very close moderately jointed (spacing generally <60 to orange-brown, occasionally purple, VERY HARD ROCK banded ironstone.	200mm occasionally 400mm),
35	27	0			N/A	N/A	N/A	N/A	N/A	N/A		27.0 <u>m27</u>	Intersected by numerous quartz veins with cavities	now generally intact, brecciated,
76	69	32	20+?									_28	appearance possible fault zone. In places, recovered as angular gravel. Quartz veining via bedding as well as cross cutting via irregular.	0° - 90°, 60° - 70° joints, i.e. alm
99	96	75	7		FG BF	2	40° 70°	CJ CJ	SJ RJ/SJ	ST,W ST		_ 29	31.75 END OF HOLE	
83	60	32	20+									30	NOTES	
94	64	12	20+									31	1) Water table at a depth of 7,85m. 2) Total water loss at a depth of 13.25m; in bedrock 27,15	5m and 30,50m.
Material lecovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	SPT-N	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGH- NESS	JOINT FILLING	WEATH- ERING	DEPTH Scale 1:75	3) Rockhead at a depth of 27,0m. CONTRACTOR: DWA MACHINE: SECO 12 DRILLED BY: N.v.d Berg PROFILED BY: G.D TYPE SET BY: E.R SETURBULE: V SET DATE: 02/11/09 12:11 TEXT: C:DOT5000104194-2-2	ELEVATION: X-COORD: 2 725 540 Y-COORD: -31 915 HOLE No: VBH 2

SETUP FILE: Y.SET

HOLE No: VBH3

Sheet 1 of 3

JOB NUMBER: 104194

ROCK FABRIC
MF -massive
BF -bedded
FF -foliated
CF -cleaved
SF -schistose
GF -gneissose
LF -laminated

ROCK FABRIC
GRAIN SIZE
FG -fine grained
MG -medium grain
CG -coarse grain
VCJ-very close space
CJ -close space
CJ -clos JOINT SPACING VCJ-very close spacg CJ-close spacing MJ-medium spacing WJ-wide spacing

RJ -rough JOINT INFILL CLN-clean ST-stained CLY-clay filled SND-sand filled

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered WEATHERING GRAPH
100%-completely weathered
75%-highly weathered
50%-moderately weathered
25%-slightly weathered
0% -unweathered



DWA MCWAP FEASIBILITY STUDY HOLE No: VBH3 Sheet 1 of 3

JOB NUMBER: 104194

				WJ -wide sp VWJ-very w	acing side spacng	SND-sand fill GVL-gravel fil	ed lled							
56	0	0	18		N/A	N/A	N/A	N/A	N/A	N/A		Scale	0.00	Dark brown, <u>clay</u> . Alluvium.
35	0	0	40		IN/A	IN/A	IN/A	IN/A	IN/A	IN/A			1.95	
41	0	0	12	<u></u>								3	7.30	Grey brown, silty clay. Alluvium. Note: Reddish brown, medium sand at 1.95 – 2.11m; 3.90 – 4.03m; 5.85 – 6.03m; 7.80 – 8.029.75 – 9.90m.
40	0	0	14									5		11.63 – 11.70m mainly medium and coarse ironstone gravels (diameter up to 0.02m).
37	0	0	16		N/A	N/A	N/A	N/A	N/A	N/A	7	.19m ₹		
31	0	0	21									9	9.75	
10	0	0										11 11		Grey to brown, silty clay with occasional rounded gravels. Alluvium.
52	0	0	13									13		
65	0	0	23		N/A	N/A	N/A	N/A	N/A	N/A		14		
Material	Core	RQD	SPT-N	FRAC.	ROCK	JOINT	JOINT	JOINT	JOINT	JOINT	WEATH-	16		
Recovery (%)	Recovery (%)	(%)	Is50 (D/A)	FREQ.	FABRIC AND GRAIN	NO OF SETS	INCLIN (deg)	SPACING	ROUGH- NESS	FILLING	ERING	Scale 1:75		

ROCK FABRIC GRAIN SIZE JOINT ROUGHNESS WEATHERING GRAPH FG -fine grained MG -medium grain SLJ-slickensided SJ -smooth MF -massive 100%-completely weathered DWA HOLE No: VBH3 aurecon HOLE No: VBH3 BF -bedded 75%-highly weathered **MCWAP FEASIBILITY STUDY** Sheet 2 of 3 FF -foliated CG -coarse grain RJ -rough 50%-moderately weathered Sheet 2 of 3 CF -cleaved SF -schistose GF -gneissose LF -laminated 25%-slightly weathered JOINT SPACING VCJ-very close spacg JOINT INFILL 0% -unweathered CLN-clean ST-stained JOB NUMBER: 104194 **VLIEEPOORT** JOB NUMBER: 104194 CJ -close spacing **ABSTRACTION WEIR** CLY-clay filled SND-sand filled MJ -medium spacing WJ -wide spacing VWJ-very wide spacng GVL-gravel filled 47 0 0 REF 17.79 18 000 Sub-rounded medium to coarse gravels and cobbles of HARD ROCK banded ironstone (diameter 10 - 70mm). Alluvium. 24 0 Matrix generally lost. 19 20 39 11 0 21 13 6 0 _22 23 3 2 0 24 25 26 3 2 0 27 28 8 0 N/A N/A N/A N/A N/A N/A 29 9 0 0 30 31 11 0 32 _ 33 RQD SPT-N FRAC. ROCK JOINT JOINT JOINT Material JOINT JOINT WEATH-DEPTH Core 0000 FREQ. **FABRIC** NO OF SPACING ROUGH-**FILLING ERING** Scale Recovery Recovery (%) Is50 **INCLIN** (D/A) AND SETS NESS 1:75 (%) (%) (deg) GRAIN

HOLE No: VBH3 Sheet 3 of 3

JOB NUMBER: 104194

ROCK FABRIC GRAIN SIZE MF -massive BF -bedded FF -foliated

FG -fine grained MG -medium grain

CF -cleaved SF -schistose GF -gneissose LF -laminated

CG -coarse grain JOINT SPACING VCJ-very close spacg CJ -close spacing MJ -medium spacing WJ -wide spacing

RJ -rough JOINT INFILL CLN-clean ST-stained

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered 100%-completely weathered 75%-highly weathered 50%-moderately weathered 25%-slightly weathered 0% -unweathered



DWA MCWAP FEASIBILITY STUDY

VLIEEPOORT ABSTRACTION WEIR

DATE: 02/11/09 12:10

TEXT: ..C:\DOT5000\104194~3.DOC

HOLE No: VBH3 Sheet 3 of 3

JOB NUMBER: 104194

	<i>,</i> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	i i	F -laminated	CJ -close sp MJ -medium WJ -wide sp VWJ-very w	pacing spacing pacing ide spacng	ST-stained CLY-clay fille SND-sand fill GVL-gravel f	ed led ïlled	1	ı	ı	<i>X//////////</i>	-a	ABSTRACTION WEIR
26	11	0										34	
24	6	0										36	
23	9	0										37	
137	29	0											1 ₀ V ₀ 1
19	7	0		20+	_							39.50m	39.50
39	28	11			-							40	180mm), greyish purple to red brown, VERY HARD ROCK occasionally MEDIUM
- 7	00		_	13								-	HARD ROCK <u>banded ironstone</u> .
57	22	0	-		1							41	Recovered as coarse, sub-angular gravel at places.
				20+								10	
13	5	0		20+	_							- 42	
49	16	0			-				_			_ 43	
				12	FG BF	2	0-10° 50-70°	AC1-C1	SJ SJ	ST ST		44	
63	45	31		16								45	
30	21	0		20+								46	
	1.0			11								47	47.80 47.80 END OF HOLE
27	13	0		17	1								NOTES
			-										1) Rockhead / bedrock at 39,50m.
Material	Core	RQD	SPT-N	FRAC.	ROCK	JOINT	JOINT	JOINT	JOINT	JOINT	WEATH-	DEPTH	2) Water table at a depth of 7,19m.
Recovery (%)	Recovery (%)	(%)	Is50 (D/A)	FREQ.	FABRIC AND GRAIN	NO OF SETS	INCLIN (deg)	SPACING	ROUGH- NESS	FILLING	ERING	Scale 1:75	CONTRACTOR: DWA INCLINATION: Vertical ELEVATION: MACHINE: SECO12 DIAM: X-COORD: 2725525 DRILLED BY: N vd Berg DATE: 04/05 – 28/07/2009 Y-COORD: -31990 PROFILED BY: L.M DATE: 16/10/2009 HOLE No: VBH3

TYPE SET BY : E.R

SETUP FILE: Y.SET

HOLE No: VBH 5

Sheet 1 of 3 JOB NUMBER: 104194

FF -foliated CF -cleaved SF -schistose GF -gneissose LF -laminated

ROCK FABRIC GRAIN SIZE MF -massive BF -bedded

FG -fine grained MG -medium grain CG -coarse grain

RJ -rough

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered 100%-completely weathered 75%-highly weathered 50%-moderately weathered 25%-slightly weathered 0% -unweathered



DWA MCWAP FEASIBILITY STUDY HOLE No: VBH 5 Sheet 1 of 3

- On	neet 1 of 3		CF -cleaved	CG -coarse grain	KJ -rougn	2	5%-moderater 5%-slightly we % -unweather	athered					(\cup)	ec			MCWAP FEASIBILITY STUDY	Sheet 1 of 3
JOB NUM	MBER: 10419	94	CF -cleaved SF -schistose GF -gneissose LF -laminated	JOINT SPACING VCJ-very close spacg	JOINT INFILI	L 09	% -unweather	ed									VLIEEPOORT	JOB NUMBER: 104194
			LF -laminated	JOINT SPACING VCJ-very close spacg CJ -close spacing MJ -medium spacing WJ -wide spacing VWJ-very wide spacng	ST-stained CLY-clay fille SND-sand fill	ed led											ABSTRACTION WEIR	
				VWJ-very wide spacng	GVL-gravel fi	illed					Scal	le :	//	0.00			<u>.</u>	
41	0	0									Scal	75			Mo Allı	oist, dark grey-brow uvium.	n, <u>clay</u> .	
60	0	0									_ 1	1/						
93	0	0									_2	1						
				N1/A	NI/A	NI/A	N/A	NI/A	N1/A		_ 3							
				N/A	N/A	N/A	IN/A	N/A	N/A		-							
45	0	0									4	1/						
		•									5	1						
22	0	0									-							
											- 6			6.00	Mo	oist, brown, <u>clayey</u> t	o coarse sand.	
50	0	0									7				Allu	uvium.		
											- 1							
											8		23) 23)					
34	0	0									-		보기 국가					
											9							
21	0	0									-							
				N/A	N/A	N/A	N/A	N/A	N/A		_ 10		22) 22)					
38	0	0									11		보기 국가					
											- ' '							
26	0	0									_ 12							
											-	1/						
		_									13		공기 공기					
27	0	0									- - - -		보기 조건					
			-								14		**************************************	14.00		oist, grey-brown, <u>cla</u>	av	
143	0	0									45				Allı	uvium.	y.	
			-								_ 15							
22	0	0		N/A	N/A	N/A	N/A	N/A	N/A		_ 16	1						
											- - - -	_₺/						
Material Recovery	Core Recovery	RQD (%)	FRAC. FREQ.	SPT-N ROCK FABRIC	NO OF	JOINT INCLIN	JOINT SPACING	JOINT ROUGH-	JOINT FILLING	WEATH- ERING	DEPTH Scale							1
(%)	(%)			AND GRAIN	SETS	(deg)		NESS			1:75							

HOLE No: VBH 5 Sheet 2 of 3

JOB NUMBER: 104194

ROCK FABRIC
MF -massive
BF -bedded
FF -foliated
CF -cleaved
SF -schistose
GF -gneissose
LF -laminated

ROCK FABRIC
GRAIN SIZE
FG -fine grained
MG -medium grain
CG -coarse grain
VCJ-very close space
CJ -close space
CJ -clos JOINT SPACING VCJ-very close spacg CJ -close spacing MJ -medium spacing

RJ -rough JOINT INFILL CLN-clean ST-stained CLY-clay filled

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered WEATHERING GRAPH
100%-completely weathered
75%-highly weathered
50%-moderately weathered
25%-slightly weathered
0% -unweathered



DWA MCWAP FEASIBILITY STUDY HOLE No: VBH 5 Sheet 2 of 3

JOB NUMBER: 104194

				WJ -medium WJ -wide spa VWJ-very wid	spacing acing de spacna	SND-sand fill GVI -gravel fi	a ed Iled								
103	0	0		vwo very wie	uc spacing	gve graver ii									
61	0	0	_										000 000 000 000 000	18.00	Sub-rounded to sub-angular, gravels and cobbles of banded ironstone in matrix of clay.
61 80	67	29										19	1 %		Matrix generally lost. Alluvium.
59	34	23	լ									- 19	16/6		Alluvium.
36	25	0	վ		N/A	N/A	N/A	N/A	N/A	N/A		20	000		
118	59	0										_20	000		
73	56	42										24	1000		
100	0 0	0 0										21	000 000 000	04.47	
11			r									-		21.47	Moist, brown, medium to coarse sand.
30	0	0										_ 22			Alluvium.
												Ė			Washbored.
												23			
46	0	0													
												24			
32	0				N/A	N/A	N/A	N/A	N/A	N/A					
32	0	0										25			
38	0	0	-									Ė			
30	0	0	-									26			
20	0	0													
30		0										27			
114	32	0											6/0/0	27.46	
75	31	0										28			Angular to sub-rounded, gravel and cobbles (diameter of 20-120mm), of moderately to highly weathered, MEDIUM HARD ROCK to EXTREMELY HARD ROCK banded
14	0	0											6/2/2		ironstone in <u>sandy clay</u> matrix.
38	0	0										29	1000		Matrix generally lost. Possibly talus / paleo-alluvium.
10	10 75	0 46											6/2/		
49	49	24			N/A	N/A	N/A	N/A	N/A	N/A		30	1 /2/2		
25	0	0										<u> </u>	00000000000000000000000000000000000000		
71	54	0										31	10/0/0		
83	83	83	<u> </u>									Ė	16/6/9		
0 [<u>0</u> 59	0	T									32	000		
81 68	15	0 0	J									32.50m	1 %/3	32.50	
66	57	0										33			
Material	Core	RQD	FRAC. FREQ.	SPT-N	ROCK FABRIC	JOINT NO OF	JOINT INCLIN	JOINT SPACING	JOINT ROUGH-	JOINT FILLING	WEATH- ERING	DEPTH Scale			1
Recovery (%)	Recovery (%)	(%)	rneu.		AND	SETS	(deg)	SFACING	NESS	FILLING	EKING	1:75			
I	I	I			GRAIN	I	l	I					1/ ~ / / 1		

HOLE No: VBH 5 Sheet 3 of 3

JOB NUMBER: 104194

ROCK FABRIC GRAIN SIZE MF -massive BF -bedded FF -foliated CF -cleaved SF -schistose GF -gneissose LF -laminated

FG -fine grained MG -medium grain CG -coarse grain

JOINT SPACING VCJ-very close spacg CJ-close spacing MJ-medium spacing WJ -wide spacing

RJ -rough

JOINT INFILL CLN-clean ST-stained

CLY-clay filled SND-sand filled

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered 100%-completely weathered 75%-highly weathered 50%-moderately weathered 25%-slightly weathered 0% -unweathered



DWA MCWAP FEASIBILITY STUDY

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ABSTRACTION WEIR

VLIEEPOORT

HOLE No: VBH 5 Sheet 3 of 3

JOB NUMBER: 104194

			VVJ-wide spacing VWJ-very wide spacng	GVL-gravel f	ieu ïlled					
84 80 111 100 38 38 75 63 83 19 110 42 53 14 98 88 85 31 93 56 133 133 78 35 81 72 28 13	100 31 23 0 0 0 0 0 0 18 45 0 0 0 18 45 0 0 0 0 0 0 0 0 0	? ? ? ?	FG MF/FF	2	50-60° 90°	VCJ/CJ VCJ/?	SJ SJ	ST ST		Highly to completely weathered, very closely to closely jointed (spacing general <60mm occasionally up to 100mm), orange brown, HARD ROCK to SOFT ROC banded ironstone. Completely weathered BIF (banded ironstone formation). Ferruginized siltstone. Largely recovered as angular gravel (possibly intact in situ). FeO/Mno oxide cement; possibly represents weathered fault zone.
103 58 92 92 131 131 53 53 100 77 103 103 82 82 102 102 123 123 106 106 79 79	92 72 15 0 44 58 43 77	? 15 20+ 8	FG BF	1	40-50°	VCJ/CJ	SJ	ST		Moderately weathered, closely jointed occasionally very closely jointed, grey and purp banded, EXTREMELY HARD ROCK banded ironstone. Evidence of brecciation (via 60-70 joints); now re-cemented possible (palaeo – fault?).
										END OF HOLE NOTES 1) No SPT's conducted (angled borehole). 2) Rockhead at 32,50m.
Material Core Recovery Recovery (%) (%)		FRAC. FREQ.	SPT-N ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGH- NESS	JOINT FILLING	WEATH- ERING	DEPTH Scale 1:75

TYPE SET BY : E.R

SETUP FILE: Y.SET

HOLE No: VBH 6 Sheet 1 of 2

JOB NUMBER: 104194

ROCK FABRIC
MF -massive
BF -bedded
FF -foliated
CF -cleaved
SF -schistose
GF -gneissose
LF -laminated

ROCK FABRIC
FG -fine graine
MG -medium SIZE
FG -fine graine
GG -coarse gra
CG -coarse gra
VCJ-very close
CJ -close space
MI -medium size JOINT SPACING VCJ-very close spacg CJ -close spacing MJ -medium spacing WJ -wide spacing

FG -fine grained MG -medium grain CG -coarse grain

RJ -rough JOINT INFILL CLN-clean ST-stained CLY-clay filled SND-sand filled

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered WEATHERING GRAPH
100%-completely weathered
75%-highly weathered
50%-moderately weathered
25%-slightly weathered
0% -unweathered



DWA MCWAP FEASIBILITY STUDY HOLE No: VBH 6 Sheet 1 of 2

JOB NUMBER: 104194

				VWJ-ve	de spacing ery wide spac	ong GVL-g	ravel filled								
46	0	0	П										Scale : 1:75 -	0.00	Dark brown, silty to sandy <u>clay</u> with sand lenses/horizons. Alluvium.
22	0	0	1										1		
				N=10	_								2		
83	0	0											3		
62	0	0	_	N=9	_										
92	0	0											4		
67	0	0											5		
80	0	0											1		
80	0	0											6		
				N=10	_								7		
94	0	0				N/A	N/A	N/A	N/A	N/A	N/A		1		
60	0	0		N=7	_								8		
33	0	0											9		
36	0	0		N=24	_								1		
43	0	0											10		
													11		
192	0	0											1		
107	0	0		N 22									12		
98	0	0		N=33									13		
89	0	0											44		
			_	N=16	-								14		
69	8	0											15	14.88	Brown, <u>clay</u> and <u>sand</u> and sub-rounded, medium to coarse <u>gravels</u> / angular <u>cobbles</u> of
93	0 0	0		N=24	-									6,0,0 6,2,0	banded ironstone, with some quartz. (Cobble and gravel horizon between 15,75 – 16,73 m)
64	44	0]										16	6,0 6,0 6,0 6,0	(Cobble and gravel horizon between 15,75 – 16,73 m) Alluvium.
Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	SPT-N Is50 (D/A)	FRAC. FREQ.	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGH- NESS	JOINT WEA	TH- DEP	TH le	14.88 0	

HOLE No: VBH 6 Sheet 2 of 2

JOB NUMBER: 104194

ROCK FABRIC
MF -massive
BF -bedded
FF -foliated
CF -cleaved
SF -schistose
GF -gneissose
LF -laminated

ROCK FABRIC GRAIN SIZE

FG -fine grained MG -medium grain CG -coarse grain JOINT SPACING VCJ-very close spacg CJ -close spacing MJ -medium spacing WJ -wide spacing

RJ -rough JOINT INFILL CLN-clean ST-stained CLY-clay filled SND-sand filled

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered 100%-completely weathered 75%-highly weathered 50%-moderately weathered 25%-slightly weathered 0% -unweathered



DWA MCWAP FEASIBILITY STUDY

Sheet 2 of 2

JOB NUMBER: 104194

HOLE No: VBH 6

VLIEEPOORT ABSTRACTION WEIR

_				WJ -wi VWJ-v	ide spacing ery wide spa	SND-s acng GVL-g	sand filled gravel filled						
31	4	0				N/A	N/A	N/A	N/A	N/A	N/A		17
32 -38	0	0]										
55 11	4 3	 8	<u> </u>	N=REF	}								20 20.35 20.35 Angular to sub-rounded gravels and cobbles of moderately to highly weathered, when the standard to be a standard to sub-rounded gravels.
100	76	31											F ² ′ ∃⊙ ∑ ⊙ nard rock to hard rock, banded ironstone.
3	3	1	_										Origin uncertain, possible rubble from palaeo – fault?, possible fault zone or alluvium
45	32	0											Note: pockets of clayey stain and wad (possible remnant of dolomite – now weather
20	10	0											
23	16 0	16 0				N/A	N/A	N/A	N/A	N/A	N/A		
73	55	0	7										
103 33	74 29	0	, 										
63	39	22	1										
58 78	39	0											27 0 0 0 7.30
130 82	130	17347 3 8 3	11	-									Moderately weathered, closely jointed (spacing 60 – 250 mm), purple to grey, V HARD ROCK, banded ironstone.
19165	105	507	13										Prominent staining, weathered laminations to 31,0m.
1695 113	1995 113	5 3 65	16	-		FG BF	3	0° 20-30°	VCJ-WJ	RJ/SJ	- St		Some evidence of dislocation via 50-60° joints, now re-cemented. Possible nearby f
83 142	83 142	0 83		_				60°	VCJ-CJ	SJ	St		30
113 1 78	113 1 78	43 178 57	13	_									31.32 END OF HOLE
1 6 143	1614 3	1@0											NOTES
													1) Rockhead at 27,30 m.
Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	SPT-N Is50 (D/A)	FRAC. FREQ.	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGH- NESS	JOINT FILLING	WEATH- ERING	DEPTH Scale CONTRACTOR: WEPPELMAN INCLINATION: VERTICAL ELEVATION: Scale 1:75 MACHINE: Seco DIAM: X-COORD: 2 725 50 DRILLED BY: WILLED BY:
		•	•	•	•	•		•	•	•			PROFILED BY : G.D DATE : 03/06/2009 HOLE No: VBF SETUR FILE: V SET TEXT: C:DOT5000/104194 1 DOC

SETUP FILE: Y.SET

TEXT: ..C:\DOT5000\104194~1.DOC

HOLE No: VBH 7 Sheet 1 of 2

FF -bedded FF -foliated CF -cleaved SF -schistose GF -gneissose LF -laminated

ROCK FABRIC GRAIN SIZE
MF -massive FG -fine graine
BF -bedded MG -medium g

FG -fine grained MG -medium grain CG -coarse grain

RJ -rough

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered WEATHERING GRAPH
100%-completely weathered
75%-highly weathered
50%-moderately weathered
25%-slightly weathered
0% -unweathered



DWA MCWAP FEASIBILITY STUDY

Sheet 1 of 2

VLIEEPOORT
ABSTRACTION WEIR

Sr	heet 1 of 2		CF -cleaved	CG -coarse g		RJ -rougn	50 25	5%-moderater 5%-slightly we	ly weathered eathered red			(aurec		MCMAP FEASIBILITY STUDY	Sheet 1 of 2
JOB NUM	MBER: 1041		SF -schistose GF -gneissose LF -laminated	JOINT SPAC VCJ-very clo CJ -close spa MJ -medium WJ -wide spa VWJ-very wi	CING se spacg acing spacing acing	JOINT INFILI CLN-clean ST-stained CLY-clay fille SND-sand fill	d ed	% -unweather	red			`			VLIEEPOORT ABSTRACTION WEIR	JOB NUMBER: 104194
72	0	0		vwj-very wi	de spacng	GVL-graver II	ilea					Sca 1:7	0.00	Moist, grey-brown Alluvium.	ı, <u>clay</u> .	
106	0	0										1		, .		
60	0	0		N=25								2				
101	0	0										-				
62	0	0		N=20								_ 3				
39	0	0			N/A	N/A	N/A	N/A	N/A	N/A		4				
67	0	0		N=26								5				
50	0	0										6				
62	0	0		N=11												
65	0	0										7	7.50			
67	0	0		N=7								8	7.30	Moist to wet, brow	vn to grey brown, <u>clayey sand</u> .	
60	0	0			N/A	N/A	N/A	N/A	N/A	N/A		9	9.03	Alluvium.		
25	14	0										10	000	Sub-angular to so weathered VERY Alluvium.	ub-rounded, <u>gravels</u> and <u>cobbles</u> (diameter 1 HARD ROCK banded ironstone in matrix of	0 – 110mm) of moderately clayey to silty sand.
13	13	0										_ 11	0000	Matrix generally lo	JSI.	
20	0	0											0000			
40	0	0		N=REF								_ 12	000			
13	5	0										_ 13	0000			
28	16	0			N/A	N/A	N/A	N/A	N/A	N/A		14	000			
20	6	0										_ 15	9.03			
22	0	0										_ 16	000000000000000000000000000000000000000			
Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	SPT-N Is50 (D/A)	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGH- NESS	JOINT FILLING	WEATH- ERING	DEPTH Scale 1:75				

HOLE No: VBH 7 Sheet 2 of 2

JOB NUMBER: 104194

MF -massive BF -bedded FF -foliated CF -cleaved

SF -schistose GF -gneissose LF -laminated

FG -fine grained MG -medium grain

ROCK FABRIC GRAIN SIZE

CG -coarse grain JOINT SPACING VCJ-very close spacg CJ -close spacing MJ -medium spacing WJ -wide spacing

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided RJ -rough

JOINT INFILL

CLY-clay filled

CLN-clean

ST-stained

100%-completely weathered 75%-highly weathered 50%-moderately weathered 25%-slightly weathered 0% -unweathered



DWA **MCWAP FEASIBILITY STUDY**

VLIEEPOORT

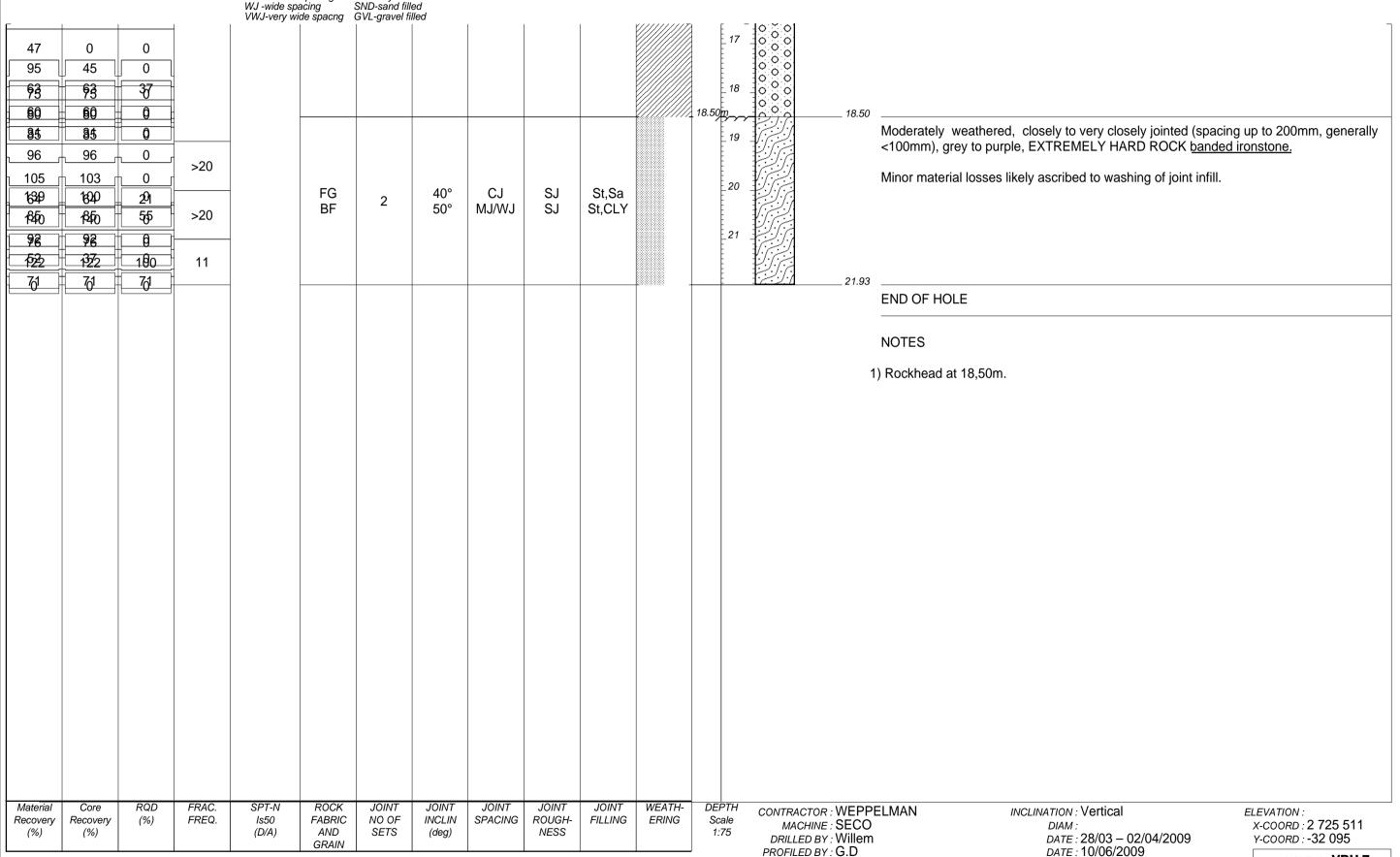
DATE: 02/11/09 12:11

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ABSTRACTION WEIR

HOLE No: VBH 7 Sheet 2 of 2

JOB NUMBER: 104194



TYPE SET BY : E.R

SETUP FILE: Y.SET

HOLE No: VBH 8 Sheet 1 of 3

JOB NUMBER: 104194

BF -bedded FF -foliated CF -cleaved

MF -massive SF -schistose

GF -gneissose LF -laminated CJ -close spacing MJ -medium spacing

ROCK FABRIC GRAIN SIZE FG -fine grained MG -medium grain CG -coarse grain JOINT SPACING

RJ -rough JOINT INFILL CLN-clean ST-stained VCJ-very close spacg CLY-clay filled

SLJ-slickensided

JOINT ROUGHNESS WEATHERING GRAPH 100%-completely weathered 75%-highly weathered 50%-moderately weathered 25%-slightly weathered 0% -unweathered



DWA **MCWAP FEASIBILITY STUDY** HOLE No: VBH 8 Sheet 1 of 3

JOB NUMBER: 104194

VLIEEPOORT ABSTRACTION WEIR

WJ -wide spacing VWJ-very wide spacing SND-sand filled GVL-gravel filled Red brown, sandy clay with gravel. 1:75 50 0 0 N/A N/A N/A N/A N/A N/A Topsoil (Colluvium). 0.90 00 0 41 0 Angular to sub-angular, medium to coarse gravels (generally diameter of 20 – 50 mm, 47 16 0 occasionally up to 120 mm), occasional cobbles of weathered, purplish, hard rock, banded ironstone; in places recovered in matrix of sandy clay. 100 100 0 Matrix generally lost. 34 12 0 Boundaries uncertain. 74 0 0 23 0 54 22 8 0 48 0 0 18 0 0 15 21 0 6 N/A N/A N/A N/A N/A N/A 129 57 46 95 19 0 117 11 0 76 39 32 158 67 0 84 0 0 10 49 9 0 110 10 0 Angular, medium to coarse gravels, occasional cobbles and boulders, of highly to 17 0 64 completely weathered brecciated, HARD ROCK banded ironstone in matrix of gravelly 91 40 0 12 <u>clay</u>. 3 2 0 Talus /possible fault breccia? 42 16 0 13 29 0 5 35 0 0 15 81 0 0 100 0 0 0 26 0 16 3 0 34 RQD ROCK JOINT JOINT JOINT Material Core FRAC. JOINT JOINT WEATH-DEPTH SPACING **FILLING** Recovery Recovery (%) FREQ. **FABRIC** NO OF **INCLIN** ROUGH-**ERING** Scale AND 1:75 (%) (%) SETS (deg) NESS GRAIN

HOLE No: VBH 8 Sheet 2 of 3 JOB NUMBER: 104194

ROCK FABRIC
MF -massive
BF -bedded
FF -foliated
CF -cleaved
SF -schistose
GF -gneissose
LF -laminated

ROCK FABRIC
FG -fine graine
MG -medium SIZE
FG -fine graine
GG -coarse gra
CG -coarse gra
VCJ-very close
CJ -close space
MI -medium size JOINT SPACING VCJ-very close spacg CJ -close spacing MJ -medium spacing WJ -wide spacing

FG -fine grained MG -medium grain CG -coarse grain

RJ -rough JOINT INFILL CLN-clean ST-stained CLY-clay filled SND-sand filled

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered WEATHERING GRAPH
100%-completely weathered
75%-highly weathered
50%-moderately weathered
25%-slightly weathered
0% -unweathered



DWA MCWAP FEASIBILITY STUDY

VLIEEPOORT **ABSTRACTION WEIR**

Sheet 2 of 3 JOB NUMBER: 104194

			WJ - VWJ	-wide spacing J-very wide si	g SND- pacng GVL-g	sand filled gravel filled						
13	0	0									18.05m ¹	
64	53	0									70.0017	
120	120	90									19	
90	53	0										
27	5	0		N/A	N/A	N/A	N/A	N/A	N/A			
97	25	0									_21	
36	6	0									_ 22	
38	22	0									_ 23	
27	0	0									_ 24	
14	0	0									_ 25	
27	0	0									_27	
18	0	0									_28	
71	0	0									29	29.35
103	87	39		FG	4	40°	VCJ	S	04 5-0		l F	Highly to completely weathered, very closely to closely jointed, (completely fractured),
57	16	0	-	BF	1	40°	VCJ	<u> </u>	St,FeO		30.35	gray to brown, meaning to continuous to cont
139	69	0									-	Traversed by veins of green mineralization.
61	56	32									- 31	оррег norizon or weanthered bedrock. 30.35
163	163	134		FG	2	45-55°	CJ	SJ	St		32	
100	100	98		BF	2	40-50°	CJ	RJ/SJ	min		_ 33	<i>₩</i> . <i>У</i> ./.
Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGH- NESS	JOINT FILLING	WEATH- ERING	DEPTH Scale 1:75	

HOLE No: VBH 8 Sheet 3 of 3

JOB NUMBER: 104194

ROCK FABRIC GRAIN SIZE MF -massive BF -bedded FF -foliated CF -cleaved

SF -schistose GF -gneissose LF -laminated

CG -coarse grain JOINT SPACING VCJ-very close spacg CJ -close spacing MJ -medium spacing

FG -fine grained MG -medium grain RJ -rough JOINT INFILL CLN-clean ST-stained CLY-clay filled

JOINT ROUGHNESS WEATHERING GRAPH 100%-completely weathered 75%-highly weathered SLJ-slickensided 50%-moderately weathered 25%-slightly weathered 0% -unweathered



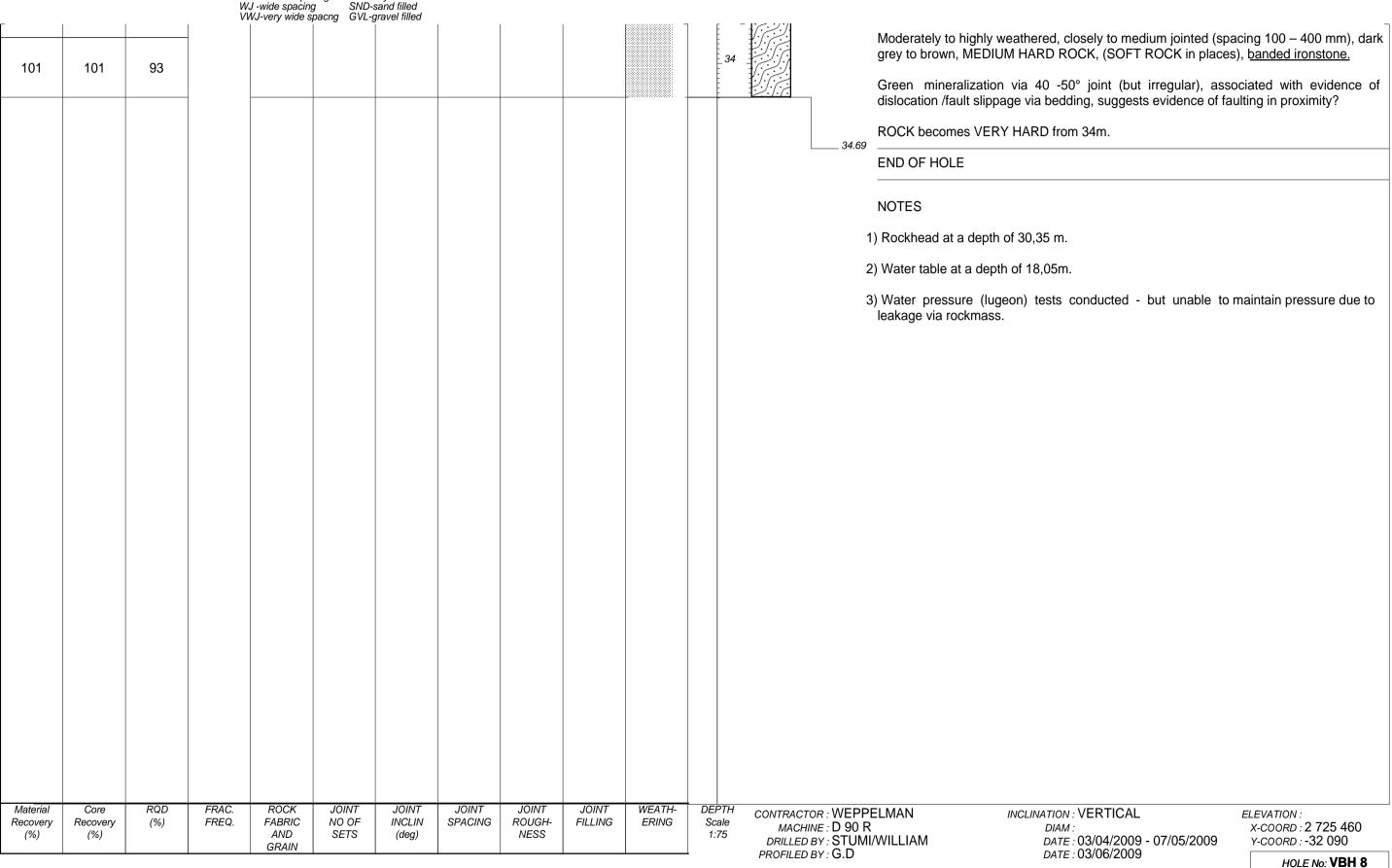
DWA **MCWAP FEASIBILITY STUDY** HOLE No: VBH 8 Sheet 3 of 3

JOB NUMBER: 104194

VLIEEPOORT ABSTRACTION WEIR

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TYPE SET BY: C.A

SETUP FILE: Y.SET

HOLE No: VBH DAM1 Sheet 1 of 1

JOB NUMBER: 104194

MF -massive BF -bedded FF -foliated

CF -cleaved SF -schistose GF -gneissose LF -laminated JOINT SPACING VCJ-very close spacg CJ-close spacing MJ-medium spacing MJ -medium spacing
WJ -wide spacing
VWJ-very wide spacing
GVL-gravel filled
GVL-gravel filled

ROCK FABRIC GRAIN SIZE FG -fine grained MG -medium grain CG -coarse grain

RJ -rough

JOINT INFILL CLN-clean ST-stained

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered 100%-completely weathered 75%-highly weathered 50%-moderately weathered 25%-slightly weathered 0% -unweathered

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DWA MCWAP FEASIBILITY STUDY

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HOLE No: VBH DAM1 Sheet 1 of 1

JOB NUMBER: 104194

VLIEEPOORT BALANCING DAM

				VWJ-very wi	ide spacng (GVL-gravel fi	lled										
54	0	0			N/A	N/A	N/A	N/A	N/A	N/A		Sca 1:	cale :/ 1:75 -/		0.0		Moist, red-brown, sandy clay. Colluvium.
82	0	0	-		IN/A	IN/A	IN/A	IN/A	IN/A	IN/A		F '					
67	0	0		N=REF	H							Ē			1.9		
35	22	0			N/A	N/A	N/A	N/A	N/A	N/A		3			1.9		Sub-angular gravels and cobbles of banded ironstone, dolomite in matrix of clay. Colluvium.
72	58	37										3.50m			3.5	50	
99	99	95	3	_								_4					Moderately to highly weathered (leached), very closely to medium jointed, light grey to blue-grey, VERY HARD ROCK, fractured (brecciated) dolomite. Zones of brecciated re-cemented rock 1,35 – 4,60m; 4,95 – 5,20m; 9,60 – 10,00m.
70	64	38	16	-								5	1 1 2				Note: Largely recovered as angular gravel, partly ascribed to drill action on fractured rock.
173	147	104		-								_6	护	///			
80	72	19	12	_	FG MF	2	20-40° 80-90°	VCJ/MJ VCJ/?	RJ/SJ St	ST,CL St		7					Prominently stained joints with remnant infill of red-brown gravelly clay, represents possible seepage paths /voids).
			20+									-	É	///			
111	95	28		-								_8	# #				
			20+									Ė					
133	95	24										_9	7				
67	36	0	20+									-					
100	65	18		-								10	,其	///	40	0.5	
			-											7 7 7	10.		END OF HOLE
																	NOTES
																1) Rockhead at 3,50m.
Material ecovery	Core Recovery	RQD (%)	FRAC. FREQ.	SPT-N	ROCK FABRIC AND	JOINT NO OF SETS	JOINT INCLIN (dea)	JOINT SPACING	JOINT ROUGH- NESS	JOINT FILLING	WEATH- ERING	DEPTH Scale 1:75	C	MAC	CTOR : WEI	NE	TAZZ DIAM: TNW X-COORD: 2 722 607
(%)	(%)				GRAIN	SEIS	(deg)		IVESS			1.75		DRILLE PROFII F	DBY:Sero	dorf	DATE: 10/06/2000
															TBY:E.R		DATE: 02/11/09 12:11

TYPE SET BY : E.R

SETUP FILE: Y.SET

HOLE No: VBH DAM2

Sheet 1 of 1

JOB NUMBER: 104194

ROCK FABRIC GRAIN SIZE MF -massive BF -bedded FF -foliated

CF -cleaved SF -schistose GF -gneissose LF -laminated

FG -fine grained MG -medium grain CG -coarse grain JOINT SPACING VCJ-very close spacg CJ-close spacing MJ-medium spacing

RJ -rough JOINT INFILL CLN-clean ST-stained MJ -medium spacing
WJ -wide spacing
VWJ-very wide spacng
GLY-clay filled
SND-sand filled
GVL-gravel filled

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered 100%-completely weathered 75%-highly weathered 50%-moderately weathered 25%-slightly weathered 0% -unweathered



DWA **MCWAP**

VLIEEPOORT BALANCING DAM

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HOLE No: VBH DAM2 Sheet 1 of 1

JOB NUMBER: 104194

			V V	vo-very wide s	pacng GVL-g	graver illieu					,			
33	19	19		N/A	N/A	N/A	N/A	N/A	N/A		S	cale 0 0 1:75 0 0	0.00	Angular, medium to coarse <u>gravels</u> of banded ironstones (with chert gravels below 1,00 m). Clayey <u>sand</u> matrix assume mostly lost (only recovered between 0,54 – 1,54m).
42	0	0		IN/A	IN/A	IN/A	IN/A	IN/A	IN/A			1 000	1.54	Colluvium.
108	64	21		N/A	N/A	N/A	N/A	N/A	N/A		- 2	2 00	1.54	Angular gravels, cobbles and boulders up to 800 mm of whitish, leached chert, stained reddish brown along fractures and joints. In places, partly re-cemented chert breccia.
97	97	72 T	6			,, .	,, .				2.67m		2.67	Dolomite residuum.
71	71	0	40									3 -/-/-/ -/-/-/		Slightly weathered, closely to medium jointed (spacing between 100 – 300 mm), light grey, VERY HARD ROCK, <u>dolomite</u> .
82	76	76	10									4 777		Recemented breccia in places, especially between 2,67 – 2,85 m.
97	97	85	9									7/7/		Prominent fracturing between 4,83 – 5,05 m, 7,10 – 7,20 m and 8,20 – 8,30 m.
122	122	56										5 7///		1 Tolliment fractuling between 4,05 – 5,05 m, 7,10 – 7,20 m and 0,20 – 0,30 m.
100	100	77	7	FG MF	3	80-90° 60-70°	CJ MJ	SJ RJ	CI CI,St			5 777		
			13	IVII		20-30°	MJ	RJ	CI,St			7 7 7		
96	92	73										7 17 7		
111	111	69	9											
96	88	84										7///		
												7//	8.91	END OF HOLE
														END OF HOLE
														NOTES
													1	I) Rockhead at 2,67m.
Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGH- NESS	JOINT FILLING	WEATH- ERING	DEPT Scale 1:75	MACHII DRILLED I	DR:WEPPINE:Seco BY:William BY:G.D&	DIAM : 63MM X-COORD : 2 722 474 DATE : 27/03/2009 Y-COORD : -31 726

TYPE SET BY : C.A

SETUP FILE: Y.SET

HOLE No: VBH DAM3

Sheet 1 of 1

JOB NUMBER: 104194

ROCK FABRIC GRAIN SIZE MF -massive BF -bedded FF -foliated

CF -cleaved SF -schistose GF -gneissose LF -laminated

FG -fine grained MG -medium grain CG -coarse grain

RJ -rough JOINT SPACING VCJ-very close spacg CJ-close spacing MJ-medium spacing JOINT INFILL CLN-clean ST-stained CLY-clay filled SND-sand filled WJ -wide spacing

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered 100%-completely weathered 75%-highly weathered 50%-moderately weathered 25%-slightly weathered 0% -unweathered



DWA **MCWAP FEASIBILITY STUDY**

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HOLE No: VBH DAM3 Sheet 1 of 1

JOB NUMBER: 104194

VLIEEPOORT BALANCING DAM

			VI	NJ-very wide s	spacng GVL-	gravel filled					-	1 / / / /		
38	0	0	_	N/A	N/A	N/A	N/A	N/A	N/A		Sc 1 1	rale :75	0.00	Moist, red-brown, <u>clay</u> to <u>sandy clay</u> with angular gravels (diameter of 20 – 50mm) of banded ironstone. Colluvium.
57	0	0									1.50m		1.50	
93	93	80	8										7.30	Slightly weathered, (slightly leached), closely to medium jointed, (spacing generally 80 – 250mm), grey to light grey, VERY HARD ROCK to EXTREMELY HARD ROCK dolomite.
97	97	57	9	FG		0-10° 70°	VCJ/MJ VCJ/?	RJ SJ	ST,CL ST.CL		4			Zones of prominent stained joints (with brown sandy clay infill, possibly with wad) = possible seepage paths at 4,23m, 4,84 – 4,95m and at 5,90m.
101	101	51	13	MF	4	30-40° 90°	CJ/MJ ?	RJ/SJ RJ	ST,CL ST,CL		_ 5			
101	101	JI	15											
103	103	73	_	-							_6			
99	99	64	14											
99	99	04		_							- 7		7.24	
														END OF HOLE
														NOTES
													•	1) Rockhead at a depth of 1,50m.
													2	2) Water loss approximately 20%.
Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGH- NESS	JOINT FILLING	WEATH- ERING	DEPTH Scale 1:75	MA	CTOR : WEPP CHINE : TONE ED BY : SEEDO ED BY : G.D	TAZZ DIAM : TNW x-coord : 2 723 110
				GRAIN			1	<u> </u>	1	1	1	PROFIL	ED BY : G.D	DATE: 10/06/2009

PROFILED BY : G.D

TYPE SET BY : E.R

SETUP FILE: Y.SET

HOLE No: VBH DAM3

HOLE No: VBH DAM 4

Sheet 1 of 1 JOB NUMBER: 104194

FF -foliated

ROCK FABRIC GRAIN SIZE MF -massive BF -bedded

CF -cleaved SF -schistose GF -gneissose LF -laminated

CG -coarse grain JOINT SPACING VCJ-very close spacg CJ-close spacing MJ-medium spacing WJ -wide spacing

FG -fine grained MG -medium grain

RJ -rough

JOINT INFILL CLN-clean ST-stained

CLY-clay filled SND-sand filled

JOINT ROUGHNESS WEATHERING GRAPH SLJ-slickensided 100%-completely weather SJ-smooth 75%-highly weathered 100%-completely weathered 75%-highly weathered 50%-moderately weathered 25%-slightly weathered 0% -unweathered



DWA **MCWAP**

VLIEEPOORT BALANCING DAM

HOLE No: VBH DAM 4 Sheet 1 of 1

JOB NUMBER: 104194

			VV	VJ-very wide s	pacng GVL-	gravel filled								
10	0	0									- Sc - 1	rale	0.00	Angular, medium to coarse gravels of banded ironstones (with chert gravels below 2,50 m).
48	0	0	_								_ 1			Matrix presumed washed away.
34	0	0		N/A	N/A	N/A	N/A	N/A	N/A		Ē	0000		Colluvium.
18	0	0									2	1, 0, 1		
26	0	0	_								E			
67	0	0									3	0000	3.19	
98	98	98											5.19	Angular to sub-angular, <u>cobbles</u> (diameter of 60 – 200 mm) of whitish, leached chert and
32	23	0	_	N/A	N/A	N/A	N/A	N/A	N/A		4			red-brown, <u>clayey sand</u> matrix (only recovered between 4,00 – 4,45m, the reminder is lost.
65	6	0	17								E			Dolomite residuum.
150	150	0	''							(//////////////////////////////////////	4.69m 5	~ 	4.69	
109	81 109	62 38	8								[7///		Slightly weathered, closey to medium jointed, (spacing between 100 – 250 mm), grey, VERY HARD ROCK, dolomite.
59	51	0	0								6	1///		
84	84	49	13								-	1///		Brecciated but recemented in places between 6,19 – 7,50 m (via 70° joints).
04	04	43	13	F 0		80-90°	VCJ-?	RJ	St,Clfilm		7			Prominent weathering along some joints, particulary at 8,40m (via 70°) also 9,25 – 9,40m.
111	108	97	12	FG MF	3	60-70° 30-40°	MJ -	RJ/SJ ST	St,Clfilm St,Clfilm		Ē.	1,1,1		Minor cavities at 7,00m and 7,35m.
100	100	58	12			30-40	_	31	St,Cillini		_8			
90	90	52	12								-			
95	95	25	12								9			
108	90	24										7 7 7		
											-	-7-7-	9.66	END OF HOLE
														NOTES
													,) Rockhead at 4,69m.
													2	2) Water loss approximately 50%.
Material	Core	RQD	FRAC.	ROCK	JOINT	JOINT	JOINT	JOINT	JOINT	WEATH-	DEPTH	1 CONTRACT	OR : WEPP	ELMAN INCLINATION : VERTICAL ELEVATION :
Recovery (%)	Recovery (%)	(%)	FREQ.	FABRIC AND	NO OF SETS	INCLIN (deg)	SPACING	ROUGH- NESS	FILLING	ERING	Scale 1:75	MACH	INE: D 90 R	DIAM: 63MM X-COORD: 2 723 191
17	(- 7			GRAIN		(3/						DRILLED PROFILED	BY: William	DATE: 14-16/05/2009 Y-COORD: -31 790 DATE: 03/06/2009 HOLE No: VBH DAM 4

TYPE SET BY : C.A

SETUP FILE: Y.SET

DATE: 02/11/09 12:08

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