

Appendix I: Borehole Drilling Logs

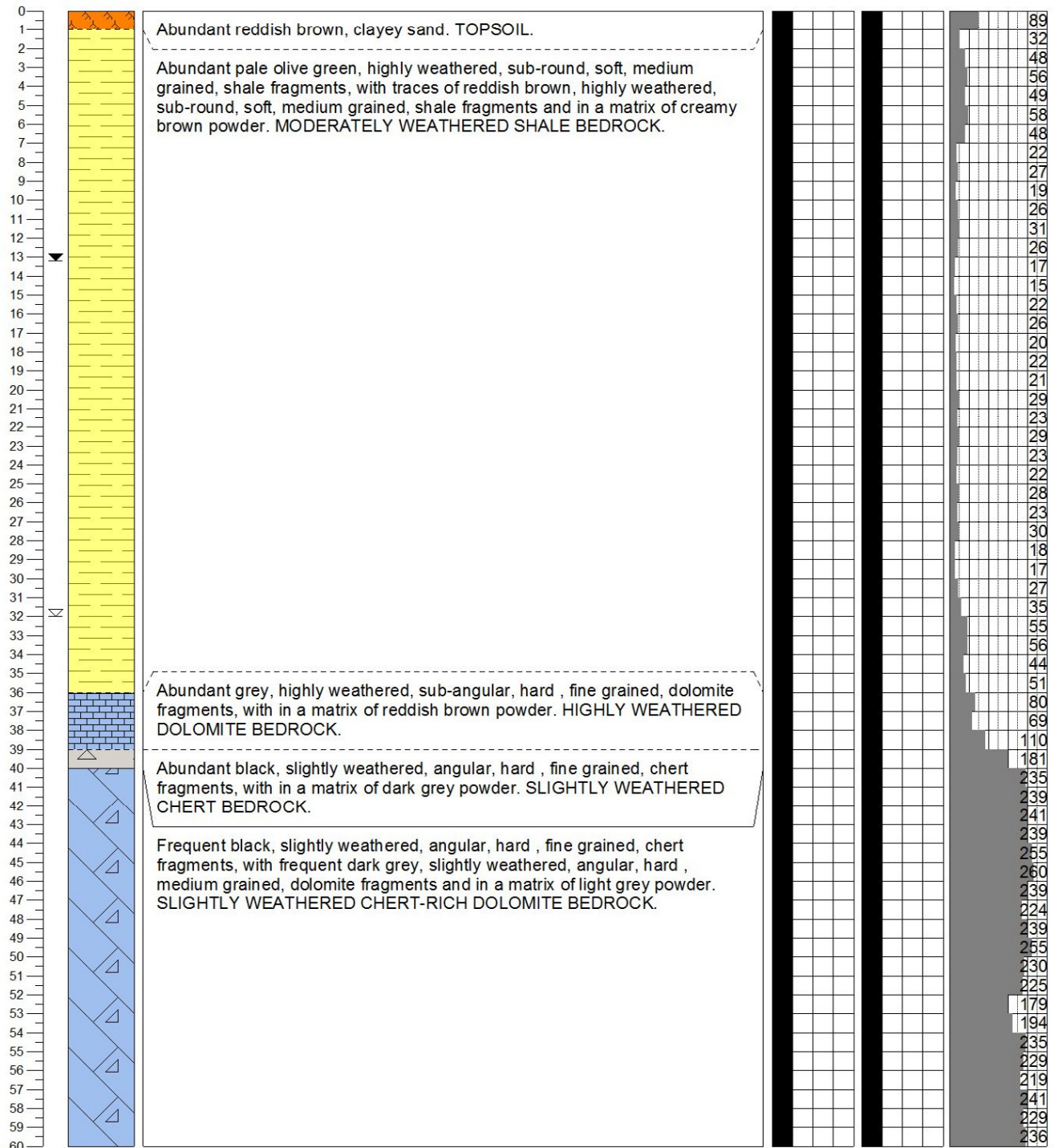
PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73871° S	BOREHOLE NO.:	FA4 17
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.01893° E	DATE DRILLED:	10/09/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1378 mamsl	DATE LOGGED:	17/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	Pieter Pretorius

Depth Lithology Description (m)

Air loss
None Slightly Medium Total

Sample Penetration recovery rates (sec.)
Good Medium Poor None 60 120 180 240 300



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Notes:

Drilling stopped after 21m of solid dolomite bedrock, at 60m.

Water added: 1 - 2, 36 - 37, 38 - 39.

Irregular hammer rates: 0 - 1, 1 - 2, 5 - 6, 10 - 11, 16 - 17, 19 - 20, 21 - 22.

No excessive water.

PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73871° S	BOREHOLE NO.:	FA4 22
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.01893° E	DATE DRILLED:	10/08/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1378 mamsl	DATE LOGGED:	10/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	Pieter Pretorius

Depth Lithology Description (m)

Depth (m)	Lithology Description	Air loss			Sample Penetration recovery rates (sec.)		
		None	Slightly	Total	Good	Poor	None
0	Abundant light reddish brown, sandy gravel. TOPSOIL.						21
1							16
2							13
3	Abundant brownish white, silt, with frequent light pale brown, highly weathered, sub-round, soft, coarse grained, shale fragments and frequent reddish brown, highly weathered, sub-round, soft, coarse grained, shale fragments and traces of pale olive green, highly weathered, sub-round, soft, coarse grained, shale fragments. HIGHLY WEATHERED SHALE BEDROCK.						18
4							17
5							20
6							15
7							12
8							14
9							17
10	Equal amounts of light pale brown, highly weathered, sub-round, soft, coarse grained, shale fragments, with equal amounts of reddish chocolate brown, highly weathered, sub-round, soft, coarse grained, shale fragments and in a matrix of brownish white powder. MODERATELY WEATHERED SHALE BEDROCK.						29
11							26
12							21
13							19
14							23
15							24
16							24
17							28
18							36
19							29
20							36
21							39
22							76
23							63
24							70
25							69
26							70
27							59
28	Abundant light grey, blotched white, moderately weathered, sub-angular, hard, fine grained, dolomite fragments, with traces of white, moderately weathered, sub-angular, hard, fine grained, dolomite fragments and in a matrix of brownish grey powder. MODERATELY WEATHERED DOLOMITE BEDROCK.						48
29							72
30							119
31							166
32							123
33							138
34	Abundant dark grey, moderately weathered, sub-angular, hard, fine grained, dolomite fragments, with traces of black, moderately weathered, sub-angular, hard, fine grained, chert fragments and in a matrix of light grey powder. MODERATELY WEATHERED CHERT-POOR DOLOMITE BEDROCK.						90
35							110
36							121
37							129
38							136
39	Abundant black, moderately weathered, angular, hard, fine grained, chert fragments, with traces of grey, moderately weathered, sub-angular, hard, fine grained, dolomite fragments and in a matrix of light grey powder. MODERATELY WEATHERED CHERT-RICH DOLOMITE BEDROCK.						121
40							135
41							123
42							130
43							135
44	Abundant black, slightly weathered, angular, hard, fine grained, chert fragments, with frequent light grey, slightly weathered, sub-angular, hard, medium grained, dolomite fragments and in a matrix of light grey powder. SLIGHTLY WEATHERED CHERT-RICH DOLOMITE BEDROCK.						181
45							166
46							178
47							182
48							239
49							195
50	Abundant light grey, slightly weathered, sub-angular, hard, fine grained, dolomite fragments, with in a matrix of light grey powder. SLIGHTLY WEATHERED DOLOMITE BEDROCK.						182
51							191
52							226
53							
54							
55							
56							
57							
58							
59							
60							



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Notes:

Drilling stopped after 10m of solid dolomite bedrock.

Water added: 30 - 31, 45 - 46, 46 - 47.

Irregular hammer rates: 30 - 31, 32 - 33, 35 - 36, 10 - 11, 40 - 41, 42 - 43, 44 - 45.

No excessive water.

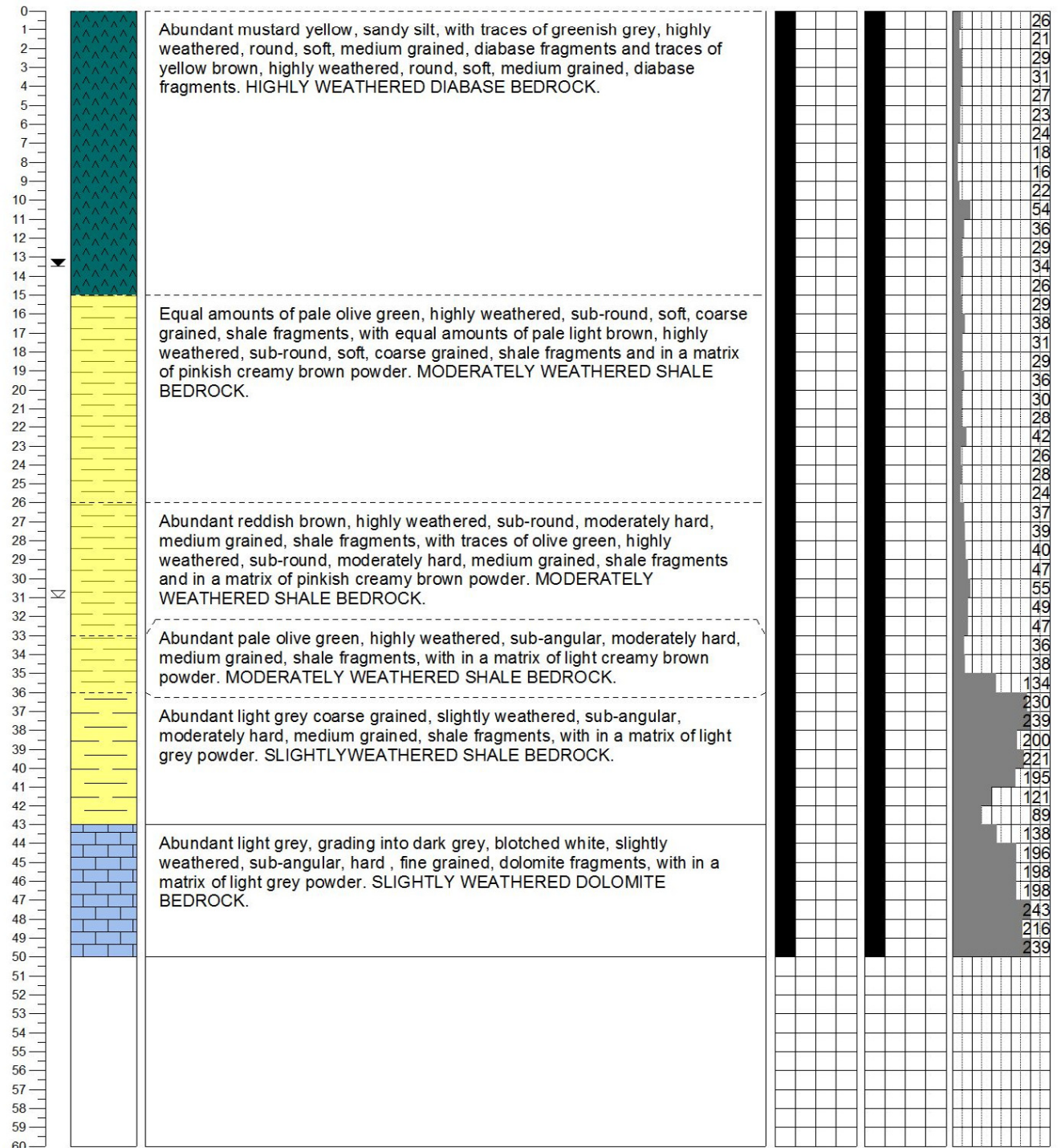
PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73892° S	BOREHOLE NO.:	FA4 23
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.02167° E	DATE DRILLED:	17/08/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1382 mamsl	DATE LOGGED:	17/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	Pieter Pretorius

Depth Lithology Description (m)

Air loss
None
Slightly
Medium
Total

Sample Penetration recovery rates (sec.)
Good
Medium
Poor
None
60
120
180
240
300



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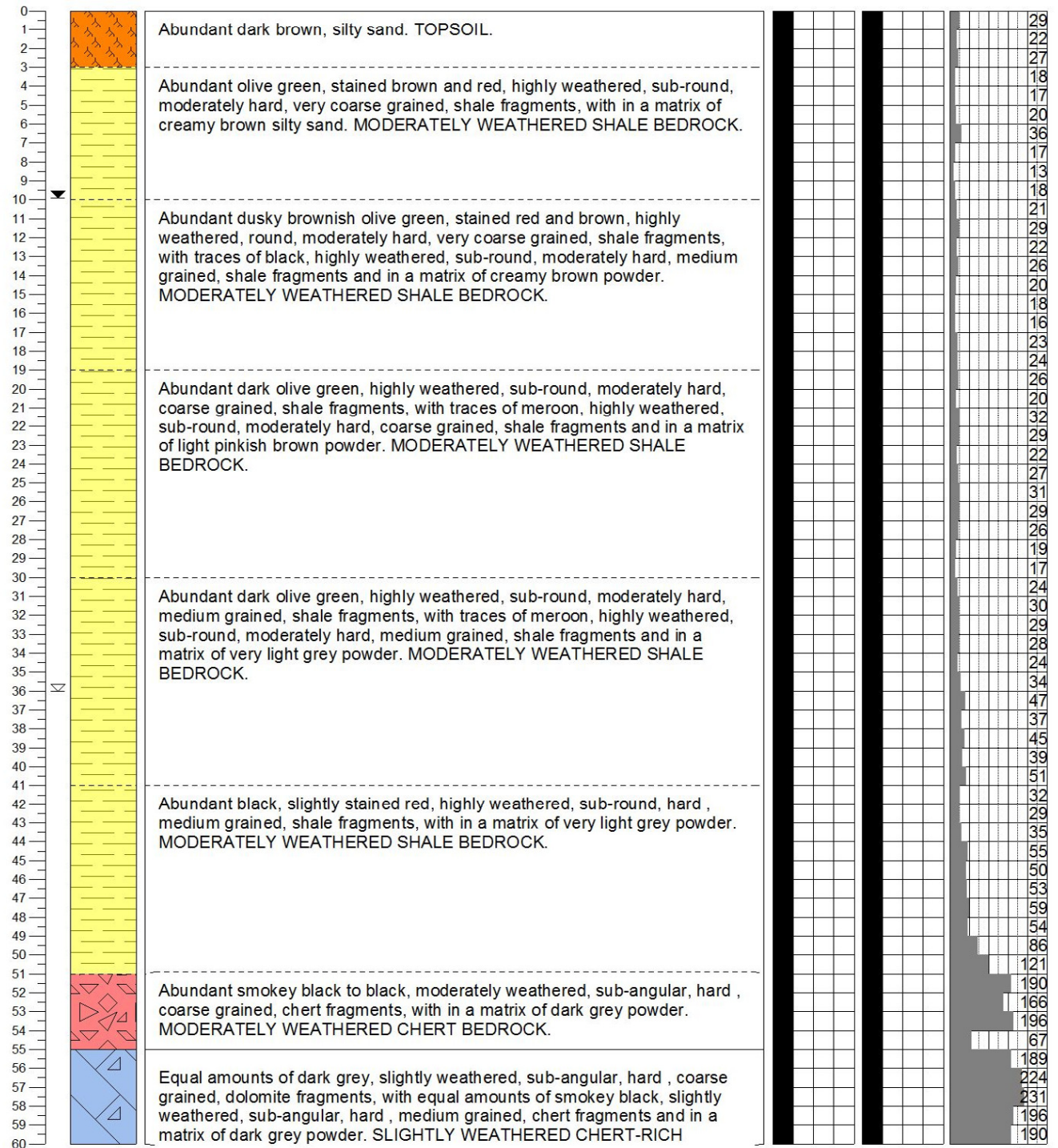
Notes: Drilling stopped after 6m of competent dolomite bedrock.
No water added.
Irregular hammer rates: 0 - 1, 35 - 36, 42 - 43, 10 - 11.
None excessive water encountered.

PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73875° S	BOREHOLE NO.: FA4 25	
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.02532° E	DATE DRILLED:	17/08/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1372 mamsl	DATE LOGGED:	17/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	P Pretorius and H Kgole

Depth (m)	Lithology Description
0.00	0.00
0.05	0.05
0.10	0.10
0.15	0.15
0.20	0.20
0.25	0.25
0.30	0.30
0.35	0.35
0.40	0.40
0.45	0.45
0.50	0.50
0.55	0.55
0.60	0.60
0.65	0.65
0.70	0.70
0.75	0.75
0.80	0.80
0.85	0.85
0.90	0.90
0.95	0.95
1.00	1.00
1.05	1.05
1.10	1.10
1.15	1.15
1.20	1.20
1.25	1.25
1.30	1.30
1.35	1.35
1.40	1.40
1.45	1.45
1.50	1.50
1.55	1.55
1.60	1.60
1.65	1.65
1.70	1.70
1.75	1.75
1.80	1.80
1.85	1.85
1.90	1.90
1.95	1.95
2.00	2.00
2.05	2.05
2.10	2.10
2.15	2.15
2.20	2.20
2.25	2.25
2.30	2.30
2.35	2.35
2.40	2.40
2.45	2.45
2.50	2.50
2.55	2.55
2.60	2.60
2.65	2.65
2.70	2.70
2.75	2.75
2.80	2.80
2.85	2.85
2.90	2.90
2.95	2.95
3.00	3.00
3.05	3.05
3.10	3.10
3.15	3.15
3.20	3.20
3.25	3.25
3.30	3.30
3.35	3.35
3.40	3.40
3.45	3.45
3.50	3.50
3.55	3.55
3.60	3.60
3.65	3.65
3.70	3.70
3.75	3.75
3.80	3.80
3.85	3.85
3.90	3.90
3.95	3.95
4.00	4.00
4.05	4.05
4.10	4.10
4.15	4.15
4.20	4.20
4.25	4.25
4.30	4.30
4.35	4.35
4.40	4.40
4.45	4.45
4.50	4.50
4.55	4.55
4.60	4.60
4.65	4.65
4.70	4.70
4.75	4.75
4.80	4.80
4.85	4.85
4.90	4.90
4.95	4.95
5.00	5.00
5.05	5.05
5.10	5.10
5.15	5.15
5.20	5.20
5.25	5.25
5.30	5.30
5.35	5.35
5.40	5.40
5.45	5.45
5.50	5.50
5.55	5.55
5.60	5.60
5.65	5.65
5.70	5.70
5.75	5.75
5.80	5.80
5.85	5.85
5.90	5.90
5.95	5.95
6.00	6.00
6.05	6.05
6.10	6.10
6.15	6.15
6.20	6.20
6.25	6.25
6.30	6.30
6.35	6.35
6.40	6.40
6.45	6.45
6.50	6.50
6.55	6.55
6.60	6.60
6.65	6.65
6.70	6.70
6.75	6.75
6.80	6.80
6.85	6.85
6.90	6.90
6.95	6.95
7.00	7.00
7.05	7.05
7.10	7.10
7.15	7.15
7.20	7.20
7.25	7.25
7.30	7.30
7.35	7.35
7.40	7.40
7.45	7.45

Air loss		Sample recovery	Penetration rates (sec.)
None	Good	60	
Slightly	Medium	120	
Medium	Poor	180	
Total	None	240	
		300	



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Notes:

Drilling stopped after 60m of drilling.

No water added.

Irregular hammer rates: 53 - 54.

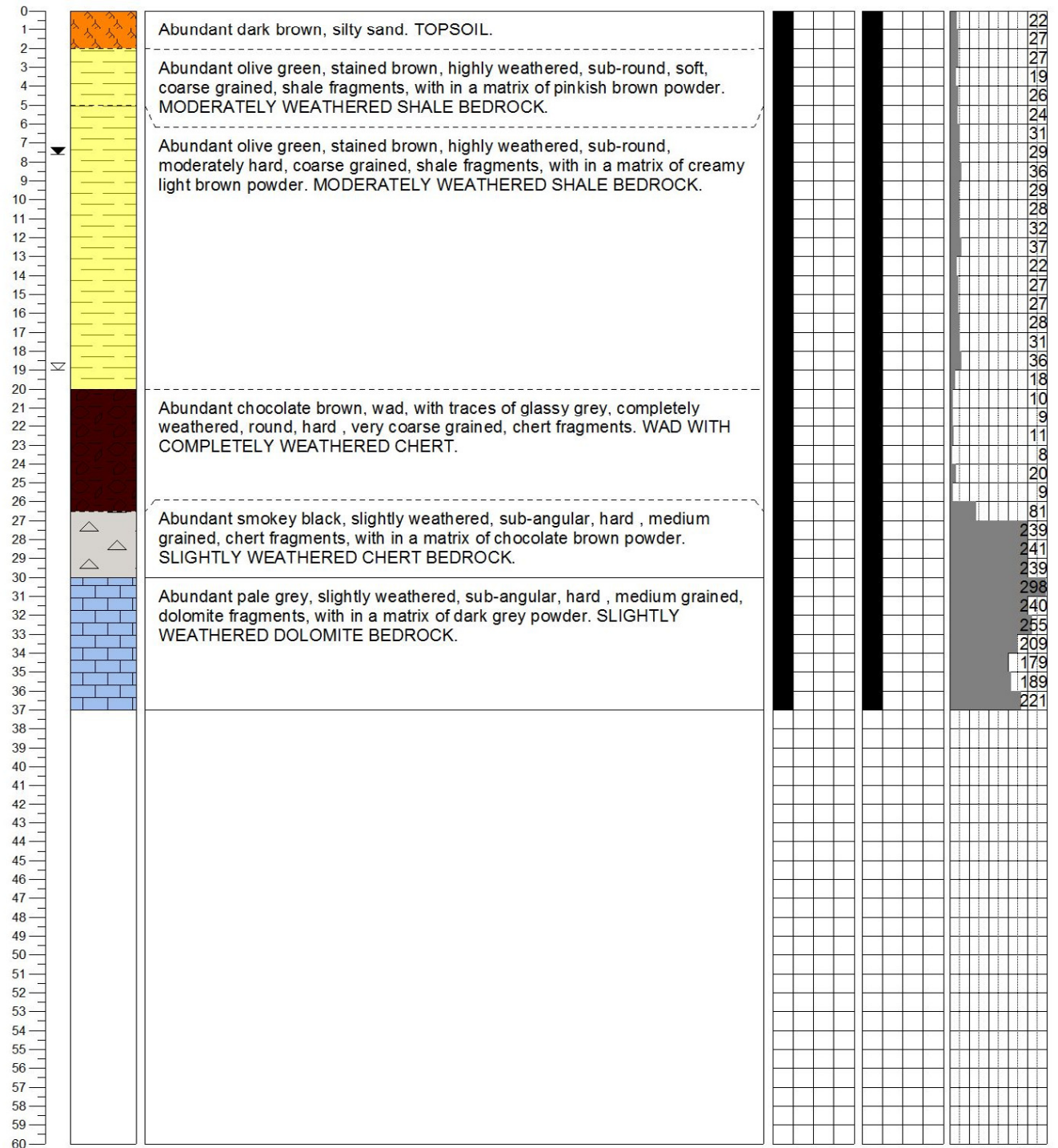
None excessive water encountered.

PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73812° S	BOREHOLE NO.: FA4 27	
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.02447° E	DATE DRILLED:	17/08/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1373 mamsl	DATE LOGGED:	17/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	P Pretorius and H Kgole

Depth (m)	Lithology Description
0.00	Surface
0.05	Topsoil
0.10	Subsoil
0.15	Gravelly sand
0.20	Sandy silt
0.25	Clayey silt
0.30	Clay
0.35	Shale
0.40	Siltstone
0.45	Sandstone
0.50	Gravelly sand
0.55	Sandy silt
0.60	Clayey silt
0.65	Clay
0.70	Shale
0.75	Siltstone
0.80	Sandstone
0.85	Gravelly sand
0.90	Sandy silt
0.95	Clayey silt
1.00	Clay
1.05	Shale
1.10	Siltstone
1.15	Sandstone
1.20	Gravelly sand
1.25	Sandy silt
1.30	Clayey silt
1.35	Clay
1.40	Shale
1.45	Siltstone
1.50	Sandstone
1.55	Gravelly sand
1.60	Sandy silt
1.65	Clayey silt
1.70	Clay
1.75	Shale
1.80	Siltstone
1.85	Sandstone
1.90	Gravelly sand
1.95	Sandy silt
2.00	Clayey silt
2.05	Clay
2.10	Shale
2.15	Siltstone
2.20	Sandstone
2.25	Gravelly sand
2.30	Sandy silt
2.35	Clayey silt
2.40	Clay
2.45	Shale
2.50	Siltstone
2.55	Sandstone
2.60	Gravelly sand
2.65	Sandy silt
2.70	Clayey silt
2.75	Clay
2.80	Shale
2.85	Siltstone
2.90	Sandstone
2.95	Gravelly sand
3.00	Sandy silt
3.05	Clayey silt
3.10	Clay
3.15	Shale
3.20	Siltstone
3.25	Sandstone
3.30	Gravelly sand
3.35	Sandy silt
3.40	Clayey silt
3.45	Clay
3.50	Shale
3.55	Siltstone
3.60	Sandstone
3.65	Gravelly sand
3.70	Sandy silt
3.75	Clayey silt
3.80	Clay
3.85	Shale
3.90	Siltstone
3.95	Sandstone
4.00	Gravelly sand
4.05	Sandy silt
4.10	Clayey silt
4.15	Clay
4.20	Shale
4.25	Siltstone
4.30	Sandstone
4.35	Gravelly sand
4.40	Sandy silt
4.45	Clayey silt
4.50	Clay
4.55	Shale
4.60	Siltstone
4.65	Sandstone
4.70	Gravelly sand
4.75	Sandy silt
4.80	Clayey silt
4.85	Clay
4.90	Shale
4.95	Siltstone
5.00	Sandstone
5.05	Gravelly sand
5.10	Sandy silt
5.15	Clayey silt
5.20	Clay
5.25	Shale
5.30	Siltstone
5.35	Sandstone
5.40	Gravelly sand
5.45	Sandy silt
5.50	Clayey silt
5.55	Clay
5.60	Shale
5.65	Siltstone
5.70	Sandstone
5.75	Gravelly sand
5.80	Sandy silt
5.85	Clayey silt
5.90	Clay
5.95	Shale
6.00	Siltstone
6.05	Sandstone
6.10	Gravelly sand
6.15	Sandy silt
6.20	Clayey silt
6.25	Clay
6.30	Shale
6.35	Siltstone
6.40	Sandstone
6.45	Gravelly sand
6.50	Sandy silt
6.55	Clayey silt
6.60	Clay
6.65	Shale
6.70	Siltstone
6.75	Sandstone
6.80	Gravelly sand
6.85	Sandy silt
6.90	Clayey silt
6.95	Clay
7.00	Shale
7.05	Siltstone
7.10	Sandstone
7.15	Gravelly sand
7.20	Sandy silt
7.25	Clayey silt
7.30	Clay
7.35	Shale
7.40	Siltstone
7.45	Sandstone
7.50	Gravelly sand
7.55	Sandy silt
7.60	Clayey silt
7.65	Clay
7.70	Shale
7.75	Siltstone
7.80	Sandstone

Air loss				Sample recovery		Penetration rates (sec.)						
None	Slightly	Medium	Total	Good	Medium	Poor	None	60	120	180	240	300



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Notes:

Drilling stopped after 7m of slightly weathered dolomite.

Water added: 31 - 32, 32 - 33, 33 - 34, 34 - 35.

Very irregular hammer rates: 0 - 1, 19 - 20, 20 - 21, 10 - 11, 24 - 25, 26 - 27.

None excessive water encountered.

PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73855° S	BOREHOLE NO.:	FA4 28
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.02377° E	DATE DRILLED:	17/08/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1369 mamsl	DATE LOGGED:	17/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	P Pretorius and H Kgole

Depth Lithology Description (m)

Depth (m)	Lithology Description	Air loss			Sample Penetration recovery rates (sec.)		
		None	Slightly	Total	Good	Poor	None
0	Abundant redish dark brown, sand gravel. TOPSOIL.						27
1							29
2							29
3							22
4	Abundant pale olive green, stained brown and meroon, highly weathered, sub-round, moderately hard, fine grained, shale fragments, with in a matrix of pale reddish brown powder. MODERATELY WEATHERED SHALE BEDROCK.						19
5							17
6							26
7							16
8							12
9							14
10							17
11	Abundant dark olive green, stained yellow and meroon, highly weathered, sub-round, moderately hard, fine grained, shale fragments, with traces of meroon, stained yellow, highly weathered, sub-round, moderately hard, fine grained, s fragments and in a matrix of light creamy brown powder. MODERATELY WEATHERED SHALE BEDROCK.						38
12							21
13							25
14							29
15							36
16							32
17							29
18							36
19							25
20							28
21	Abundant olive green, stained yellow, black and meroon, highly weathered, sub-round, moderately hard, very coarse grained, shale fragments, with traces of brown, stained yellow, highly weathered, sub-round, moderately hard, medium grained, shale fragments and in a matrix of pinkish light brown powder. MODERATELY WEATHERED SHALE BEDROCK.						18
22							31
23							19
24							22
25							35
26							34
27							27
28							31
29							28
30							29
31	Equal amounts of olive green, stained yellow, black and meroon, highly weathered, sub-round, hard , very coarse grained, shale fragments, with equal amounts of brown, stained meroon, highly weathered, sub-round, hard , very coarse grained, shale fragments and in a matrix of very light grey powder. MODERATELY WEATHERED SHALE BEDROCK.						31
32							28
33							43
34							31
35							39
36							28
37	Abundant black, stained brown and meroon, highly weathered, sub-round, hard , very coarse grained, shale fragments, with in a matrix of dark grey powder. MODERATELY WEATHERED SHALE BEDROCK.						38
38							36
39							47
40							40
41	Abundant black, stained brown and meroon, highly weathered, sub-round, hard , very coarse grained, shale fragments, with traces of black, highly weathered, sub-angular, hard , medium grained, chert fragments in a matrix of dark grey powder. MODERATELY WEATHERED SHALE BEDROCK.						58
42							61
43							88
44							221
45	Abundant dark grey dolomite, slightly weathered, sub-angular, hard , medium grained, dolomite fragments, with in a matrix of grey powder. SLIGHTLY WEATHERED DOLOMITE BEDROCK.						239
46							241
47							226
48							236
49							110
50							235
51							241
52							220
53							189
54							219
55							220
56							
57							
58							
59							
60							



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Notes:

Drilling stopped after 6m of slightly weathered dolomite.

No water added.

Irregular hammer rates: 42 - 43, 44 - 45, 49 - 50, 10 - 11.

None excessive water encountered.

PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73946° S	BOREHOLE NO.:	FA4 30
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.02047° E	DATE DRILLED:	18/08/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1381 mamsl	DATE LOGGED:	18/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	P Pretorius and H Kgole

Depth Lithology Description (m)

Depth (m)	Lithology Description	Air loss			Sample Penetration recovery rates (sec.)		
		None	Slightly	Total	Good	Poor	None
0	Abundant dark reddish brown, sand. TOPSOIL.						52
1							28
2							26
3	Abundant reddish brown, silty sand, with traces of black and yellow, completely weathered, round, soft, medium grained, diabase fragments. HIGHLY WEATHERED DIABASE BEDROCK.						55
4							36
5							29
6							47
7	Abundant pale olive green, blotched red and black, highly weathered, round, moderately hard, coarse grained, diabase fragments, with in a matrix of dark red clayey sand. MODERATELY WEATHERED DIABASE BEDROCK.						22
8							27
9							24
10							29
11	Abundant dark grey, highly weathered, sub-angular, hard, very coarse grained, diabase fragments, with traces of brown and grey, stained brown, highly weathered, sub-angular, hard, coarse grained, diabase fragments and in a matrix of light grey powder. MODERATELY WEATHERED DIABASE BEDROCK.						34
12							50
13							61
14							33
15							63
16							119
17							40
18							49
19							53
20							61
21	Abundant pale olive green, highly weathered, sub-round, hard, coarse grained, shale fragments, with in a matrix of dark brown powder. MODERATELY WEATHERED SHALE BEDROCK.						40
22							39
23							40
24							39
25	Abundant light and dark brown, highly weathered, sub-round, hard, coarse grained, shale fragments, with traces of pale olive green, highly weathered, sub-round, hard, coarse grained, shale fragments and in a matrix of light yellow brown powder. MODERATELY WEATHERED SHALE BEDROCK.						59
26							55
27							46
28							42
29							46
30							59
31							44
32							28
33							32
34							29
35							32
36							42
37							32
38	Equal amounts of pale olive brown, highly weathered, sub-round, hard, medium grained, shale fragments, with equal amounts of greenish grey, highly weathered, sub-round, hard, medium grained, fragments and equal amounts of light olive to aqua green, highly weathered, sub-round, hard, medium grained, fragments and in a matrix of creamy yellow brown. MODERATELY WEATHERED SHALE BEDROCK.						36
39							22
40							59
41							63
42							86
43							70
44							72
45							63
46							220
47	Abundant light to dark grey with light and dark grey patches, slightly weathered, sub-angular, hard, medium grained, dolomite fragments, with traces of milky white, slightly weathered, sub-angular, hard, medium grained, quartzite fragments and in a matrix of grey powder. SLIGHTLY WEATHERED DOLOMITE BEDROCK.						204
48							194
49							216
50							202
51							221
52							
53							
54							
55							
56							
57							
58							
59							
60							



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Notes:

- Drilling stopped after 6m of slightly weathered dolomite.
- No water added.
- Irregular hammer rates: 0 - 1, 12 - 13, 16 - 17, 10 - 11.
- None excessive water encountered.

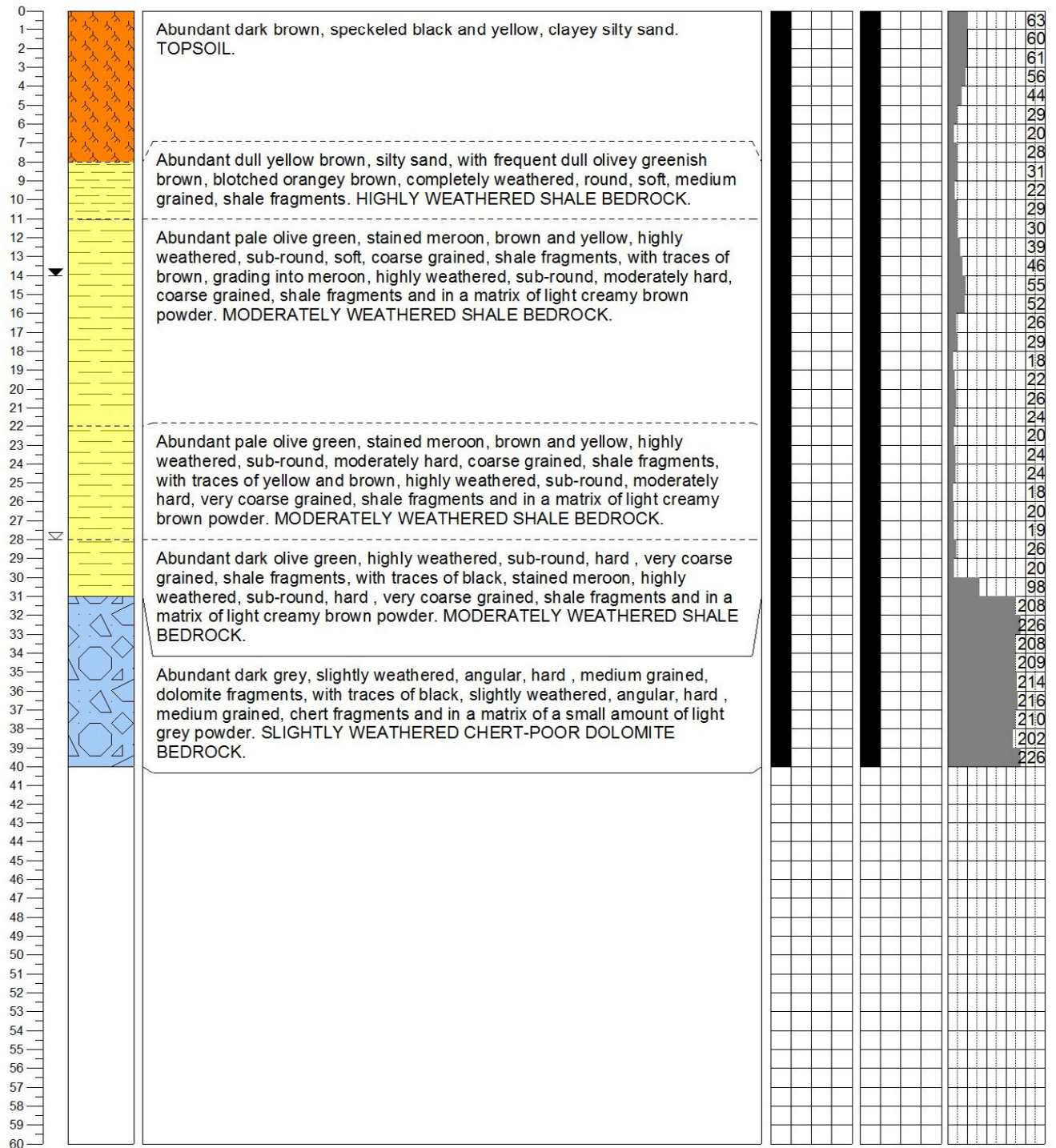
PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73894° S	BOREHOLE NO.:	FA4 31
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.02055° E	DATE DRILLED:	18/08/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1387 mamsl	DATE LOGGED:	18/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	P Pretorius and H Kgole

Depth Lithology Description (m)

Air loss
None Slightly Medium Total

Sample Penetration recovery rates (sec.)
Good Medium Poor None 60 120 180 240 300



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Notes:

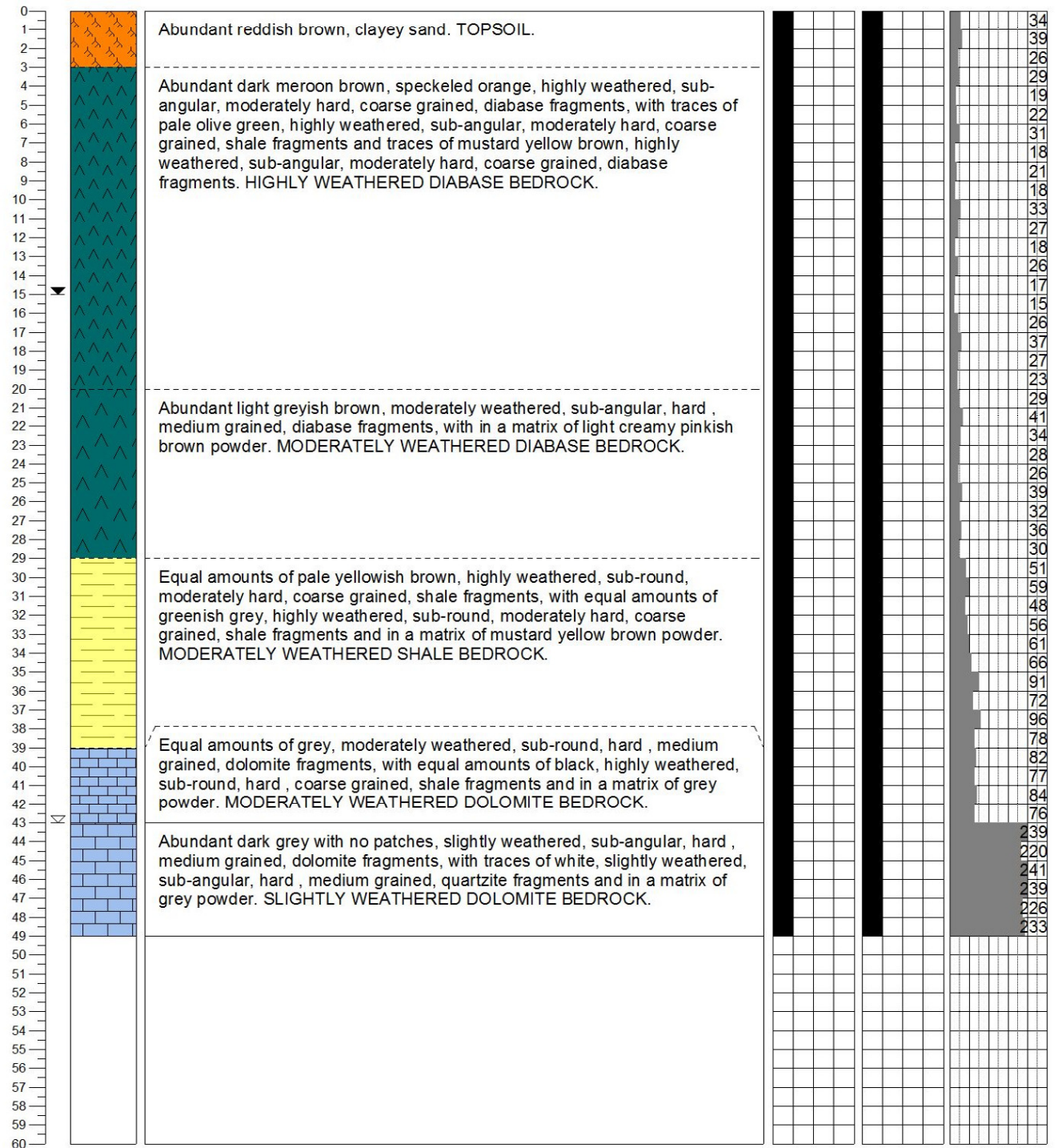
- Drilling stopped after 9.
- No water added.
- Irregular hammer rates: 30 - 31.
- High amounts of water encountered.

PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73823° S	BOREHOLE NO.: FA4 35	
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.01968° E	DATE DRILLED:	19/08/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1382 mamsl	DATE LOGGED:	19/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	P Pretorius and H Kgole

Depth (m)	Lithology Description
0.00	0.00
0.05	0.05
0.10	0.10
0.15	0.15
0.20	0.20
0.25	0.25
0.30	0.30
0.35	0.35
0.40	0.40
0.45	0.45
0.50	0.50
0.55	0.55
0.60	0.60
0.65	0.65
0.70	0.70
0.75	0.75
0.80	0.80
0.85	0.85
0.90	0.90
0.95	0.95
1.00	1.00
1.05	1.05
1.10	1.10
1.15	1.15
1.20	1.20
1.25	1.25
1.30	1.30
1.35	1.35
1.40	1.40
1.45	1.45
1.50	1.50
1.55	1.55
1.60	1.60
1.65	1.65
1.70	1.70
1.75	1.75
1.80	1.80
1.85	1.85
1.90	1.90
1.95	1.95
2.00	2.00
2.05	2.05
2.10	2.10
2.15	2.15
2.20	2.20
2.25	2.25
2.30	2.30
2.35	2.35
2.40	2.40
2.45	2.45
2.50	2.50
2.55	2.55
2.60	2.60
2.65	2.65
2.70	2.70
2.75	2.75
2.80	2.80
2.85	2.85
2.90	2.90
2.95	2.95
3.00	3.00
3.05	3.05
3.10	3.10
3.15	3.15
3.20	3.20
3.25	3.25
3.30	3.30
3.35	3.35
3.40	3.40
3.45	3.45
3.50	3.50
3.55	3.55
3.60	3.60
3.65	3.65
3.70	3.70
3.75	3.75
3.80	3.80
3.85	3.85
3.90	3.90
3.95	3.95
4.00	4.00
4.05	4.05
4.10	4.10
4.15	4.15
4.20	4.20
4.25	4.25
4.30	4.30
4.35	4.35
4.40	4.40
4.45	4.45
4.50	4.50
4.55	4.55
4.60	4.60
4.65	4.65
4.70	4.70
4.75	4.75
4.80	4.80
4.85	4.85
4.90	4.90
4.95	4.95
5.00	5.00
5.05	5.05
5.10	5.10
5.15	5.15
5.20	5.20
5.25	5.25
5.30	5.30
5.35	5.35
5.40	5.40
5.45	5.45
5.50	5.50
5.55	5.55
5.60	5.60
5.65	5.65
5.70	5.70
5.75	5.75
5.80	5.80
5.85	5.85
5.90	5.90
5.95	5.95
6.00	6.00
6.05	6.05
6.10	6.10
6.15	6.15
6.20	6.20
6.25	6.25
6.30	6.30
6.35	6.35
6.40	6.40
6.45	6.45
6.50	6.50
6.55	6.55
6.60	6.60
6.65	6.65
6.70	6.70
6.75	6.75
6.80	6.80
6.85	6.85
6.90	6.90
6.95	6.95
7.00	7.00
7.05	7.05
7.10	7.10
7.15	7.15
7.20	7.20
7.25	7.25
7.30	7.30
7.35	7.35
7.40	7.40
7.45	7.45

Air loss		Sample recovery	Penetration rates (sec.)
None		Good	60
Slightly		Medium	120
Medium		Poor	180
Total		None	240
			300



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Notes:

Drilling stopped after 6m of slightly weathered dolomite.

Water added: 42 - 43, 43 - 44, 45 - 46, 46 - 47, 47 - 48.

No irregular hammer rates.

Some water encountered.

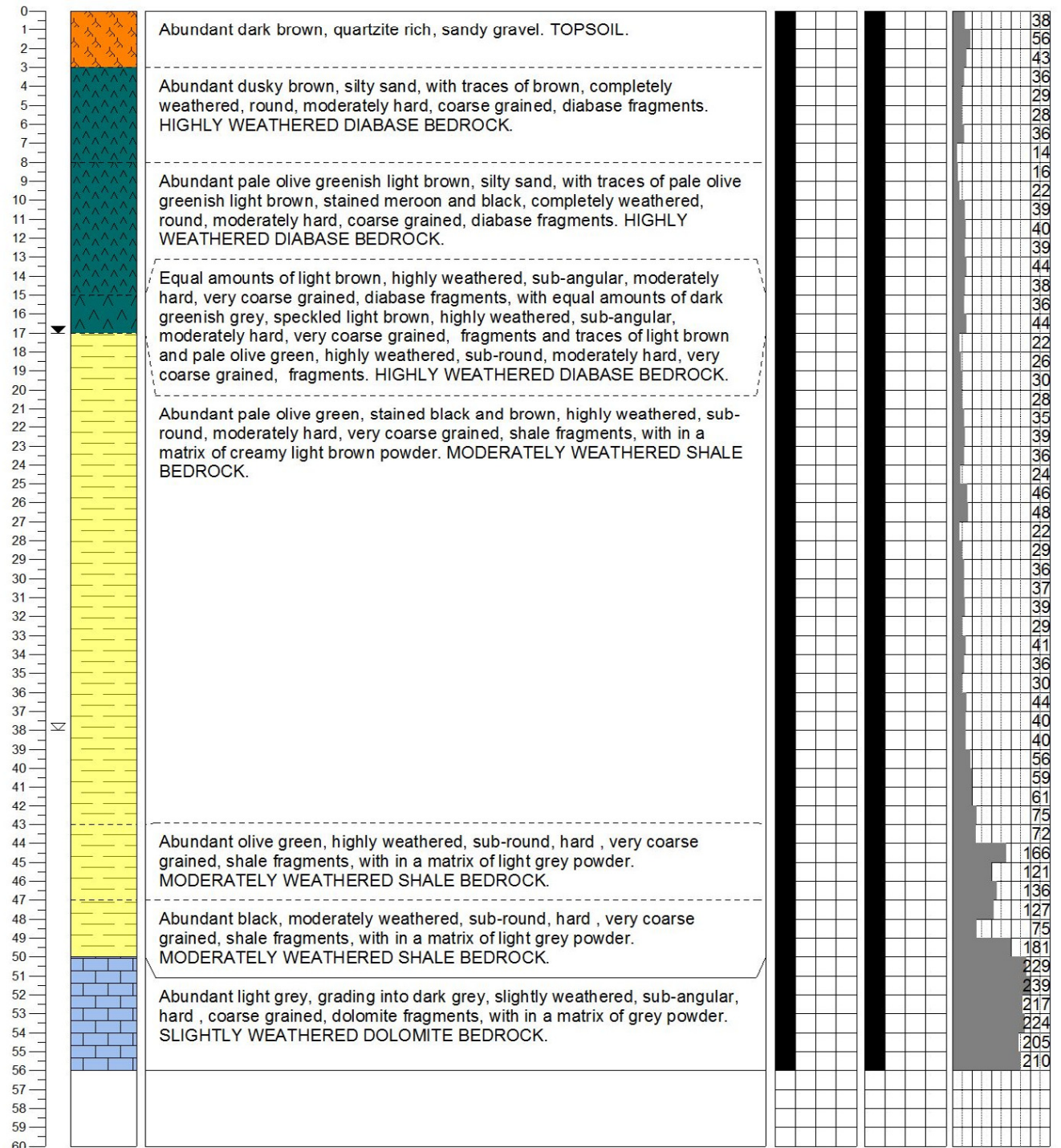
PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73772° S	BOREHOLE NO.:	FA4 36
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.01926° E	DATE DRILLED:	22/08/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1380 mamsl	DATE LOGGED:	22/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	P Pretorius and H Kgole

Depth Lithology Description (m)

Air loss
None Slightly Medium Total

Sample Penetration recovery rates (sec.)
Good Medium Poor None 60 120 180 240 300



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Notes: Drilling stopped after 7m of slightly weathered dolomite.
No water added.
Irregular hammer rates: 0 - 1, 40 - 41, 49 - 50, 10 - 11.
No excessive water encountered.

PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73734° S	BOREHOLE NO.:	FA4 38
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.0183° E	DATE DRILLED:	22/08/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1382 mamsl	DATE LOGGED:	22/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	P Pretorius and H Kgole

Depth Lithology Description (m)

Depth (m)	Lithology Description	Air loss				Sample Penetration recovery rates (sec.)			
		None	Slightly	Medium	Total	Good	Medium	Poor	None
0	Abundant dusky reddish brown, sandy gravel. TOPSOIL.								
1									
2									
3	Abundant light brown, blotched meroon and orange, silty sand, with traces of light brown, completely weathered, round, soft, coarse grained, shale fragments. COMPLETELY WEATHERED SHALE BEDROCK.								
4									
5									
6									
7									
8	Equal amounts of dark brown, stained meroon, highly weathered, sub-round, moderately hard, very coarse grained, shale fragments, with equal amounts of olive green, highly weathered, sub-round, moderately hard, very coarse grained, shale fragments and in a matrix of light creamy brown powder. HIGHLY WEATHERED SHALE BEDROCK.								
9									
10									
11									
12									
13									
14	Abundant olive green, stained brown and meroon, highly weathered, sub-round, moderately hard, very coarse grained, shale fragments, with traces of dark purple, grading into dark olive green, highly weathered, sub-round, moderately hard, very coarse grained, shale fragments and in a matrix of light creamy brown powder. HIGHLY WEATHERED SHALE BEDROCK.								
15									
16									
17									
18									
19									
20									
21									
22									
23	Abundant grey, stained meroon and yellow, highly weathered, sub-round, hard, very coarse grained, shale fragments, with in a matrix of light grey powder. HIGHLY WEATHERED SHALE BEDROCK.								
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41	Abundant black, highly weathered, sub-round, hard, very coarse grained, shale fragments, with in a matrix of dark grey powder. HIGHLY WEATHERED SHALE BEDROCK.								
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52	Abundant light grey, speckled darker grey, slightly weathered, sub-angular, hard, coarse grained, dolomite fragments, with traces of milky white, slightly weathered, sub-angular, hard, medium grained, quartz fragments and in a matrix of dark grey powder. SLIGHTLY WEATHERED DOLOMITE BEDROCK.								
53									
54									
55									
56									
57									
58	Abundant light grey, slightly weathered, sub-angular, hard, coarse grained, dolomite fragments, with frequent orangey red in a clear matrix, slightly								
59									
60									



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Notes:

Drilling stopped after 4m of slightly weathered dolomite.

No water added.

Irregular hammer rates: 0 - 1, 40 - 41, 44 - 45, 10 - 11, 52 - 53, 53 - 54.

a moderate amount of water was encountered.

PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73734° S	BOREHOLE NO.:	FA4 38
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.0183° E	DATE DRILLED:	22/08/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1382 mamsl	DATE LOGGED:	22/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	P Pretorius and H Kgole

Depth Lithology Description
(m)

Air loss
None
Slightly
Medium
Total

Sample Penetration recovery rates (sec.)
Good
Medium
Poor
None
60
120
180
240
300

weathered, sub-angular, hard, coarse grained, chert fragments and in a matrix of dark grey powder. SLIGHTLY WEATHERED CHERT-RICH DOLOMITE BEDROCK.

Abundant dark green, slightly weathered, sub-angular, hard, medium grained, diabase fragments, with in a matrix of greenish grey powder. SLIGHTLY WEATHERED DIABASE BEDROCK.



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Notes:

Drilling stopped after 4m of slightly weathered dolomite.

No water added.

Irregular hammer rates: 0 - 1, 40 - 41, 44 - 45, 10 - 11, 52 - 53, 53 - 54.

a moderate amount of water was encountered.

PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73625° S	BOREHOLE NO.:	FA4 39
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.02042° E	DATE DRILLED:	23/08/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1389 mamsl	DATE LOGGED:	23/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	P Pretorius and H Kgole

Depth Lithology Description
(m)

Depth (m)	Lithology Description	Air loss			Sample Penetration recovery rates (sec.)		
		None	Slightly	Medium	Good	Poor	None
0							
1	Abundant dark brown, silty sand, with traces of dark pinkish brown, completely weathered, round, soft, coarse grained, diabase fragments. COMPLETELY WEATHERED DIABASE BEDROCK.						49
2							34
3							36
4							29
5							28
6							35
7	Abundant creamy brown, speckled meroon, highly weathered, sub-round, moderately hard, very coarse grained, diabase fragments, with in a matrix of creamy light brown powder. HIGHLY WEATHERED DIABASE BEDROCK.						22
8							27
9							19
10							15
11	Abundant creamy pale greenish brown, highly weathered, sub-round, moderately hard, coarse grained, diabase fragments, with traces of inclusionless creamy white, slightly layered, highly weathered, sub-round, soft, very coarse grained, shale fragments and in a matrix of creamy light brown powder. HIGHLY WEATHERED DIABASE BEDROCK.						17
12							26
13							19
14							20
15							17
16							23
17							26
18	Abundant creamy greenish white, speckled red, highly weathered, sub-round, soft, very coarse grained, shale fragments, with in a matrix of white powder. MODERATELY WEATHERED SHALE BEDROCK.						18
19							15
20							15
21							23
22	Abundant creamy white, speckled balck, highly weathered, sub-round, soft, very coarse grained, shale fragments, with in a matrix of light creamy brown powder. MODERATELY WEATHERED SHALE BEDROCK.						21
23							19
24							16
25							23
26							21
27							24
28	Abundant glassy grey, highly weathered, angular, hard, coarse grained, chert fragments, with in a matrix of brown powder. HIGHLY WEATHERED CHERT.						58
29							36
30							31
31							53
32							75
33							75
34	Abundant dark glassy grey, highly weathered, sub-round, hard, coarse grained, chert fragments, with abundant chocolate brown, wad. HIGHLY WEATHERED CHERT AND DOLOMITE RESIDUUM WITH TRACES OF WAD.						60
35							76
36							80
37							73
38							116
39	Abundant light glassy grey, highly weathered, sub-angular, hard, coarse grained, chert fragments, with in a matrix of brown powder. HIGHLY WEATHERED CHERT AND DOLOMITE RESIDUUM.						63
40							87
41							71
42							121
43							79
44							76
45	Abundant glassy grey, highly weathered, sub-round, hard, coarse grained, chert fragments, with in a matrix of brown powder. HIGHLY WEATHERED CHERT AND DOLOMITE RESIDUUM.						239
46							181
47							206
48							179
49							230
50							179
51							175
52							76
53							116
54							90
55	Abundant light grey, slightly weathered, sub-angular, hard, coarse grained, dolomite fragments, with in a matrix of grey powder. SLIGHTLY WEATHERED DOLOMITE BEDROCK.						123
56							176
57							320
58							243
59							226
60							236
							260



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Notes:

Drilling stopped after 5m of slightly weathered dolomite.

Water added: 34 - 35, 40 - 41, 47 - 48.

Irregular hammer rates: 0 - 1, 23 - 24, 2 - 3, 10 - 11, 40 - 41, 43 - 44, 48 - 49, 53 - 54.

No excessive water encountered.

PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73706° S	BOREHOLE NO.:	FA4 40
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.02016° E	DATE DRILLED:	28/08/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1385 mamsl	DATE LOGGED:	28/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	P Pretorius and H Kgole

Depth Lithology Description (m)

Depth (m)	Lithology Description	Air loss				Sample Penetration recovery rates (sec.)			
		None	Slightly	Medium	Total	Good	Medium	Poor	None
0	Abundant dark brown, silty sand. TOPSOIL.								
1									
2									
3	Abundant reddish orange brown, completely weathered, round, soft, , diabase fragments, with traces of pale olive green, stained orange, highly weathered, round, soft, , shale fragments and in a matrix of orange brown silty sand. HIGHLY WEATHERED DIABASE BEDROCK.								
4									
5									
6									
7									
8	Abundant light and dark brown, speckled dark brown, highly weathered, sub-angular, soft, coarse grained, diabase fragments, with traces of pale olive green, highly weathered, sub-angular, soft, coarse grained, diabase fragments and in a matrix of light creamy brown . HIGHLY WEATHERED DIABASE BEDROCK.								
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19	Abundant creamy pale olive green, highly weathered, sub-round, soft, very coarse grained, shale fragments, with in a matrix of creamy white powder. MODERATELY WEATHERED SHALE BEDROCK.								
20									
21									
22									
23									
24									
25	Abundant creamy white, blotched black and brown, highly weathered, sub-round, soft, coarse grained, shale fragments, with in a matrix of dark reddish brown powder. MODERATELY WEATHERED SHALE BEDROCK.								
26									
27									
28									
29	Abundant glassy grey, moderately weathered, sub-angular, hard, coarse grained, chert fragments, with in a matrix of brown powder. MODERATELY WEATHERED CHERT AND DOLOMITE RESIDUUM.								
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									



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Notes:

Drilling stopped at 60 m.

No water added.

Irregular hammer rates: 21 - 25, 10 - 11, 30 - 31, 39 - 40, 45 - 46, 49 - 50,

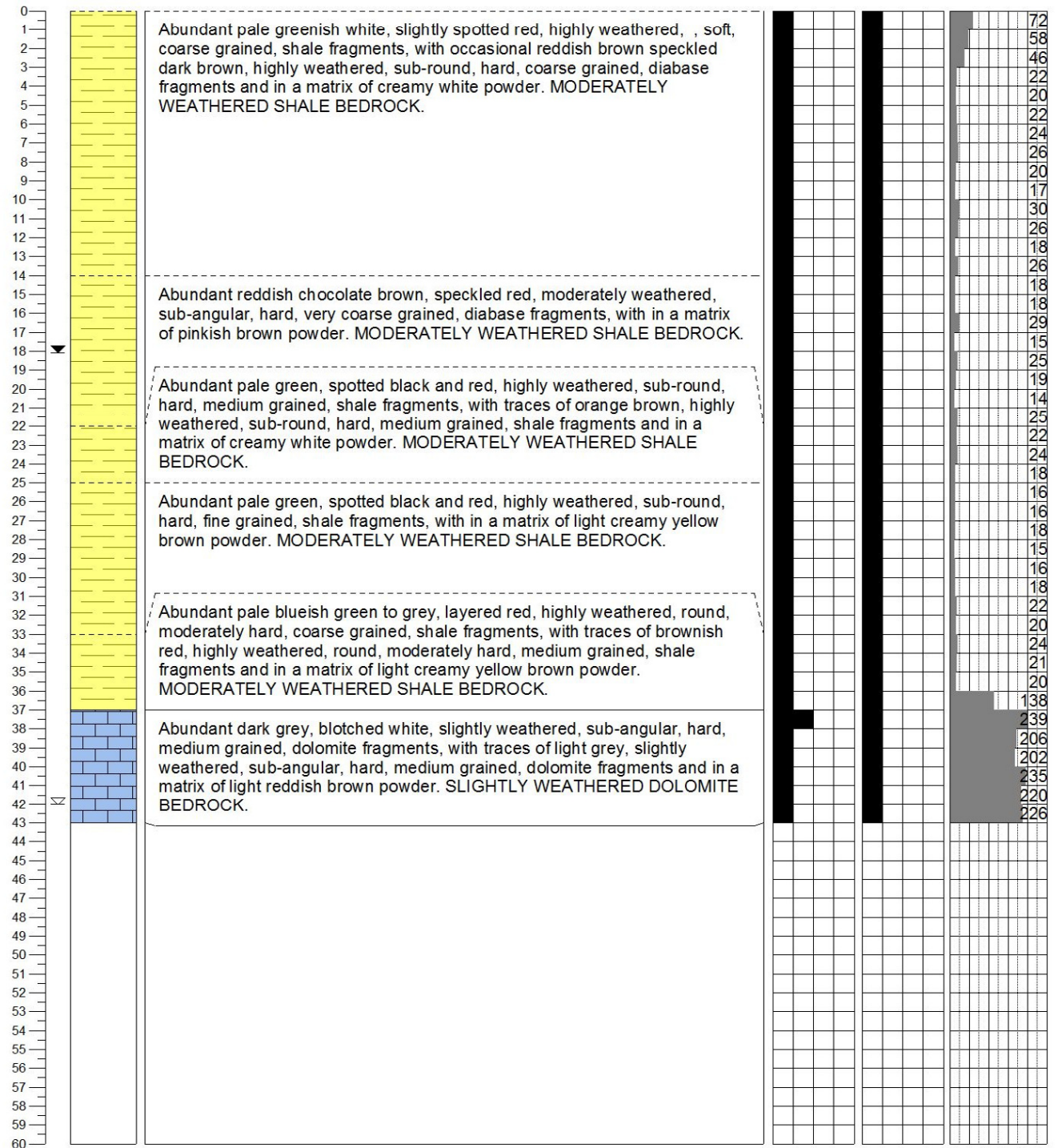
Very irregular hammer rates: 38 - 40.

PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73759° S	BOREHOLE NO.: FA4 41	
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.01984° E	DATE DRILLED:	23/08/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1386 mamsl	DATE LOGGED:	23/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	Pieter Pretorius

Depth (m)	Lithology Description
0.00	0.00
0.05	0.05
0.10	0.10
0.15	0.15
0.20	0.20
0.25	0.25
0.30	0.30
0.35	0.35
0.40	0.40
0.45	0.45
0.50	0.50
0.55	0.55
0.60	0.60
0.65	0.65
0.70	0.70
0.75	0.75
0.80	0.80
0.85	0.85
0.90	0.90
0.95	0.95
1.00	1.00
1.05	1.05
1.10	1.10
1.15	1.15
1.20	1.20
1.25	1.25
1.30	1.30
1.35	1.35
1.40	1.40
1.45	1.45
1.50	1.50
1.55	1.55
1.60	1.60
1.65	1.65
1.70	1.70
1.75	1.75
1.80	1.80
1.85	1.85
1.90	1.90
1.95	1.95
2.00	2.00
2.05	2.05
2.10	2.10
2.15	2.15
2.20	2.20
2.25	2.25
2.30	2.30
2.35	2.35
2.40	2.40
2.45	2.45
2.50	2.50
2.55	2.55
2.60	2.60
2.65	2.65
2.70	2.70
2.75	2.75
2.80	2.80
2.85	2.85
2.90	2.90
2.95	2.95
3.00	3.00
3.05	3.05
3.10	3.10
3.15	3.15
3.20	3.20
3.25	3.25
3.30	3.30
3.35	3.35
3.40	3.40
3.45	3.45
3.50	3.50
3.55	3.55
3.60	3.60
3.65	3.65
3.70	3.70
3.75	3.75
3.80	3.80
3.85	3.85
3.90	3.90
3.95	3.95
4.00	4.00
4.05	4.05
4.10	4.10
4.15	4.15
4.20	4.20
4.25	4.25
4.30	4.30
4.35	4.35
4.40	4.40
4.45	4.45
4.50	4.50
4.55	4.55
4.60	4.60
4.65	4.65
4.70	4.70
4.75	4.75
4.80	4.80
4.85	4.85
4.90	4.90
4.95	4.95
5.00	5.00
5.05	5.05
5.10	5.10
5.15	5.15
5.20	5.20
5.25	5.25
5.30	5.30
5.35	5.35
5.40	5.40
5.45	5.45
5.50	5.50
5.55	5.55
5.60	5.60
5.65	5.65
5.70	5.70
5.75	5.75
5.80	5.80
5.85	5.85
5.90	5.90
5.95	5.95
6.00	6.00
6.05	6.05
6.10	6.10
6.15	6.15
6.20	6.20
6.25	6.25
6.30	6.30
6.35	6.35
6.40	6.40
6.45	6.45
6.50	6.50
6.55	6.55
6.60	6.60
6.65	6.65
6.70	6.70
6.75	6.75
6.80	6.80
6.85	6.85
6.90	6.90
6.95	6.95
7.00	7.00
7.05	7.05
7.10	7.10
7.15	7.15
7.20	7.20
7.25	7.25
7.30	7.30
7.35	7.35
7.40	7.40
7.45	7.45

Air loss				Sample recovery		Penetration rates (sec.)						
None	Slightly	Medium	Total	Good	Medium	Poor	None	60	120	180	240	300



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NOORDBRUG, 2522

Tel. No.: +27 - (0)18 - 297 6588
e-mail: northwest@ages-group.com

www.ages-group.com

Notes:

Drilling stopped after 6m of slightly weathered dolomite.

No water added.

Irregular hammer rates: 2 - 3, 36 - 37.

No excessive water encountered.

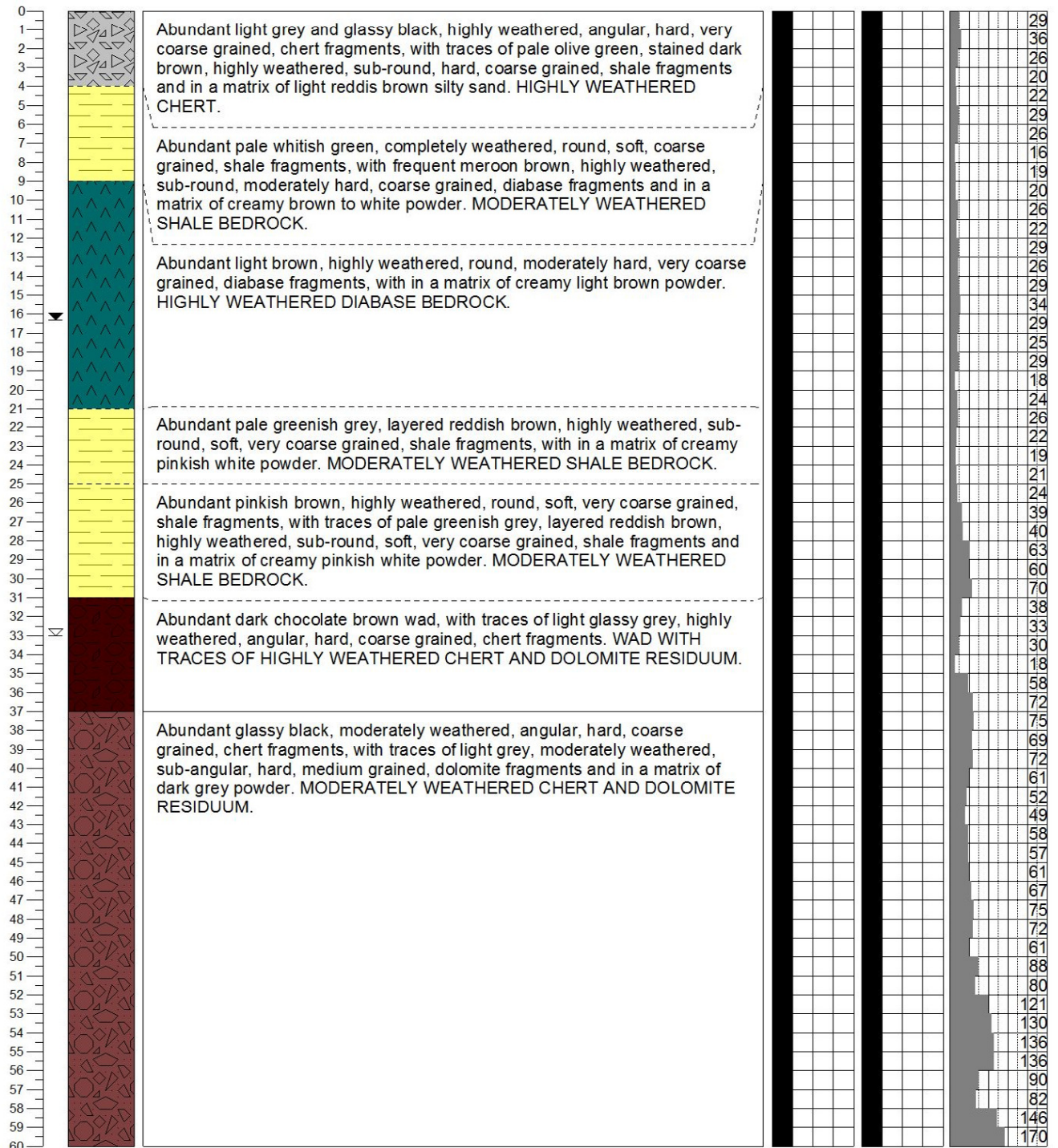
PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73771° S	BOREHOLE NO.:	FA4 42
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.02085° E	DATE DRILLED:	23/08/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1387 mamsl	DATE LOGGED:	23/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	Pieter Pretorius

Depth Lithology Description (m)

Air loss
None Slightly Medium Total

Sample Penetration recovery rates (sec.)
Good Medium Poor None 60 120 180 240 300



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Notes:

Drilling stopped at 60m.

No water added.

Irregular hammer rates: 0 - 1, 28 - 29, 32 - 33, 10 - 11, 35 - 36, 36 - 37, 41 - 42.

Large quantities of water encountered.

PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73806° S	BOREHOLE NO.:	FA4 44
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.02276° E	DATE DRILLED:	24/08/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1377 mamsl	DATE LOGGED:	24/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	P Pretorius & H Kgole

Depth Lithology Description (m)

Depth (m)	Lithology Description	Air loss			Sample Penetration recovery rates (sec.)		
		None	Slightly	Medium	Good	Poor	None
0							
1	Abundant dark reddish brown, silty sand. TOPSOIL.						21
2							24
3	Abundant dark grey, highly weathered, sub-round, hard, medium grained, chert fragments, with in a matrix of brown silty sand. HIGHLY WEATHERED CHERT RESIDUUM.						33
4							45
5							63
6							82
7	Abundant reddish brown, highly weathered, sub-round, moderately hard, coarse grained, diabase fragments, with in a matrix of reddish brown silty sand. HIGHLY WEATHERED DIABASE BEDROCK.						59
8							55
9							36
10							44
11	Equal amounts of light brown, highly weathered, sub-angular, moderately hard, medium grained, shale fragments, with equal amounts of pale olive green, highly weathered, sub-angular, moderately hard, medium grained, shale fragments and traces of smokey grey, highly weathered, sub-angular, hard, medium grained, chert fragments and in a matrix of yellow brown powder. MODERATELY WEATHERED SHALE BEDROCK.						34
12							26
13							28
14							31
15							34
16							29
17							28
18	Abundant pale olive green, speckled orange, highly weathered, sub-round, moderately hard, coarse grained, shale fragments, with in a matrix of light creamy white powder. MODERATELY WEATHERED SHALE BEDROCK.						22
19							26
20							30
21							29
22							16
23	Abundant olive green, highly weathered, sub-round, hard, coarse grained, shale fragments, with in a matrix of light pinkish brown powder. MODERATELY WEATHERED SHALE BEDROCK.						19
24							23
25							24
26							28
27	Abundant olive green, highly weathered, sub-round, hard, coarse grained, shale fragments, with in a matrix of light creamy pink . MODERATELY WEATHERED SHALE BEDROCK.						38
28							44
29							52
30							46
31							59
32							63
33							55
34							61
35	Abundant grey, moderately weathered, sub-angular, hard, medium grained, dolomite fragments, with in a matrix of light grey powder. MODERATELY WEATHERED DOLOMITE BEDROCK.						86
36							226
37							202
38							206
39							90
40	Abundant smokey light grey, moderately weathered, angular, hard, coarse grained, chert fragments, with in a matrix of light grey powder. MODERATELY WEATHERED CHERT.						78
41							69
42							60
43							70
44	Abundant light grey, moderately weathered, sub-angular, hard, medium grained, dolomite fragments, with traces of smokey grey, moderately weathered, sub-angular, hard, medium grained, chert fragments. MODERATELY WEATHERED CHERT-POOR DOLOMITE BEDROCK.						239
45							181
46							190
47							206
48							230
49							190
50							180
51							
52							
53							
54							
55							
56							
57							
58							
59							
60							



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Notes:

Drilling stopped at 60m.

No water added.

Irregular hammer rates: 34 - 35, 38 - 39, 43 - 44, 10 - 11.

No excessive water was encountered.

PROJECT: Focus Area 4 (FA4)

CLIENT:	Tlokwe Local Municipality	LATITUDE:	-26.73823° S	BOREHOLE NO.:	FA4 45
CONTRACTOR:	Hennie Erwee Drilling	LONGITUDE:	27.02172° E	DATE DRILLED:	24/08/2011
MACHINE TYPE:	Super Rock 165mm	ELEVATION:	1382 mamsl	DATE LOGGED:	24/08/2011
COMPRESSOR:	19 bar	ORIENTATION:	Vertical	LOGGED BY:	P Pretorius & H Kgole

Depth Lithology Description (m)

Depth (m)	Lithology Description	Air loss			Sample Penetration recovery rates (sec.)		
		None	Slightly	Total	Good	Poor	None
0	Abundant dark brown, silty sand. TOPSOIL.						
1							
2							
3							
4	Abundant pale olive green, stained light brown, highly weathered, sub-round, moderately hard, medium grained, shale fragments, with in a matrix of reddish brown silty sand. MODERATELY WEATHERED SHALE BEDROCK.						
5							
6							
7							
8							
9							
10	Abundant pale olive green and red brown, highly weathered, sub-round, moderately hard, medium grained, shale fragments, with in a matrix of light creamy brown power. MODERATELY WEATHERED SHALE BEDROCK.						
11							
12							
13							
14	Abundant dark meroonish brown, highly weathered, sub-round, moderately hard, medium grained, shale fragments, with in a matrix of creamy pinkish brown powder. MODERATELY WEATHERED SHALE BEDROCK.						
15							
16							
17							
18	Abundant olive green, highly weathered, sub-round, hard, medium grained, shale fragments, with in a matrix of creamy pinkish brown powder. MODERATELY WEATHERED SHALE BEDROCK.						
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29	Abundant light grey, slightly weathered, sub-round, hard, medium grained, dolomite fragments, with traces of light grey with white patches, slightly weathered, sub-angular, hard, medium grained, dolomite fragments and in a matrix of dark grey powder. SLIGHTLY WEATHERED DOLOMITE BEDROCK.						
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
41	Abundant glassy black, slightly weathered, angular, hard, fine grained, chert fragments, with in a matrix of dark grey powder. SLIGHTLY WEATHERED CHERT BEDROCK.						
42							
43							
44							
45							
46							
47							
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Notes:

Drilling stopped at 60m.
No water added.
Irregular hammer rates: 28 - 29, 34 - 35, 40 - 41, 10 - 11.
No excessive water was encountered.

Notes: Drilling stopped after 6m of slightly weathered dolomite.
No water added.
Irregular hammer rates: 0 - 1, 8 - 9, 10 - 11, 10 - 11, 19 - 24, 25 - 30.
No excessive water was encountered.