

HOLE No: **VBA 9A**
Sheet 1 of 2

JOB NUMBER: 104194

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

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

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

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

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

JOINT INFILL
CLN-clean
ST-stained
CLY-clay filled
SND-sand filled
GVL-gravel filled



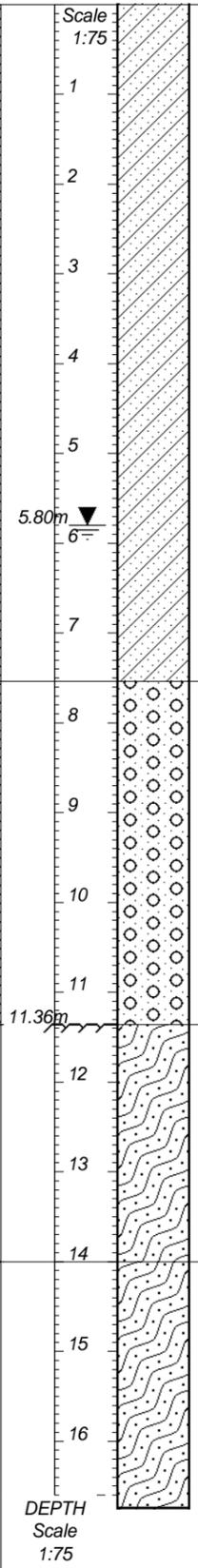
DWA
MCWAP FEASIBILITY STUDY

VLIEEPOORT
ABSTRACTION WEIR

HOLE No: **VBA 9A**
Sheet 1 of 2

JOB NUMBER: 104194

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 ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75	DESCRIPTION
46	0	0										0.00	Dark brown, sandy <u>clay</u> becoming clay from 1,45 – 5,24m then reddish brown <u>sand</u> from 6,96 – 7,54 m. Alluvium.
122	0	0										1	
56	0	0										2	
78	0	0										3	
64	0	0										4	
42	0	0										5	
53	0	0										6	
28	0	0										7	
71	0	0										8	
62	0	0										9	
41	0	0										10	
9	7	0										11	
46	34	0	>20									12	
68	0	0										13	
154	154	0	15									14	
80	80	34										15	
53	53	0	>20									16	
154	113	0										17	
48	37	19	>20									18	
76	76	76										19	
90	90	49										20	
84	84	0	19									21	
94	94	55										22	
82	82	0	14									23	
65	53	19										24	
												25	
												26	
												27	
												28	
												29	
												30	
												31	
												32	
												33	
												34	
												35	
												36	
												37	
												38	
												39	
												40	
												41	
												42	
												43	
												44	
												45	
												46	
												47	
												48	
												49	
												50	
												51	
												52	
												53	
												54	
												55	
												56	
												57	
												58	
												59	
												60	
												61	
												62	
												63	
												64	
												65	
												66	
												67	
												68	
												69	
												70	
												71	
												72	
												73	
												74	
												75	
												76	
												77	
												78	
												79	
												80	
												81	
												82	
												83	
												84	
												85	
												86	
												87	
												88	
												89	
												90	
												91	
												92	
												93	
												94	
												95	
												96	
												97	
												98	
												99	
												100	



0.00 Dark brown, sandy clay becoming clay from 1,45 – 5,24m then reddish brown sand from 6,96 – 7,54 m. Alluvium.

7.54 Angular, coarse gravels to cobbles (diameter of 30 – 100 mm) of moderately weathered banded ironstone in a matrix of clayey silty sand. Alluvium.

11.36 Moderately to highly weathered, very closely to closely jointed (<100 mm average spacing), red-black-orange HARD ROCK, banded ironstone. (Brecciated in places, faulted, re-cemented). Red, ferruginized zone, hard rock, from 12,20 – 13,60m, with zone of highly fractured rock between 13,03 – 13,27m.

14.00 Slightly weathered, very closely to closely jointed (spacing 60 – 150 mm), red-black-orange banded, VERY HARD ROCK banded ironstone.
Zone 16,10 – 16,40m with re-cemented fractures (veining) cross-cutting bedding.

HOLE No: **VBH 1**
Sheet 1 of 2

JOB NUMBER: **104194**

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

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
VWJ-very wide spacng

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

JOINT INFILL
CLN-clean
ST-stained
CLY-clay filled
SND-sand filled
GVL-gravel filled

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



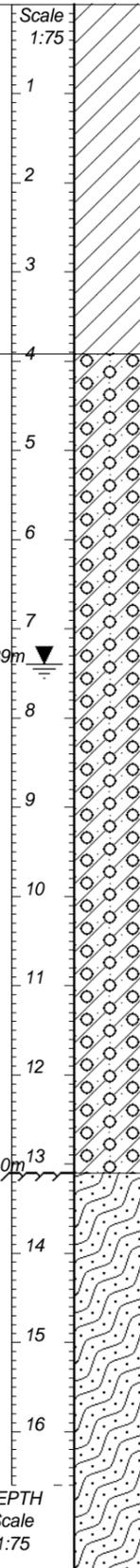
DWA
MCWAP FEASIBILITY STUDY

VLIEEPOORT
ABSTRACTION WEIR

HOLE No: **VBH 1**
Sheet 1 of 2

JOB NUMBER: **104194**

Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	SPT-N	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75	DESCRIPTION
38	0	0		13								0.00	Grey brown clay. Alluvium.
82	0	0										1	
36	0	0		35								2	
85	0	0			N/A	N/A	N/A	N/A	N/A	N/A		3	
97	0	0										4	
93	0	0										5	
100	0	0		57								6	
42	0	0										7	
36	0	0										8	
62	0	0										9	
16	6	0										10	
29	0	0		55								11	
38	0	0			N/A	N/A	N/A	N/A	N/A	N/A		12	
42	0	0		12								13	
0	0	0										14	
53	0	0										15	
78	22	0										16	
74	74	0	20+									17	
87	87	87										18	
69	66	0	20+?									19	
42	29	29	20+?		FG BF	2	0-10° 90°	VCJ-CJ ?	SJ SJ	ST ST		20	
89	83	10	20+									21	
												22	
												23	
												24	
												25	
												26	
												27	
												28	
												29	
												30	
												31	
												32	
												33	
												34	
												35	
												36	
												37	
												38	
												39	
												40	
												41	
												42	
												43	
												44	
												45	
												46	
												47	
												48	
												49	
												50	
												51	
												52	
												53	
												54	
												55	
												56	
												57	
												58	
												59	
												60	
												61	
												62	
												63	
												64	
												65	
												66	
												67	
												68	
												69	
												70	
												71	
												72	
												73	
												74	
												75	
												76	
												77	
												78	
												79	
												80	
												81	
												82	
												83	
												84	
												85	
												86	
												87	
												88	
												89	
												90	
												91	
												92	
												93	
												94	
												95	
												96	
												97	
												98	
												99	
												100	



0.00 Grey brown clay. Alluvium.

3.92 Sub-rounded to sub-angular, medium to coarse gravels, (diameter of 10-60mm) of HARD ROCK banded ironstone in matrix of sandy clay. Alluvium. Matrix generally lost.

7.39m

13.10 Moderately weathered, very closely to closely jointed (spacing generally <60 up to 80mm), grey brown to purple, VERY HARD ROCK occasionally to MEDIUM HARD ROCK banded ironstone. Includes minor horizons of brecciated material, also some quartz veining, possibly indicating proximity to fault. Recovered in places as angular gravel.

HOLE No: **VBH 2**
Sheet 1 of 2

JOB NUMBER: **104194**

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

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
VWJ-very wide spacng

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

JOINT INFILL
CLN-clean
ST-stained
CLY-clay filled
SND-sand filled
GVL-gravel filled

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



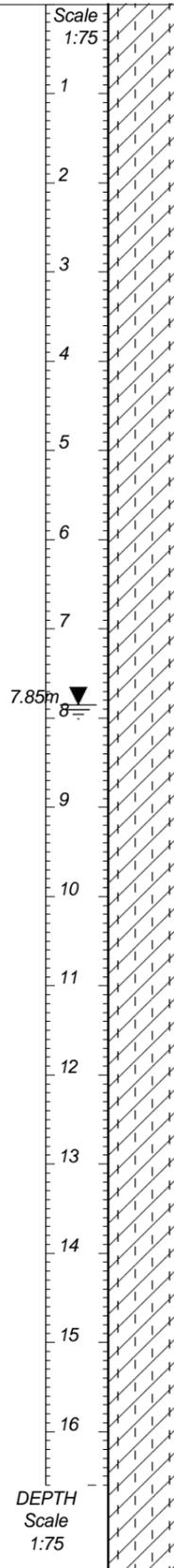
DWA
MCWAP FEASIBILITY STUDY

VLIEEPOORT
ABSTRACTION WEIR

HOLE No: **VBH 2**
Sheet 1 of 2

JOB NUMBER: **104194**

Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	SPT-N	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75
69	0	0		9								1
67	0	0		30								2
89	0	0		38								3
87	0	0		25								4
84	0	0		55								5
100	0	0		56								6
72	0	0		29	N/A	N/A	N/A	N/A	N/A	N/A		7
69	0	0		62								8
15	0	0										9
												10
												11
												12
												13
												14
												15
												16



Grey to brown, silty clay with occasional rounded gravels. Alluvium.

HOLE No: **VBH 2**
Sheet 2 of 2

JOB NUMBER: 104194

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

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

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

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

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

JOINT INFILL
CLN-clean
ST-stained
CLY-clay filled
SND-sand filled
GVL-gravel filled

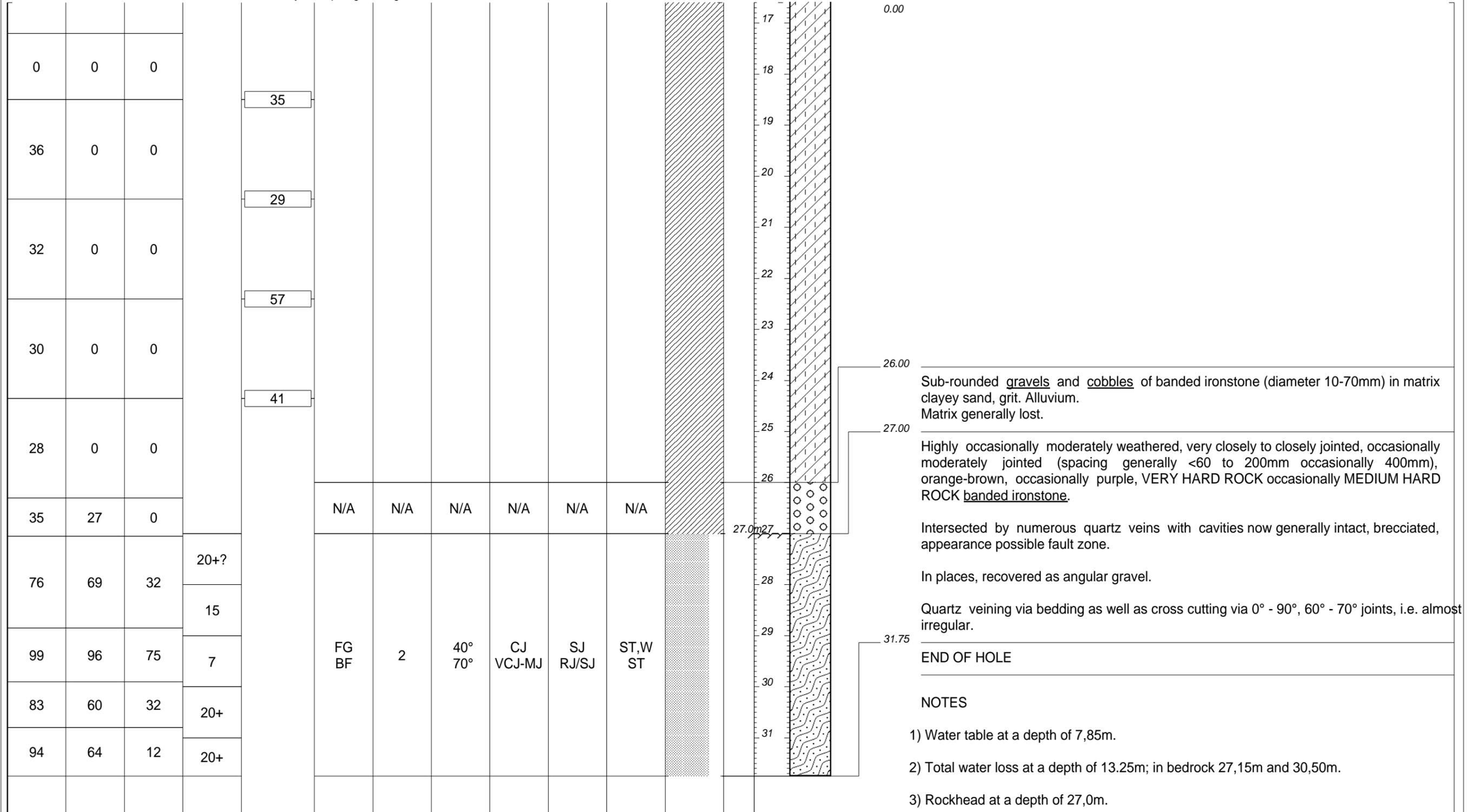


DWA
MCWAP FEASIBILITY STUDY

VLIEEPOORT
ABSTRACTION WEIR

HOLE No: **VBH 2**
Sheet 2 of 2

JOB NUMBER: 104194



- NOTES**
- 1) Water table at a depth of 7,85m.
 - 2) Total water loss at a depth of 13,25m; in bedrock 27,15m and 30,50m.
 - 3) Rockhead at a depth of 27,0m.

Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	SPT-N	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75	CONTRACTOR : DWA MACHINE : SECO 12 DRILLED BY : N.v.d Berg PROFILED BY : G.D	INCLINATION : Vertical DIAM : DATE : 2-30/04/2009 DATE : 10/06/2009	ELEVATION : X-COORD : 2 725 540 Y-COORD : -31 915
													TYPE SET BY : E.R SETUP FILE : Y.SET	DATE : 02/11/09 12:11 TEXT : ..C:\DOT5000\104194-2.DOC	

HOLE No: **VBH 2**

HOLE No: VBH3
Sheet 2 of 3

JOB NUMBER: 104194

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

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
VWJ-very wide spacng

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

JOINT INFILL
CLN-clean
ST-stained
CLY-clay filled
SND-sand filled
GVL-gravel filled

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



DWA
MCWAP FEASIBILITY STUDY

VLIEEPOORT
ABSTRACTION WEIR

HOLE No: VBH3
Sheet 2 of 3

JOB NUMBER: 104194

Material Recovery (%)	Core Recovery (%)	RQD (%)	SPT-N Is50 (D/A)	FRAC. FREQ.	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75
47	0	0										17
												17.79
24	5	0										18
39	11	0										19
13	6	0										20
3	2	0										21
3	2	0										22
3	2	0										23
8	4	0			N/A	N/A	N/A	N/A	N/A	N/A		24
9	0	0										25
11	3	0										26
												27
												28
												29
												30
												31
												32
												33

Sub-rounded medium to coarse gravels and cobbles of HARD ROCK banded ironstone (diameter 10 – 70mm). Alluvium. Matrix generally lost.

HOLE No: VBH3
Sheet 3 of 3

JOB NUMBER: 104194

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

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
VWJ-very wide spacng

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

JOINT INFILL
CLN-clean
ST-stained
CLY-clay filled
SND-sand filled
GVL-gravel filled

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



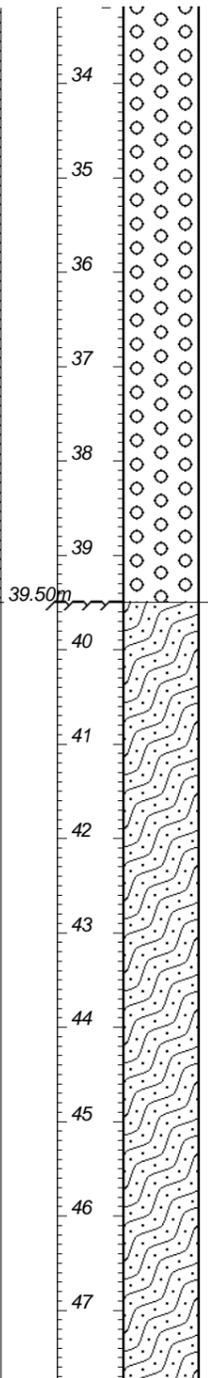
DWA
MCWAP FEASIBILITY STUDY

VLIEEPOORT
ABSTRACTION WEIR

HOLE No: VBH3
Sheet 3 of 3

JOB NUMBER: 104194

Material Recovery (%)	Core Recovery (%)	RQD (%)	SPT-N Is50 (D/A)	FRAC. FREQ.	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75	CONTRACTOR : DWA MACHINE : SECO12 DRILLED BY : N vd Berg PROFILED BY : L.M TYPE SET BY : E.R SETUP FILE : Y.SET	INCLINATION : Vertical DIAM : DATE : 04/05 – 28/07/2009 DATE : 16/10/2009 DATE : 02/11/09 12:10 TEXT : ..C:\DOT5000\104194-3.DOC	ELEVATION : X-COORD : 2725525 Y-COORD : -31990
26	11	0													
24	6	0													
23	9	0													
137	29	0													
19	7	0													
39	28	11		20+								39.50m			
57	22	0		13											
13	5	0		20+											
49	16	0		20+											
63	45	31		12	FG BF	2	0-10° 50-70°	VCJ-CJ VCJ	SJ SJ	ST ST					
30	21	0		16											
27	13	0		20+											
				11											
				17											



Highly, occasionally moderately weathered, very closely to closely jointed (<60 – 180mm), greyish purple to red brown, VERY HARD ROCK occasionally MEDIUM HARD ROCK banded ironstone.

Recovered as coarse, sub-angular gravel at places.

END OF HOLE

NOTES

- 1) Rockhead / bedrock at 39,50m.
- 2) Water table at a depth of 7,19m.

HOLE No: VBH3

HOLE No: **VBH 5**
Sheet 1 of 3

JOB NUMBER: **104194**

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

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
VWJ-very wide spacng

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

JOINT INFILL
CLN-clean
ST-stained
CLY-clay filled
SND-sand filled
GVL-gravel filled

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



DWA
MCWAP FEASIBILITY STUDY

VLIEEPOORT
ABSTRACTION WEIR

HOLE No: **VBH 5**
Sheet 1 of 3

JOB NUMBER: **104194**

Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	SPT-N	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75	DESCRIPTION
41	0	0										0.00	Moist, dark grey-brown, <u>clay</u> . Alluvium.
60	0	0										1	
93	0	0										2	
					N/A	N/A	N/A	N/A	N/A	N/A		3	
45	0	0										4	
22	0	0										5	
												6	6.00
50	0	0										7	Moist, brown, <u>clayey to coarse sand</u> . Alluvium.
34	0	0										8	
21	0	0										9	
					N/A	N/A	N/A	N/A	N/A	N/A		10	
38	0	0										11	
26	0	0										12	
27	0	0										13	
												14	14.00
143	0	0										15	Moist, grey-brown, <u>clay</u> . Alluvium.
22	0	0										16	
					N/A	N/A	N/A	N/A	N/A	N/A		17	

HOLE No: **VBH 5**
Sheet 3 of 3

JOB NUMBER: **104194**

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

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
VWJ-very wide spacng

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

JOINT INFILL
CLN-clean
ST-stained
CLY-clay filled
SND-sand filled
GVL-gravel filled

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



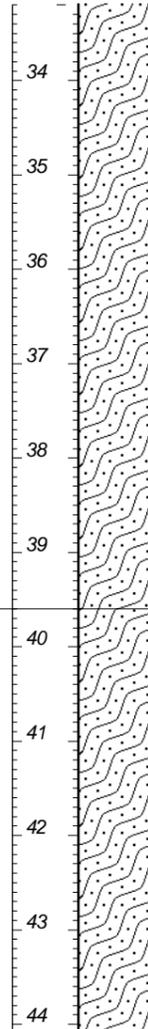
DWA
MCWAP FEASIBILITY STUDY

VLIEEPOORT
ABSTRACTION WEIR

HOLE No: **VBH 5**
Sheet 3 of 3

JOB NUMBER: **104194**

Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	SPT-N	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75	CONTRACTOR : WEPPELMAN MACHINE : SECO 12 DRILLED BY : WILLEM PROFILED BY : G.D TYPE SET BY : E.R SETUP FILE : Y.SET	INCLINATION : 60° DIAM : DATE : 20/02 - 14/03/2009 DATE : 10/06/2009 DATE : 02/11/09 12:11 TEXT : ..C:\DOT5000\104194-2.DOC	ELEVATION : X-COORD : 2 725 480 Y-COORD : -32 040
84	80	0	?									34			
111	100	100										35			
38	38	31	?									36			
75	63	23										37			
83	19	0			FG	2	50-60°	VCJ/CJ	SJ	ST		38			
110	42	0	?		MF/FF		90°	VCJ/?	SJ	ST		39			
53	14	0										40			
98	88	0	?									41			
85	31	0										42			
93	56	0										43			
133	133	0	?									44			
78	35	18										44.21			
81	72	45	?												
28	13	0													
103	58	0	?												
92	92	92													
131	131	72	15												
53	53	15													
100	77	0	20+		FG	1	40-50°	VCJ/CJ	SJ	ST					
103	103	44			BF										
82	82	58	8												
102	102	43													
123	123	77	10												
106	106	98													
79	79	79													



Highly to completely weathered, very closely to closely jointed (spacing generally <60mm occasionally up to 100mm), orange brown, HARD ROCK to SOFT ROCK 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.

Moderately weathered, closely jointed occasionally very closely jointed, grey and purple 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.

HOLE No: **VBH 5**

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

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

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

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

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

JOINT INFILL
CLN-clean
ST-stained
CLY-clay filled
SND-sand filled
GVL-gravel filled



DWA
MCWAP FEASIBILITY STUDY

VLIEEPOORT
ABSTRACTION WEIR

HOLE No: **VBH 6**
Sheet 1 of 2

JOB NUMBER: **104194**

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 ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75	Description
46	0	0											0.00	Dark brown, silty to sandy <u>clay</u> with sand lenses/horizons. Alluvium.
433	0	0											1	
22	0	0											2	
83	0	0											3	
62	0	0											4	
92	0	0											5	
67	0	0											6	
80	0	0											7	
80	0	0											8	
94	0	0											9	
60	0	0											10	
33	0	0											11	
36	0	0											12	
43	0	0											13	
192	0	0											14	
107	0	0											15	
98	0	0											16	
89	0	0											17	
69	8	0											18	
93	0	0											19	
90	0	0											20	
64	44	0											21	
													22	
													23	
													24	
													25	
													26	
													27	
													28	
													29	
													30	
													31	
													32	
													33	
													34	
													35	
													36	
													37	
													38	
													39	
													40	
													41	
													42	
													43	
													44	
													45	
													46	
													47	
													48	
													49	
													50	
													51	
													52	
													53	
													54	
													55	
													56	
													57	
													58	
													59	
													60	
													61	
													62	
													63	
													64	
													65	
													66	
													67	
													68	
													69	
													70	
													71	
													72	
													73	
													74	
													75	
													76	
													77	
													78	
													79	
													80	
													81	
													82	
													83	
													84	
													85	
													86	
													87	
													88	
													89	
													90	
													91	
													92	
													93	
													94	
													95	
													96	
													97	
													98	
													99	
													100	

14.88

Brown, clay and sand and sub-rounded, medium to coarse gravels / angular cobbles of banded ironstone, with some quartz.
(Cobble and gravel horizon between 15,75 – 16,73 m)
Alluvium.

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

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

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

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

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

JOINT INFILL
CLN-clean
ST-stained
CLY-clay filled
SND-sand filled
GVL-gravel filled



**DWA
MCWAP FEASIBILITY STUDY**

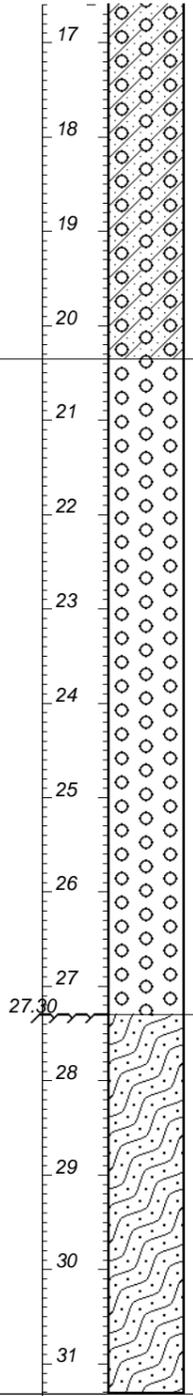
**VLIEEPOORT
ABSTRACTION WEIR**

HOLE No: **VBH 6**
Sheet 2 of 2

JOB NUMBER: 104194

DEPTH (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 ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75	CONTRACTOR : WEPPELMAN	INCLINATION : VERTICAL	ELEVATION :
31		4	0														
32		0	0														
-38		10	0														
55		0	0														
71		3	0														
100		76	31														
3		3	1														
45		32	0														
20		10	0														
23		16	16														
0		0	0														
73		55	0														
103		74	0														
33		29	0														
63		39	22														
58		22	0														
78		39	0														
130		130	130														
83		83	38														
95		105	57														
105		105	57														
113		113	65														
83		83	0														
142		142	83														
113		113	43														
178		178	178														
77		77	57														
148		148	148														
78		78	0														

N=REF



20.35
Angular to sub-rounded gravels and cobbles of moderately to highly weathered, very hard rock to hard rock, banded ironstone. Partly cemented (FeO), generally iron stained. Origin uncertain, possible rubble from palaeo – fault?, possible fault zone or alluvium. Note: pockets of clayey stain and wad (possible remnant of dolomite – now weathered?)

27.30
27.30
Moderately weathered, closely jointed (spacing 60 – 250 mm), purple to grey, VERY HARD ROCK, banded ironstone.
Prominent staining, weathered laminations to 31,0m.
Some evidence of dislocation via 50-60° joints, now re-cemented. Possible nearby fault?

31.32
END OF HOLE

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 ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75	CONTRACTOR : WEPPELMAN	INCLINATION : VERTICAL	ELEVATION :
														MACHINE : Seco	DIAM :	X-COORD : 2 725 508
														DRILLED BY : Willem	DATE : 16/03/2009 – 27/03/2009	Y-COORD : -32 066
														PROFIED BY : G.D	DATE : 03/06/2009	
														TYPE SET BY : C.A	DATE : 02/11/09 12:08	
														SETUP FILE : Y.SET	TEXT : ..C:\DOT5000\104194-1.DOC	

HOLE No: **VBH 6**

HOLE No: **VBH 7**
Sheet 2 of 2

JOB NUMBER: 104194

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

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

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

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

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

JOINT INFILL
CLN-clean
ST-stained
CLY-clay filled
SND-sand filled
GVL-gravel filled



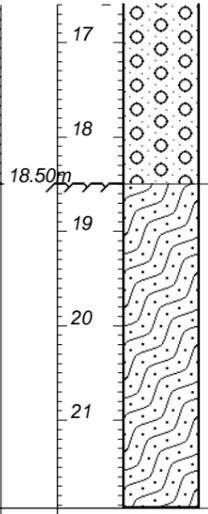
**DWA
MCWAP FEASIBILITY STUDY**

**VLIEEPOORT
ABSTRACTION WEIR**

HOLE No: **VBH 7**
Sheet 2 of 2

JOB NUMBER: 104194

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 ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75	CONTRACTOR : WEPPELMAN MACHINE : SECO DRILLED BY : Willem PROFILED BY : G.D TYPE SET BY : E.R SETUP FILE : Y.SET	INCLINATION : Vertical DIAM : DATE : 28/03 – 02/04/2009 DATE : 10/06/2009 DATE : 02/11/09 12:11 TEXT : ..C:\DOT5000\104194-2.DOC	ELEVATION : X-COORD : 2 725 511 Y-COORD : -32 095
47	0	0										17			
95	45	0										18			
93	93	37										18.50			
80	80	0										19			
85	85	0										20			
96	96	0										21			
105	103	0	>20		FG	2	40°	CJ	SJ	St,Sa		21.93			
139	139	21	>20		BF		50°	MJ/WJ	SJ	St,CLY					
140	140	55													
98	98	0	11												
122	122	100													
71	71	71													
												END OF HOLE			
												NOTES			
												1) Rockhead at 18,50m.			



Moderately weathered, closely to very closely jointed (spacing up to 200mm, generally <100mm), grey to purple, **EXTREMELY HARD ROCK banded ironstone**.

Minor material losses likely ascribed to washing of joint infill.

HOLE No: **VBH 7**

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

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
VWJ-very wide spacng

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

JOINT INFILL
CLN-clean
ST-stained
CLY-clay filled
SND-sand filled
GVL-gravel filled

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



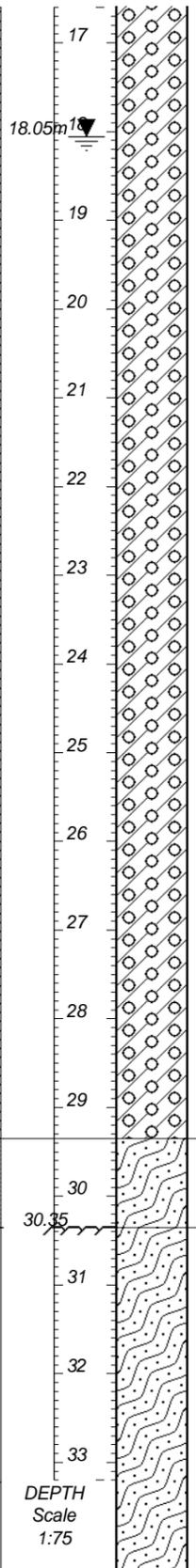
DWA
MCWAP FEASIBILITY STUDY

VLIEEPOORT
ABSTRACTION WEIR

HOLE No: **VBH 8**
Sheet 2 of 3

JOB NUMBER: 104194

Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75
13	0	0									
64	40	0									
60	53	0									
120	120	90									
90	53	0									
27	5	0		N/A	N/A	N/A	N/A	N/A	N/A		
97	25	0									
36	6	0									
38	22	0									
27	0	0									
14	0	0									
27	0	0									
18	0	0									
71	0	0									
103	87	39		FG BF	1	40°	VCJ	S	St,FeO		
57	16	0									
139	69	0									
61	56	32									
163	163	134		FG BF	2	45-55° 40-50°	CJ CJ	SJ RJ/SJ	St min		
100	100	98									



29.35
Highly to completely weathered, very closely to closely jointed, (completely fractured), grey to brown, MEDIUM HARD to SOFT ROCK, banded ironstone. In places weathered to FeO, HARD ROCK, almost hardpan. Traversed by veins of green mineralization. Upper horizon of weathered bedrock.
30.35

HOLE No: **VBH 8**
Sheet 3 of 3

JOB NUMBER: 104194

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

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

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

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

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

JOINT INFILL
CLN-clean
ST-stained
CLY-clay filled
SND-sand filled
GVL-gravel filled



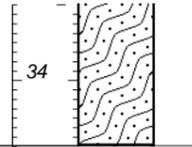
**DWA
MCWAP FEASIBILITY STUDY**

**VLIEEPOORT
ABSTRACTION WEIR**

HOLE No: **VBH 8**
Sheet 3 of 3

JOB NUMBER: 104194

Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75
101	101	93									34
											34.69



Moderately to highly weathered, closely to medium jointed (spacing 100 – 400 mm), dark grey to brown, MEDIUM HARD ROCK, (SOFT ROCK in places), banded ironstone.

Green mineralization via 40 -50° joint (but irregular), associated with evidence of dislocation /fault slippage via bedding, suggests evidence of faulting in proximity?

ROCK becomes VERY HARD from 34m.

END OF HOLE

NOTES

- 1) Rockhead at a depth of 30,35 m.
- 2) Water table at a depth of 18,05m.
- 3) Water pressure (lugeon) tests conducted - but unable to maintain pressure due to leakage via rockmass.

CONTRACTOR : WEPPELMAN	INCLINATION : VERTICAL	ELEVATION :
MACHINE : D 90 R	DIAM :	X-COORD : 2 725 460
DRILLED BY : STUMI/WILLIAM	DATE : 03/04/2009 - 07/05/2009	Y-COORD : -32 090
PROFILED BY : G.D	DATE : 03/06/2009	
TYPE SET BY : C.A	DATE : 02/11/09 12:08	
SETUP FILE : Y.SET	TEXT : ..C:\DOT5000\104194-1.DOC	

HOLE No: **VBH 8**

HOLE No: **VBH DAM1**
Sheet 1 of 1

JOB NUMBER: **104194**

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

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

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

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

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

JOINT INFILL
CLN-clean
ST-stained
CLY-clay filled
SND-sand filled
GVL-gravel filled



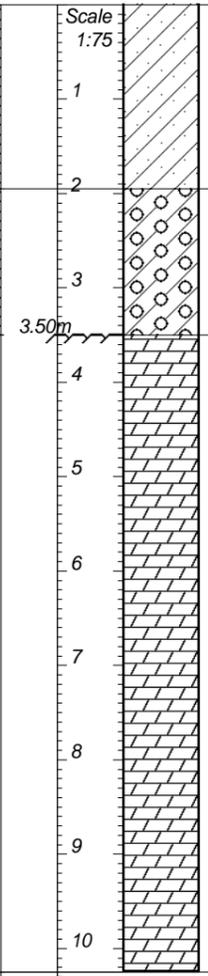
DWA
MCWAP FEASIBILITY STUDY

VLIEEPOORT
BALANCING DAM

HOLE No: **VBH DAM1**
Sheet 1 of 1

JOB NUMBER: **104194**

DEPTH (m)	DIAM (mm)	RQD (%)	FRAC. (mm)	SPT-N	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGHNESS	JOINT FILLING	WEATHERING	DESCRIPTION
54	0	0										Moist, red-brown, <u>sandy clay</u> . Colluvium.
82	0	0										N=REF
67	0	0										
35	22	0										Sub-angular <u>gravels</u> and <u>cobbles</u> of banded ironstone, dolomite in matrix of <u>clay</u> . Colluvium.
72	58	37										Moderately to highly weathered (leached), very closely to medium jointed, light grey to blue-grey, VERY HARD ROCK, fractured (brecciated) <u>dolomite</u> . Zones of brecciated re-cemented rock 1,35 – 4,60m; 4,95 – 5,20m; 9,60 – 10,00m. Note: Largely recovered as angular gravel, partly ascribed to drill action on fractured rock. Prominently stained joints with remnant infill of red-brown gravelly clay, represents possible seepage paths /voids).
99	99	95		3								
70	64	38		16								
173	147	104		12								
80	72	19		20+	FG MF	2	20-40° 80-90°	VCJ/MJ VCJ/?	RJ/SJ St	ST,CL St		
111	95	28		20+								
133	95	24		20+								
67	36	0		20+								
100	65	18		20+								



NOTES

1) Rockhead at 3,50m.

Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	SPT-N	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75	CONTRACTOR : WEPPELMAN MACHINE : TONE TAZZ DRILLED BY : Serdorf PROFILED BY : G.D TYPE SET BY : E.R SETUP FILE : Y.SET	INCLINATION : Vertical DIAM : TNW DATE : 28/03 – 30/03/2009 DATE : 10/06/2009 DATE : 02/11/09 12:11 TEXT : ..C:\DOT5000\104194-2.DOC	ELEVATION : X-COORD : 2 722 607 Y-COORD : -31 295
-----------------------	-------------------	---------	-------------	-------	-----------------------	------------------	--------------------	---------------	-----------------	---------------	------------	------------------	---	---	---

HOLE No: **VBH DAM1**

HOLE No: **VBH DAM2**
Sheet 1 of 1

JOB NUMBER: **104194**

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

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

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

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

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

JOINT INFILL
CLN-clean
ST-stained
CLY-clay filled
SND-sand filled
GVL-gravel filled



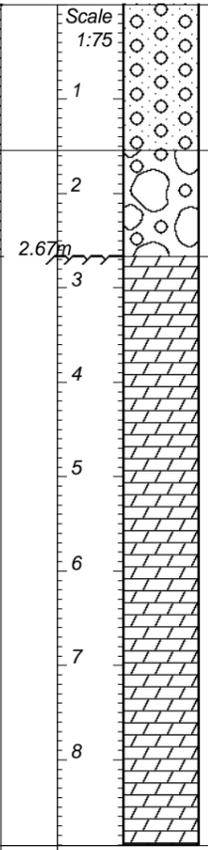
DWA
MCWAP

VLIEEPOORT
BALANCING DAM

HOLE No: **VBH DAM2**
Sheet 1 of 1

JOB NUMBER: **104194**

DEPTH (m)	Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGHNESS	JOINT FILLING	WEATHERING	DESCRIPTION						
33	19	19										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). Colluvium.						
42	0	0			N/A	N/A	N/A	N/A	N/A	N/A	N/A							
108	64	21		6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Angular <u>gravels</u> , <u>cobbles</u> and <u>boulders</u> up to 800 mm of whitish, leached chert, stained reddish brown along fractures and joints. In places, partly re-cemented chert breccia. Dolomite residuum.						
97	97	72		10	FG MF	3	80-90° 60-70° 20-30°	CJ MJ MJ	SJ RJ RJ	CI CI,St CI,St		Slightly weathered, closely to medium jointed (spacing between 100 – 300 mm), light grey, <u>VERY HARD ROCK</u> , <u>dolomite</u> .						
71	71	0																Recemented breccia in places, especially between 2,67 – 2,85 m.
82	76	76		9														Prominent fracturing between 4,83 – 5,05 m, 7,10 – 7,20 m and 8,20 – 8,30 m.
97	97	85		7														
122	122	56		13														
100	100	77		9														
96	92	73																
111	111	69																
96	88	84																
8.91												END OF HOLE						



NOTES

1) 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 ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75	CONTRACTOR : WEPPELMAN MACHINE : Seco DRILLED BY : William PROFILED BY : G.D & C.A TYPE SET BY : C.A SETUP FILE : Y.SET	INCLINATION : VERTICAL DIAM : 63MM DATE : 27/03/2009 DATE : 03/06/2009 DATE : 02/11/09 12:08 TEXT : ..C:\DOT5000\104194-1.DOC	ELEVATION : X-COORD : 2 722 474 Y-COORD : -31 726
-----------------------	-------------------	---------	-------------	-----------------------	------------------	--------------------	---------------	-----------------	---------------	------------	------------------	--	--	---

HOLE No: **VBH DAM2**

HOLE No: **VBH DAM3**
Sheet 1 of 1

JOB NUMBER: **104194**

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

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
VWJ-very wide spacng

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

JOINT INFILL
CLN-clean
ST-stained
CLY-clay filled
SND-sand filled
GVL-gravel filled

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



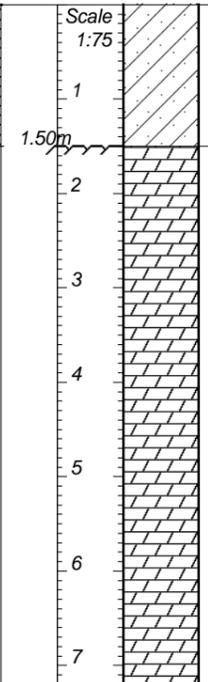
**DWA
MCWAP FEASIBILITY STUDY**

**VLIEEPOORT
BALANCING DAM**

HOLE No: **VBH DAM3**
Sheet 1 of 1

JOB NUMBER: **104194**

Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75	DESCRIPTION
											0.00	Moist, red-brown, <u>clay</u> to <u>sandy clay</u> with angular gravels (diameter of 20 – 50mm) of banded ironstone. Colluvium.
											1.50m	Slightly weathered, (slightly leached), closely to medium jointed, (spacing generally 80 – 250mm), grey to light grey, VERY HARD ROCK to EXTREMELY HARD ROCK <u>dolomite</u> .
											7.24	END OF HOLE
												NOTES
												1) Rockhead at a depth of 1,50m.
												2) Water loss approximately 20%.



CONTRACTOR : WEPPELMAN
MACHINE : TONE TAZZ
DRILLED BY : SEEDORF
PROFILED BY : G.D
TYPE SET BY : E.R
SETUP FILE : Y.SET

INCLINATION : Vertical
DIAM : TNW
DATE : 23/03/2009
DATE : 10/06/2009
DATE : 02/11/09 12:11
TEXT : ..C:\DOT5000\104194-2.DOC

ELEVATION :
X-COORD : 2 723 110
Y-COORD : -31 482

HOLE No: **VBH DAM3**

HOLE No: **VBH DAM 4**
Sheet 1 of 1

JOB NUMBER: 104194

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

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

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

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

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

JOINT INFILL
CLN-clean
ST-stained
CLY-clay filled
SND-sand filled
GVL-gravel filled



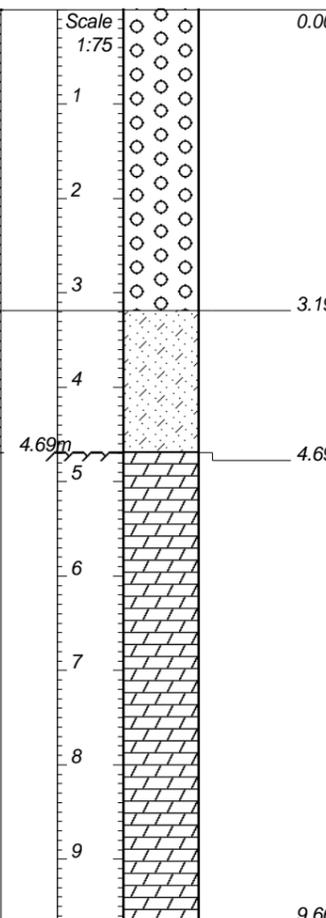
DWA
MCWAP

VLIEEPOORT
BALANCING DAM

HOLE No: **VBH DAM 4**
Sheet 1 of 1

JOB NUMBER: 104194

DEPTH (m)	Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGHNESS	JOINT FILLING	WEATHERING	DESCRIPTION
10	0	0										Angular, medium to coarse <u>gravels</u> of banded ironstones (with chert gravels below 2,50 m). Matrix presumed washed away. Colluvium.
48	0	0										
34	0	0			N/A	N/A	N/A	N/A	N/A	N/A		
18	0	0										
26	0	0										
67	0	0										
98	98	98										
32	23	0			N/A	N/A	N/A	N/A	N/A	N/A		Angular to sub-angular, <u>cobbles</u> (diameter of 60 – 200 mm) of whitish, leached chert and red-brown, <u>clayey sand</u> matrix (only recovered between 4,00 – 4,45m, the remainder is lost). Dolomite residuum.
65	6	0		17								
150	150	0										
81	81	62		8								Slightly weathered, close to medium jointed, (spacing between 100 – 250 mm), grey, VERY HARD ROCK, <u>dolomite</u> .
109	109	38										
59	51	0										Brecciated but recemented in places between 6,19 – 7,50 m (via 70° joints).
84	84	49		13								Prominent weathering along some joints, particularly at 8,40m (via 70°) also 9,25 – 9,40m.
111	108	97		12	FG MF	3	80-90° 60-70° 30-40°	VCJ-? MJ -	RJ RJ/SJ ST	St,Clfilm St,Clfilm St,Clfilm		Minor cavities at 7,00m and 7,35m.
100	100	58										
90	90	52		12								
95	95	25										
108	90	24										
												END OF HOLE



0.00 Angular, medium to coarse gravels of banded ironstones (with chert gravels below 2,50 m).
Matrix presumed washed away.
Colluvium.

3.19

4.69 Angular to sub-angular, cobbles (diameter of 60 – 200 mm) of whitish, leached chert and red-brown, clayey sand matrix (only recovered between 4,00 – 4,45m, the remainder is lost).
Dolomite residuum.

4.69

6.19 Brecciated but recemented in places between 6,19 – 7,50 m (via 70° joints).

8.40 Prominent weathering along some joints, particularly at 8,40m (via 70°) also 9,25 – 9,40m.

9.66 END OF HOLE

- NOTES
- 1) Rockhead at 4,69m.
 - 2) Water loss approximately 50%.

Material Recovery (%)	Core Recovery (%)	RQD (%)	FRAC. FREQ.	ROCK FABRIC AND GRAIN	JOINT NO OF SETS	JOINT INCLIN (deg)	JOINT SPACING	JOINT ROUGHNESS	JOINT FILLING	WEATHERING	DEPTH Scale 1:75	CONTRACTOR : WEPPELMAN MACHINE : D 90 R DRILLED BY : William PROFILED BY : G.D TYPE SET BY : C.A SETUP FILE : Y.SET	INCLINATION : VERTICAL DIAM : 63MM DATE : 14-16/05/2009 DATE : 03/06/2009 DATE : 02/11/09 12:08 TEXT : ..C:\DOT5000\104194-1.DOC	ELEVATION : X-COORD : 2 723 191 Y-COORD : -31 790
-----------------------	-------------------	---------	-------------	-----------------------	------------------	--------------------	---------------	-----------------	---------------	------------	------------------	--	---	---

HOLE No: **VBH DAM 4**