

# GEOTECHNICAL BOREHOLE LOG



**PROJECT: ESKOM GEOTECH INVEST**  
**SITE: DUYNESFONTEIN**  
**PROJECT No: 385908/42C**

**HOLE NO: KB 1**  
**INCLINATION: VERTICAL**  
**FINAL DEPTH: 30.02m**

**ELEVATION: 5.428mamsl**  
**CO-ORDS: X = 3726105.68**  
**Y = 53585.103**

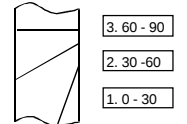
**PAGE: 1 OF 2**  
**DATE: 28-04-2010**  
**LOGGED BY: JB**

| Drilling Interval | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution |                |                |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------|----------------|----------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1<br>0° - 30°      | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 0.00              |          |       |       |      |    | 17.20<br>↓       | SILTSTONE | 54         | 1.97            |          |             | 2-3                | 2-3            | 3                  | 1              | 3              | 7     | 1                       | 1           | 2           | 10                 | 1                |
| 1.50              | 1.50     | 0.66  | 44    |      |    |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 2                       | 5           | 8           | 10                 | 1                |
| 1.95              | 0.45     | 0.24  | 53    |      |    | 19.17            |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 5           | 8           | 10                 | 1                |
| 3.00              | 1.05     | 0.40  | 38    |      |    | 1.97             |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 3.45              | 0.45     | 0.24  | 53    |      |    |                  |           |            |                 | 0        | 0           | 0                  | 0              |                    |                |                |       |                         |             |             |                    |                  |
| 4.50              | 1.05     | 0.47  | 45    |      |    |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 4.95              | 0.45     | 0.37  | 82    |      |    | G1               |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 6.00              | 1.05     | 0.39  | 37    |      |    | 19.17<br>↓       | MUDSTONE  | 30         | 3.39            |          |             | 2-4                | 3              | 5                  | 5              | 2              | 12    | 1                       | 1           | 2           | 10                 | 1                |
| 6.45              | 0.45     | 0.36  | 80    |      |    |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 2                       | 1           | 2           | 10                 | 1                |
| 7.50              | 1.05     | 0.40  | 38    |      |    | 22.78            |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 5           | 8           | 10                 | 1                |
| 7.95              | 0.45     | 0.27  | 60    |      |    | 3.61             |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 9.00              | 1.05     | 0.65  | 62    |      |    |                  |           |            |                 | 0.22     | M3/M6       | 2-4                | 3              |                    |                |                |       |                         |             |             |                    |                  |
| 9.45              | 0.45     | 0.34  | 76    |      |    |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 10.50             | 1.05     | 0.67  | 64    |      |    | G2               |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 10.95             | 0.45     | 0.45  | 100   |      |    | 22.78<br>↓       | GREYWACKE | 19         | 1.40            |          |             | 3-4                | 2              | 0                  | 4              | 6              | 10    | 1                       | 0           | 0           | 0                  | 0                |
| 12.00             | 1.05     | 0.54  | 51    |      |    |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 2                       | 5           | 8           | 10                 | 1                |
| 12.45             | 0.45     | 0.45  | 100   |      |    | 24.40            |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 5           | 8           | 10                 | 1                |
| 13.50             | 1.05     | 0.34  | 32    |      |    | 1.62             |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 13.95             | 0.45     | 0.45  | 100   |      |    |                  |           |            |                 | 0.22     | M3/M6       | 3-4                | 2              |                    |                |                |       |                         |             |             |                    |                  |
| 15.00             | 1.05     | 0.64  | 61    |      |    |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 15.95             | 0.95     | 0.30  | 32    |      |    | G3               |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 16.50             | 0.55     | 0.50  | 91    |      |    | 24.40<br>↓       | MUDSTONE  | 9          | 0.55            |          |             | 2-3                | 2-4            | 4                  | 0              | 0              | 4     | 1                       | 1           | 2           | 10                 | 1                |
| 16.95             | 0.45     | 0.30  | 67    |      |    |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 2                       | 0           | 0           | 0                  | 0                |
| 18.02             | 1.07     | 0.82  | 77    | 0.28 | 26 | 25.80            |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 0           | 0           | 0                  | 0                |
| 19.52             | 1.50     | 1.42  | 95    | 0.78 | 52 | 1.40             |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 21.02             | 1.50     | 1.13  | 75    | 0.36 | 24 |                  |           |            |                 | 0.85     | M3/M6       | 2-3                | 4              |                    |                |                |       |                         |             |             |                    |                  |
| 22.52             | 1.50     | 1.40  | 93    | 0.71 | 47 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 24.02             | 1.50     | 1.33  | 89    | 0.31 | 21 | G4               |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
 1.VERY SOFT (0-5)  
 2.SOFT (5-25)  
 3.HARD (25-45)  
 4.VERY HARD (45-105)  
 5.EXTREMELY HARD (105+)

**WEATHERING**  
 1.UNWEATHERED  
 2.SLIGHTLY  
 3.MODERATELY  
 4.HIGHLY  
 5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
 1.STRAIGHT  
 2.SLIGHT UNDULATION  
 3.CURVED  
 4.UNI DIRECTIONAL WAVY  
 5.MULTI DIRECTIONAL WAVY

**MICRO**  
 1.POLISHED  
 2.SMOOTH PLANAR  
 3.ROUGH PLANAR  
 4.SLICKENSIDED  
 5.SMOOTH  
 6.ROUGH UNDULATING  
 7.SLICKENSIDED  
 8.SMOOTH STEPPED  
 9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
 1.GOUGE t > Amplit. of IRREG.  
 2.GOUGE t < Amplit. of IRREG.  
 Soft sheared material, e.g. Talc  
 3.FINE  
 4.MEDIUM  
 5.COARSE  
 Non-softening sheared material  
 6.FINE  
 7.MEDIUM  
 8.COARSE  
 9.STAINING  
 10.NONE

**JOINT WALL ALT.**  
 1.WALL = ROCK HARDNESS  
 2.WALL > ROCK HARDNESS  
 3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
 M1. FAULTS  
 M2. SHEARS  
 M3. INTENSE JOINTING  
 M4. INTENSE MINERALISATION  
 M5. DEFORMABLE MATERIAL  
 M6. INTENSE DRILLING FRACTURES



**SRK Consulting**  
Engineers and Scientists

HOLE NO: KB 1  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.02m

ELEVATION: 5.428mamsl  
CO-ORDS: X = 3726105.68  
Y = 53585.103

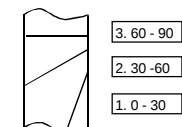
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DATE: 28-04-2010  
LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |   |
|----------------------------------|----------|-------|-------|------|---|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|---|
|                                  | m Drill  | m Rec | % Rec | m    | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |   |
| 24.02                            |          |       |       |      |   | 25.80            | GREYWACKE | 2          | 0.43            |          |             | 3-4                  | 1                | 10                 | 1           | 6           | 17    | 1                       | 2           | 2           | 6                  | 1                |   |
| 25.52                            | 1.50     | 1.26  | 84    | 0.13 | 9 | ↓                |           |            |                 |          |             |                      |                  |                    |             |             |       | 2                       | 2           | 1           | 2                  | 10               | 1 |
| 27.02                            | 1.50     | 1.24  | 83    | 0.00 | 0 | 30.02            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 1           | 3           | 10                 | 1                |   |
| 28.52                            | 1.50     | 0.61  | 41    | 0.00 | 0 | 4.22             |           |            |                 | 3.79     | M3/M6       | 3-4                  | 1                |                    |             |             |       |                         |             |             |                    |                  |   |
| 30.02                            | 1.50     | 1.13  | 75    | 0.10 | 7 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
| END OF HOLE - FINAL DEPTH 30.02m |          |       |       |      |   | G5               |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |

| HARDNESS (MPa) |                       |
|----------------|-----------------------|
| 1.             | VERY SOFT (0-5)       |
| 2.             | SOFT (5-25)           |
| 3.             | HARD (25-45)          |
| 4.             | VERY HARD (45-105)    |
| 5.             | EXTREMELY HARD (105+) |

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMPLETLY

## JOINT DISTRIBUTION



### JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**

- 1.POLISHED
- 2.SMOOTH PLANAR
- 3.ROUGH PLANAR
- 4.SLICKENSIDED  
UNDULATING
- 5.SMOOTH  
UNDULATING
- 6.ROUGH UNDULATING
- 7.SLICKENSIDED  
STEPPED
- 8.SMOOTH STEPPED
- 9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**  
1. GOUGE t. > Amplit. of IRREG.  
2. GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3. FINE  
4. MEDIUM  
5. COARSE  
Non-softening sheared material  
6. FINE  
7. MEDIUM  
8. COARSE  
9. STAINING  
10. NONE

**JOINT WALL ALT.**

1. WALL = ROCK HARDNESS
2. WALL > ROCK HARDNESS
3. WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNEFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 5  
INCLINATION: VERTICAL  
FINAL DEPTH: 29.96m

ELEVATION: 12.140mamsl  
CO-ORDS: X = 3727221.24  
Y = 52883.806

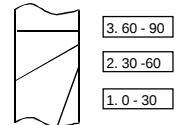
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DATE: 28-04-2010  
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| Drilling Interval | Recovery |       |       | RQD |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution |                |                |       | Joint Surface Condition |           |           |                  |                |
|-------------------|----------|-------|-------|-----|---|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------|----------------|----------------|-------|-------------------------|-----------|-----------|------------------|----------------|
|                   | m Drill  | m Rec | % Rec | m   | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1<br>0° - 30°      | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro 1-5 | Micro 1-9 | Infill Type 1-10 | Wall Alter 1-3 |
| 0.00              |          |       |       |     |   | 22.55<br>↓       | GREYWACKE | 59         | 4.02            |          |             | 2-3                | 3              | 4                  | 5              | 7              | 16    | 1                       | 1         | 2         | 10               | 1              |
| 1.50              | 1.50     | 0.52  | 35    |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 2                       | 1         | 2         | 10               | 1              |
| 1.95              | 0.45     | 0.23  | 51    |     |   | 26.86            |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 1         | 2         | 10               | 1              |
| 3.00              | 1.05     | 0.47  | 45    |     |   | 4.31             |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 3.45              | 0.45     | 0.27  | 60    |     |   |                  |           |            |                 | 0.29     | M5          | 2                  | 3-4            |                    |                |                |       |                         |           |           |                  |                |
| 4.50              | 1.05     | 0.50  | 48    |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 4.95              | 0.45     | 0.21  | 47    |     |   | G1               |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 6.00              | 1.05     | 0.58  | 55    |     |   | 26.86<br>↓       | GREYWACKE | 41         | 3.11            |          |             | 2-3                | 3              | 6                  | 2              | 3              | 11    | 1                       | 1         | 2         | 10               | 1              |
| 6.45              | 0.45     | 0.20  | 44    |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 2                       | 1         | 2         | 10               | 1              |
| 7.50              | 1.05     | 0.46  | 44    |     |   | 29.96            |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 1         | 2         | 10               | 1              |
| 7.95              | 0.45     | 0.33  | 73    |     |   | 3.10             |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 9.00              | 1.05     | 0.60  | 57    |     |   |                  |           |            |                 | 0        | 0           | 0                  | 0              |                    |                |                |       |                         |           |           |                  |                |
| 9.45              | 0.45     | 0.26  | 58    |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 10.50             | 1.05     | 1.10  | 105   |     |   | G2               |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 10.95             | 0.45     | 0.21  | 47    |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 12.00             | 1.05     | 0.98  | 93    |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 12.45             | 0.45     | 0.29  | 64    |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 13.50             | 1.05     | 0.71  | 68    |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 13.95             | 0.45     | 0.28  | 62    |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 15.00             | 1.05     | 0.33  | 31    |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 15.95             | 0.95     | 0.32  | 34    |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 16.50             | 0.55     | 0.64  | 116   |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 16.95             | 0.45     | 0.25  | 56    |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 18.00             | 1.05     | 0.71  | 68    |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 18.45             | 0.45     | 0.21  | 47    |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 19.50             | 1.05     | 0.46  | 44    |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 19.95             | 0.45     | 0.32  | 71    |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 21.00             | 1.05     | 0.54  | 51    |     |   |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
UNDULATING  
5.SMOOTH  
UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED  
STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**  
1.GOUGE t > Amplit. of IRREG.  
2.GOUGE t < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES



**SRK Consulting**  
Engineers and Scientists

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DATE: 28-04-2010  
LOGGED BY: JB

| HARDNESS (MPa)          |  |
|-------------------------|--|
| 1.VERY SOFT (0-5)       |  |
| 2.SOFT (5-25)           |  |
| 3.HARD (25-45)          |  |
| 4.VERY HARD (45-105)    |  |
| 5.EXTREMELY HARD (105+) |  |

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMPLETLY

1.0 - 30

## MACRO

- MACRO
1. STRAIGHT
  2. SLIGHT UNDULATION
  3. CURVED
  4. UNI DIRECTIONAL WAVY
  5. MULTI DIRECTIONAL WAVY

## MICRO

- 1.POLISHED
- 2.SMOOTH PLANAR
- 3.ROUGH PLANAR
- 4.SLICKENSIDED  
UNDULATING
- 5.SMOOTH  
UNDULATING
- 6.ROUGH UNDULATING
- 7.SLICKENSIDED  
STEPPED
- 8.SMOOTH STEPPED
- 9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**

1. GOUGE t. > Amplit. of IRREG.  
2. GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3. FINE  
4. MEDIUM  
5. COARSE  
Non-softening sheared material  
6. FINE  
7. MEDIUM  
8. COARSE  
9. STAINING  
10. NONE

## JOINT WALL ALT.

- JOINT WALL ALT.
- 1.WALL = ROCK HARDNESS
  - 2.WALL > ROCK HARDNESS
  - 3.WALL < ROCK HARDNESS

**MATRIX TYPE**

- MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

[illegible]

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNESFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 6  
INCLINATION: VERTICAL  
FINAL DEPTH: 40.52m

ELEVATION: 11.736mamsl  
CO-ORDS: X = 3727017.97  
Y = 52985.997

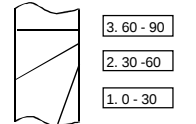
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DATE: 17-07-2008  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 0.00              |          |       |       |      |    | 14.00<br>↓       | SHALE     | 12         | 2.78            |          |             | 2                  | 3              | 5                  | 5           | 11          | 21    | 1                       | 2           | 5           | 3                  | 1                |
| 1.50              | 1.50     | 0.47  | 31    |      |    |                  |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 2           | 5           | 3                  | 1                |
| 1.95              | 0.45     | 0.26  | 58    |      |    | 16.98            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 1           | 2           | 3                  | 1                |
| 3.00              | 1.05     | 0.55  | 52    |      |    | 2.98             |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 3.45              | 0.45     | 0.22  | 49    |      |    |                  |           |            |                 | 0.20     | M5          | 2                  | 2              |                    |             |             |       |                         |             |             |                    |                  |
| 4.50              | 1.05     | 0.51  | 49    |      |    |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 4.95              | 0.45     | 0.27  | 60    |      |    | G1               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 6.00              | 1.05     | 0.55  | 52    |      |    | 16.98<br>↓       | SHALE     | 54         | 1.26            |          |             | 2                  | 1              | 3                  | 2           | 8           | 13    | 1                       | 1           | 2           | 3                  | 1                |
| 6.45              | 0.45     | 0.29  | 64    |      |    |                  |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 1           | 2           | 3                  | 1                |
| 7.50              | 1.05     | 0.49  | 47    |      |    | 18.27            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 1           | 2           | 3                  | 1                |
| 7.95              | 0.45     | 0.28  | 62    |      |    | 1.29             |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 9.00              | 1.05     | 0.51  | 49    |      |    |                  |           |            |                 | 0.03     | M5/M6       | 2                  | 3              |                    |             |             |       |                         |             |             |                    |                  |
| 9.45              | 0.45     | 0.32  | 71    |      |    |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 10.50             | 1.05     | 0.59  | 56    |      |    | G2               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 10.95             | 0.45     | 0.22  | 49    |      |    | 18.27<br>↓       | GREYWACKE | 27         | 1.51            |          |             | 3                  | 1              | 3                  | 3           | 12          | 18    | 1                       | 2           | 6           | 10                 | 1                |
| 12.00             | 1.05     | 0.44  | 42    |      |    |                  |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 1           | 2           | 10                 | 1                |
| 12.45             | 0.45     | 0.28  | 62    |      |    | 19.95            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |
| 13.50             | 1.05     | 0.53  | 50    |      |    | 1.68             |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 13.95             | 0.45     | 0.27  | 60    |      |    |                  |           |            |                 | 0.17     | M6          | 3                  | 1              |                    |             |             |       |                         |             |             |                    |                  |
| 15.00             | 1.05     | 0.69  | 66    |      |    |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 16.50             | 1.50     | 1.29  | 86    | 0.25 | 17 | G3               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 18.00             | 1.50     | 1.42  | 95    | 0.81 | 54 | 19.95<br>↓       | GREYWACKE | 61         | 2.72            |          |             | 3                  | 1              | 1                  | 1           | 16          | 18    | 1                       | 1           | 2           | 10                 | 1                |
| 19.50             | 1.50     | 1.35  | 90    | 0.30 | 20 |                  |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 1           | 2           | 10                 | 1                |
| 21.00             | 1.50     | 1.38  | 92    | 0.48 | 32 | 22.72            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 1           | 3           | 10                 | 1                |
| 22.50             | 1.50     | 1.44  | 96    | 1.19 | 79 | 2.77             |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 24.00             | 1.50     | 1.56  | 104   | 1.27 | 85 |                  |           |            |                 | 0.05     | M6          | 3                  | 1              |                    |             |             |       |                         |             |             |                    |                  |
| 25.50             | 1.50     | 1.35  | 90    | 0.83 | 55 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 27.00             | 1.50     | 1.39  | 93    | 0.92 | 61 | G4               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t > Amplit. of IRREG.  
2.GOUGE t < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 6  
INCLINATION: VERTICAL  
FINAL DEPTH: 40.52m

ELEVATION: 11.736mamsl  
CO-ORDS: X = 3727017.97  
Y = 52985.997

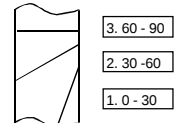
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DATE: 17-07-2008  
LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |     | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |   |  |
|----------------------------------|----------|-------|-------|------|-----|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|---|--|
|                                  | m Drill  | m Rec | % Rec | m    | %   |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |   |  |
| 27.00                            |          |       |       |      |     | 22.72            | GREYWACKE | 70         |                 |          |             | 4                    | 1                | 0                  | 1           | 11          | 12    | 1                       | 0           | 0           | 0                  | 0                |   |  |
| 28.60                            | 1.60     | 1.60  | 100   | 1.43 | 89  | ↓                |           |            | 3.03            |          |             |                      |                  |                    |             |             |       |                         | 2           | 2           | 6                  | 7                | 1 |  |
| 30.20                            | 1.60     | 1.57  | 98    | 1.40 | 88  | 25.75            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |   |  |
| 31.73                            | 1.53     | 1.54  | 101   | 1.11 | 73  | 3.03             |           |            |                 |          |             | 0                    | 0                | 0                  | 0           |             |       |                         |             |             |                    |                  |   |  |
| 33.23                            | 1.50     | 1.48  | 99    | 0.80 | 53  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |  |
| 34.73                            | 1.50     | 1.49  | 99    | 1.29 | 86  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |  |
| 36.23                            | 1.50     | 1.49  | 99    | 1.35 | 90  |                  |           |            | G5              |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |  |
| 37.73                            | 1.50     | 1.47  | 98    | 1.42 | 95  | 25.75            | GREYWACKE | 80         |                 |          |             | 4                    | 1                | 1                  | 2           | 8           | 11    | 1                       | 3           | 5           | 10                 | 1                |   |  |
| 39.27                            | 1.54     | 1.50  | 97    | 0.93 | 60  | ↓                |           |            | 4.75            |          |             |                      |                  |                    |             |             |       |                         | 2           | 1           | 2                  | 10               | 1 |  |
| 40.52                            | 1.25     | 1.25  | 100   | 1.25 | 100 | 30.50            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 3           | 5           | 10                 | 1                |   |  |
| END OF HOLE - FINAL DEPTH 40.52m |          |       |       |      |     | 4.75             |           |            |                 |          |             | 0                    | 0                | 0                  | 0           |             |       |                         |             |             |                    |                  |   |  |
|                                  |          |       |       |      |     |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |  |
|                                  |          |       |       |      |     |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |  |
|                                  |          |       |       |      |     | G6               |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |  |
|                                  |          |       |       |      |     | 30.50            | GREYWACKE | 59         |                 |          |             | 4                    | 1                | 1                  | 5           | 12          | 18    | 1                       | 1           | 2           | 10                 | 1                |   |  |
|                                  |          |       |       |      |     | ↓                |           |            | 3.10            |          |             |                      |                  |                    |             |             |       |                         | 2           | 1           | 2                  | 10               | 1 |  |
|                                  |          |       |       |      |     | 33.60            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 3           | 5           | 10                 | 1                |   |  |
|                                  |          |       |       |      |     | 3.10             |           |            |                 |          |             | 0                    | 0                | 0                  | 0           |             |       |                         |             |             |                    |                  |   |  |
|                                  |          |       |       |      |     |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |  |
|                                  |          |       |       |      |     |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |  |
|                                  |          |       |       |      |     |                  |           |            | G7              |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |  |
|                                  |          |       |       |      |     | 33.60            | GREYWACKE | 87         |                 |          |             | 4                    | 1                | 0                  | 3           | 12          | 15    | 1                       | 0           | 0           | 0                  | 0                |   |  |
|                                  |          |       |       |      |     | ↓                |           |            | 6.92            |          |             |                      |                  |                    |             |             |       |                         | 2           | 2           | 5                  | 10               | 1 |  |
|                                  |          |       |       |      |     | 40.52            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |   |  |
|                                  |          |       |       |      |     | 6.92             |           |            |                 |          |             | 0                    | 0                | 0                  | 0           |             |       |                         |             |             |                    |                  |   |  |
|                                  |          |       |       |      |     |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |  |
|                                  |          |       |       |      |     |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |  |
|                                  |          |       |       |      |     |                  |           |            | G8              |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
UNDULATING  
5.SMOOTH  
UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED  
STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**  
1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 7  
INCLINATION: VERTICAL  
FINAL DEPTH: 54.25m

ELEVATION: 10.083mamsl  
CO-ORDS: X = 3726815.12  
Y = 53069.914

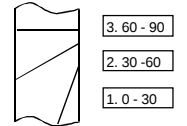
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DATE: 03-05-2010  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution       |                |                |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------------|----------------|----------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1<br>0° - 30°            | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 0.00              |          |       |       |      |    | 19.40            | GREYWACKE | 0          | 1.01            |          |             | 3                  | 1-2            | 4                        | 6              | 4              | 14    | 1                       | 1           | 3           | 10                 | 1                |
| 1.50              | 1.50     | 0.96  | 64    | 0.00 | 0  | ↓                |           |            |                 |          |             |                    |                |                          |                |                |       | 2                       | 1           | 2           | 9                  | 1                |
| 1.95              | 0.45     | 0.39  | 87    | 0.00 | 0  | 20.54            |           |            |                 |          |             |                    |                |                          |                |                |       | 3                       | 1           | 2           | 10                 | 1                |
| 3.00              | 1.05     | 0.94  | 90    | 0.00 | 0  | 1.14             |           |            |                 |          |             |                    |                | Yellowish green stained. |                |                |       |                         |             |             |                    |                  |
| 3.45              | 0.45     | 0.41  | 91    | 0.00 | 0  |                  |           |            |                 | 0.13     | M3/M5       | 3                  | 1-2            |                          |                |                |       |                         |             |             |                    |                  |
| 4.50              | 1.05     | 0.87  | 83    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                          |                |                |       |                         |             |             |                    |                  |
| 4.95              | 0.45     | 0.45  | 100   | 0.00 | 0  | G1               |           |            |                 |          |             |                    |                |                          |                |                |       |                         |             |             |                    |                  |
| 6.00              | 1.05     | 0.93  | 89    | 0.00 | 0  | 20.54            | GREYWACKE | 7          | 14.71           |          |             | 4                  | 1-2            | 59                       | 36             | 51             | 146   | 1                       | 1           | 2           | 10                 | 1                |
| 6.45              | 0.45     | 0.44  | 98    | 0.00 | 0  | ↓                |           |            |                 |          |             |                    |                |                          |                |                |       | 2                       | 1           | 2           | 10                 | 1                |
| 7.50              | 1.05     | 0.87  | 83    | 0.00 | 0  | 36.43            |           |            |                 |          |             |                    |                |                          |                |                |       | 3                       | 1           | 2           | 10                 | 1                |
| 7.95              | 0.45     | 0.39  | 87    | 0.00 | 0  | 15.89            |           |            |                 |          |             |                    |                |                          |                |                |       |                         |             |             |                    |                  |
| 9.00              | 1.05     | 0.93  | 89    | 0.00 | 0  |                  |           |            |                 | 1.18     | M3/M5       | 4                  | 1-2            |                          |                |                |       |                         |             |             |                    |                  |
| 9.45              | 0.45     | 0.35  | 78    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                          |                |                |       |                         |             |             |                    |                  |
| 10.50             | 1.05     | 0.96  | 91    | 0.00 | 0  | G2               |           |            |                 |          |             |                    |                |                          |                |                |       |                         |             |             |                    |                  |
| 10.95             | 0.45     | 0.40  | 89    | 0.00 | 0  | 36.43            | GREYWACKE | 29         | 3.62            |          |             | 4                  | 1              | 13                       | 3              | 14             | 30    | 1                       | 1           | 2           | 3                  | 1                |
| 12.00             | 1.05     | 0.95  | 90    | 0.00 | 0  | ↓                |           |            |                 |          |             |                    |                |                          |                |                |       | 2                       | 5           | 8           | 3                  | 1                |
| 12.45             | 0.45     | 0.42  | 93    | 0.00 | 0  | 40.05            |           |            |                 |          |             |                    |                |                          |                |                |       | 3                       | 1           | 2           | 10                 | 1                |
| 13.50             | 1.05     | 1.00  | 95    | 0.00 | 0  | 3.62             |           |            |                 | 0        | 0           | 0                  | 0              | 2. Talc / Chlorite <1mm. |                |                |       |                         |             |             |                    |                  |
| 13.95             | 0.45     | 0.34  | 76    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                          |                |                |       |                         |             |             |                    |                  |
| 15.00             | 1.05     | 0.90  | 86    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                          |                |                |       |                         |             |             |                    |                  |
| 15.95             | 0.95     | 0.37  | 39    | 0.00 | 0  | G3               |           |            |                 |          |             |                    |                |                          |                |                |       |                         |             |             |                    |                  |
| 16.50             | 0.55     | 0.95  | 173   | 0.00 | 0  | 40.05            | GREYWACKE | 31         | 1.94            |          |             | 4                  | 1              | 6                        | 0              | 15             | 21    | 1                       | 1           | 2           | 10                 | 1                |
| 16.95             | 0.45     | 0.43  | 96    | 0.00 | 0  | ↓                |           |            |                 |          |             |                    |                |                          |                |                |       | 2                       | 0           | 0           | 0                  | 0                |
| 18.12             | 1.17     | 0.92  | 79    | 0.00 | 0  | 41.99            |           |            |                 |          |             |                    |                |                          |                |                |       | 3                       | 1           | 2           | 10                 | 1                |
| 18.57             | 0.45     | 0.43  | 96    | 0.00 | 0  | 1.94             |           |            |                 |          |             |                    |                |                          |                |                |       |                         |             |             |                    |                  |
| 19.62             | 1.05     | 0.33  | 31    | 0.00 | 0  |                  |           |            |                 | 0        | 0           | 0                  | 0              |                          |                |                |       |                         |             |             |                    |                  |
| 21.11             | 1.49     | 1.01  | 68    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                          |                |                |       |                         |             |             |                    |                  |
| 22.61             | 1.50     | 1.40  | 93    | 0.42 | 28 | G4               |           |            |                 |          |             |                    |                |                          |                |                |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 7  
INCLINATION: VERTICAL  
FINAL DEPTH: 54.25m

ELEVATION: 10.083mamsl  
CO-ORDS: X = 3726815.12  
Y = 53069.914

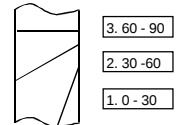
PAGE: 2 OF 2  
DATE: 03-05-2010  
LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |
|----------------------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 22.61                            |          |       |       |      |    | 41.99            | GREYWACKE | 45         | 4.03            |          |             | 4                  | 1              | 7                  | 8           | 15          | 30    | 1                       | 1           | 2           | 10                 | 1                |
| 24.11                            | 1.50     | 1.24  | 83    | 0.00 | 0  | ↓                |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 1           | 2           | 10                 | 1                |
| 25.61                            | 1.50     | 1.20  | 80    | 0.25 | 17 | 46.08            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |
| 27.11                            | 1.50     | 1.61  | 107   | 0.21 | 14 | 4.09             |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 28.61                            | 1.50     | 1.35  | 90    | 0.00 | 0  |                  |           |            | 0.06            | M6       |             | 4                  | 1              |                    |             |             |       |                         |             |             |                    |                  |
| 30.11                            | 1.50     | 1.07  | 71    | 0.15 | 10 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 31.61                            | 1.50     | 1.43  | 95    | 0.14 | 9  | G5               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 33.11                            | 1.50     | 1.44  | 96    | 0.00 | 0  | 46.08            | GREYWACKE | 27         | 1.97            |          |             | 3                  | 1              | 6                  | 4           | 14          | 24    | 1                       | 1           | 2           | 10                 | 1                |
| 34.61                            | 1.50     | 1.44  | 96    | 0.00 | 0  | ↓                |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 1           | 3           | 6                  | 1                |
| 36.11                            | 1.50     | 1.32  | 88    | 0.00 | 0  | 48.05            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |
| 37.61                            | 1.50     | 1.47  | 98    | 0.57 | 38 | 1.97             |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 39.11                            | 1.50     | 1.45  | 97    | 0.28 | 19 |                  |           |            | 0               | 0        |             | 0                  | 0              |                    |             |             |       |                         |             |             |                    |                  |
| 40.05                            | 0.94     | 0.90  | 96    | 0.19 | 20 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 41.65                            | 1.60     | 1.53  | 96    | 0.60 | 38 | G6               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 43.25                            | 1.60     | 1.65  | 103   | 0.73 | 46 | 48.05            | GREYWACKE | 64         | 1.49            |          |             | 4                  | 1              | 2                  | 0           | 2           | 4     | 1                       | 1           | 3           | 6                  | 1                |
| 44.85                            | 1.60     | 1.62  | 101   | 0.52 | 33 | ↓                |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 0           | 0           | 0                  | 0                |
| 46.45                            | 1.60     | 1.52  | 95    | 0.58 | 36 | 49.54            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 1           | 3           | 10                 | 1                |
| 48.05                            | 1.60     | 1.53  | 96    | 0.53 | 33 | 1.49             |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 49.65                            | 1.60     | 1.52  | 95    | 0.95 | 59 |                  |           |            | 0               | 0        |             | 0                  | 0              |                    |             |             |       |                         |             |             |                    |                  |
| 51.25                            | 1.60     | 1.50  | 94    | 0.27 | 17 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 52.75                            | 1.50     | 1.47  | 98    | 1.10 | 73 | G7               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 54.25                            | 1.50     | 1.26  | 84    | 0.40 | 27 | 49.54            | GREYWACKE | 38         | 4.49            |          |             | 3                  | 1              | 14                 | 1           | 14          | 29    | 1                       | 1           | 2           | 10                 | 1                |
| END OF HOLE - FINAL DEPTH 54.25m |          |       |       |      |    | ↓                |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 1           | 2           | 10                 | 1                |
|                                  |          |       |       |      |    | 54.25            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |
|                                  |          |       |       |      |    | 4.71             |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |           |            | 0.22            | M5/M6    |             | 3                  | 1              |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    | G8               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
UNDULATING  
5.SMOOTH  
UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED  
STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**  
1.GOUGE t > Amplit. of IRREG.  
2.GOUGE t < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 8  
INCLINATION: VERTICAL  
FINAL DEPTH: 40.45m

ELEVATION: 10.129mamsl  
CO-ORDS: X = 3726614.42  
Y = 53162.192

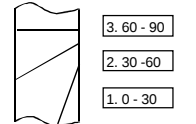
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DATE: 02-04-2009  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution |                |                |       | Joint Surface Condition |           |           |                  |                |
|-------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------|----------------|----------------|-------|-------------------------|-----------|-----------|------------------|----------------|
|                   | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1<br>0° - 30°      | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro 1-5 | Micro 1-9 | Infill Type 1-10 | Wall Alter 1-3 |
| 0.00              |          |       |       |      |    | 20.20<br>↓       | GREYWACKE | 44         | 1.03            |          |             | 2                  | 4              | 1                  | 1              | 0              | 2     | 1                       | 1         | 2         | 10               | 1              |
| 1.50              | 1.50     | 0.53  | 35    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 2                       | 1         | 2         | 10               | 1              |
| 1.95              | 0.45     | 0.37  | 82    | 0.00 | 0  | 21.23            |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 0         | 0         | 0                | 0              |
| 3.00              | 1.05     | 0.32  | 30    | 0.00 | 0  | 1.03             |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 3.45              | 0.45     | 0.27  | 60    | 0.00 | 0  |                  |           |            |                 | 0        | 0           | 0                  | 0              |                    |                |                |       |                         |           |           |                  |                |
| 4.50              | 1.05     | 0.59  | 56    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 4.95              | 0.45     | 0.39  | 87    | 0.00 | 0  | G1               |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 6.00              | 1.05     | 0.47  | 45    | 0.00 | 0  | 21.23<br>↓       | GREYWACKE | 10         | 1.62            |          |             | 2-3                | 4-5            | 2                  | 4              | 2              | 8     | 1                       | 1         | 3         | 10               | 1              |
| 6.45              | 0.45     | 0.28  | 62    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 2                       | 1         | 9         | 10               | 1              |
| 7.50              | 1.05     | 0.51  | 49    | 0.00 | 0  | 23.95            |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 1         | 9         | 10               | 1              |
| 7.95              | 0.45     | 0.42  | 93    | 0.00 | 0  | 2.72             |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 9.00              | 1.05     | 0.81  | 77    | 0.00 | 0  |                  |           |            |                 | 1.10     | M5/M6       | 2-3                | 4-5            |                    |                |                |       |                         |           |           |                  |                |
| 9.45              | 0.45     | 0.43  | 96    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 10.50             | 1.05     | 0.59  | 56    | 0.00 | 0  | G2               |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 10.95             | 0.45     | 0.29  | 64    | 0.00 | 0  | 23.95<br>↓       | GREYWACKE | 35         | 1.08            |          |             | 2                  | 4              | 4                  | 3              | 11             | 18    | 1                       | 1         | 2         | 3                | 1              |
| 12.00             | 1.05     | 0.83  | 79    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 2                       | 1         | 3         | 10               | 1              |
| 12.45             | 0.45     | 0.45  | 100   | 0.00 | 0  | 26.18            |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 1         | 2         | 10               | 1              |
| 13.50             | 1.05     | 0.39  | 37    | 0.00 | 0  | 2.23             |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 13.95             | 0.45     | 0.42  | 93    | 0.00 | 0  |                  |           |            |                 | 0.15     | M5          | 2                  | 4              |                    |                |                |       |                         |           |           |                  |                |
| 15.00             | 1.05     | 0.45  | 43    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 15.45             | 0.45     | 0.38  | 84    | 0.00 | 0  | G3               |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 16.45             | 1.00     | 0.75  | 75    | 0.00 | 0  | 26.18<br>↓       | GREYWACKE | 0          | 1.60            |          |             | 2                  | 4              | 4                  | 2              | 2              | 8     | 1                       | 1         | 2         | 3                | 1              |
| 17.95             | 1.50     | 0.60  | 40    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 2                       | 1         | 2         | 10               | 1              |
| 18.30             | 0.35     | 0.25  | 71    | 0.00 | 0  | 28.45            |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 1         | 2         | 10               | 1              |
| 19.45             | 1.15     | 0.86  | 75    | 0.00 | 0  | 2.27             |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 19.80             | 0.35     | 0.35  | 100   | 0.00 | 0  |                  |           |            |                 | 0.67     | M5/M6       | 2                  | 4              |                    |                |                |       |                         |           |           |                  |                |
| 20.95             | 1.15     | 0.75  | 65    | 0.45 | 39 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |
| 22.45             | 1.50     | 1.18  | 79    | 0.00 | 0  | G4               |           |            |                 |          |             |                    |                |                    |                |                |       |                         |           |           |                  |                |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMPLETELY

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t > Amplit. of IRREG.  
2.GOUGE t < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 8  
INCLINATION: VERTICAL  
FINAL DEPTH: 40.45m

ELEVATION: 10.129mamsl  
CO-ORDS: X = 3726614.42  
Y = 53162.192

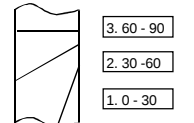
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DATE: 02-04-2009  
LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |  |
|----------------------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |
| 22.45                            |          |       |       |      |    | 28.45            | GREYWACKE | 0          | 0.90            |          |             | 2                    | 4                | 2                  | 0           | 0           | 2     | 1                       | 1           | 2           | 10                 | 1                |  |
| 23.95                            | 1.50     | 1.30  | 87    | 0.28 | 19 | ↓                |           |            |                 |          |             |                      |                  |                    |             |             |       | 2                       | 0           | 0           | 0                  | 0                |  |
| 25.45                            | 1.50     | 1.18  | 79    | 0.34 | 23 | 29.35            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 0           | 0           | 0                  | 0                |  |
| 26.95                            | 1.50     | 1.56  | 104   | 0.45 | 30 | 0.90             |           |            |                 | 0        | 0           | 0                    | 0                |                    |             |             |       |                         |             |             |                    |                  |  |
| 28.45                            | 1.50     | 0.98  | 65    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 29.95                            | 1.50     | 1.17  | 78    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 31.45                            | 1.50     | 1.02  | 68    | 0.35 | 23 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 32.95                            | 1.50     | 1.42  | 95    | 0.00 | 0  | 29.35            | GREYWACKE | 0          | 0.60            |          |             | 1-2                  | 4-5              | 0                  | 0           | 0           | 0     | 1                       | 0           | 0           | 0                  | 0                |  |
| 34.45                            | 1.50     | 1.17  | 78    | 0.29 | 19 | ↓                |           |            |                 |          |             |                      |                  |                    |             |             |       | 2                       | 0           | 0           | 0                  | 0                |  |
| 35.95                            | 1.50     | 1.26  | 84    | 0.00 | 0  | 29.95            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 0           | 0           | 0                  | 0                |  |
| 37.45                            | 1.50     | 1.45  | 97    | 0.14 | 9  | 0.60             |           |            |                 | 0        | 0           | 0                    | 0                |                    |             |             |       |                         |             |             |                    |                  |  |
| 38.95                            | 1.50     | 1.06  | 71    | 0.54 | 36 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 40.45                            | 1.50     | 1.03  | 69    | 0.11 | 7  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| END OF HOLE - FINAL DEPTH 40.45m |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    | 29.95            | GREYWACKE | 15         | 2.05            |          |             | 2                    | 4                | 6                  | 2           | 5           | 13    | 1                       | 1           | 2           | 9                  | 1                |  |
|                                  |          |       |       |      |    | ↓                |           |            |                 |          |             |                      |                  |                    |             |             |       | 2                       | 1           | 2           | 9                  | 1                |  |
|                                  |          |       |       |      |    | 32.35            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |  |
|                                  |          |       |       |      |    | 2.40             |           |            |                 | 0.35     | M5          | 2                    | 4                |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    | G7               |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    | 32.35            | GREYWACKE | 0          | 0.00            |          |             | 0                    | 0                | 0                  | 0           | 0           | 0     | 1                       | 0           | 0           | 0                  | 0                |  |
|                                  |          |       |       |      |    | ↓                |           |            |                 |          |             |                      |                  |                    |             |             |       | 2                       | 0           | 0           | 0                  | 0                |  |
|                                  |          |       |       |      |    | 33.10            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 0           | 0           | 0                  | 0                |  |
|                                  |          |       |       |      |    | 0.75             |           |            |                 | 0.75     | M5/M6       | 2                    | 4                |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    | G8               |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t > Amplit. of IRREG.  
2.GOUGE t < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



**PROJECT: ESKOM GEOTECH INVEST**  
**SITE: DUYNESFONTEIN**  
**PROJECT No: 385908/42C**

**HOLE NO: KB 8**  
**INCLINATION: VERTICAL**  
**FINAL DEPTH: 40.45m**

**ELEVATION: 10.129mamsl**  
**CO-ORDS: X = 3726614.42**  
**Y = 53162.192**

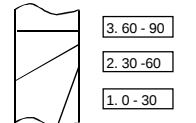
**PAGE: 3 OF 3**  
**DATE: 02-04-2009**  
**LOGGED BY: JB**

| Drilling Interval | Recovery |       |       | RQD |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|-----|---|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m   | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
|                   |          |       |       |     |   | 33.10<br>↓       | GREYWACKE | 55         | 0.55            |          |             | 3                  | 3              | 2                  | 1           | 0           | 3     | 1                       | 1           | 9           | 10                 | 1                |
|                   |          |       |       |     |   | 33.65            |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 1           | 9           | 3                  | 1                |
|                   |          |       |       |     |   | 0.55             |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 0           | 0           | 0                  | 0                |
|                   |          |       |       |     |   | G9               |           |            |                 | 0        | 0           | 0                  | 0              |                    |             |             |       |                         |             |             |                    |                  |
|                   |          |       |       |     |   | 33.65<br>↓       | GREYWACKE | 13         | 1.39            |          |             | 2                  | 4              | 4                  | 3           | 2           | 9     | 1                       | 1           | 3           | 10                 | 1                |
|                   |          |       |       |     |   | 35.95            |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 1           | 3           | 10                 | 1                |
|                   |          |       |       |     |   | 2.30             |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |
|                   |          |       |       |     |   | G10              |           |            |                 | 0.91     | M5/M6       | 2                  | 4              |                    |             |             |       |                         |             |             |                    |                  |
|                   |          |       |       |     |   | 35.95<br>↓       | GREYWACKE | 9          | 1.30            |          |             | 3                  | 3              | 4                  | 1           | 2           | 7     | 1                       | 1           | 2           | 10                 | 1                |
|                   |          |       |       |     |   | 37.45            |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 1           | 3           | 9                  | 1                |
|                   |          |       |       |     |   | 1.50             |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |
|                   |          |       |       |     |   | G11              |           |            |                 | 0.2      | M5/M6       | 3                  | 3              |                    |             |             |       |                         |             |             |                    |                  |
|                   |          |       |       |     |   | 37.45<br>↓       | GREYWACKE | 22         | 2.75            |          |             | 3                  | 1              | 8                  | 3           | 4           | 15    | 1                       | 1           | 3           | 10                 | 1                |
|                   |          |       |       |     |   | 40.45            |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 1           | 3           | 10                 | 1                |
|                   |          |       |       |     |   | 3.00             |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 1           | 3           | 10                 | 1                |
|                   |          |       |       |     |   | G12              |           |            |                 | 0.25     | M5/M6       | 3                  | 1              |                    |             |             |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
 1.VERY SOFT (0-5)  
 2.SOFT (5-25)  
 3.HARD (25-45)  
 4.VERY HARD (45-105)  
 5.EXTREMELY HARD (105+)

**WEATHERING**  
 1.UNWEATHERED  
 2.SLIGHTLY  
 3.MODERATELY  
 4.HIGHLY  
 5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
 1.STRAIGHT  
 2.SLIGHT UNDULATION  
 3.CURVED  
 4.UNI DIRECTIONAL WAVY  
 5.MULTI DIRECTIONAL WAVY

**MICRO**  
 1.POLISHED  
 2.SMOOTH PLANAR  
 3.ROUGH PLANAR  
 4.SLICKENSIDED  
 5.SMOOTH UNDULATING  
 6.ROUGH UNDULATING  
 7.SLICKENSIDED STEPPED  
 8.SMOOTH STEPPED  
 9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
 1.GOUGE t > Amplit. of IRREG.  
 2.GOUGE t < Amplit. of IRREG.  
 Soft sheared material, e.g. Talc  
 3.FINE  
 4.MEDIUM  
 5.COARSE  
 Non-softening sheared material  
 6.FINE  
 7.MEDIUM  
 8.COARSE  
 9.STAINING  
 10.NONE

**JOINT WALL ALT.**  
 1.WALL = ROCK HARDNESS  
 2.WALL > ROCK HARDNESS  
 3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
 M1. FAULTS  
 M2. SHEARS  
 M3. INTENSE JOINTING  
 M4. INTENSE MINERALISATION  
 M5. DEFORMABLE MATERIAL  
 M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 9  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.00m

ELEVATION: 12.407mamsl  
CO-ORDS: X = 3726417.11  
Y = 53258.424

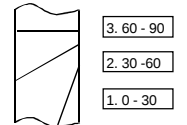
PAGE: 1 OF 2  
DATE: 28-04-2010  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution                     |             |             |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|-----|---|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|----------------------------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m   | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°                             | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 0.00              |          |       |       |     |   | 24.50<br>↓       | GREYWACKE | 11         | 1.35            |          |             | 1                  | 4              | 3                                      | 2           | 2           | 7     | 1                       | 1           | 2           | 10                 | 1                |
| 1.50              | 1.50     | 0.43  | 29    |     |   |                  |           |            |                 |          |             |                    |                |                                        |             |             |       | 2                       | 1           | 2           | 10                 | 1                |
| 1.95              | 0.45     | 0.19  | 42    |     |   | 25.85            |           |            |                 |          |             |                    |                |                                        |             |             |       | 3                       | 2           | 5           | 10                 | 1                |
| 3.00              | 1.05     | 0.56  | 53    |     |   | 1.35             |           |            |                 |          |             |                    |                |                                        |             |             |       |                         |             |             |                    |                  |
| 3.45              | 0.45     | 0.26  | 58    |     |   |                  |           |            |                 | 0        | 0           | 0                  | 0              |                                        |             |             |       |                         |             |             |                    |                  |
| 4.50              | 1.05     | 0.48  | 46    |     |   |                  |           |            |                 |          |             |                    |                |                                        |             |             |       |                         |             |             |                    |                  |
| 4.95              | 0.45     | 0.23  | 51    |     |   | G1               |           |            |                 |          |             |                    |                |                                        |             |             |       |                         |             |             |                    |                  |
| 6.00              | 1.05     | 0.49  | 47    |     |   | 25.85<br>↓       | GREYWACKE | 10         | 1.50            |          |             | 2                  | 4              | 4                                      | 1           | 5           | 10    | 1                       | 1           | 2           | 10                 | 1                |
| 6.45              | 0.45     | 0.25  | 56    |     |   |                  |           |            |                 |          |             |                    |                |                                        |             |             |       | 2                       | 1           | 2           | 9                  | 1                |
| 7.50              | 1.05     | 0.47  | 45    |     |   | 27.91            |           |            |                 |          |             |                    |                |                                        |             |             |       | 3                       | 1           | 2           | 9                  | 1                |
| 7.95              | 0.45     | 0.24  | 53    |     |   | 2.06             |           |            |                 |          |             |                    |                | 2. Yellow stained<br>3. Clayey infill  |             |             |       |                         |             |             |                    |                  |
| 9.00              | 1.05     | 0.61  | 58    |     |   |                  |           |            |                 | 0.56     | M3/M5       | 1-2                | 4              |                                        |             |             |       |                         |             |             |                    |                  |
| 9.45              | 0.45     | 0.23  | 51    |     |   |                  |           |            |                 |          |             |                    |                |                                        |             |             |       |                         |             |             |                    |                  |
| 10.50             | 1.05     | 0.46  | 44    |     |   | G2               |           |            |                 |          |             |                    |                |                                        |             |             |       |                         |             |             |                    |                  |
| 10.95             | 0.45     | 0.24  | 53    |     |   | 27.91<br>↓       | GREYWACKE | 33         | 2.09            |          |             | 2                  | 3              | 2                                      | 4           | 5           | 11    | 1                       | 1           | 2           | 10                 | 1                |
| 12.00             | 1.05     | 0.49  | 47    |     |   |                  |           |            |                 |          |             |                    |                |                                        |             |             |       | 2                       | 1           | 2           | 9                  | 1                |
| 12.45             | 0.45     | 0.29  | 64    |     |   | 30.00            |           |            |                 |          |             |                    |                |                                        |             |             |       | 3                       | 1           | 2           | 9                  | 1                |
| 13.50             | 1.05     | 0.54  | 51    |     |   | 2.09             |           |            |                 |          |             |                    |                | 2. Yellow stained<br>3. Yellow stained |             |             |       |                         |             |             |                    |                  |
| 13.95             | 0.45     | 0.26  | 58    |     |   |                  |           |            |                 | 0        | 0           | 0                  | 0              |                                        |             |             |       |                         |             |             |                    |                  |
| 15.00             | 1.05     | 0.51  | 49    |     |   |                  |           |            |                 |          |             |                    |                |                                        |             |             |       |                         |             |             |                    |                  |
| 15.45             | 0.45     | 0.25  | 56    |     |   | G3               |           |            |                 |          |             |                    |                |                                        |             |             |       |                         |             |             |                    |                  |
| 16.50             | 1.05     | 0.45  | 43    |     |   |                  |           |            |                 |          |             |                    |                |                                        |             |             |       |                         |             |             |                    |                  |
| 16.95             | 0.45     | 0.28  | 62    |     |   |                  |           |            |                 |          |             |                    |                |                                        |             |             |       |                         |             |             |                    |                  |
| 18.00             | 1.05     | 0.48  | 46    |     |   |                  |           |            |                 |          |             |                    |                |                                        |             |             |       |                         |             |             |                    |                  |
| 18.45             | 0.45     | 0.26  | 58    |     |   |                  |           |            |                 |          |             |                    |                |                                        |             |             |       |                         |             |             |                    |                  |
| 19.50             | 1.05     | 0.52  | 50    |     |   |                  |           |            |                 |          |             |                    |                |                                        |             |             |       |                         |             |             |                    |                  |
| 19.95             | 0.45     | 0.26  | 58    |     |   |                  |           |            |                 |          |             |                    |                |                                        |             |             |       |                         |             |             |                    |                  |
| 21.00             | 1.05     | 0.51  | 49    |     |   |                  |           |            |                 |          |             |                    |                |                                        |             |             |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
UNDULATING  
5.SMOOTH  
UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED  
STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**  
1.GOUGE t > Amplit. of IRREG.  
2.GOUGE t < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES



PROJECT: ESKOM GEOTECH INVEST

SITE: DUYNEFONTEIN

PROJECT No: 385908/42C

HOLE No: KB 9

INCLINATION: VERTICAL

FINAL DEPTH: 30.00m

ELEVATION: 12.407mamsl

CO-ORDS: X = 3726417.11

Y = 53258.424

PAGE: 2 OF 2

DATE: 28-04-2010

LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution |                |                |       | Joint Surface Condition |             |             |                    |                  |  |
|----------------------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|--------------------|----------------|----------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1<br>0° - 30°      | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |
| 21.00                            |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
| 21.45                            | 0.45     | 0.27  | 60    |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
| 22.50                            | 1.05     | 0.51  | 49    |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
| 22.95                            | 0.45     | 0.30  | 67    |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
| 24.00                            | 1.05     | 0.57  | 54    |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
| 24.45                            | 0.45     | 0.25  | 56    |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
| 25.50                            | 1.05     | 1.05  | 100   | 0.15 | 14 |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
| 27.00                            | 1.50     | 1.40  | 93    | 0.11 | 7  |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
| 28.50                            | 1.50     | 1.36  | 91    | 0.23 | 15 |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
| 30.00                            | 1.50     | 1.48  | 99    | 0.58 | 39 |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
| END OF HOLE - FINAL DEPTH 30.00m |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |



3. 60 - 90

2. 30 - 60

1. 0 - 30

JOINT CONDITION

MACRO

1. STRAIGHT  
2. SLIGHT UNDULATION  
3. CURVED  
4. UNI DIRECTIONAL WAVY  
5. MULTI DIRECTIONAL WAVY

MICRO

1. POLISHED  
2. SMOOTH PLANAR  
3. ROUGH PLANAR  
4. SLICK SIDED  
5. SMOOTH UNDULATING  
6. ROUGH UNDULATING  
7. SLICK SIDED STEPPED  
8. SMOOTH STEPPED  
9. ROUGH STEPPED / IRREGULAR

INFILL TYPE

1. GOUGE t. > Amplit. of IRREG.  
2. GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3. FINE  
4. MEDIUM  
5. COARSE  
Non-softening sheared material  
6. FINE  
7. MEDIUM  
8. COARSE  
9. STAINING  
10. NONE

JOINT WALL ALT.

1. WALL = ROCK HARDNESS  
2. WALL > ROCK HARDNESS  
3. WALL < ROCK HARDNESS

MATRIX TYPE

M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



**PROJECT: ESKOM GEOTECH INVEST**  
**SITE: DUYNEFONTEIN**  
**PROJECT No: 385908/42C**

**HOLE NO: KB 10**  
**INCLINATION: VERTICAL**  
**FINAL DEPTH: 26.92m**

**ELEVATION: 17.816mamsl**  
**CO-ORDS: X = 3726329.75**  
**Y = 53060.803**

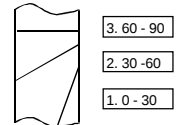
**PAGE: 1 OF 2**  
**DATE: 28-04-2010**  
**LOGGED BY: JB**

| Drilling Interval | Recovery |       |       | RQD |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution        |                |                |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|-----|---|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|---------------------------|----------------|----------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m   | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1<br>0° - 30°             | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 0.00              |          |       |       |     |   | 20.51<br>↓       | GREYWACKE | 5          | 2.20            |          |             | 2-3                | 3              | 8                         | 2              | 10             | 20    | 1                       | 1           | 2           | 10                 | 1                |
| 1.50              | 1.50     | 0.95  | 63    |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       | 2                       | 3           | 6           | 10                 | 1                |
| 1.95              | 0.45     | 0.31  | 69    |     |   | 24.76            |           |            |                 |          |             |                    |                |                           |                |                |       | 3                       | 1           | 2           | 10                 | 1                |
| 3.00              | 1.05     | 0.62  | 59    |     |   | 4.25             |           |            |                 |          |             |                    |                | 2. Coarse quartz crystals |                |                |       |                         |             |             |                    |                  |
| 3.45              | 0.45     | 0.20  | 44    |     |   |                  |           |            | 2.05            | M3/M6    |             | 2-3                | 3              |                           |                |                |       |                         |             |             |                    |                  |
| 4.50              | 1.05     | 0.48  | 46    |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |
| 4.95              | 0.45     | 0.24  | 53    |     |   | G1               |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |
| 6.00              | 1.05     | 0.72  | 69    |     |   | 24.76<br>↓       | GREYWACKE | 70         | 2.16            |          |             | 3-4                | 2              | 0                         | 2              | 10             | 12    | 1                       | 0           | 0           | 0                  | 0                |
| 6.45              | 0.45     | 0.22  | 49    |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       | 2                       | 5           | 9           | 10                 | 1                |
| 7.50              | 1.05     | 0.70  | 67    |     |   | 26.92            |           |            |                 |          |             |                    |                |                           |                |                |       | 3                       | 1           | 2           | 10                 | 1                |
| 7.95              | 0.45     | 0.19  | 42    |     |   | 2.16             |           |            |                 |          |             |                    |                | 2. Coarse quartz crystals |                |                |       |                         |             |             |                    |                  |
| 9.00              | 1.05     | 0.45  | 43    |     |   |                  |           |            | 0               | 0        | 0           | 0                  | 0              |                           |                |                |       |                         |             |             |                    |                  |
| 9.45              | 0.45     | 0.45  | 100   |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |
| 10.50             | 1.05     | 0.77  | 73    |     |   | G2               |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |
| 10.95             | 0.45     | 0.30  | 67    |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |
| 12.00             | 1.05     | 0.97  | 92    |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |
| 12.30             | 0.30     | 0.13  | 43    |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |
| 13.50             | 1.20     | 0.86  | 72    |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |
| 13.95             | 0.45     | 0.23  | 51    |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |
| 15.00             | 1.05     | 0.60  | 57    |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |
| 15.45             | 0.45     | 0.29  | 64    |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |
| 16.50             | 1.05     | 0.51  | 49    |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |
| 16.95             | 0.45     | 0.31  | 69    |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |
| 18.00             | 1.05     | 0.72  | 69    |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |
| 18.45             | 0.45     | 0.14  | 31    |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |
| 19.50             | 1.05     | 0.82  | 78    |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |
| 19.75             | 0.25     | 0.27  | 108   |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |
| 20.92             | 1.17     | 0.58  | 50    |     |   |                  |           |            |                 |          |             |                    |                |                           |                |                |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
 1.VERY SOFT (0-5)  
 2.SOFT (5-25)  
 3.HARD (25-45)  
 4.VERY HARD (45-105)  
 5.EXTREMELY HARD (105+)

**WEATHERING**  
 1.UNWEATHERED  
 2.SLIGHTLY  
 3.MODERATELY  
 4.HIGHLY  
 5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
 1.STRAIGHT  
 2.SLIGHT UNDULATION  
 3.CURVED  
 4.UNI DIRECTIONAL WAVY  
 5.MULTI DIRECTIONAL WAVY

**MICRO**  
 1.POLISHED  
 2.SMOOTH PLANAR  
 3.ROUGH PLANAR  
 4.SLICKENSIDED  
 5.SMOOTH UNDULATING  
 6.ROUGH UNDULATING  
 7.SLICKENSIDED STEPPED  
 8.SMOOTH STEPPED  
 9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
 1.GOUGE t > Amplit. of IRREG.  
 2.GOUGE t < Amplit. of IRREG.  
 Soft sheared material, e.g. Talc  
 3.FINE  
 4.MEDIUM  
 5.COARSE  
 Non-softening sheared material  
 6.FINE  
 7.MEDIUM  
 8.COARSE  
 9.STAINING  
 10.NONE

**JOINT WALL ALT.**  
 1.WALL = ROCK HARDNESS  
 2.WALL > ROCK HARDNESS  
 3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
 M1. FAULTS  
 M2. SHEARS  
 M3. INTENSE JOINTING  
 M4. INTENSE MINERALISATION  
 M5. DEFORMABLE MATERIAL  
 M6. INTENSE DRILLING FRACTURES



**SRK Consulting**  
Engineers and Scientists

HOLE NO: KB 10  
INCLINATION: VERTICAL  
FINAL DEPTH: 26.92m

ELEVATION: 17.816mamsl  
CO-ORDS: X = 3726329.75  
Y = 53060.803

PAGE: 2 OF 2  
DATE: 28-04-2010  
LOGGED BY: JB

[illegible]

| HARDNESS (MPa)          |  |
|-------------------------|--|
| 1.VERY SOFT (0-5)       |  |
| 2.SOFT (5-25)           |  |
| 3.HARD (25-45)          |  |
| 4.VERY HARD (45-105)    |  |
| 5.EXTREMELY HARD (105+) |  |

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMPLETLY

1.0 - 30

## MACRO

- MACRO
1. STRAIGHT
  2. SLIGHT UNDULATION
  3. CURVED
  4. UNI DIRECTIONAL WAVY
  5. MULTI DIRECTIONAL WAVY

## MICRO

- 1.POLISHED
- 2.SMOOTH PLANAR
- 3.ROUGH PLANAR
- 4.SLICKENSIDED  
UNDULATING
- 5.SMOOTH  
UNDULATING
- 6.ROUGH UNDULATING
- 7.SLICKENSIDED  
STEPPED
- 8.SMOOTH STEPPED
- 9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**

- 1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10. NONE

## JOINT WALL ALT.

- JOINT WALL ALT.
1. WALL = ROCK HARDNESS
  2. WALL > ROCK HARDNESS
  3. WALL < ROCK HARDNESS

**MATRIX TYPE**

- MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNEFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 11  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.13m

ELEVATION: 16.221mamsl  
CO-ORDS: X = 3726527.38  
Y = 52967.352

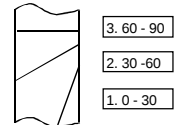
PAGE: 1 OF 2  
DATE: 03-04-2009  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD  |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|------|---|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m    | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 0.00              |          |       |       |      |   | 26.48            | SHALE     | 0          | 0.00            |          |             | 1                    | 5                | 0                  | 0           | 0           | 0     | 1                       | 0           | 0           | 0                  | 0                |
| 1.50              | 1.50     | 1.06  | 71    | 0.00 | 0 | ↓                |           |            |                 |          |             |                      |                  |                    |             |             |       | 2                       | 0           | 0           | 0                  | 0                |
| 1.95              | 0.45     | 0.19  | 42    | 0.00 | 0 | 27.26            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 0           | 0           | 0                  | 0                |
| 3.00              | 1.05     | 1.03  | 98    | 0.00 | 0 | 0.78             |           |            | 0.78            | M6       | 1           | 5                    |                  |                    |             |             |       |                         |             |             |                    |                  |
| 3.45              | 0.45     | 0.32  | 71    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |
| 4.50              | 1.05     | 1.18  | 112   | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |
| 4.95              | 0.45     | 0.21  | 47    | 0.00 | 0 |                  |           |            |                 |          |             |                      | G1               |                    |             |             |       |                         |             |             |                    |                  |
| 6.00              | 1.05     | 1.21  | 115   | 0.00 | 0 | 27.26            | GREYWACKE | 19         | 0.56            |          |             | 2                    | 3                | 5                  | 2           | 0           | 7     | 1                       | 5           | 8           | 10                 | 1                |
| 6.45              | 0.45     | 0.20  | 44    | 0.00 | 0 | ↓                |           |            |                 |          |             |                      |                  |                    |             |             |       | 2                       | 2           | 5           | 9                  | 1                |
| 7.50              | 1.05     | 0.83  | 79    | 0.00 | 0 | 27.93            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 0           | 0           | 0                  | 0                |
| 7.95              | 0.45     | 0.45  | 100   | 0.00 | 0 | 0.67             |           |            | 0.11            | M5/M6    | 2           | 3                    |                  |                    |             |             |       |                         |             |             |                    |                  |
| 9.00              | 1.05     | 0.89  | 85    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |
| 9.45              | 0.45     | 0.41  | 91    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |
| 10.50             | 1.05     | 0.95  | 90    | 0.00 | 0 |                  |           |            |                 |          |             |                      | G2               |                    |             |             |       |                         |             |             |                    |                  |
| 10.95             | 0.45     | 0.35  | 78    | 0.00 | 0 | 27.93            | GREYWACKE | 0          | 0.14            |          |             | 1                    | 4-5              | 2                  | 3           | 1           | 6     | 1                       | 1           | 2           | 10                 | 1                |
| 12.00             | 1.05     | 0.84  | 80    | 0.00 | 0 | ↓                |           |            |                 |          |             |                      |                  |                    |             |             |       | 2                       | 2           | 5           | 3                  | 1                |
| 12.45             | 0.45     | 0.45  | 100   | 0.00 | 0 | 28.42            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |
| 13.50             | 1.05     | 0.82  | 78    | 0.00 | 0 | 0.49             |           |            | 0.35            | M5/M6    | 1           | 4-5                  |                  |                    |             |             |       |                         |             |             |                    |                  |
| 13.95             | 0.45     | 0.45  | 100   | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |
| 15.00             | 1.05     | 0.84  | 80    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |
| 15.45             | 0.45     | 0.45  | 100   | 0.00 | 0 |                  |           |            |                 |          |             |                      | G3               |                    |             |             |       |                         |             |             |                    |                  |
| 16.50             | 1.05     | 0.80  | 76    | 0.00 | 0 | 28.42            | GREYWACKE | 22         | 1.46            |          |             | 2-3                  | 2                | 3                  | 6           | 0           | 9     | 1                       | 2           | 5           | 3                  | 1                |
| 16.95             | 0.45     | 0.42  | 93    | 0.00 | 0 | ↓                |           |            |                 |          |             |                      |                  |                    |             |             |       | 2                       | 1           | 2           | 3                  | 1                |
| 18.13             | 1.18     | 0.84  | 71    | 0.00 | 0 | 29.88            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 0           | 0           | 0                  | 0                |
| 18.58             | 0.45     | 0.38  | 84    | 0.00 | 0 | 1.46             |           |            | 0               | 0        | 0           | 0                    |                  |                    |             |             |       |                         |             |             |                    |                  |
| 19.63             | 1.05     | 0.86  | 82    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |
| 20.08             | 0.45     | 0.45  | 100   | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |
| 21.13             | 1.05     | 0.78  | 74    | 0.00 | 0 |                  |           |            |                 |          |             |                      | G4               |                    |             |             |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
UNDULATING  
5.SMOOTH  
UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED  
STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**  
1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 11  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.13m

ELEVATION: 16.221mamsl  
CO-ORDS: X = 3726527.38  
Y = 52967.352

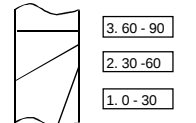
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DATE: 03-04-2009  
LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|----------------------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|---|----|---|---|---|---|---|---|---|---|---|---|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |   |    |   |   |   |   |   |   |   |   |   |   |
| 21.13                            |          |       |       |      |    | 29.88            | GREYWACKE | 0          | 0.00            |          |             | 2                    | 4                | 0                  | 1           | 0           | 1     | 0                       | 5           | 3           | 0                  | 0                |   |    |   |   |   |   |   |   |   |   |   |   |
| 21.58                            | 0.45     | 0.29  | 64    | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  | 2 | 4  | 0 | 1 | 0 | 1 | 1 | 2 | 2 | 5 | 3 | 1 |
| 22.63                            | 1.05     | 0.60  | 57    | 0.00 | 0  | 30.13            |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  | 3 | 0  | 0 | 0 | 0 | 0 |   |   |   |   |   |   |
| 23.08                            | 0.45     | 0.32  | 71    | 0.00 | 0  | 0.25             |           |            |                 | 0.25     | M5/M6       | 2                    | 4                |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
| 24.13                            | 1.05     | 0.51  | 49    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
| 24.58                            | 0.45     | 0.31  | 69    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
| 25.63                            | 1.05     | 0.85  | 81    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   | G5 |   |   |   |   |   |   |   |   |   |   |
| 26.08                            | 0.45     | 0.28  | 62    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
| 27.13                            | 1.05     | 0.70  | 67    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    | 1                |   |    |   |   |   |   |   |   |   |   |   |   |
| 28.63                            | 1.50     | 1.41  | 94    | 0.13 | 9  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    | 2                |   |    |   |   |   |   |   |   |   |   |   |   |
| 30.13                            | 1.50     | 1.41  | 94    | 0.32 | 21 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    | 3                |   |    |   |   |   |   |   |   |   |   |   |   |
| END OF HOLE - FINAL DEPTH 30.13m |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  | 1 |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  | 2 |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  | 3 |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  | 1 |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  | 2 |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  | 3 |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  | 1 |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  | 2 |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  | 3 |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |   |    |   |   |   |   |   |   |   |   |   |   |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t > Amplit. of IRREG.  
2.GOUGE t < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNEFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 12  
INCLINATION: VERTICAL  
FINAL DEPTH: 40.14m

ELEVATION: 16.367mamsl  
CO-ORDS: X = 3726736.26  
Y = 52859.935

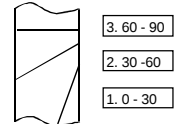
PAGE: 1 OF 2  
DATE: 03-04-2009  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD  |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution   |             |             |       | Joint Surface Condition |             |             |                    |                  |  |
|-------------------|----------|-------|-------|------|---|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|----------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|
|                   | m Drill  | m Rec | % Rec | m    | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°           | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |
| 0.00              |          |       |       |      |   | 24.45            | GREYWACKE | 35         | 3.58            |          |             | 3                  | 2              | 3                    | 17          | 8           | 28    | 1                       | 1           | 3           | 9                  | 1                |  |
| 1.50              | 1.50     | 0.76  | 51    | 0.00 | 0 | ↓                |           |            |                 |          |             |                    |                |                      |             |             |       | 2                       | 1           | 2           | 6                  | 1                |  |
| 1.95              | 0.45     | 0.19  | 42    | 0.00 | 0 | 28.10            |           |            |                 |          |             |                    |                |                      |             |             |       | 3                       | 3           | 5           | 9                  | 1                |  |
| 3.00              | 1.05     | 0.63  | 60    | 0.00 | 0 | 3.65             |           |            |                 | 0.07     | M5/M6       | 3                  | 2              | 2. Calcite           |             |             |       |                         |             |             |                    |                  |  |
| 3.45              | 0.45     | 0.17  | 38    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                      |             |             |       |                         |             |             |                    |                  |  |
| 4.50              | 1.05     | 0.62  | 59    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                      |             |             |       |                         |             |             |                    |                  |  |
| 4.95              | 0.45     | 0.24  | 53    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                      |             |             |       |                         |             |             |                    |                  |  |
| 6.00              | 1.05     | 0.77  | 73    | 0.00 | 0 | 28.10            | GREYWACKE | 16         | 3.94            |          |             | 3                  | 2-3            | 3                    | 4           | 37          | 44    | 1                       | 2           | 5           | 3                  | 1                |  |
| 6.45              | 0.45     | 0.32  | 71    | 0.00 | 0 | ↓                |           |            |                 |          |             |                    |                |                      |             |             |       | 2                       | 5           | 8           | 9                  | 1                |  |
| 7.50              | 1.05     | 0.96  | 91    | 0.00 | 0 | 32.54            |           |            |                 |          |             |                    |                |                      |             |             |       | 3                       | 2           | 5           | 10                 | 1                |  |
| 7.95              | 0.45     | 0.31  | 69    | 0.00 | 0 | 4.44             |           |            |                 | 0.50     | M5/M6       | 2-3                | 2-3            | 1. Quartz infill 1mm |             |             |       |                         |             |             |                    |                  |  |
| 9.00              | 1.05     | 0.84  | 80    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                      |             |             |       |                         |             |             |                    |                  |  |
| 9.45              | 0.45     | 0.23  | 51    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                      |             |             |       |                         |             |             |                    |                  |  |
| 10.50             | 1.05     | 0.91  | 87    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                      |             |             |       |                         |             |             |                    |                  |  |
| 10.95             | 0.45     | 0.29  | 64    | 0.00 | 0 | 32.54            | GREYWACKE | 50         | 7.59            |          |             | 4                  | 1              | 4                    | 11          | 31          | 46    | 1                       | 3           | 5           | 10                 | 1                |  |
| 12.00             | 1.05     | 0.83  | 79    | 0.00 | 0 | ↓                |           |            |                 |          |             |                    |                |                      |             |             |       | 2                       | 1           | 2           | 3                  | 1                |  |
| 12.45             | 0.45     | 0.25  | 56    | 0.00 | 0 | 40.14            |           |            |                 |          |             |                    |                |                      |             |             |       | 3                       | 2           | 5           | 3                  | 1                |  |
| 13.50             | 1.05     | 0.71  | 68    | 0.00 | 0 | 7.60             |           |            |                 | 0.11     | M6          | 4                  | 1              | Clayey infill        |             |             |       |                         |             |             |                    |                  |  |
| 13.95             | 0.45     | 0.38  | 84    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                      |             |             |       |                         |             |             |                    |                  |  |
| 15.00             | 1.05     | 0.86  | 82    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                      |             |             |       |                         |             |             |                    |                  |  |
| 15.45             | 0.45     | 0.28  | 62    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                      |             |             |       |                         |             |             |                    |                  |  |
| 16.50             | 1.05     | 0.87  | 83    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                      |             |             |       |                         |             |             |                    |                  |  |
| 16.95             | 0.45     | 0.24  | 53    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                      |             |             |       |                         |             |             |                    |                  |  |
| 18.00             | 1.05     | 0.59  | 56    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                      |             |             |       |                         |             |             |                    |                  |  |
| 18.45             | 0.45     | 0.28  | 62    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                      |             |             |       |                         |             |             |                    |                  |  |
| 19.50             | 1.05     | 0.65  | 62    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                      |             |             |       |                         |             |             |                    |                  |  |
| 19.95             | 0.45     | 0.26  | 58    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                      |             |             |       |                         |             |             |                    |                  |  |
| 21.00             | 1.05     | 0.66  | 63    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                      |             |             |       |                         |             |             |                    |                  |  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES



**SRK Consulting**  
Engineers and Scientists

PAGE: 2 OF 2  
DATE: 03-04-2009  
LOGGED BY: JB

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

[illegible]

# GEOTECHNICAL BOREHOLE LOG



**PROJECT: ESKOM GEOTECH INVEST**  
**SITE: DUYNFONTEIN**  
**PROJECT No: 385908/42C**

**HOLE NO: KB 13**  
**INCLINATION: VERTICAL**  
**FINAL DEPTH: 28.50m**

**ELEVATION: 15.493mamsl**  
**CO-ORDS: X = 3726931.63**  
**Y = 52768.018**

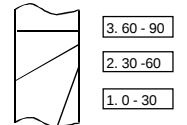
**PAGE: 1 OF 2**  
**DATE: 30-04-2010**  
**LOGGED BY: JB**

| Drilling Interval | Recovery |       |       | RQD  |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution     |                |                |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|------|---|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|------------------------|----------------|----------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m    | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1<br>0° - 30°          | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 0.00              |          |       |       |      |   | 22.95<br>↓       | GREYWACKE | 0          | 0.00            |          |             | 2-3                | 3              | 0                      | 0              | 0              | 0     | 1                       | 0           | 0           | 0                  | 0                |
| 1.50              | 1.50     | 0.44  | 29    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                        |                |                |       | 2                       | 0           | 0           | 0                  | 0                |
| 1.95              | 0.45     | 0.21  | 47    | 0.00 | 0 | 24.00            |           |            |                 |          |             |                    |                |                        |                |                |       | 3                       | 0           | 0           | 0                  | 0                |
| 3.00              | 1.05     | 0.43  | 41    | 0.00 | 0 | 1.05             |           |            |                 | 1.05     | M5/M6       | 2-3                | 3              |                        |                |                |       |                         |             |             |                    |                  |
| 3.45              | 0.45     | 0.20  | 44    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
| 4.50              | 1.05     | 0.37  | 35    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
| 4.95              | 0.45     | 0.19  | 42    | 0.00 | 0 | G1               |           |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
| 6.00              | 1.05     | 0.37  | 35    | 0.00 | 0 | 24.00<br>↓       | GREYWACKE | 0          | 0.61            |          |             | 2-3                | 3              | 2                      | 1              | 1              | 4     | 1                       | 1           | 2           | 9                  | 1                |
| 6.45              | 0.45     | 0.20  | 44    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                        |                |                |       | 2                       | 1           | 2           | 10                 | 1                |
| 7.50              | 1.05     | 0.46  | 44    | 0.00 | 0 | 24.61            |           |            |                 |          |             |                    |                |                        |                |                |       | 3                       | 2           | 6           | 10                 | 1                |
| 7.95              | 0.45     | 0.22  | 49    | 0.00 | 0 | 0.61             |           |            |                 |          |             |                    |                | 1. Clayey Silt.        |                |                |       |                         |             |             |                    |                  |
| 9.00              | 1.05     | 0.49  | 47    | 0.00 | 0 |                  |           |            |                 | 0        | 0           | 2-3                | 3              |                        |                |                |       |                         |             |             |                    |                  |
| 9.45              | 0.45     | 0.21  | 47    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
| 10.50             | 1.05     | 0.48  | 46    | 0.00 | 0 | G2               |           |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
| 10.95             | 0.45     | 0.19  | 42    | 0.00 | 0 | 24.61<br>↓       | GREYWACKE | 0          | 0               |          |             | 2                  | 4              | 0                      | 0              | 0              | 0     | 1                       | 0           | 0           | 0                  | 0                |
| 12.00             | 1.05     | 0.47  | 45    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                        |                |                |       | 2                       | 0           | 0           | 0                  | 0                |
| 12.45             | 0.45     | 0.17  | 38    | 0.00 | 0 | 24.80            |           |            |                 |          |             |                    |                |                        |                |                |       | 3                       | 0           | 0           | 0                  | 0                |
| 13.50             | 1.05     | 0.51  | 49    | 0.00 | 0 | 0.19             |           |            |                 | 0.19     | M3/M5       | 2                  | 4              |                        |                |                |       |                         |             |             |                    |                  |
| 13.95             | 0.45     | 0.20  | 44    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
| 15.00             | 1.05     | 0.55  | 52    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
| 15.45             | 0.45     | 0.20  | 44    | 0.00 | 0 | G3               |           |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
| 16.50             | 1.05     | 0.50  | 48    | 0.00 | 0 | 24.80<br>↓       | GREYWACKE | 15         | 2.45            |          |             | 3                  | 2-3            | 8                      | 6              | 5              | 19    | 1                       | 2           | 5           | 9                  | 1                |
| 16.95             | 0.45     | 0.22  | 49    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                        |                |                |       | 2                       | 2           | 5           | 9                  | 1                |
| 18.00             | 1.05     | 0.56  | 53    | 0.00 | 0 | 27.43            |           |            |                 |          |             |                    |                |                        |                |                |       | 3                       | 1           | 2           | 9                  | 1                |
| 18.45             | 0.45     | 0.18  | 40    | 0.00 | 0 | 2.63             |           |            |                 |          |             |                    |                | 1. Clayey Silt Infill. |                |                |       |                         |             |             |                    |                  |
| 19.50             | 1.05     | 0.45  | 43    | 0.00 | 0 |                  |           |            |                 | 0.18     | M6          | 2-3                | 2-3            | 2. Clayey Silt Infill. |                |                |       |                         |             |             |                    |                  |
| 19.95             | 0.45     | 0.21  | 47    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                | 3. Clayey Silt infill. |                |                |       |                         |             |             |                    |                  |
| 21.00             | 1.05     | 0.51  | 49    | 0.00 | 0 | G4               |           |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
 1.VERY SOFT (0-5)  
 2.SOFT (5-25)  
 3.HARD (25-45)  
 4.VERY HARD (45-105)  
 5.EXTREMELY HARD (105+)

**WEATHERING**  
 1.UNWEATHERED  
 2.SLIGHTLY  
 3.MODERATELY  
 4.HIGHLY  
 5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
 1.STRAIGHT  
 2.SLIGHT UNDULATION  
 3.CURVED  
 4.UNI DIRECTIONAL WAVY  
 5.MULTI DIRECTIONAL WAVY

**MICRO**  
 1.POLISHED  
 2.SMOOTH PLANAR  
 3.ROUGH PLANAR  
 4.SLICKENSIDED  
 5.SMOOTH  
 6.ROUGH UNDULATING  
 7.SLICKENSIDED  
 8.SMOOTH STEPPED  
 9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
 1.GOUGE t. > Amplit. of IRREG.  
 2.GOUGE t. < Amplit. of IRREG.  
 Soft sheared material, e.g. Talc  
 3.FINE  
 4.MEDIUM  
 5.COARSE  
 Non-softening sheared material  
 6.FINE  
 7.MEDIUM  
 8.COARSE  
 9.STAINING  
 10.NONE

**JOINT WALL ALT.**  
 1.WALL = ROCK HARDNESS  
 2.WALL > ROCK HARDNESS  
 3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
 M1. FAULTS  
 M2. SHEARS  
 M3. INTENSE JOINTING  
 M4. INTENSE MINERALISATION  
 M5. DEFORMABLE MATERIAL  
 M6. INTENSE DRILLING  
 FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 13  
INCLINATION: VERTICAL  
FINAL DEPTH: 28.50m

ELEVATION: 15.493mamsl  
CO-ORDS: X = 3726931.63  
Y = 52768.018

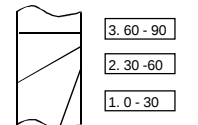
PAGE: 2 OF 2  
DATE: 30-04-2010  
LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type            | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution     |                |                |       | Joint Surface Condition |             |             |                    |                  |
|----------------------------------|----------|-------|-------|------|----|------------------|----------------------|------------|-----------------|----------|-------------|--------------------|----------------|------------------------|----------------|----------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                  |                      |            | Solid m         | Matrix m | Matrix Type |                    |                | 1<br>0° - 30°          | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 21.00                            |          |       |       |      |    | 27.43            | QUARTZITIC SANDSTONE | 26         | 1.07            |          |             | 3                  | 1              | 4                      | 1              | 6              | 11    | 1                       | 1           | 2           | 9                  | 1                |
| 21.45                            | 0.45     | 0.25  | 56    | 0.00 | 0  | ↓                |                      |            |                 |          |             |                    |                |                        |                |                |       | 2                       | 1           | 2           | 10                 | 1                |
| 22.50                            | 1.05     | 0.50  | 48    | 0.00 | 0  | 28.50            |                      |            |                 |          |             |                    |                |                        |                |                |       | 3                       | 1           | 2           | 10                 | 1                |
| 22.95                            | 0.45     | 0.23  | 51    | 0.00 | 0  | 1.07             |                      |            |                 |          |             |                    |                | 1. Clayey Silt Infill. |                |                |       |                         |             |             |                    |                  |
| 24.00                            | 1.05     | 0.39  | 37    | 0.00 | 0  |                  |                      |            |                 | 0        | 0           | 0                  | 0              |                        |                |                |       |                         |             |             |                    |                  |
| 25.50                            | 1.50     | 1.30  | 87    | 0.17 | 11 |                  |                      |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
| 27.00                            | 1.50     | 1.39  | 93    | 0.38 | 25 | G5               |                      |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
| 28.50                            | 1.50     | 1.45  | 97    | 0.28 | 19 |                  |                      |            |                 |          |             |                    |                |                        |                |                |       | 1                       |             |             |                    |                  |
| END OF HOLE - FINAL DEPTH 28.50m |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       | 2                       |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       | 3                       |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       | 1                       |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       | 2                       |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       | 3                       |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       | 1                       |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       | 2                       |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       | 3                       |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |                      |            |                 |          |             |                    |                |                        |                |                |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



**PROJECT: ESKOM GEOTECH INVEST**  
**SITE: DUYNEFONTEIN**  
**PROJECT No: 385908/42C**

**HOLE NO: KB 14**  
**INCLINATION: VERTICAL**  
**FINAL DEPTH: 27.05m**

**ELEVATION: 15.636mamsl**  
**CO-ORDS: X = 3727135.09**  
**Y = 52676.96**

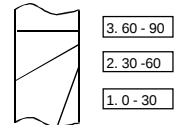
**PAGE: 1 OF 2**  
**DATE: 29-04-2010**  
**LOGGED BY: JB**

| Drilling Interval | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution  |                |                |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|---------------------|----------------|----------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1<br>0° - 30°       | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 0.00              |          |       |       |      |    | 19.95            | GREYWACKE | 6          |                 |          |             | 3                  | 1              |                     |                |                |       | 1                       | 1           | 2           | 10                 | 1                |
| 1.50              | 1.50     | 0.75  | 50    | 0.00 | 0  | ↓                |           |            | 3.94            |          |             |                    |                | 13                  | 20             | 8              | 41    | 2                       | 1           | 2           | 10                 | 1                |
| 1.95              | 0.45     | 0.12  | 27    | 0.00 | 0  | 24.26            |           |            |                 |          |             |                    |                |                     |                |                |       | 3                       | 1           | 2           | 10                 | 1                |
| 3.05              | 1.10     | 0.46  | 42    | 0.00 | 0  | 4.31             |           |            |                 |          |             | 3                  | 1              |                     |                |                |       |                         |             |             |                    |                  |
| 3.50              | 0.45     | 0.15  | 33    | 0.00 | 0  |                  |           |            |                 | 0.37     | M3/M6       |                    |                |                     |                |                |       |                         |             |             |                    |                  |
| 4.55              | 1.05     | 0.40  | 38    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                     |                |                |       |                         |             |             |                    |                  |
| 5.00              | 0.45     | 0.25  | 56    | 0.00 | 0  | G1               |           |            |                 |          |             |                    |                |                     |                |                |       |                         |             |             |                    |                  |
| 6.00              | 1.00     | 0.78  | 78    | 0.00 | 0  | 24.26            | SHALE     | 0          | 1.05            |          |             | 3                  | 2              | 5                   | 4              | 0              | 9     | 1                       | 2           | 5           | 10                 | 1                |
| 6.45              | 0.45     | 0.29  | 64    | 0.00 | 0  | ↓                |           |            |                 |          |             |                    |                |                     |                |                |       | 2                       | 1           | 2           | 10                 | 1                |
| 7.50              | 1.05     | 0.65  | 62    | 0.00 | 0  | 25.70            |           |            |                 |          |             |                    |                |                     |                |                |       | 3                       | 0           | 0           | 0                  | 0                |
| 7.95              | 0.45     | 0.29  | 64    | 0.00 | 0  | 1.44             |           |            |                 |          |             | 3                  | 2              |                     |                |                |       |                         |             |             |                    |                  |
| 9.00              | 1.05     | 0.55  | 52    | 0.00 | 0  |                  |           |            |                 | 0.39     | M3/M5       |                    |                |                     |                |                |       |                         |             |             |                    |                  |
| 9.45              | 0.45     | 0.31  | 69    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                     |                |                |       |                         |             |             |                    |                  |
| 10.50             | 1.05     | 0.58  | 55    | 0.00 | 0  | G2               |           |            |                 |          |             |                    |                |                     |                |                |       |                         |             |             |                    |                  |
| 10.95             | 0.45     | 0.14  | 31    | 0.00 | 0  | 25.70            | GREYWACKE | 19         | 1.29            |          |             | 3                  | 1              | 0                   | 3              | 7              | 10    | 1                       | 0           | 0           | 0                  | 0                |
| 12.00             | 1.05     | 0.69  | 66    | 0.00 | 0  | ↓                |           |            |                 |          |             |                    |                |                     |                |                |       | 2                       | 2           | 5           | 10                 | 1                |
| 12.45             | 0.45     | 0.30  | 67    | 0.00 | 0  | 27.05            |           |            |                 |          |             |                    |                |                     |                |                |       | 3                       | 5           | 9           | 6                  | 1                |
| 13.50             | 1.05     | 0.77  | 73    | 0.00 | 0  | 1.35             |           |            |                 |          |             | 3                  | 1              | 3. Quartz Crystals. |                |                |       |                         |             |             |                    |                  |
| 13.95             | 0.45     | 0.32  | 71    | 0.00 | 0  |                  |           |            |                 | 0.06     | M6          |                    |                |                     |                |                |       |                         |             |             |                    |                  |
| 15.00             | 1.05     | 0.78  | 74    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                     |                |                |       |                         |             |             |                    |                  |
| 15.45             | 0.45     | 0.32  | 71    | 0.00 | 0  | G3               |           |            |                 |          |             |                    |                |                     |                |                |       |                         |             |             |                    |                  |
| 16.50             | 1.05     | 0.58  | 55    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                     |                |                |       | 1                       |             |             |                    |                  |
| 16.95             | 0.45     | 0.45  | 100   | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                     |                |                |       | 2                       |             |             |                    |                  |
| 18.00             | 1.05     | 0.24  | 23    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                     |                |                |       | 3                       |             |             |                    |                  |
| 18.45             | 0.45     | 0.45  | 100   | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                     |                |                |       |                         |             |             |                    |                  |
| 19.50             | 1.05     | 0.52  | 50    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                     |                |                |       |                         |             |             |                    |                  |
| 19.95             | 0.45     | 0.45  | 100   | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                     |                |                |       |                         |             |             |                    |                  |
| 21.05             | 1.10     | 1.15  | 105   | 0.26 | 24 |                  |           |            |                 |          |             |                    |                |                     |                |                |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
 1.VERY SOFT (0-5)  
 2.SOFT (5-25)  
 3.HARD (25-45)  
 4.VERY HARD (45-105)  
 5.EXTREMELY HARD (105+)

**WEATHERING**  
 1.UNWEATHERED  
 2.SLIGHTLY  
 3.MODERATELY  
 4.HIGHLY  
 5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
 1.STRAIGHT  
 2.SLIGHT UNDULATION  
 3.CURVED  
 4.UNI DIRECTIONAL WAVY  
 5.MULTI DIRECTIONAL WAVY

**MICRO**  
 1.POLISHED  
 2.SMOOTH PLANAR  
 3.ROUGH PLANAR  
 4.SLICKENSIDED  
 5.SMOOTH  
 6.ROUGH UNDULATING  
 7.SLICKENSIDED  
 8.SMOOTH STEPPED  
 9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
 1.GOUGE t. > Amplit. of IRREG.  
 2.GOUGE t. < Amplit. of IRREG.  
 Soft sheared material, e.g. Talc  
 3.FINE  
 4.MEDIUM  
 5.COARSE  
 Non-softening sheared material  
 6.FINE  
 7.MEDIUM  
 8.COARSE  
 9.STAINING  
 10.NONE

**JOINT WALL ALT.**  
 1.WALL = ROCK HARDNESS  
 2.WALL > ROCK HARDNESS  
 3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
 M1. FAULTS  
 M2. SHEARS  
 M3. INTENSE JOINTING  
 M4. INTENSE MINERALISATION  
 M5. DEFORMABLE MATERIAL  
 M6. INTENSE DRILLING  
 FRACTURES



**SRK Consulting**  
Engineers and Scientists

PROJECT: ESKOM GEOTECH INVEST

SITE: DUYNEFONTEIN

PROJECT No: 385908/42C

HOLE No: KB 14

INCLINATION: VERTICAL

FINAL DEPTH: 27.05m

ELEVATION: 15.636mamsl

CO-ORDS: X = 3727135.09

Y = 52676.96

PAGE: 2 OF 2

DATE: 29-04-2010

LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution |                |                |       | Joint Surface Condition |             |             |                    |                  |  |  |  |
|----------------------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|--------------------|----------------|----------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|--|--|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1<br>0° - 30°      | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |  |  |
| 21.05                            |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       | 1                       |             |             |                    |                  |  |  |  |
| 22.55                            | 1.50     | 1.54  | 103   | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             | 2           |                    |                  |  |  |  |
| 24.05                            | 1.50     | 1.35  | 90    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             | 3           |                    |                  |  |  |  |
| 25.55                            | 1.50     | 0.94  | 63    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |  |  |
| 27.05                            | 1.50     | 1.40  | 93    | 0.25 | 17 |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |  |  |
| END OF HOLE - FINAL DEPTH 27.05m |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       | 1                       |             |             |                    |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             | 2                  |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             | 3                  |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       | 1                       |             |             |                    |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             | 2                  |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             | 3                  |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       | 1                       |             |             |                    |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             | 2                  |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             | 3                  |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       | 1                       |             |             |                    |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             | 2                  |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             | 3                  |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       | 1                       |             |             |                    |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             | 2                  |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             | 3                  |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |                |                |       |                         |             |             |                    |                  |  |  |  |



3. 60 - 90

2. 30 - 60

1. 0 - 30

JOINT CONDITION

MACRO

1. STRAIGHT  
2. SLIGHT UNDULATION  
3. CURVED  
4. UNI DIRECTIONAL WAVY  
5. MULTI DIRECTIONAL WAVY

MICRO

1. POLISHED  
2. SMOOTH PLANAR  
3. ROUGH PLANAR  
4. SLICK SIDED  
5. SMOOTH UNDULATING  
6. ROUGH UNDULATING  
7. SLICK SIDED STEPPED  
8. SMOOTH STEPPED  
9. ROUGH STEPPED / IRREGULAR

INFILL TYPE

1. GOUGE t. > Amplit. of IRREG.  
2. GOUGE t. < Amplit. of IRREG.  
3. FINE  
4. MEDIUM  
5. COARSE  
6. FINE  
7. MEDIUM  
8. COARSE  
9. STAINING  
10. NONE

JOINT WALL ALT.

1. WALL = ROCK HARDNESS  
2. WALL > ROCK HARDNESS  
3. WALL < ROCK HARDNESS

MATRIX TYPE

M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



**PROJECT: ESKOM GEOTECH INVEST**  
**SITE: DUYNFONTEIN**  
**PROJECT No: 385908/42C**

**HOLE NO: KB 17**  
**INCLINATION: VERTICAL**  
**FINAL DEPTH: 21.58m**

**ELEVATION: 7.149mamsl**  
**CO-ORDS: X = 3727058.02**  
**Y = 53079.818**

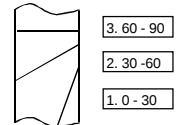
**PAGE: 1 OF 2**  
**DATE: 03-05-2010**  
**LOGGED BY: JB**

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution                                             |             |             |       | Joint Surface Condition |             |             |                    |                  |  |
|----------------------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|----------------------------------------------------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1 0° - 30°                                                     | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |
| 0.00                             |          |       |       |      |    | 16.02            | SHALE     | 0          | 0.97            |          |             | 2                    | 3                | 9                                                              | 0           | 3           | 12    | 1                       | 1           | 2           | 10                 | 1                |  |
| 1.50                             | 1.50     | 0.85  | 57    | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                                                                |             |             |       | 2                       | 0           | 0           | 0                  | 0                |  |
| 1.95                             | 0.45     | 0.44  | 98    | 0.00 | 0  | 16.99            |           |            |                 |          |             |                      |                  |                                                                |             |             |       | 3                       | 2           | 6           | 10                 | 1                |  |
| 3.00                             | 1.05     | 0.88  | 84    | 0.00 | 0  | 0.97             |           |            |                 | 0        | 0           | 0                    | 0                |                                                                |             |             |       |                         |             |             |                    |                  |  |
| 3.45                             | 0.45     | 0.39  | 87    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                                |             |             |       |                         |             |             |                    |                  |  |
| 4.50                             | 1.05     | 0.85  | 81    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                                |             |             |       |                         |             |             |                    |                  |  |
| 4.95                             | 0.45     | 0.34  | 76    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                                |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    | G1               |           |            |                 |          |             |                      |                  |                                                                |             |             |       |                         |             |             |                    |                  |  |
| 6.00                             | 1.05     | 0.84  | 80    | 0.00 | 0  | 16.99            | GREYWACKE | 50         | 0.82            |          |             | 2-3                  | 2                | 3                                                              | 1           | 0           | 4     | 1                       | 1           | 2           | 10                 | 1                |  |
| 6.45                             | 0.45     | 0.29  | 64    | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                                                                |             |             |       | 2                       | 1           | 2           | 10                 | 1                |  |
| 7.50                             | 1.05     | 0.81  | 77    | 0.00 | 0  | 17.81            |           |            |                 |          |             |                      |                  |                                                                |             |             |       | 3                       | 0           | 0           | 0                  | 0                |  |
| 7.95                             | 0.45     | 0.31  | 69    | 0.00 | 0  | 0.82             |           |            |                 | 0        | 0           | 0                    | 0                |                                                                |             |             |       |                         |             |             |                    |                  |  |
| 9.00                             | 1.05     | 0.83  | 79    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                                |             |             |       |                         |             |             |                    |                  |  |
| 9.45                             | 0.45     | 0.45  | 100   | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                                |             |             |       |                         |             |             |                    |                  |  |
| 10.50                            | 1.05     | 0.86  | 82    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                                |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    | G2               |           |            |                 |          |             |                      |                  |                                                                |             |             |       |                         |             |             |                    |                  |  |
| 10.95                            | 0.45     | 0.28  | 62    | 0.00 | 0  | 17.81            | GREYWACKE | 0          | 0.15            |          |             | 2                    | 4                | 1                                                              | 1           | 3           | 5     | 1                       | 2           | 5           | 10                 | 1                |  |
| 12.00                            | 1.05     | 0.69  | 66    | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                                                                |             |             |       | 2                       | 1           | 2           | 10                 | 1                |  |
| 12.45                            | 0.45     | 0.17  | 38    | 0.00 | 0  | 18.08            |           |            |                 |          |             |                      |                  |                                                                |             |             |       | 3                       | 1           | 2           | 10                 | 1                |  |
| 13.50                            | 1.05     | 0.43  | 41    | 0.00 | 0  | 0.27             |           |            |                 | 0.12     | M3          | 2                    | 4                |                                                                |             |             |       |                         |             |             |                    |                  |  |
| 13.95                            | 0.45     | 0.36  | 80    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                                |             |             |       |                         |             |             |                    |                  |  |
| 15.00                            | 1.05     | 0.62  | 59    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                                |             |             |       |                         |             |             |                    |                  |  |
| 15.45                            | 0.45     | 0.23  | 51    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                                |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    | G3               |           |            |                 |          |             |                      |                  |                                                                |             |             |       |                         |             |             |                    |                  |  |
| 16.58                            | 1.13     | 0.56  | 50    | 0.00 | 0  | 18.08            | GREYWACKE | 79         | 1.85            |          |             | 3                    | 1                | 1                                                              | 3           | 0           | 4     | 1                       | 3           | 5           | 9                  | 1                |  |
| 18.08                            | 1.50     | 1.25  | 83    | 0.41 | 27 | ↓                |           |            |                 |          |             |                      |                  |                                                                |             |             |       | 2                       | 2           | 5           | 9                  | 1                |  |
| 19.58                            | 1.50     | 1.27  | 85    | 1.15 | 77 | 19.93            |           |            |                 |          |             |                      |                  |                                                                |             |             |       | 3                       | 0           | 0           | 0                  | 0                |  |
| 21.58                            | 2.00     | 1.67  | 84    | 1.11 | 56 | 1.85             |           |            |                 | 0        | 0           | 0                    | 0                | 1. Yellowish Green Stained.<br><br>3. Yellowish Green Stained. |             |             |       |                         |             |             |                    |                  |  |
| END OF HOLE - FINAL DEPTH 21.58m |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                                                                |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                                                                |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                                                                |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    | G4               |           |            |                 |          |             |                      |                  |                                                                |             |             |       |                         |             |             |                    |                  |  |

**HARDNESS (MPa)**  
 1.VERY SOFT (0-5)  
 2.SOFT (5-25)  
 3.HARD (25-45)  
 4.VERY HARD (45-105)  
 5.EXTREMELY HARD (105+)

**WEATHERING**  
 1.UNWEATHERED  
 2.SLIGHTLY  
 3.MODERATELY  
 4.HIGHLY  
 5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
 1.STRAIGHT  
 2.SLIGHT UNDULATION  
 3.CURVED  
 4.UNI DIRECTIONAL WAVY  
 5.MULTI DIRECTIONAL WAVY

**MICRO**  
 1.POLISHED  
 2.SMOOTH PLANAR  
 3.ROUGH PLANAR  
 4.SLICKENSIDED  
 5.SMOOTH UNDULATING  
 6.ROUGH UNDULATING  
 7.SLICKENSIDED STEPPED  
 8.SMOOTH STEPPED  
 9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
 1.GOUGE t. > Amplit. of IRREG.  
 2.GOUGE t. < Amplit. of IRREG.  
 Soft sheared material, e.g. Talc  
 3.FINE  
 4.MEDIUM  
 5.COARSE  
 Non-softening sheared material  
 6.FINE  
 7.MEDIUM  
 8.COARSE  
 9.STAINING  
 10.NONE

**JOINT WALL ALT.**  
 1.WALL = ROCK HARDNESS  
 2.WALL > ROCK HARDNESS  
 3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
 M1. FAULTS  
 M2. SHEARS  
 M3. INTENSE JOINTING  
 M4. INTENSE MINERALISATION  
 M5. DEFORMABLE MATERIAL  
 M6. INTENSE DRILLING FRACTURES

1. Yellowish Green Stained.  
 3. Yellowish Green Stained.



**SRK Consulting**  
Engineers and Scientists

HOLE NO: KB 17  
INCLINATION: VERTICAL  
FINAL DEPTH: 21.58m

ELEVATION: 7.149mamsl  
CO-ORDS: X = 3727058.02  
Y = 53079.818

PAGE: 2 OF 2  
DATE: 03-05-2010  
LOGGED BY: JB

[illegible]

| HARDNESS (MPa)          |  |
|-------------------------|--|
| 1.VERY SOFT (0-5)       |  |
| 2.SOFT (5-25)           |  |
| 3.HARD (25-45)          |  |
| 4.VERY HARD (45-105)    |  |
| 5.EXTREMELY HARD (105+) |  |

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMPLETLY

1.0 - 30

## MACRO

- MACRO
1. STRAIGHT
  2. SLIGHT UNDULATION
  3. CURVED
  4. UNI DIRECTIONAL WAVY
  5. MULTI DIRECTIONAL WAVY

## MICRO

- 1.POLISHED
- 2.SMOOTH PLANAR
- 3.ROUGH PLANAR
- 4.SLICKENSIDED  
UNDULATING
- 5.SMOOTH  
UNDULATING
- 6.ROUGH UNDULATING
- 7.SLICKENSIDED  
STEPPED
- 8.SMOOTH STEPPED
- 9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**

1. GOUGE t. > Amplit. of IRREG.  
2. GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3. FINE  
4. MEDIUM  
5. COARSE  
Non-softening sheared material  
6. FINE  
7. MEDIUM  
8. COARSE  
9. STAINING  
10. NONE

## JOINT WALL ALT.

- 1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**

- MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 18  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.10m

ELEVATION: 14.470mamsl  
CO-ORDS: X = 3726978.93  
Y = 52881.178

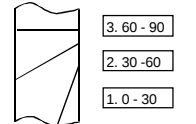
PAGE: 1 OF 2  
DATE: 03-05-2010  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD  |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution          |             |             |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|------|---|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|-----------------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m    | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°                  | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 0.00              |          |       |       |      |   | 19.95            | GREYWACKE | 19         |                 |          |             | 3                  | 2              |                             |             |             |       | 1                       | 1           | 2           | 9                  | 1                |
| 1.50              | 1.50     | 0.60  | 40    | 0.00 | 0 | ↓                |           |            | 2.80            |          |             |                    |                | 6                           | 5           | 14          | 25    | 2                       | 1           | 2           | 10                 | 1                |
| 1.95              | 0.45     | 0.23  | 51    | 0.00 | 0 | 22.80            |           |            |                 |          |             |                    |                |                             |             |             |       | 3                       | 1           | 2           | 10                 | 1                |
| 3.00              | 1.05     | 0.43  | 41    | 0.00 | 0 | 2.85             |           |            |                 |          |             | 3                  | 2              | 1. Yellowish green stained. |             |             |       |                         |             |             |                    |                  |
| 3.45              | 0.45     | 0.24  | 53    | 0.00 | 0 |                  |           |            |                 | 0.05     | M3/M6       |                    |                |                             |             |             |       |                         |             |             |                    |                  |
| 4.50              | 1.05     | 0.46  | 44    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                             |             |             |       |                         |             |             |                    |                  |
| 4.95              | 0.45     | 0.27  | 60    | 0.00 | 0 | G1               |           |            |                 |          |             |                    |                |                             |             |             |       |                         |             |             |                    |                  |
| 6.00              | 1.05     | 0.48  | 46    | 0.00 | 0 | 22.80            | GREYWACKE | 43         |                 |          |             | 3                  | 2              |                             |             |             |       | 1                       | 1           | 2           | 10                 | 1                |
| 6.45              | 0.45     | 0.21  | 47    | 0.00 | 0 | ↓                |           |            | 2.60            |          |             |                    |                | 6                           | 7           | 7           | 20    | 2                       | 1           | 2           | 9                  | 1                |
| 7.50              | 1.05     | 0.59  | 56    | 0.00 | 0 | 25.40            |           |            |                 |          |             |                    |                |                             |             |             |       | 3                       | 1           | 2           | 10                 | 1                |
| 7.95              | 0.45     | 0.29  | 64    | 0.00 | 0 | 2.60             |           |            |                 |          |             | 0                  | 0              | 2. Iron - stained.          |             |             |       |                         |             |             |                    |                  |
| 9.00              | 1.05     | 0.53  | 50    | 0.00 | 0 |                  |           |            |                 | 0        | 0           |                    |                |                             |             |             |       |                         |             |             |                    |                  |
| 9.45              | 0.45     | 0.24  | 53    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                             |             |             |       |                         |             |             |                    |                  |
| 10.50             | 1.05     | 0.55  | 52    | 0.00 | 0 | G2               |           |            |                 |          |             |                    |                |                             |             |             |       |                         |             |             |                    |                  |
| 10.95             | 0.45     | 0.21  | 47    | 0.00 | 0 | 25.40            | GREYWACKE | 13         |                 |          |             | 4                  | 1              |                             |             |             |       | 1                       | 1           | 2           | 10                 | 1                |
| 12.00             | 1.05     | 0.48  | 46    | 0.00 | 0 | ↓                |           |            | 1.60            |          |             |                    |                | 7                           | 4           | 6           | 17    | 2                       | 1           | 2           | 10                 | 1                |
| 12.45             | 0.45     | 0.19  | 42    | 0.00 | 0 | 27.00            |           |            |                 |          |             |                    |                |                             |             |             |       | 3                       | 1           | 2           | 9                  | 1                |
| 13.50             | 1.05     | 0.54  | 51    | 0.00 | 0 | 1.60             |           |            |                 |          |             | 0                  | 0              | 3. Iron - stained.          |             |             |       |                         |             |             |                    |                  |
| 13.95             | 0.45     | 0.25  | 56    | 0.00 | 0 |                  |           |            |                 | 0        | 0           |                    |                |                             |             |             |       |                         |             |             |                    |                  |
| 15.00             | 1.05     | 0.49  | 47    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                             |             |             |       |                         |             |             |                    |                  |
| 15.45             | 0.45     | 0.27  | 60    | 0.00 | 0 | G3               |           |            |                 |          |             |                    |                |                             |             |             |       |                         |             |             |                    |                  |
| 16.50             | 1.05     | 0.45  | 43    | 0.00 | 0 | 27.00            | GREYWACKE | 37         |                 |          |             | 4                  | 1              |                             |             |             |       | 1                       | 1           | 2           | 10                 | 1                |
| 16.95             | 0.45     | 0.26  | 58    | 0.00 | 0 | ↓                |           |            | 3.10            |          |             |                    |                | 6                           | 3           | 11          | 20    | 2                       | 1           | 2           | 10                 | 1                |
| 18.00             | 1.05     | 0.56  | 53    | 0.00 | 0 | 30.10            |           |            |                 |          |             |                    |                |                             |             |             |       | 3                       | 1           | 2           | 10                 | 1                |
| 18.45             | 0.45     | 0.28  | 62    | 0.00 | 0 | 3.10             |           |            |                 |          |             | 0                  | 0              |                             |             |             |       |                         |             |             |                    |                  |
| 19.50             | 1.05     | 0.57  | 54    | 0.00 | 0 |                  |           |            |                 | 0        | 0           |                    |                |                             |             |             |       |                         |             |             |                    |                  |
| 19.95             | 0.45     | 0.23  | 51    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                             |             |             |       |                         |             |             |                    |                  |
| 21.00             | 1.05     | 0.49  | 47    | 0.00 | 0 | G4               |           |            |                 |          |             |                    |                |                             |             |             |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
UNDULATING  
5.SMOOTH  
UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED  
STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**  
1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES



**SRK Consulting**  
Engineers and Scientists

HOLE NO: KB 18  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.10m

ELEVATION: 14.470mamsl  
CO-ORDS: X = 3726978.93  
Y = 52881.178

PAGE: 2 OF 2  
DATE: 03-05-2010  
LOGGED BY: JB

[illegible]

| HARDNESS (MPa)          |  |
|-------------------------|--|
| 1.VERY SOFT (0-5)       |  |
| 2.SOFT (5-25)           |  |
| 3.HARD (25-45)          |  |
| 4.VERY HARD (45-105)    |  |
| 5.EXTREMELY HARD (105+) |  |

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely



1.0 - 30

## MACRO

- MACRO
1. STRAIGHT
  2. SLIGHT UNDULATION
  3. CURVED
  4. UNI DIRECTIONAL WAVY
  5. MULTI DIRECTIONAL WAVY

## MICRO

- 1.POLISHED
- 2.SMOOTH PLANAR
- 3.ROUGH PLANAR
- 4.SLICKENSIDED  
UNDULATING
- 5.SMOOTH  
UNDULATING
- 6.ROUGH UNDULATING
- 7.SLICKENSIDED  
STEPPED
- 8.SMOOTH STEPPED
- 9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**

- 1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

## JOINT WALL ALT.

- JOINT WALL ALT.
1. WALL = ROCK HARDNESS
  2. WALL > ROCK HARDNESS
  3. WALL < ROCK HARDNESS

**MATRIX TYPE**

- MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



**PROJECT: ESKOM GEOTECH INVEST**  
**SITE: DUYNFONTEIN**  
**PROJECT No: 385908/42C**

**HOLE NO: KB 19**  
**INCLINATION: VERTICAL**  
**FINAL DEPTH: 29.60m**

**ELEVATION: 10.016mamsl**  
**CO-ORDS: X = 3726858.33**  
**Y = 53167.492**

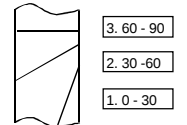
**PAGE: 1 OF 2**  
**DATE: 30-04-2010**  
**LOGGED BY: JB**

| Drilling Interval | Recovery |       |       | RQD  |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution     |             |             |       | Joint Surface Condition |             |             |                    |                  |    |  |  |  |  |  |  |  |  |
|-------------------|----------|-------|-------|------|---|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|------------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|----|--|--|--|--|--|--|--|--|
|                   | m Drill  | m Rec | % Rec | m    | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1 0° - 30°             | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |    |  |  |  |  |  |  |  |  |
| 0.00              |          |       |       |      |   | 23.82            | GREYWACKE | 39         | 2.49            |          |             | 2-3                  | 2                | 0                      | 12          | 5           | 17    | 1                       | 0           | 0           | 0                  | 0                |    |  |  |  |  |  |  |  |  |
| 1.50              | 1.50     | 0.36  | 24    | 0.00 | 0 | ↓                |           |            |                 |          |             |                      |                  |                        |             |             |       | 2                       | 1           | 2           | 10                 | 1                |    |  |  |  |  |  |  |  |  |
| 1.95              | 0.45     | 0.22  | 49    | 0.00 | 0 | 26.31            |           |            |                 |          |             |                      |                  |                        |             |             |       | 3                       | 1           | 2           | 10                 | 1                |    |  |  |  |  |  |  |  |  |
| 3.00              | 1.05     | 0.46  | 44    | 0.00 | 0 | 2.49             |           |            |                 | 0        | 0           | 0                    | 0                | 1. Clayey Silt Infill. |             |             |       |                         |             |             |                    |                  |    |  |  |  |  |  |  |  |  |
| 3.45              | 0.45     | 0.21  | 47    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |  |  |  |  |  |  |  |  |
| 4.50              | 1.05     | 0.39  | 37    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |  |  |  |  |  |  |  |  |
| 4.95              | 0.45     | 0.24  | 53    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  | G1 |  |  |  |  |  |  |  |  |
| 6.00              | 1.05     | 0.47  | 45    | 0.00 | 0 | 23.61            | GREYWACKE | 0          | 0.12            |          |             | 2                    | 3-4              | 0                      | 4           | 0           | 4     | 1                       | 0           | 0           | 0                  | 0                |    |  |  |  |  |  |  |  |  |
| 6.45              | 0.45     | 0.22  | 49    | 0.00 | 0 | ↓                |           |            |                 |          |             |                      |                  |                        |             |             |       | 2                       | 1           | 2           | 10                 | 1                |    |  |  |  |  |  |  |  |  |
| 7.50              | 1.05     | 0.44  | 42    | 0.00 | 0 | 26.64            |           |            |                 |          |             |                      |                  |                        |             |             |       | 3                       | 0           | 0           | 0                  | 0                |    |  |  |  |  |  |  |  |  |
| 7.95              | 0.45     | 0.23  | 51    | 0.00 | 0 | 3.03             |           |            |                 | 0.21     | M3/M5       | 2                    | 3-4              | 1. Clayey Silt Infill. |             |             |       |                         |             |             |                    |                  |    |  |  |  |  |  |  |  |  |
| 9.00              | 1.05     | 0.36  | 34    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |  |  |  |  |  |  |  |  |
| 9.45              | 0.45     | 0.22  | 49    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |  |  |  |  |  |  |  |  |
| 10.50             | 1.05     | 0.31  | 30    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  | G2 |  |  |  |  |  |  |  |  |
| 10.95             | 0.45     | 0.22  | 49    | 0.00 | 0 | 26.64            | GREYWACKE | 22         | 2.82            |          |             | 2-3                  | 2-3              | 5                      | 19          | 3           | 27    | 1                       | 1           | 2           | 10                 | 1                |    |  |  |  |  |  |  |  |  |
| 12.00             | 1.05     | 0.44  | 42    | 0.00 | 0 | ↓                |           |            |                 |          |             |                      |                  |                        |             |             |       | 2                       | 1           | 2           | 10                 | 1                |    |  |  |  |  |  |  |  |  |
| 12.45             | 0.45     | 0.21  | 47    | 0.00 | 0 | 29.60            |           |            |                 |          |             |                      |                  |                        |             |             |       | 3                       | 1           | 2           | 10                 | 1                |    |  |  |  |  |  |  |  |  |
| 13.50             | 1.05     | 0.45  | 43    | 0.00 | 0 | 2.96             |           |            |                 | 0.14     | M6          | 2-3                  | 2-3              |                        |             |             |       |                         |             |             |                    |                  |    |  |  |  |  |  |  |  |  |
| 13.95             | 0.45     | 0.23  | 51    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |  |  |  |  |  |  |  |  |
| 15.00             | 1.05     | 0.53  | 50    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |  |  |  |  |  |  |  |  |
| 15.45             | 0.45     | 0.23  | 51    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  | G3 |  |  |  |  |  |  |  |  |
| 16.50             | 1.05     | 0.43  | 41    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                        |             |             | 1     |                         |             |             |                    |                  |    |  |  |  |  |  |  |  |  |
| 16.95             | 0.45     | 0.20  | 44    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                        |             |             | 2     |                         |             |             |                    |                  |    |  |  |  |  |  |  |  |  |
| 18.00             | 1.05     | 0.46  | 44    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                        |             |             | 3     |                         |             |             |                    |                  |    |  |  |  |  |  |  |  |  |
| 18.45             | 0.45     | 0.21  | 47    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |  |  |  |  |  |  |  |  |
| 19.50             | 1.05     | 0.52  | 50    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |  |  |  |  |  |  |  |  |
| 19.95             | 0.45     | 0.25  | 56    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |  |  |  |  |  |  |  |  |
| 21.00             | 1.05     | 0.64  | 61    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |  |  |  |  |  |  |  |  |

**HARDNESS (MPa)**  
 1.VERY SOFT (0-5)  
 2.SOFT (5-25)  
 3.HARD (25-45)  
 4.VERY HARD (45-105)  
 5.EXTREMELY HARD (105+)

**WEATHERING**  
 1.UNWEATHERED  
 2.SLIGHTLY  
 3.MODERATELY  
 4.HIGHLY  
 5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
 1.STRAIGHT  
 2.SLIGHT UNDULATION  
 3.CURVED  
 4.UNI DIRECTIONAL WAVY  
 5.MULTI DIRECTIONAL WAVY

**MICRO**  
 1.POLISHED  
 2.SMOOTH PLANAR  
 3.ROUGH PLANAR  
 4.SLICKENSIDED  
 5.SMOOTH  
 6.ROUGH UNDULATING  
 7.SLICKENSIDED  
 8.SMOOTH STEPPED  
 9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
 1.GOUGE t. > Amplit. of IRREG.  
 2.GOUGE t. < Amplit. of IRREG.  
 Soft sheared material, e.g. Talc  
 3.FINE  
 4.MEDIUM  
 5.COARSE  
 Non-softening sheared material  
 6.FINE  
 7.MEDIUM  
 8.COARSE  
 9.STAINING  
 10.NONE

**JOINT WALL ALT.**  
 1.WALL = ROCK HARDNESS  
 2.WALL > ROCK HARDNESS  
 3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
 M1. FAULTS  
 M2. SHEARS  
 M3. INTENSE JOINTING  
 M4. INTENSE MINERALISATION  
 M5. DEFORMABLE MATERIAL  
 M6. INTENSE DRILLING  
 FRACTURES



**SRK Consulting**  
Engineers and Scientists

HOLE NO: KB 19  
INCLINATION: VERTICAL  
FINAL DEPTH: 29.60m

ELEVATION: 10.016mamsl  
CO-ORDS: X = 3726858.33  
Y = 53167.492

PAGE: 2 OF 2  
DATE: 30-04-2010  
LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness<br>1 - 5<br>(MPa) | Weathering<br>1 - 5 | Joint Distribution |                |                |       | Joint Surface Condition |                |                |                          |                        |  |  |
|----------------------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|----------------------------|---------------------|--------------------|----------------|----------------|-------|-------------------------|----------------|----------------|--------------------------|------------------------|--|--|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                            |                     | 1<br>0° - 30°      | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro<br>1 - 5 | Micro<br>1 - 9 | Infill<br>Type<br>1 - 10 | Wall<br>Alter<br>1 - 3 |  |  |
| 21.00                            |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                | 1     |                         |                |                |                          |                        |  |  |
| 21.45                            | 0.45     | 0.23  | 51    | 0.00 | 0  |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                | 2              |                          |                        |  |  |
| 22.50                            | 1.05     | 0.47  | 45    | 0.00 | 0  |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                | 3              |                          |                        |  |  |
| 22.95                            | 0.45     | 0.24  | 53    | 0.00 | 0  |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
| 24.00                            | 1.05     | 0.94  | 90    | 0.13 | 12 |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
| 25.50                            | 1.50     | 1.50  | 100   | 0.47 | 31 |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
| 27.00                            | 1.50     | 1.38  | 92    | 0.48 | 32 |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
| 28.10                            | 1.10     | 1.06  | 96    | 0.26 | 24 |                  |           |            |                 |          |             |                            |                     |                    |                |                | 1     |                         |                |                |                          |                        |  |  |
| 29.60                            | 1.50     | 1.35  | 90    | 0.29 | 19 |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                | 2              |                          |                        |  |  |
| END OF HOLE - FINAL DEPTH 29.60m |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         | 3              |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                | 1     |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                | 2              |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                | 3              |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                | 1     |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                | 2              |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                | 3              |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |

| HARDNESS (MPa)          |  |
|-------------------------|--|
| 1.VERY SOFT (0-5)       |  |
| 2.SOFT (5-25)           |  |
| 3.HARD (25-45)          |  |
| 4.VERY HARD (45-105)    |  |
| 5.EXTREMELY HARD (105+) |  |

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMPLETLY

1.0 - 30

## MACRO

- MACRO
1. STRAIGHT
  2. SLIGHT UNDULATION
  3. CURVED
  4. UNI DIRECTIONAL WAVY
  5. MULTI DIRECTIONAL WAVY

## MICRO

- 1.POLISHED
- 2.SMOOTH PLANAR
- 3.ROUGH PLANAR
- 4.SLICKENSIDED  
UNDULATING
- 5.SMOOTH  
UNDULATING
- 6.ROUGH UNDULATING
- 7.SLICKENSIDED  
STEPPED
- 8.SMOOTH STEPPED
- 9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**

1. GOUGE t. > Amplit. of IRREG.  
2. GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3. FINE  
4. MEDIUM  
5. COARSE  
Non-softening sheared material  
6. FINE  
7. MEDIUM  
8. COARSE  
9. STAINING  
10. NONE

## JOINT WALL ALT.

- JOINT WALL ALT.
1. WALL = ROCK HARDNESS
  2. WALL > ROCK HARDNESS
  3. WALL < ROCK HARDNESS

**MATRIX TYPE**

- MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



**PROJECT: ESKOM GEOTECH INVEST**  
**SITE: DUYNFONTEIN**  
**PROJECT No: 385908/42C**

**HOLE NO: KB 21**  
**INCLINATION: VERTICAL**  
**FINAL DEPTH: 54.95m**

**ELEVATION: 5.836mamsl**  
**CO-ORDS: X = 3726674.66**  
**Y = 53284.895**

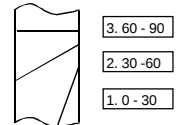
**PAGE: 1 OF 2**  
**DATE: 30-04-2010**  
**LOGGED BY: JB**

| Drilling Interval | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution     |             |             |       | Joint Surface Condition |             |             |                    |                  |  |
|-------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|------------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|
|                   | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1 0° - 30°             | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |
| 0.00              |          |       |       |      |    | 18.00            | GREYWACKE | 10         | 0.34            |          |             | 1                    | 4                | 5                      | 0           | 1           | 6     | 1                       | 2           | 5           | 9                  | 1                |  |
| 1.50              | 1.50     | 0.53  | 35    | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                        |             |             |       | 2                       | 0           | 0           | 0                  | 0                |  |
| 1.95              | 0.45     | 0.21  | 47    | 0.00 | 0  | 19.95            |           |            |                 |          |             |                      |                  |                        |             |             |       | 3                       | 3           | 5           | 10                 | 1                |  |
| 3.00              | 1.05     | 0.53  | 50    | 0.00 | 0  | 1.95             |           |            |                 | 1.61     | M3/M5       | 1                    | 4                | 1. Clayey Silt Infill. |             |             |       |                         |             |             |                    |                  |  |
| 3.45              | 0.45     | 0.24  | 53    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |  |
| 4.50              | 1.05     | 0.43  | 41    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |  |
| 4.95              | 0.45     | 0.26  | 58    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |  |
|                   |          |       |       |      |    | G1               |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |  |
| 6.00              | 1.05     | 0.39  | 37    | 0.00 | 0  | 19.95            | GREYWACKE | 16         | 8.40            |          |             | 2-3                  | 3                | 24                     | 10          | 26          | 60    | 1                       | 1           | 2           | 10                 | 1                |  |
| 6.45              | 0.45     | 0.18  | 40    | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                        |             |             |       | 2                       | 1           | 2           | 10                 | 1                |  |
| 7.50              | 1.05     | 0.50  | 48    | 0.00 | 0  | 29.45            |           |            |                 |          |             |                      |                  |                        |             |             |       | 3                       | 1           | 2           | 10                 | 1                |  |
| 7.95              | 0.45     | 0.18  | 40    | 0.00 | 0  | 9.50             |           |            |                 | 1.10     | M3/M5       | 2-3                  | 3                |                        |             |             |       |                         |             |             |                    |                  |  |
| 9.00              | 1.05     | 0.50  | 48    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |  |
| 9.45              | 0.45     | 0.25  | 56    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |  |
| 10.50             | 1.05     | 0.49  | 47    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |  |
|                   |          |       |       |      |    | G2               |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |  |
| 10.95             | 0.45     | 0.16  | 36    | 0.00 | 0  | 29.45            | GREYWACKE | 43         | 3.79            |          |             | 3                    | 1                | 5                      | 3           | 13          | 21    | 1                       | 1           | 2           | 9                  | 1                |  |
| 12.00             | 1.05     | 0.37  | 35    | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                        |             |             |       | 2                       | 1           | 3           | 10                 | 1                |  |
| 12.45             | 0.45     | 0.24  | 53    | 0.00 | 0  | 33.24            |           |            |                 |          |             |                      |                  |                        |             |             |       | 3                       | 1           | 3           | 10                 | 1                |  |
| 13.50             | 1.05     | 0.55  | 52    | 0.00 | 0  | 3.79             |           |            |                 | 0        | 0           | 0                    | 0                | 1. Clayey Silt Infill. |             |             |       |                         |             |             |                    |                  |  |
| 13.95             | 0.45     | 0.22  | 49    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |  |
| 15.00             | 1.05     | 0.50  | 48    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |  |
| 15.45             | 0.45     | 0.24  | 53    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |  |
|                   |          |       |       |      |    | G3               |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |  |
| 16.50             | 1.05     | 0.70  | 67    | 0.00 | 0  | 33.24            | SHALE     | 39         | 0.56            |          |             | 3                    | 3                | 0                      | 0           | 0           | 0     | 1                       | 0           | 0           | 0                  | 0                |  |
| 16.95             | 0.45     | 0.20  | 44    | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                        |             |             |       | 2                       | 0           | 0           | 0                  | 0                |  |
| 18.00             | 1.05     | 0.59  | 56    | 0.00 | 0  | 33.80            |           |            |                 |          |             |                      |                  |                        |             |             |       | 3                       | 0           | 0           | 0                  | 0                |  |
| 18.45             | 0.45     | 0.22  | 49    | 0.00 | 0  | 0.56             |           |            |                 | M1       | 3           | 3                    | FAULT            |                        |             |             |       |                         |             |             |                    |                  |  |
| 19.95             | 1.50     | 1.12  | 75    | 0.19 | 13 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |  |
| 20.45             | 0.50     | 0.48  | 96    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |  |
| 21.95             | 1.50     | 1.46  | 97    | 0.17 | 11 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |  |
|                   |          |       |       |      |    | G4               |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |  |

**HARDNESS (MPa)**  
 1.VERY SOFT (0-5)  
 2.SOFT (5-25)  
 3.HARD (25-45)  
 4.VERY HARD (45-105)  
 5.EXTREMELY HARD (105+)

**WEATHERING**  
 1.UNWEATHERED  
 2.SLIGHTLY  
 3.MODERATELY  
 4.HIGHLY  
 5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
 1.STRAIGHT  
 2.SLIGHT UNDULATION  
 3.CURVED  
 4.UNI DIRECTIONAL WAVY  
 5.MULTI DIRECTIONAL WAVY

**MICRO**  
 1.POLISHED  
 2.SMOOTH PLANAR  
 3.ROUGH PLANAR  
 4.SLICKENSIDED  
 5.SMOOTH UNDULATING  
 6.ROUGH UNDULATING  
 7.SLICKENSIDED STEPPED  
 8.SMOOTH STEPPED  
 9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
 1.GOUGE t. > Amplit. of IRREG.  
 2.GOUGE t. < Amplit. of IRREG.  
 Soft sheared material, e.g. Talc  
 3.FINE  
 4.MEDIUM  
 5.COARSE  
 Non-softening sheared material  
 6.FINE  
 7.MEDIUM  
 8.COARSE  
 9.STAINING  
 10.NONE

**JOINT WALL ALT.**  
 1.WALL = ROCK HARDNESS  
 2.WALL > ROCK HARDNESS  
 3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
 M1. FAULTS  
 M2. SHEARS  
 M3. INTENSE JOINTING  
 M4. INTENSE MINERALISATION  
 M5. DEFORMABLE MATERIAL  
 M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 21  
INCLINATION: VERTICAL  
FINAL DEPTH: 54.95m

ELEVATION: 5.836mamsl  
CO-ORDS: X = 3726674.66  
Y = 53284.895

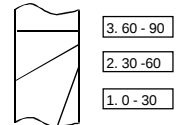
PAGE: 2 OF 2  
DATE: 30-04-2010  
LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution                                        |             |             |       | Joint Surface Condition |             |             |                    |                  |
|----------------------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|-----------------------------------------------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°                                                | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 21.95                            |          |       |       |      |    | 33.80            | GREYWACKE | 26         |                 |          |             | 4                  | 1              |                                                           |             |             |       | 1                       | 1           | 2           | 6                  | 1                |
| 23.45                            | 1.50     | 1.45  | 97    | 0.31 | 21 | ↓                |           |            | 7.65            |          |             |                    |                | 18                                                        | 10          | 21          | 49    | 2                       | 1           | 2           | 10                 | 1                |
| 24.95                            | 1.50     | 1.47  | 98    | 0.47 | 31 | 41.45            |           |            |                 |          |             |                    |                |                                                           |             |             |       | 3                       | 1           | 2           | 10                 | 1                |
| 26.45                            | 1.50     | 1.44  | 96    | 0.42 | 28 | 7.65             |           |            |                 |          |             | 0                  | 0              | 1. Greenish Talc / Calc <2mm.                             |             |             |       |                         |             |             |                    |                  |
| 27.95                            | 1.50     | 1.47  | 98    | 0.00 | 0  |                  |           |            |                 | 0        | 0           |                    |                |                                                           |             |             |       |                         |             |             |                    |                  |
| 29.45                            | 1.50     | 1.20  | 80    | 0.13 | 9  |                  |           |            |                 |          |             |                    |                |                                                           |             |             |       |                         |             |             |                    |                  |
| 30.95                            | 1.50     | 1.43  | 95    | 0.40 | 27 | G5               |           |            |                 |          |             |                    |                |                                                           |             |             |       |                         |             |             |                    |                  |
| 32.45                            | 1.50     | 1.45  | 97    | 0.85 | 57 | 41.45            | GREYWACKE | 54         |                 |          |             | 5                  | 1              |                                                           |             |             |       | 1                       | 1           | 2           | 6                  | 1                |
| 33.95                            | 1.50     | 1.49  | 99    | 0.55 | 37 | ↓                |           |            | 11.95           |          |             |                    |                | 29                                                        | 11          | 13          | 53    | 2                       | 1           | 2           | 6                  | 1                |
| 35.45                            | 1.50     | 1.43  | 95    | 0.41 | 27 | 53.40            |           |            |                 |          |             |                    |                |                                                           |             |             |       | 3                       | 1           | 2           | 6                  | 1                |
| 36.95                            | 1.50     | 1.41  | 94    | 0.41 | 27 | 11.95            |           |            |                 |          |             | 0                  | 0              | 1. Calc <1mm.<br>2. Calc <1mm.<br>3. Calc <1mm.           |             |             |       |                         |             |             |                    |                  |
| 38.45                            | 1.50     | 1.42  | 95    | 0.17 | 11 |                  |           |            |                 | 0        | 0           |                    |                |                                                           |             |             |       |                         |             |             |                    |                  |
| 39.95                            | 1.50     | 1.37  | 91    | 0.72 | 48 |                  |           |            |                 |          |             |                    |                |                                                           |             |             |       |                         |             |             |                    |                  |
| 41.45                            | 1.50     | 1.41  | 94    | 0.27 | 18 | G6               |           |            |                 |          |             |                    |                |                                                           |             |             |       |                         |             |             |                    |                  |
| 42.95                            | 1.50     | 1.40  | 93    | 0.67 | 45 | 53.40            | GREYWACKE | 70         |                 |          |             | 4                  | 1              |                                                           |             |             |       | 1                       | 5           | 8           | 6                  | 1                |
| 44.55                            | 1.60     | 1.49  | 93    | 0.79 | 49 | ↓                |           |            | 1.55            |          |             |                    |                | 1                                                         | 1           | 1           | 3     | 2                       | 5           | 8           | 6                  | 1                |
| 46.15                            | 1.60     | 1.56  | 97    | 0.51 | 32 | 54.95            |           |            |                 |          |             |                    |                |                                                           |             |             |       | 3                       | 5           | 8           | 6                  | 1                |
| 47.55                            | 1.40     | 1.52  | 109   | 0.67 | 48 | 1.55             |           |            |                 |          |             | 0                  | 0              | 1. Calc <1mm.<br>2. Calc <1mm.<br>3. Calc / Quartz <10mm. |             |             |       |                         |             |             |                    |                  |
| 49.05                            | 1.50     | 1.47  | 98    | 0.79 | 53 |                  |           |            |                 | 0        | 0           |                    |                |                                                           |             |             |       |                         |             |             |                    |                  |
| 50.35                            | 1.30     | 1.23  | 95    | 0.83 | 64 |                  |           |            |                 |          |             |                    |                |                                                           |             |             |       |                         |             |             |                    |                  |
| 51.90                            | 1.55     | 1.54  | 99    | 0.97 | 63 | G7               |           |            |                 |          |             |                    |                |                                                           |             |             |       |                         |             |             |                    |                  |
| 53.40                            | 1.50     | 1.44  | 96    | 1.26 | 84 |                  |           |            |                 |          |             |                    |                |                                                           |             |             |       | 1                       |             |             |                    |                  |
| 54.95                            | 1.55     | 1.47  | 95    | 1.09 | 70 |                  |           |            |                 |          |             |                    |                |                                                           |             |             |       | 2                       |             |             |                    |                  |
| END OF HOLE - FINAL DEPTH 54.95m |          |       |       |      |    |                  |           |            |                 |          |             |                    |                |                                                           |             |             |       | 3                       |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                    |                |                                                           |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                    |                |                                                           |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                    |                |                                                           |             |             |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t > Amplit. of IRREG.  
2.GOUGE t < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNESFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 25  
INCLINATION: VERTICAL  
FINAL DEPTH: 24.00m

ELEVATION: 4.724mamsl  
CO-ORDS: X = 3726697.64  
Y = 53361.561

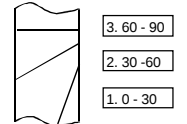
PAGE: 1 OF 2  
DATE: 17-07-2008  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type         | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |  |
|-------------------|----------|-------|-------|------|----|------------------|-------------------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|
|                   | m Drill  | m Rec | % Rec | m    | %  |                  |                   |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |
| 0.00              |          |       |       |      |    | 18.50            | SILTSTONE         | 0          | 0.00            |          |             | 1                  | 4              | 0                  | 0           | 0           | 0     | 1                       | 0           | 0           | 0                  | 0                |  |
| 1.50              | 1.50     | 0.77  | 51    |      |    | ↓                |                   |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 0           | 0           | 0                  | 0                |  |
| 1.95              | 0.45     | 0.27  | 60    |      |    | 18.91            |                   |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 0           | 0           | 0                  | 0                |  |
| 3.00              | 1.05     | 0.78  | 74    |      |    | 0.41             |                   |            |                 | M5/M6    | 1           | 4                  |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 3.45              | 0.45     | 0.28  | 62    |      |    |                  |                   |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 4.50              | 1.05     | 0.39  | 37    |      |    |                  |                   |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 4.95              | 0.45     | 0.22  | 49    |      |    |                  |                   |            |                 |          |             |                    | G1             |                    |             |             |       |                         |             |             |                    |                  |  |
| 6.00              | 1.05     | 0.46  | 44    |      |    | 18.91            | SILTSTONE / SHALE | 100        | 0.59            |          |             | 2                  | 4              | 0                  | 2           | 1           | 3     | 1                       | 0           | 0           | 0                  | 0                |  |
| 6.45              | 0.45     | 0.29  | 64    |      |    | ↓                |                   |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 1           | 2           | 10                 | 1                |  |
| 7.50              | 1.05     | 0.68  | 65    |      |    | 19.60            |                   |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 1           | 3           | 10                 | 1                |  |
| 7.95              | 0.45     | 0.28  | 62    |      |    | 0.69             |                   |            |                 | 0.10     | M5          | 2                  | 4              |                    |             |             |       |                         |             |             |                    |                  |  |
| 9.00              | 1.05     | 0.58  | 55    |      |    |                  |                   |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 9.45              | 0.45     | 0.29  | 64    |      |    |                  |                   |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 10.50             | 1.05     | 0.56  | 53    |      |    |                  |                   |            |                 |          |             |                    |                | G2                 |             |             |       |                         |             |             |                    |                  |  |
| 10.95             | 0.45     | 0.29  | 64    |      |    | 19.60            | SHALE             | 0          | 0.00            |          |             | 1                  | 4-5            | 0                  | 0           | 0           | 0     | 1                       | 0           | 0           | 0                  | 0                |  |
| 12.00             | 1.05     | 0.85  | 81    |      |    | ↓                |                   |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 0           | 0           | 0                  | 0                |  |
| 12.45             | 0.45     | 0.25  | 56    |      |    | 20.02            |                   |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 0           | 0           | 0                  | 0                |  |
| 13.50             | 1.05     | 0.56  | 53    |      |    | 0.42             |                   |            |                 | M5/M6    | 1           | 4-5                |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 13.95             | 0.45     | 0.28  | 62    |      |    |                  |                   |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 15.00             | 1.05     | 0.49  | 47    |      |    |                  |                   |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 15.45             | 0.45     | 0.20  | 44    |      |    |                  |                   |            |                 |          |             |                    | G3             |                    |             |             |       |                         |             |             |                    |                  |  |
| 16.50             | 1.05     | 0.54  | 51    |      |    | 20.02            | SHALE             | 0          | 0.54            |          |             | 1                  | 3-4            | 0                  | 2           | 1           | 3     | 1                       | 0           | 0           | 0                  | 0                |  |
| 16.95             | 0.45     | 0.21  | 47    |      |    | ↓                |                   |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 1           | 3           | 9                  | 1                |  |
| 18.00             | 1.05     | 0.71  | 68    |      |    | 20.56            |                   |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 1           | 3           | 9                  | 1                |  |
| 18.45             | 0.45     | 0.20  | 44    |      |    | 0.54             |                   |            |                 | 0        | 0           | 0                  | 0              |                    |             |             |       |                         |             |             |                    |                  |  |
| 19.50             | 1.05     | 1.03  | 98    | 0.71 | 68 |                  |                   |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 21.00             | 1.50     | 1.48  | 99    | 0.47 | 31 |                  |                   |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 22.50             | 1.50     | 1.36  | 91    | 0.00 | 0  |                  |                   |            |                 |          |             |                    |                | G4                 |             |             |       |                         |             |             |                    |                  |  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 25  
INCLINATION: VERTICAL  
FINAL DEPTH: 24.00m

ELEVATION: 4.724mamsl  
CO-ORDS: X = 3726697.64  
Y = 53361.561

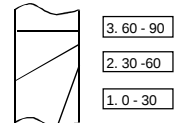
PAGE: 2 OF 2  
DATE: 17-07-2008  
LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |
|----------------------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 22.50                            |          |       |       |      |    | 20.56            | SILTSTONE | 0          | 0.00            |          |             | 1                  | 4-5            | 0                  | 0           | 0           | 0     | 1                       | 0           | 0           | 0                  | 0                |
| 24.00                            | 1.50     | 1.40  | 93    | 0.31 | 21 | ↓                |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 0           | 0           | 0                  | 0                |
| END OF HOLE - FINAL DEPTH 24.00m |          |       |       |      |    | 21.02            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 0           | 0           | 0                  | 0                |
|                                  |          |       |       |      |    | 0.46             | SILTSTONE | 0          |                 | 0.46     | M5/M6       | 1                  | 4-5            |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    | G5               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    | 21.02            | SHALE     | 0          | 0.83            |          |             | 1                  | 4-5            | 5                  | 0           | 0           | 5     | 1                       | 1           | 2           | 10                 | 1                |
|                                  |          |       |       |      |    | ↓                |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 0           | 0           | 0                  | 0                |
|                                  |          |       |       |      |    | 22.55            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 0           | 0           | 0                  | 0                |
|                                  |          |       |       |      |    | 1.53             |           |            |                 | 0.70     | M5/M6       | 1                  | 4-5            |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  | SHALE     | 21         |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    | G6               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    | 22.55            |           |            | 1.04            |          |             | 1-2                | 4              | 3                  | 2           | 0           | 5     | 1                       | 1           | 2           | 10                 | 1                |
|                                  |          |       |       |      |    | ↓                |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 1           | 3           | 10                 | 1                |
|                                  |          |       |       |      |    | 24.00            | SHALE     | 21         |                 |          |             |                    |                |                    |             |             |       | 3                       | 0           | 0           | 0                  | 0                |
|                                  |          |       |       |      |    | 1.45             |           |            |                 | 0.41     | M5/M6       | 1-2                | 4              |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    | G7               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
UNDULATING  
5.SMOOTH  
UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED  
STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**  
1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNESFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 26  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.00m

ELEVATION: 5.178mamsl  
CO-ORDS: X = 3727099.40  
Y = 53180.532

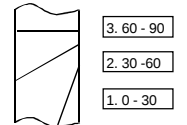
PAGE: 1 OF 2  
DATE: 28-04-2010  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution        |             |             |       | Joint Surface Condition |             |             |                    |                  |  |    |
|-------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|---------------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|----|
|                   | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°                | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |    |
| 0.00              |          |       |       |      |    | 18.50            | GREYWACKE | 16         | 4.70            |          |             | 1                  | 4-5            | 10                        | 15          | 8           | 33    | 1                       | 1           | 2           | 10                 | 1                |  |    |
| 1.50              | 1.50     | 0.55  | 37    |      |    | ↓                |           |            |                 |          |             |                    |                |                           |             |             |       | 2                       | 1           | 2           | 10                 | 1                |  |    |
| 1.95              | 0.45     | 0.32  | 71    |      |    | 23.64            |           |            |                 |          |             |                    |                |                           |             |             |       | 3                       | 1           | 2           | 10                 | 1                |  |    |
| 3.00              | 1.05     | 0.39  | 37    |      |    | 5.14             |           |            |                 | 0.44     | M3/M5       | 1                  | 4-5            | Clayey silt infill        |             |             |       |                         |             |             |                    |                  |  |    |
| 3.45              | 0.45     | 0.31  | 69    |      |    |                  |           |            |                 |          |             |                    |                |                           |             |             |       |                         |             |             |                    |                  |  |    |
| 4.50              | 1.05     | 0.53  | 50    |      |    |                  |           |            |                 |          |             |                    |                |                           |             |             |       |                         |             |             |                    |                  |  |    |
| 4.95              | 0.45     | 0.29  | 64    |      |    |                  |           |            |                 |          |             |                    |                |                           |             |             |       |                         |             |             |                    |                  |  | G1 |
| 6.00              | 1.05     | 0.44  | 42    |      |    | 23.64            | GREYWACKE | 0          | 0.23            |          |             | 1                  | 4-5            | 1                         | 1           | 0           | 2     | 1                       | 2           | 5           | 10                 | 1                |  |    |
| 6.45              | 0.45     | 0.30  | 67    |      |    | ↓                |           |            |                 |          |             |                    |                |                           |             |             |       | 2                       | 2           | 5           | 10                 | 1                |  |    |
| 7.50              | 1.05     | 0.50  | 48    |      |    | 24.23            |           |            |                 |          |             |                    |                |                           |             |             |       | 3                       | 0           | 0           | 0                  | 0                |  |    |
| 7.95              | 0.45     | 0.26  | 58    |      |    | 0.59             |           |            |                 | 0.36     | M3/M5       | 1                  | 4-5            | Clayey silt infill        |             |             |       |                         |             |             |                    |                  |  |    |
| 9.00              | 1.05     | 0.58  | 55    |      |    |                  |           |            |                 |          |             |                    |                |                           |             |             |       |                         |             |             |                    |                  |  |    |
| 9.45              | 0.45     | 0.28  | 62    |      |    |                  |           |            |                 |          |             |                    |                |                           |             |             |       |                         |             |             |                    |                  |  |    |
| 10.50             | 1.05     | 0.57  | 54    |      |    |                  |           |            |                 |          |             |                    |                |                           |             |             |       |                         |             |             |                    |                  |  | G2 |
| 10.95             | 0.45     | 0.26  | 58    |      |    | 24.23            | GREYWACKE | 4          | 1.10            |          |             | 2-3                | 3              | 8                         | 3           | 6           | 17    | 1                       | 3           | 5           | 10                 | 1                |  |    |
| 12.00             | 1.05     | 0.42  | 40    |      |    | ↓                |           |            |                 |          |             |                    |                |                           |             |             |       | 2                       | 2           | 5           | 10                 | 1                |  |    |
| 12.45             | 0.45     | 0.25  | 56    |      |    | 27.35            |           |            |                 |          |             |                    |                |                           |             |             |       | 3                       | 2           | 5           | 10                 | 1                |  |    |
| 13.50             | 1.05     | 0.56  | 53    |      |    | 3.12             |           |            |                 | 2.02     | M3/M5       | 2-3                | 3              |                           |             |             |       |                         |             |             |                    |                  |  |    |
| 13.95             | 0.45     | 0.24  | 53    |      |    |                  |           |            |                 |          |             |                    |                |                           |             |             |       |                         |             |             |                    |                  |  |    |
| 15.00             | 1.05     | 0.52  | 50    |      |    |                  |           |            |                 |          |             |                    |                |                           |             |             |       |                         |             |             |                    |                  |  |    |
| 15.45             | 0.45     | 0.26  | 58    |      |    |                  |           |            |                 |          |             |                    |                |                           |             |             |       |                         |             |             |                    |                  |  | G3 |
| 16.50             | 1.05     | 0.49  | 47    |      |    | 27.35            | GREYWACKE | 28         | 2.65            |          |             | 2-3                | 2              | 3                         | 4           | 12          | 19    | 1                       | 5           | 8           | 10                 | 1                |  |    |
| 16.95             | 0.45     | 0.33  | 73    |      |    | ↓                |           |            |                 |          |             |                    |                |                           |             |             |       | 2                       | 5           | 8           | 10                 | 1                |  |    |
| 18.00             | 1.05     | 0.54  | 51    |      |    | 30.00            |           |            |                 |          |             |                    |                |                           |             |             |       | 3                       | 1           | 2           | 10                 | 1                |  |    |
| 18.45             | 0.45     | 0.30  | 67    |      |    | 2.65             |           |            |                 | 0        | 0           | 0                  | 0              | 3. Coarse quartz crystals |             |             |       |                         |             |             |                    |                  |  |    |
| 19.50             | 1.05     | 1.00  | 95    | 0.28 | 27 |                  |           |            |                 |          |             |                    |                |                           |             |             |       |                         |             |             |                    |                  |  |    |
| 21.00             | 1.50     | 1.42  | 95    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                           |             |             |       |                         |             |             |                    |                  |  |    |
| 22.50             | 1.50     | 1.46  | 97    | 0.28 | 19 |                  |           |            |                 |          |             |                    |                |                           |             |             |       |                         |             |             |                    |                  |  | G4 |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t > Amplit. of IRREG.  
2.GOUGE t < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES



**SRK Consulting**  
Engineers and Scientists

HOLE NO: KB 26  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.00m

ELEVATION: 5.178mamsl  
CO-ORDS: X = 3727099.40  
Y = 53180.532

PAGE: 2 OF 2  
DATE: 28-04-2010  
LOGGED BY: JB

| HARDNESS (MPa)          |  |
|-------------------------|--|
| 1.VERY SOFT (0-5)       |  |
| 2.SOFT (5-25)           |  |
| 3.HARD (25-45)          |  |
| 4.VERY HARD (45-105)    |  |
| 5.EXTREMELY HARD (105+) |  |

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

1. 0 - 30

## MACRO

1. STRAIGHT
2. SLIGHT UNDULATION
3. CURVED
4. UNI DIRECTIONAL WAVY
5. MULTI DIRECTIONAL WAVY

**MICRO**

- 1.POLISHED
- 2.SMOOTH PLANAR
- 3.ROUGH PLANAR
- 4.SLICKENSIDED  
UNDULATING
- 5.SMOOTH  
UNDULATING
- 6.ROUGH UNDULATING
- 7.SLICKENSIDED  
STEPPED
- 8.SMOOTH STEPPED
- 9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**

1. GOUGE t. > Amplit. of IRREG.  
2. GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3. FINE  
4. MEDIUM  
5. COARSE  
Non-softening sheared material  
6. FINE  
7. MEDIUM  
8. COARSE  
9. STAINING  
10. NONE

## JOINT WALL ALT.

1. WALL = ROCK HARDNESS
2. WALL > ROCK HARDNESS
3. WALL < ROCK HARDNESS

**MATRIX TYPE**

- MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

[illegible]

# GEOTECHNICAL BOREHOLE LOG



**PROJECT: ESKOM GEOTECH INVEST**  
**SITE: DUYNEFONTEIN**  
**PROJECT No: 385908/42C**

**HOLE NO: KB 27**  
**INCLINATION: VERTICAL**  
**FINAL DEPTH: 22.63m**

**ELEVATION: 5.985mamsl**  
**CO-ORDS: X = 3727181.33**  
**Y = 53090.174**

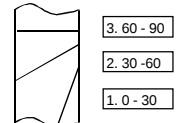
**PAGE: 1 OF 2**  
**DATE: 17-07-2008**  
**LOGGED BY: JB**

| Drilling Interval | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |  |
|-------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|
|                   | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |
| 0.00              |          |       |       |      |    | 18.50            | MUDSTONE  | 43         | 1.16            |          |             | 2                    | 3                | 1                  | 2           | 11          | 14    | 1                       | 2           | 5           | 3                  | 1                |  |
| 1.50              | 1.50     | 0.45  | 30    | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                    |             |             |       | 2                       | 1           | 2           | 3                  | 1                |  |
| 1.95              | 0.45     | 0.13  | 29    | 0.00 | 0  | 19.75            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 3           | 5           | 3                  | 1                |  |
| 3.00              | 1.05     | 0.71  | 68    | 0.00 | 0  | 1.25             |           |            |                 | 0.09     | M6          | 2                    | 3                | Clayey infill      |             |             |       |                         |             |             |                    |                  |  |
| 3.45              | 0.45     | 0.30  | 67    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 4.50              | 1.05     | 0.82  | 78    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 4.95              | 0.45     | 0.24  | 53    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 6.00              | 1.05     | 0.75  | 71    | 0.00 | 0  | 19.75            | MUDSTONE  | 11         | 2.78            |          |             | 2                    | 3                | 7                  | 16          | 14          | 37    | 1                       | 1           | 2           | 3                  | 1                |  |
| 6.45              | 0.45     | 0.25  | 56    | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                    |             |             |       | 2                       | 1           | 2           | 3                  | 1                |  |
| 7.50              | 1.05     | 0.84  | 80    | 0.00 | 0  | 22.63            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 3           | 5           | 3                  | 1                |  |
| 7.95              | 0.45     | 0.26  | 58    | 0.00 | 0  | 2.88             |           |            |                 | 0.10     | M5/M6       | 2                    | 3                | Clayey infill      |             |             |       |                         |             |             |                    |                  |  |
| 9.00              | 1.05     | 0.80  | 76    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 9.45              | 0.45     | 0.27  | 60    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 10.50             | 1.05     | 0.77  | 73    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 10.95             | 0.45     | 0.35  | 78    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 12.00             | 1.05     | 0.94  | 90    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 12.45             | 0.45     | 0.30  | 67    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 13.50             | 1.05     | 0.82  | 78    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 13.95             | 0.45     | 0.20  | 44    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 15.00             | 1.05     | 0.96  | 91    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 15.45             | 0.45     | 0.28  | 62    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 16.50             | 1.05     | 0.80  | 76    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 16.95             | 0.45     | 0.30  | 67    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 18.00             | 1.05     | 0.62  | 59    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 18.45             | 0.45     | 0.19  | 42    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 18.77             | 0.32     | 0.40  | 125   | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 19.75             | 0.98     | 1.03  | 105   | 0.54 | 55 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 21.15             | 1.40     | 1.34  | 96    | 0.11 | 8  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |

**HARDNESS (MPa)**  
 1.VERY SOFT (0-5)  
 2.SOFT (5-25)  
 3.HARD (25-45)  
 4.VERY HARD (45-105)  
 5.EXTREMELY HARD (105+)

**WEATHERING**  
 1.UNWEATHERED  
 2.SLIGHTLY  
 3.MODERATELY  
 4.HIGHLY  
 5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
 1.STRAIGHT  
 2.SLIGHT UNDULATION  
 3.CURVED  
 4.UNI DIRECTIONAL WAVY  
 5.MULTI DIRECTIONAL WAVY

**MICRO**  
 1.POLISHED  
 2.SMOOTH PLANAR  
 3.ROUGH PLANAR  
 4.SLICKSIDED  
 5.SMOOTH UNDULATING  
 6.ROUGH UNDULATING  
 7.SLICKSIDED STEPPED  
 8.SMOOTH STEPPED  
 9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
 1.GOUGE t > Amplit. of IRREG.  
 2.GOUGE t < Amplit. of IRREG.  
 Soft sheared material, e.g. Talc  
 3.FINE  
 4.MEDIUM  
 5.COARSE  
 Non-softening sheared material  
 6.FINE  
 7.MEDIUM  
 8.COARSE  
 9.STAINING  
 10.NONE

**JOINT WALL ALT.**  
 1.WALL = ROCK HARDNESS  
 2.WALL > ROCK HARDNESS  
 3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
 M1. FAULTS  
 M2. SHEARS  
 M3. INTENSE JOINTING  
 M4. INTENSE MINERALISATION  
 M5. DEFORMABLE MATERIAL  
 M6. INTENSE DRILLING FRACTURES



**SRK Consulting**  
Engineers and Scientists

HOLE NO: KB 27  
INCLINATION: VERTICAL  
FINAL DEPTH: 22.63m

ELEVATION: 5.985mamsl  
CO-ORDS: X = 3727181.33  
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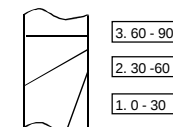
PAGE: 2 OF 2  
DATE: 17-07-2008  
LOGGED BY: JB

[illegible]

| HARDNESS (MPa)          |  |
|-------------------------|--|
| 1.VERY SOFT (0-5)       |  |
| 2.SOFT (5-25)           |  |
| 3.HARD (25-45)          |  |
| 4.VERY HARD (45-105)    |  |
| 5.EXTREMELY HARD (105+) |  |

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMPLETLY

## JOINT DISTRIBUTION



### JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

MICRO

- 1.POLISHED
- 2.SMOOTH PLANAR
- 3.ROUGH PLANAR
- 4.SLICKENSIDED  
UNDULATING
- 5.SMOOTH  
UNDULATING
- 6.ROUGH UNDULATING
- 7.SLICKENSIDED  
STEPPED
- 8.SMOOTH STEPPED
- 9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**

1. GOUGE t. > Amplit. of IRREG.  
2. GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3. FINE  
4. MEDIUM  
5. COARSE  
Non-softening sheared material  
6. FINE  
7. MEDIUM  
8. COARSE  
9. STAINING  
10. NONE

JOINT WALL ALT.

JOINT WALL ALT.

1. WALL = ROCK HARDNESS
2. WALL > ROCK HARDNESS
3. WALL < ROCK HARDNESS

**MATRIX TYPE**

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



**PROJECT: ESKOM GEOTECH INVEST**  
**SITE: DUYNEFONTEIN**  
**PROJECT No: 385908/42C**

**HOLE NO: KB 29**  
**INCLINATION: VERTICAL**  
**FINAL DEPTH: 30.00m**

**ELEVATION: 6.567mamsl**  
**CO-ORDS: X = 3726781.60**  
**Y = 53267.456**

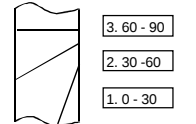
**PAGE: 1 OF 3**  
**DATE: 28-04-2010**  
**LOGGED BY: JB**

| Drilling Interval | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |  |
|-------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|
|                   | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |
| 0.00              |          |       |       |      |    | 18.45            | GREYWACKE | 0          | 0.27            |          |             | 1                  | 4-5            | 3                  | 0           | 0           | 3     | 1                       | 1           | 2           | 10                 | 1                |  |
| 1.50              | 1.50     | 0.54  | 36    | 0.00 | 0  | ↓                |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 0           | 0           | 0                  | 0                |  |
| 1.95              | 0.45     | 0.18  | 40    | 0.00 | 0  | 19.50            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 0           | 0           | 0                  | 0                |  |
| 3.00              | 1.05     | 0.59  | 56    | 0.00 | 0  | 1.05             |           |            |                 | 0.78     | M3/M5       | 1                  | 4-5            |                    |             |             |       |                         |             |             |                    |                  |  |
| 3.45              | 0.45     | 0.22  | 49    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 4.50              | 1.05     | 0.58  | 55    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 4.95              | 0.45     | 0.24  | 53    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 6.00              | 1.05     | 0.47  | 45    | 0.00 | 0  | 19.50            | GREYWACKE | 21         | 0.68            |          |             | 2                  | 4              | 0                  | 3           | 0           | 3     | 1                       | 0           | 0           | 0                  | 0                |  |
| 6.45              | 0.45     | 0.24  | 53    | 0.00 | 0  | ↓                |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 1           | 2           | 10                 | 1                |  |
| 7.50              | 1.05     | 0.59  | 56    | 0.00 | 0  | 20.18            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 0           | 0           | 0                  | 0                |  |
| 7.95              | 0.45     | 0.23  | 51    | 0.00 | 0  | 0.68             |           |            |                 | 0        | 0           | 0                  | 0              |                    |             |             |       |                         |             |             |                    |                  |  |
| 9.00              | 1.05     | 0.60  | 57    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 9.45              | 0.45     | 0.23  | 51    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 10.50             | 1.05     | 0.55  | 52    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 10.95             | 0.45     | 0.27  | 60    | 0.00 | 0  | 20.18            | SHALE     | 0          | 0.46            |          |             | 1-2                | 4              | 5                  | 1           | 0           | 6     | 1                       | 1           | 2           | 9                  | 1                |  |
| 12.00             | 1.05     | 0.63  | 60    | 0.00 | 0  | ↓                |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 5           | 8           | 10                 | 1                |  |
| 12.45             | 0.45     | 0.28  | 62    | 0.00 | 0  | 20.87            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 0           | 0           | 0                  | 0                |  |
| 13.50             | 1.05     | 0.60  | 57    | 0.00 | 0  | 0.69             |           |            |                 | 0.23     | M3/M5       | 1-2                | 4              | 1. Black stained.  |             |             |       |                         |             |             |                    |                  |  |
| 13.95             | 0.45     | 0.23  | 51    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 15.00             | 1.05     | 0.74  | 70    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 15.45             | 0.45     | 0.23  | 51    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 16.50             | 1.05     | 0.53  | 50    | 0.00 | 0  | 20.87            | GREYWACKE | 9          | 2.18            |          |             | 2                  | 4              | 3                  | 4           | 2           | 9     | 1                       | 2           | 5           | 10                 | 1                |  |
| 16.95             | 0.45     | 0.28  | 62    | 0.00 | 0  | ↓                |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 1           | 2           | 10                 | 1                |  |
| 18.00             | 1.05     | 0.44  | 42    | 0.00 | 0  | 23.25            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 5           | 8           | 10                 | 1                |  |
| 18.45             | 0.45     | 0.32  | 71    | 0.00 | 0  | 2.38             |           |            |                 | 0.20     | M5/M6       | 2                  | 4              |                    |             |             |       |                         |             |             |                    |                  |  |
| 19.50             | 1.05     | 0.66  | 63    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 21.00             | 1.50     | 1.34  | 89    | 0.14 | 9  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 22.50             | 1.50     | 1.23  | 82    | 0.21 | 14 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |

**HARDNESS (MPa)**  
 1.VERY SOFT (0-5)  
 2.SOFT (5-25)  
 3.HARD (25-45)  
 4.VERY HARD (45-105)  
 5.EXTREMELY HARD (105+)

**WEATHERING**  
 1.UNWEATHERED  
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 3.MODERATELY  
 4.HIGHLY  
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## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
 1.STRAIGHT  
 2.SLIGHT UNDULATION  
 3.CURVED  
 4.UNI DIRECTIONAL WAVY  
 5.MULTI DIRECTIONAL WAVY

**MICRO**  
 1.POLISHED  
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 3.ROUGH PLANAR  
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**INFILL TYPE**  
 1.GOUGE t. > Amplit. of IRREG.  
 2.GOUGE t. < Amplit. of IRREG.  
 Soft sheared material, e.g. Talc  
 3.FINE  
 4.MEDIUM  
 5.COARSE  
 Non-softening sheared material  
 6.FINE  
 7.MEDIUM  
 8.COARSE  
 9.STAINING  
 10.NONE

**JOINT WALL ALT.**  
 1.WALL = ROCK HARDNESS  
 2.WALL > ROCK HARDNESS  
 3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
 M1. FAULTS  
 M2. SHEARS  
 M3. INTENSE JOINTING  
 M4. INTENSE MINERALISATION  
 M5. DEFORMABLE MATERIAL  
 M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 29  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.00m

ELEVATION: 6.567mamsl  
CO-ORDS: X = 3726781.60  
Y = 53267.456

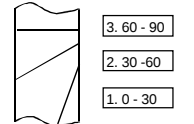
PAGE: 2 OF 3  
DATE: 28-04-2010  
LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |  |
|----------------------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |
| 22.50                            |          |       |       |      |    | 23.25            | SHALE     | 8          | 0.33            |          |             | 1-2                  | 4-5              | 1                  | 2           | 0           | 3     | 1                       | 3           | 5           | 10                 | 1                |  |
| 24.00                            | 1.50     | 1.25  | 83    | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                    |             |             |       | 2                       | 1           | 2           | 10                 | 1                |  |
| 25.50                            | 1.50     | 1.38  | 92    | 0.12 | 8  | 24.80            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 0           | 0           | 0                  | 0                |  |
| 27.00                            | 1.50     | 0.82  | 55    | 0.00 | 0  | 1.55             |           |            |                 | 1.22     | M3/M5       | 1                    | 5                |                    |             |             |       |                         |             |             |                    |                  |  |
| 28.50                            | 1.50     | 1.52  | 101   | 0.67 | 45 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 30.00                            | 1.50     | 1.38  | 92    | 0.21 | 14 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| END OF HOLE - FINAL DEPTH 30.00m |          |       |       |      |    | G5               |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    | 24.80            | GREYWACKE | 0          | 0.35            |          |             | 2                    | 3                | 2                  | 0           | 2           | 4     | 1                       | 1           | 2           | 10                 | 1                |  |
|                                  |          |       |       |      |    | ↓                |           |            |                 |          |             |                      |                  |                    |             |             |       | 2                       | 0           | 0           | 0                  | 0                |  |
|                                  |          |       |       |      |    | 25.15            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 3           | 5           | 10                 | 1                |  |
|                                  |          |       |       |      |    | 0.35             |           |            |                 | 0        | 0           | 0                    | 0                |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    | G6               |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    | 25.15            | GREYWACKE | 0          | 1.68            |          |             | 1-2                  | 4-5              | 6                  | 0           | 2           | 8     | 1                       | 1           | 2           | 10                 | 1                |  |
|                                  |          |       |       |      |    | ↓                |           |            |                 |          |             |                      |                  |                    |             |             |       | 2                       | 0           | 0           | 0                  | 0                |  |
|                                  |          |       |       |      |    | 27.00            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |  |
|                                  |          |       |       |      |    | 1.85             |           |            |                 | 0.17     | M3/M5       | 1-2                  | 4-5              |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    | G7               |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    | 27.00            | GREYWACKE | 78         | 0.86            |          |             | 2                    | 4                | 2                  | 2           | 1           | 5     | 1                       | 1           | 2           | 10                 | 1                |  |
|                                  |          |       |       |      |    | ↓                |           |            |                 |          |             |                      |                  |                    |             |             |       | 2                       | 1           | 2           | 10                 | 1                |  |
|                                  |          |       |       |      |    | 27.86            |           |            |                 |          |             |                      |                  |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |  |
|                                  |          |       |       |      |    | 0.86             |           |            |                 | 0        | 0           | 0                    | 0                |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    | G8               |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
UNDULATING  
5.SMOOTH  
UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED  
STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**  
1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES



**SRK Consulting**  
Engineers and Scientists

HOLE NO: KB 29  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.00m

ELEVATION: 6.567mamsl  
CO-ORDS: X = 3726781.60  
Y = 53267.456

PAGE: 3 OF 3  
DATE: 28-04-2010  
LOGGED BY: JB

[illegible]

| HARDNESS (MPa)          |  |
|-------------------------|--|
| 1.VERY SOFT (0-5)       |  |
| 2.SOFT (5-25)           |  |
| 3.HARD (25-45)          |  |
| 4.VERY HARD (45-105)    |  |
| 5.EXTREMELY HARD (105+) |  |

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMPLETLY

1.0 - 30

## MACRO

- MACRO
1. STRAIGHT
  2. SLIGHT UNDULATION
  3. CURVED
  4. UNI DIRECTIONAL WAVY
  5. MULTI DIRECTIONAL WAVY

## MICRO

- 1.POLISHED
- 2.SMOOTH PLANAR
- 3.ROUGH PLANAR
- 4.SLICKENSIDED  
UNDULATING
- 5.SMOOTH  
UNDULATING
- 6.ROUGH UNDULATING
- 7.SLICKENSIDED  
STEPPED
- 8.SMOOTH STEPPED
- 9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**

1. GOUGE t. > Amplit. of IRREG.  
2. GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3. FINE  
4. MEDIUM  
5. COARSE  
Non-softening sheared material  
6. FINE  
7. MEDIUM  
8. COARSE  
9. STAINING  
10. NONE

## JOINT WALL ALT.

- JOINT WALL ALT.
- 1.WALL = ROCK HARDNESS
  - 2.WALL > ROCK HARDNESS
  - 3.WALL < ROCK HARDNESS

**MATRIX TYPE**

- MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 30  
INCLINATION: VERTICAL  
FINAL DEPTH: 25.50m

ELEVATION: 4.909mamsl  
CO-ORDS: X = 3726580.47  
Y = 53356.720

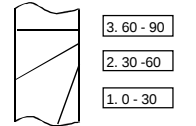
PAGE: 1 OF 3  
DATE: 29-04-2010  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |  |
|-------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|
|                   | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |
| 0.00              |          |       |       |      |    | 18.00<br>↓       | SHALE     | 15         | 0.30            |          |             | 2                  | 4-5            | 3                  | 0           | 0           | 3     | 1                       | 1           | 2           | 9                  | 1                |  |
| 1.50              | 1.50     | 0.86  | 57    | 0.00 | 0  | 2                |           |            |                 |          |             |                    |                |                    |             |             |       | 0                       | 0           | 0           | 0                  |                  |  |
| 1.95              | 0.45     | 0.36  | 80    | 0.00 | 0  | 3                |           |            |                 |          |             |                    |                |                    |             |             |       | 0                       | 0           | 0           | 0                  |                  |  |
| 3.00              | 1.05     | 0.87  | 83    | 0.00 | 0  | 1.50             |           |            |                 | 1.20     | M3/M5       | 2                  | 4-5            | 1. Clayey Silt.    |             |             |       |                         |             |             |                    |                  |  |
| 3.45              | 0.45     | 0.38  | 84    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 4.50              | 1.05     | 0.95  | 90    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 4.95              | 0.45     | 0.34  | 76    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
|                   |          |       |       |      |    | G1               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 6.00              | 1.05     | 0.98  | 93    | 0.00 | 0  | 19.50<br>↓       | SHALE     | 45         | 3.00            |          |             | 2-3                | 3              | 7                  | 0           | 1           | 8     | 1                       | 1           | 2           | 10                 | 1                |  |
| 6.45              | 0.45     | 0.27  | 60    | 0.00 | 0  | 2                |           |            |                 |          |             |                    |                |                    |             |             |       | 0                       | 0           | 0           | 0                  |                  |  |
| 7.50              | 1.05     | 0.70  | 67    | 0.00 | 0  | 3                |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 5           | 10          | 1                  |                  |  |
| 7.95              | 0.45     | 0.36  | 80    | 0.00 | 0  | 3.00             |           |            |                 | 0        | 0           | 0                  | 0              |                    |             |             |       |                         |             |             |                    |                  |  |
| 9.00              | 1.05     | 0.59  | 56    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 9.45              | 0.45     | 0.19  | 42    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 10.50             | 1.05     | 0.49  | 47    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
|                   |          |       |       |      |    | G2               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 10.95             | 0.45     | 0.35  | 78    | 0.00 | 0  | 22.50<br>↓       | SHALE     | 62         | 3.00            |          |             | 2                  | 2              | 6                  | 2           | 0           | 8     | 1                       | 1           | 2           | 10                 | 1                |  |
| 12.00             | 1.05     | 0.68  | 65    | 0.00 | 0  | 2                |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 5           | 10          | 1                  |                  |  |
| 12.45             | 0.45     | 0.29  | 64    | 0.00 | 0  | 3                |           |            |                 |          |             |                    |                |                    |             |             |       | 0                       | 0           | 0           | 0                  |                  |  |
| 13.50             | 1.05     | 0.41  | 39    | 0.00 | 0  | 3.00             |           |            |                 | 0        | 0           | 0                  | 0              |                    |             |             |       |                         |             |             |                    |                  |  |
| 13.95             | 0.45     | 0.29  | 64    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 15.00             | 1.05     | 0.52  | 50    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 15.45             | 0.45     | 0.27  | 60    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
|                   |          |       |       |      |    | G3               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 16.50             | 1.05     | 0.97  | 92    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       | 1                       |             |             |                    |                  |  |
| 16.95             | 0.45     | 0.45  | 100   | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       |             |             |                    |                  |  |
| 18.00             | 1.05     | 0.80  | 76    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       |             |             |                    |                  |  |
| 19.50             | 1.50     | 1.10  | 73    | 0.22 | 15 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 21.00             | 1.50     | 1.38  | 92    | 0.60 | 40 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 22.50             | 1.50     | 1.07  | 71    | 0.76 | 51 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |
| 24.00             | 1.50     | 1.24  | 83    | 0.91 | 61 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMPLETELY

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES



**SRK Consulting**  
Engineers and Scientists

HOLE NO: KB 30  
INCLINATION: VERTICAL  
FINAL DEPTH: 25.50m

ELEVATION: 4.909mamsl  
CO-ORDS: X = 3726580.47  
Y = 53356.720

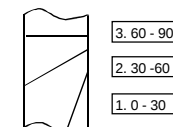
PAGE: 2 OF 2  
DATE: 29-04-2010  
LOGGED BY: JB

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| HARDNESS (MPa)          |  |
|-------------------------|--|
| 1.VERY SOFT (0-5)       |  |
| 2.SOFT (5-25)           |  |
| 3.HARD (25-45)          |  |
| 4.VERY HARD (45-105)    |  |
| 5.EXTREMELY HARD (105+) |  |

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMPLETLY

## JOINT DISTRIBUTION



### JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**

- 1.POLISHED
- 2.SMOOTH PLANAR
- 3.ROUGH PLANAR
- 4.SLICKENSIDED  
UNDULATING
- 5.SMOOTH  
UNDULATING
- 6.ROUGH UNDULATING
- 7.SLICKENSIDED  
STEPPED
- 8.SMOOTH STEPPED
- 9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**

1. GOUGE t. > Amplit. of IRREG.  
2. GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3. FINE  
4. MEDIUM  
5. COARSE  
Non-softening sheared material  
6. FINE  
7. MEDIUM  
8. COARSE  
9. STAINING  
10. NONE

JOINT WALL ALT.

1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 31  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.18m

ELEVATION: 6.610mamsl  
CO-ORDS: X = 3727292.05  
Y = 53093.098

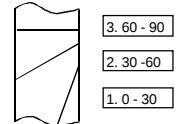
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DATE: 29-04-2010  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD  |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|------|---|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m    | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 0.00              |          |       |       |      |   | 22.95<br>↓       | MUDSTONE  | 55         | 1.15            |          |             | 3                  | 2              | 4                  | 3           | 1           | 8     | 1                       | 1           | 2           | 10                 | 1                |
| 1.50              | 1.50     | 0.70  | 47    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 1           | 2           | 10                 | 1                |
| 3.00              | 1.50     | 0.70  | 47    | 0.00 | 0 | 24.10            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 5           | 8           | 10                 | 1                |
| 3.45              | 0.45     | 0.22  | 49    | 0.00 | 0 | 1.15             |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 4.50              | 1.05     | 0.66  | 63    | 0.00 | 0 |                  |           |            |                 | 0        | 0           | 0                  | 0              |                    |             |             |       |                         |             |             |                    |                  |
| 4.95              | 0.45     | 0.16  | 36    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 6.00              | 1.05     | 0.60  | 57    | 0.00 | 0 | G1               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 6.45              | 0.45     | 0.25  | 56    | 0.00 | 0 | 24.10<br>↓       | GREYWACKE | 68         | 0.00            |          |             | 2-3                | 2              | 2                  | 0           | 1           | 3     | 1                       | 1           | 2           | 10                 | 1                |
| 7.50              | 1.05     | 0.48  | 46    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 0           | 0           | 0                  | 0                |
| 7.95              | 0.45     | 0.21  | 47    | 0.00 | 0 | 25.53            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |
| 9.00              | 1.05     | 0.69  | 66    | 0.00 | 0 | 1.43             |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 9.45              | 0.45     | 0.28  | 62    | 0.00 | 0 |                  |           |            |                 | 0        | 0           | 0                  | 0              |                    |             |             |       |                         |             |             |                    |                  |
| 10.50             | 1.05     | 0.58  | 55    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 10.95             | 0.45     | 0.23  | 51    | 0.00 | 0 | G2               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 12.00             | 1.05     | 0.74  | 70    | 0.00 | 0 | 25.53<br>↓       | MUDSTONE  | 58         | 2.21            |          |             | 2-3                | 1              | 7                  | 0           | 4           | 11    | 1                       | 1           | 2           | 10                 | 1                |
| 12.45             | 0.45     | 0.26  | 58    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 0           | 0           | 0                  | 0                |
| 13.50             | 1.05     | 0.54  | 51    | 0.00 | 0 | 27.85            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 1           | 3           | 9                  | 1                |
| 13.95             | 0.45     | 0.30  | 67    | 0.00 | 0 | 2.32             |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 15.00             | 1.05     | 0.61  | 58    | 0.00 | 0 |                  |           |            |                 | 0.10     | M6          | 2-3                | 1              |                    |             |             |       |                         |             |             |                    |                  |
| 15.45             | 0.45     | 0.23  | 51    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 16.50             | 1.05     | 0.66  | 63    | 0.00 | 0 | G3               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 16.95             | 0.45     | 0.21  | 47    | 0.00 | 0 | 27.85<br>↓       | SILTSTONE | 26         | 2.18            |          |             | 3                  | 1              | 7                  | 5           | 7           | 19    | 1                       | 1           | 3           | 10                 | 1                |
| 18.00             | 1.05     | 0.85  | 81    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       | 2                       | 1           | 2           | 10                 | 1                |
| 18.45             | 0.45     | 0.23  | 51    | 0.00 | 0 | 30.18            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |
| 19.50             | 1.05     | 0.87  | 83    | 0.00 | 0 | 2.33             |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 19.95             | 0.45     | 0.24  | 53    | 0.00 | 0 |                  |           |            |                 | 0.05     | M5          | 3                  | 1              |                    |             |             |       |                         |             |             |                    |                  |
| 21.00             | 1.05     | 0.80  | 76    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 21.45             | 0.45     | 0.24  | 53    | 0.00 | 0 | G4               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t > Amplit. of IRREG.  
2.GOUGE t < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES



**SRK Consulting**  
Engineers and Scientists

HOLE NO: KB 31  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.18m

ELEVATION: 6.610mamsl  
CO-ORDS: X = 3727292.05  
Y = 53093.098

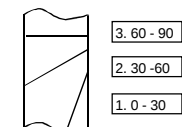
PAGE: 2 OF 2  
DATE: 29-04-2010  
LOGGED BY: JB

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| HARDNESS (MPa)          |  |
|-------------------------|--|
| 1.VERY SOFT (0-5)       |  |
| 2.SOFT (5-25)           |  |
| 3.HARD (25-45)          |  |
| 4.VERY HARD (45-105)    |  |
| 5.EXTREMELY HARD (105+) |  |

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



### JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**

- 1.POLISHED
- 2.SMOOTH PLANAR
- 3.ROUGH PLANAR
- 4.SLICKENSIDED  
UNDULATING
- 5.SMOOTH  
UNDULATING
- 6.ROUGH UNDULATING
- 7.SLICKENSIDED  
STEPPED
- 8.SMOOTH STEPPED
- 9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**

1. GOUGE t. > Amplit. of IRREG.  
2. GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3. FINE  
4. MEDIUM  
5. COARSE  
Non-softening sheared material  
6. FINE  
7. MEDIUM  
8. COARSE  
9. STAINING  
10. NONE

JOINT WALL ALT.

1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



**PROJECT: ESKOM GEOTECH INVEST**  
**SITE: DUYNEFONTEIN**  
**PROJECT No: 385908/42C**

**HOLE NO: KB 32**  
**INCLINATION: VERTICAL**  
**FINAL DEPTH: 40.20m**

**ELEVATION: 6.981mamsl**  
**CO-ORDS: X = 3726897.19**  
**Y = 53267.65**

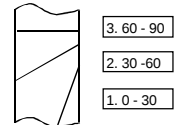
**PAGE: 1 OF 2**  
**DATE: 30-04-2010**  
**LOGGED BY: JB**

| Drilling Interval | Recovery |       |       | RQD  |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution            |             |             |       | Joint Surface Condition |             |             |                    |                  |  |
|-------------------|----------|-------|-------|------|---|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|-------------------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|
|                   | m Drill  | m Rec | % Rec | m    | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1 0° - 30°                    | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |
| 0.00              |          |       |       |      |   | 19.95<br>↓       | GREYWACKE | 0          | 0.20            |          |             | 1                    | 4-5              | 3                             | 0           | 0           | 3     | 1                       | 3           | 5           | 10                 | 1                |  |
| 1.50              | 1.50     | 0.40  | 27    | 0.00 | 0 | 21.10            |           |            |                 |          |             |                      |                  |                               |             |             |       | 2                       | 0           | 0           | 0                  | 0                |  |
| 1.95              | 0.45     | 0.22  | 49    | 0.00 | 0 | 3                |           |            |                 |          |             |                      |                  |                               |             |             |       | 0                       | 0           | 0           | 0                  |                  |  |
| 3.00              | 1.05     | 0.43  | 41    | 0.00 | 0 | 1.15             |           |            |                 | 0.95     | M3/M5       | 1                    | 4-5              |                               |             |             |       |                         |             |             |                    |                  |  |
| 3.45              | 0.45     | 0.22  | 49    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                               |             |             |       |                         |             |             |                    |                  |  |
| 4.50              | 1.05     | 0.40  | 38    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                               |             |             |       |                         |             |             |                    |                  |  |
| 4.95              | 0.45     | 0.23  | 51    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                               |             |             |       |                         |             |             |                    |                  |  |
|                   |          |       |       |      |   | G1               |           |            |                 |          |             |                      |                  |                               |             |             |       |                         |             |             |                    |                  |  |
| 6.00              | 1.05     | 0.32  | 30    | 0.00 | 0 | 21.10<br>↓       | GREYWACKE | 0          | 0.67            |          |             | 2                    | 4                | 1                             | 0           | 6           | 7     | 1                       | 1           | 2           | 9                  | 1                |  |
| 6.45              | 0.45     | 0.23  | 51    | 0.00 | 0 | 21.77            |           |            |                 |          |             |                      |                  |                               |             |             |       | 2                       | 0           | 0           | 0                  | 0                |  |
| 7.50              | 1.05     | 0.42  | 40    | 0.00 | 0 | 3                |           |            |                 |          |             |                      |                  |                               |             |             |       | 1                       | 2           | 9           | 1                  |                  |  |
| 7.95              | 0.45     | 0.19  | 42    | 0.00 | 0 | 0.67             |           |            |                 | 0        | 0           | 0                    | 0                | 1. Iron-stained.              |             |             |       |                         |             |             |                    |                  |  |
| 9.00              | 1.05     | 0.40  | 38    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  | 3. Iron-stained.              |             |             |       |                         |             |             |                    |                  |  |
| 9.45              | 0.45     | 0.24  | 53    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                               |             |             |       |                         |             |             |                    |                  |  |
| 10.50             | 1.05     | 0.42  | 40    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                               |             |             |       |                         |             |             |                    |                  |  |
|                   |          |       |       |      |   | G2               |           |            |                 |          |             |                      |                  |                               |             |             |       |                         |             |             |                    |                  |  |
| 10.95             | 0.45     | 0.19  | 42    | 0.00 | 0 | 21.77<br>↓       | GREYWACKE | 0          | 0.00            |          |             | 1                    | 4-5              | 4                             | 0           | 1           | 5     | 1                       | 1           | 2           | 10                 | 1                |  |
| 12.00             | 1.05     | 0.39  | 37    | 0.00 | 0 | 22.63            |           |            |                 |          |             |                      |                  |                               |             |             |       | 2                       | 0           | 0           | 0                  | 0                |  |
| 12.45             | 0.45     | 0.21  | 47    | 0.00 | 0 | 3                |           |            |                 |          |             |                      |                  |                               |             |             |       | 1                       | 2           | 10          | 1                  |                  |  |
| 13.50             | 1.05     | 0.34  | 32    | 0.00 | 0 | 0.86             |           |            |                 | 0.86     | M2/M3       | 1                    | 4-5              |                               |             |             |       |                         |             |             |                    |                  |  |
| 13.95             | 0.45     | 0.23  | 51    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                               |             |             |       |                         |             |             |                    |                  |  |
| 15.00             | 1.05     | 0.41  | 39    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                               |             |             |       |                         |             |             |                    |                  |  |
| 15.45             | 0.45     | 0.22  | 49    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  |                               |             |             |       |                         |             |             |                    |                  |  |
|                   |          |       |       |      |   | G3               |           |            |                 |          |             |                      |                  |                               |             |             |       |                         |             |             |                    |                  |  |
| 16.50             | 1.05     | 0.30  | 29    | 0.00 | 0 | 22.63<br>↓       | GREYWACKE | 0          | 1.15            |          |             | 2                    | 3                | 10                            | 6           | 3           | 19    | 1                       | 2           | 5           | 9                  | 1                |  |
| 16.95             | 0.45     | 0.25  | 56    | 0.00 | 0 | 24.88            |           |            |                 |          |             |                      |                  |                               |             |             |       | 2                       | 2           | 5           | 9                  | 1                |  |
| 18.00             | 1.05     | 0.39  | 37    | 0.00 | 0 | 3                |           |            |                 |          |             |                      |                  |                               |             |             |       | 2                       | 5           | 9           | 1                  |                  |  |
| 18.45             | 0.45     | 0.21  | 47    | 0.00 | 0 | 2.25             |           |            |                 | 1.10     | M3/M5       | 2                    | 3                | 1. Iron-stained/clayey silt.  |             |             |       |                         |             |             |                    |                  |  |
| 19.50             | 1.05     | 0.39  | 37    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  | 2. Iron-stained /clayey silt. |             |             |       |                         |             |             |                    |                  |  |
| 19.95             | 0.45     | 0.23  | 51    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  | 3. Clayey silt.               |             |             |       |                         |             |             |                    |                  |  |
| 21.00             | 1.05     | 1.03  | 98    | 0.00 | 0 |                  |           |            |                 |          |             |                      |                  | G4                            |             |             |       |                         |             |             |                    |                  |  |

**HARDNESS (MPa)**  
 1.VERY SOFT (0-5)  
 2.SOFT (5-25)  
 3.HARD (25-45)  
 4.VERY HARD (45-105)  
 5.EXTREMELY HARD (105+)

**WEATHERING**  
 1.UNWEATHERED  
 2.SLIGHTLY  
 3.MODERATELY  
 4.HIGHLY  
 5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
 1.STRAIGHT  
 2.SLIGHT UNDULATION  
 3.CURVED  
 4.UNI DIRECTIONAL WAVY  
 5.MULTI DIRECTIONAL WAVY

**MICRO**  
 1.POLISHED  
 2.SMOOTH PLANAR  
 3.ROUGH PLANAR  
 4.SLICKENSIDED  
 5.SMOOTH  
 6.ROUGH UNDULATING  
 7.SLICKENSIDED  
 8.SMOOTH STEPPED  
 9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
 1.GOUGE t. > Amplit. of IRREG.  
 2.GOUGE t. < Amplit. of IRREG.  
 Soft sheared material, e.g. Talc  
 3.FINE  
 4.MEDIUM  
 5.COARSE  
 Non-softening sheared material  
 6.FINE  
 7.MEDIUM  
 8.COARSE  
 9.STAINING  
 10.NONE

**JOINT WALL ALT.**  
 1.WALL = ROCK HARDNESS  
 2.WALL > ROCK HARDNESS  
 3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
 M1. FAULTS  
 M2. SHEARS  
 M3. INTENSE JOINTING  
 M4. INTENSE MINERALISATION  
 M5. DEFORMABLE MATERIAL  
 M6. INTENSE DRILLING  
 FRACTURES

# GEOTECHNICAL BOREHOLE LOG



**PROJECT: ESKOM GEOTECH INVEST**  
**SITE: DUYNFONTEIN**  
**PROJECT No: 385908/42C**

**HOLE NO: KB 32**  
**INCLINATION: VERTICAL**  
**FINAL DEPTH: 40.20m**

**ELEVATION: 6.981mamsl**  
**CO-ORDS: X = 3726897.19**  
**Y = 53267.65**

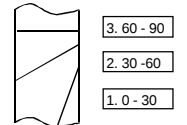
**PAGE: 2 OF 2**  
**DATE: 30-04-2010**  
**LOGGED BY: JB**

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5            | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |    |
|----------------------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|----------------------|-----------------------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|----|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                             | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |    |
| 21.00                            |          |       |       |      |    | 24.88            | GREYWACKE | 0          | 0.00            |          |             | 1                    | 4-5                         | 0                  | 0           | 0           | 0     | 1                       | 0           | 0           | 0                  | 0                |    |
| 22.50                            | 1.50     | 1.39  | 93    | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                             |                    |             |             |       | 2                       | 0           | 0           | 0                  | 0                |    |
| 24.00                            | 1.50     | 1.26  | 84    | 0.00 | 0  | 25.50            |           |            |                 |          |             |                      |                             |                    |             |             |       | 3                       | 0           | 0           | 0                  | 0                |    |
| 25.50                            | 1.50     | 1.37  | 91    | 0.00 | 0  | 0.62             |           |            |                 | M3/M5    | 1           | 4-5                  | Could be driller's induced. |                    |             |             |       |                         |             |             |                    |                  |    |
| 27.00                            | 1.50     | 1.34  | 89    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                             |                    |             |             |       |                         |             |             |                    |                  |    |
| 28.50                            | 1.50     | 1.39  | 93    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                             |                    |             |             |       |                         |             |             |                    |                  |    |
| 30.00                            | 1.50     | 1.42  | 95    | 0.15 | 10 |                  |           |            |                 |          |             |                      |                             |                    |             |             |       |                         |             |             |                    |                  | G5 |
| 31.50                            | 1.50     | 1.42  | 95    | 1.35 | 90 | 25.50            | GREYWACKE | 0          | 0.00            |          |             | 2-3                  | 3                           | 4                  | 5           | 7           | 16    | 1                       | 3           | 5           | 10                 | 1                |    |
| 33.10                            | 1.60     | 1.55  | 97    | 1.01 | 63 | ↓                |           |            |                 |          |             |                      |                             |                    |             |             |       | 2                       | 1           | 2           | 10                 | 1                |    |
| 34.10                            | 1.00     | 1.00  | 100   | 0.16 | 16 | 26.90            |           |            |                 |          |             |                      |                             |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |    |
| 35.70                            | 1.60     | 1.48  | 92    | 0.56 | 35 | 1.40             |           |            |                 | M3/M5    | 2-3         | 3                    |                             |                    |             |             |       |                         |             |             |                    |                  |    |
| 37.30                            | 1.60     | 1.52  | 95    | 1.06 | 66 |                  |           |            |                 |          |             |                      |                             |                    |             |             |       |                         |             |             |                    |                  |    |
| 38.90                            | 1.60     | 1.48  | 92    | 0.10 | 6  |                  |           |            |                 |          |             |                      |                             |                    |             |             |       |                         |             |             |                    |                  |    |
| 40.20                            | 1.30     | 1.20  | 92    | 0.85 | 65 |                  |           |            |                 |          |             |                      |                             |                    |             |             |       |                         |             |             |                    |                  | G6 |
| END OF HOLE - FINAL DEPTH 40.20m |          |       |       |      |    | 26.90            | GREYWACKE | 0          | 0.93            |          |             | 2-3                  | 3                           | 17                 | 13          | 9           | 39    | 1                       | 1           | 2           | 10                 | 1                |    |
|                                  |          |       |       |      |    | ↓                |           |            |                 |          |             |                      |                             |                    |             |             |       | 2                       | 1           | 2           | 10                 | 1                |    |
|                                  |          |       |       |      |    | 29.90            |           |            |                 |          |             |                      |                             |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |    |
|                                  |          |       |       |      |    | 3.00             |           |            |                 | 2.07     | M3          | 2-3                  | 3                           |                    |             |             |       |                         |             |             |                    |                  |    |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                             |                    |             |             |       |                         |             |             |                    |                  |    |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                             |                    |             |             |       |                         |             |             |                    |                  |    |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                             |                    |             |             |       |                         |             |             |                    |                  |    |
|                                  |          |       |       |      |    | 29.90            | SHALE     | 51         | 9.86            |          |             | 3                    | 1                           | 28                 | 4           | 25          | 57    | 1                       | 3           | 5           | 10                 | 1                |    |
|                                  |          |       |       |      |    | ↓                |           |            |                 |          |             |                      |                             |                    |             |             |       | 2                       | 2           | 5           | 10                 | 1                |    |
|                                  |          |       |       |      |    | 40.20            |           |            |                 |          |             |                      |                             |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |    |
|                                  |          |       |       |      |    | 10.30            |           |            |                 | 0.44     | M3/M5       | 3                    | 1                           |                    |             |             |       |                         |             |             |                    |                  |    |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                             |                    |             |             |       |                         |             |             |                    |                  |    |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                             |                    |             |             |       |                         |             |             |                    |                  |    |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                             |                    |             |             |       |                         |             |             |                    |                  |    |

**HARDNESS (MPa)**  
 1.VERY SOFT (0-5)  
 2.SOFT (5-25)  
 3.HARD (25-45)  
 4.VERY HARD (45-105)  
 5.EXTREMELY HARD (105+)

**WEATHERING**  
 1.UNWEATHERED  
 2.SLIGHTLY  
 3.MODERATELY  
 4.HIGHLY  
 5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
 1.STRAIGHT  
 2.SLIGHT UNDULATION  
 3.CURVED  
 4.UNI DIRECTIONAL WAVY  
 5.MULTI DIRECTIONAL WAVY

**MICRO**  
 1.POLISHED  
 2.SMOOTH PLANAR  
 3.ROUGH PLANAR  
 4.SLICKENSIDED  
 5.SMOOTH UNDULATING  
 6.ROUGH UNDULATING  
 7.SLICKENSIDED STEPPED  
 8.SMOOTH STEPPED  
 9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
 1.GOUGE t. > Amplit. of IRREG.  
 2.GOUGE t. < Amplit. of IRREG.  
 Soft sheared material, e.g. Talc  
 3.FINE  
 4.MEDIUM  
 5.COARSE  
 Non-softening sheared material  
 6.FINE  
 7.MEDIUM  
 8.COARSE  
 9.STAINING  
 10.NONE

**JOINT WALL ALT.**  
 1.WALL = ROCK HARDNESS  
 2.WALL > ROCK HARDNESS  
 3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
 M1. FAULTS  
 M2. SHEARS  
 M3. INTENSE JOINTING  
 M4. INTENSE MINERALISATION  
 M5. DEFORMABLE MATERIAL  
 M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



**PROJECT: ESKOM GEOTECH INVEST**  
**SITE: DUYNEFONTEIN**  
**PROJECT No: 385908/42C**

**HOLE NO: KB 33**  
**INCLINATION: VERTICAL**  
**FINAL DEPTH: 30.00m**

**ELEVATION: 4.757mamsl**  
**CO-ORDS: X = 3726498.54**  
**Y = 53449.088**

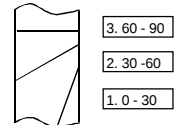
**PAGE: 1 OF 2**  
**DATE: 03-04-2009**  
**LOGGED BY: JB**

| Drilling Interval | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution    |                |                |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|-----------------------|----------------|----------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1<br>0° - 30°         | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 0.00              |          |       |       |      |    | 13.95<br>↓       | GREYWACKE | 47         | 1.30            |          |             | 3                  | 3              | 1                     | 4              | 4              | 9     | 1                       | 2           | 5           | 3                  | 1                |
| 1.50              | 1.50     | 0.63  | 42    |      |    |                  |           |            |                 |          |             |                    |                |                       |                |                |       | 2                       | 2           | 5           | 3                  | 1                |
| 1.95              | 0.45     | 0.23  | 51    |      |    | 15.25            |           |            |                 |          |             |                    |                |                       |                |                |       | 3                       | 5           | 9           | 10                 | 1                |
| 3.00              | 1.05     | 0.44  | 42    |      |    | 1.30             |           |            |                 |          |             |                    |                |                       |                |                |       |                         |             |             |                    |                  |
| 3.45              | 0.45     | 0.23  | 51    |      |    |                  |           |            |                 | 0        | 0           | 0                  | 0              |                       |                |                |       |                         |             |             |                    |                  |
| 4.50              | 1.05     | 0.63  | 60    |      |    |                  |           |            |                 |          |             |                    |                |                       |                |                |       |                         |             |             |                    |                  |
| 4.95              | 0.45     | 0.24  | 53    |      |    | G1               |           |            |                 |          |             |                    |                |                       |                |                |       |                         |             |             |                    |                  |
| 6.00              | 1.05     | 0.77  | 73    |      |    | 15.25<br>↓       | GREYWACKE | 30         | 1.12            |          |             | 2-3                | 3              | 3                     | 7              | 0              | 10    | 1                       | 5           | 9           | 10                 | 1                |
| 6.45              | 0.45     | 0.28  | 62    |      |    |                  |           |            |                 |          |             |                    |                |                       |                |                |       | 2                       | 3           | 6           | 9                  | 1                |
| 7.50              | 1.05     | 0.91  | 87    |      |    | 16.37            |           |            |                 |          |             |                    |                |                       |                |                |       | 3                       | 0           | 0           | 0                  | 0                |
| 7.95              | 0.45     | 0.27  | 60    |      |    | 1.12             |           |            |                 |          |             |                    |                |                       |                |                |       |                         |             |             |                    |                  |
| 9.00              | 1.05     | 0.77  | 73    |      |    |                  |           |            |                 | 0        | 0           | 0                  | 0              |                       |                |                |       |                         |             |             |                    |                  |
| 9.45              | 0.45     | 0.26  | 58    |      |    |                  |           |            |                 |          |             |                    |                |                       |                |                |       |                         |             |             |                    |                  |
| 10.50             | 1.05     | 0.85  | 81    |      |    | G2               |           |            |                 |          |             |                    |                |                       |                |                |       |                         |             |             |                    |                  |
| 10.95             | 0.45     | 0.23  | 51    |      |    | 16.37<br>↓       | GREYWACKE | 29         | 4.25            |          |             | 3                  | 2              | 6                     | 17             | 7              | 30    | 1                       | 2           | 6           | 7                  | 1                |
| 12.00             | 1.05     | 0.85  | 81    |      |    |                  |           |            |                 |          |             |                    |                |                       |                |                |       | 2                       | 2           | 6           | 3                  | 1                |
| 12.45             | 0.45     | 0.27  | 60    |      |    | 21.00            |           |            |                 |          |             |                    |                |                       |                |                |       | 3                       | 5           | 9           | 3                  | 1                |
| 13.50             | 1.05     | 0.49  | 47    |      |    | 4.63             |           |            |                 |          |             |                    |                | 2. Clayey infill 1mm. |                |                |       |                         |             |             |                    |                  |
| 13.95             | 0.45     | 0.29  | 64    |      |    |                  |           |            |                 | 0.38     | M5/M6       | 3                  | 2              |                       |                |                |       |                         |             |             |                    |                  |
| 15.00             | 1.05     | 1.04  | 99    | 0.61 | 58 |                  |           |            |                 |          |             |                    |                |                       |                |                |       |                         |             |             |                    |                  |
| 16.50             | 1.50     | 1.50  | 100   | 0.34 | 23 | G3               |           |            |                 |          |             |                    |                |                       |                |                |       |                         |             |             |                    |                  |
| 18.00             | 1.50     | 1.37  | 91    | 0.79 | 53 | 21.00<br>↓       | GREYWACKE | 39         | 2.95            |          |             | 3                  | 1              | 5                     | 5              | 11             | 21    | 1                       | 1           | 3           | 10                 | 1                |
| 19.50             | 1.50     | 1.26  | 84    | 0.33 | 22 |                  |           |            |                 |          |             |                    |                |                       |                |                |       | 2                       | 2           | 5           | 10                 | 1                |
| 21.00             | 1.50     | 1.52  | 101   | 0.22 | 15 | 24.00            |           |            |                 |          |             |                    |                |                       |                |                |       | 3                       | 1           | 2           | 9                  | 1                |
| 22.50             | 1.50     | 1.51  | 101   | 0.82 | 55 | 3.00             |           |            |                 |          |             |                    |                | 3. Staining           |                |                |       |                         |             |             |                    |                  |
| 24.00             | 1.50     | 1.44  | 96    | 0.36 | 24 |                  |           |            |                 | 0.05     | M6          | 3                  | 1              |                       |                |                |       |                         |             |             |                    |                  |
| 25.50             | 1.50     | 1.46  | 97    | 0.68 | 45 |                  |           |            |                 |          |             |                    |                |                       |                |                |       |                         |             |             |                    |                  |
| 27.00             | 1.50     | 1.49  | 99    | 0.79 | 53 | G4               |           |            |                 |          |             |                    |                |                       |                |                |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
 1.VERY SOFT (0-5)  
 2.SOFT (5-25)  
 3.HARD (25-45)  
 4.VERY HARD (45-105)  
 5.EXTREMELY HARD (105+)

**WEATHERING**  
 1.UNWEATHERED  
 2.SLIGHTLY  
 3.MODERATELY  
 4.HIGHLY  
 5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
 1.STRAIGHT  
 2.SLIGHT UNDULATION  
 3.CURVED  
 4.UNI DIRECTIONAL WAVY  
 5.MULTI DIRECTIONAL WAVY

**MICRO**  
 1.POLISHED  
 2.SMOOTH PLANAR  
 3.ROUGH PLANAR  
 4.SLICKENSIDED  
 5.SMOOTH UNDULATING  
 6.ROUGH UNDULATING  
 7.SLICKENSIDED STEPPED  
 8.SMOOTH STEPPED  
 9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
 1.GOUGE t > Amplit. of IRREG.  
 2.GOUGE t < Amplit. of IRREG.  
 Soft sheared material, e.g. Talc  
 3.FINE  
 4.MEDIUM  
 5.COARSE  
 Non-softening sheared material  
 6.FINE  
 7.MEDIUM  
 8.COARSE  
 9.STAINING  
 10.NONE

**JOINT WALL ALT.**  
 1.WALL = ROCK HARDNESS  
 2.WALL > ROCK HARDNESS  
 3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
 M1. FAULTS  
 M2. SHEARS  
 M3. INTENSE JOINTING  
 M4. INTENSE MINERALISATION  
 M5. DEFORMABLE MATERIAL  
 M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 33  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.00m

ELEVATION: 4.757mamsl  
CO-ORDS: X = 3726498.54  
Y = 53449.088

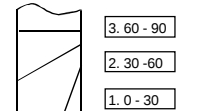
PAGE: 2 OF 2  
DATE: 03-04-2009  
LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |
|----------------------------------|----------|-------|-------|------|---|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                                  | m Drill  | m Rec | % Rec | m    | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 27.00                            |          |       |       |      |   | 24.00            | GREYWACKE | 50         |                 |          |             | 4                  | 1              | 5                  | 3           | 14          | 22    | 1                       | 1           | 2           | 10                 | 1                |
| 28.50                            | 1.50     | 1.42  | 95    | 0.14 | 9 | ↓                |           |            | 3.10            |          |             |                    |                |                    |             |             |       | 2                       | 2           | 6           | 10                 | 1                |
| 30.00                            | 1.50     | 1.41  | 94    | 0.10 | 7 | 27.20            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 1           | 2           | 10                 | 1                |
| END OF HOLE - FINAL DEPTH 30.00m |          |       |       |      |   | 3.20             | GREYWACKE | 50         |                 |          |             | 4                  | 1              |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |   |                  |           |            |                 | 0.10     | M6          |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |   | G5               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |   | 27.20            | GREYWACKE | 4          |                 |          |             | 3                  | 1              | 11                 | 3           | 2           | 16    | 1                       | 3           | 5           | 10                 | 1                |
|                                  |          |       |       |      |   | ↓                |           |            | 1.28            |          |             |                    |                |                    |             |             |       | 2                       | 2           | 5           | 10                 | 1                |
|                                  |          |       |       |      |   | 30.00            |           |            |                 |          |             |                    |                |                    |             |             |       | 3                       | 2           | 5           | 10                 | 1                |
|                                  |          |       |       |      |   | 2.80             | GREYWACKE | 4          |                 |          |             | 3                  | 1              |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |   |                  |           |            |                 | 1.52     | M5/M6       |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |   | G6               |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
|                                  |          |       |       |      |   |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t > Amplit. of IRREG.  
2.GOUGE t < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



**PROJECT: ESKOM GEOTECH INVEST**  
**SITE: DUYNESFONTEIN**  
**PROJECT No: 385908/42C**

**HOLE NO: KB 34**  
**INCLINATION: VERTICAL**  
**FINAL DEPTH: 30.14m**

**ELEVATION: 7.621mamsl**  
**CO-ORDS: X = 3726541.48**  
**Y = 53249.274**

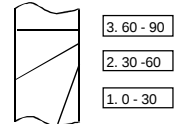
**PAGE: 1 OF 2**  
**DATE: 29-04-2010**  
**LOGGED BY: JB**

| Drilling Interval | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution                                    |             |             |       | Joint Surface Condition |             |             |                    |                  |  |
|-------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|-------------------------------------------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|
|                   | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1 0° - 30°                                            | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |
| 0.00              |          |       |       |      |    | 18.60            | GREYWACKE | 4          | 1.60            |          |             | 1                    | 4-5              | 4                                                     | 3           | 0           | 7     | 1                       | 1           | 2           | 10                 | 1                |  |
| 1.50              | 1.50     | 0.94  | 63    | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                                                       |             |             |       | 2                       | 1           | 2           | 9                  | 1                |  |
| 1.95              | 0.45     | 0.38  | 84    | 0.00 | 0  | 21.94            |           |            |                 |          |             |                      |                  |                                                       |             |             |       | 3                       | 0           | 0           | 0                  | 0                |  |
| 3.00              | 1.05     | 0.98  | 93    | 0.00 | 0  | 3.34             |           |            |                 | 1.74     | M5          | 1                    | 4-5              | 2. Clayey Silt.                                       |             |             |       |                         |             |             |                    |                  |  |
| 3.45              | 0.45     | 0.34  | 76    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                       |             |             |       |                         |             |             |                    |                  |  |
| 4.50              | 1.05     | 1.01  | 96    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                       |             |             |       |                         |             |             |                    |                  |  |
| 4.95              | 0.45     | 0.45  | 100   | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                       |             |             |       |                         |             |             |                    |                  |  |
| 6.00              | 1.05     | 0.95  | 90    | 0.00 | 0  | 21.94            | GREYWACKE | 85         | 0.70            |          |             | 2                    | 4                | 1                                                     | 0           | 0           | 1     | 1                       | 1           | 2           | 10                 | 1                |  |
| 6.45              | 0.45     | 0.31  | 69    | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                                                       |             |             |       | 2                       | 0           | 0           | 0                  | 0                |  |
| 7.50              | 1.05     | 1.12  | 107   | 0.00 | 0  | 22.64            |           |            |                 |          |             |                      |                  |                                                       |             |             |       | 3                       | 0           | 0           | 0                  | 0                |  |
| 7.95              | 0.45     | 0.25  | 56    | 0.00 | 0  | 0.70             |           |            |                 | 0        | 0           | 0                    | 0                |                                                       |             |             |       |                         |             |             |                    |                  |  |
| 9.00              | 1.05     | 1.01  | 96    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                       |             |             |       |                         |             |             |                    |                  |  |
| 9.45              | 0.45     | 0.28  | 62    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                       |             |             |       |                         |             |             |                    |                  |  |
| 10.50             | 1.05     | 1.06  | 101   | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                       |             |             |       |                         |             |             |                    |                  |  |
| 10.95             | 0.45     | 0.30  | 67    | 0.00 | 0  | 22.64            | GREYWACKE | 0          | 0.20            |          |             | 1                    | 4-5              | 3                                                     | 0           | 0           | 3     | 1                       | 1           | 2           | 9                  | 1                |  |
| 12.00             | 1.05     | 1.05  | 100   | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                                                       |             |             |       | 2                       | 0           | 0           | 0                  | 0                |  |
| 12.45             | 0.45     | 0.29  | 64    | 0.00 | 0  | 24.14            |           |            |                 |          |             |                      |                  |                                                       |             |             |       | 3                       | 0           | 0           | 0                  | 0                |  |
| 13.50             | 1.05     | 0.96  | 91    | 0.00 | 0  | 1.50             |           |            |                 | 1.30     | M3/M5       | 1                    | 4-5              | 1. Clayey Silt.                                       |             |             |       |                         |             |             |                    |                  |  |
| 13.95             | 0.45     | 0.36  | 80    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                       |             |             |       |                         |             |             |                    |                  |  |
| 15.00             | 1.05     | 0.91  | 87    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                       |             |             |       |                         |             |             |                    |                  |  |
| 15.45             | 0.45     | 0.42  | 93    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                       |             |             |       |                         |             |             |                    |                  |  |
| 16.50             | 1.05     | 0.85  | 81    | 0.00 | 0  | 24.14            | GREYWACKE | 48         | 3.60            |          |             | 2                    | 3-4              | 8                                                     | 3           | 3           | 14    | 1                       | 2           | 5           | 9                  | 1                |  |
| 16.95             | 0.45     | 0.45  | 100   | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                                                       |             |             |       | 2                       | 1           | 2           | 9                  | 1                |  |
| 18.00             | 1.05     | 0.81  | 77    | 0.00 | 0  | 28.49            |           |            |                 |          |             |                      |                  |                                                       |             |             |       | 3                       | 2           | 5           | 9                  | 1                |  |
| 18.45             | 0.45     | 0.45  | 100   | 0.00 | 0  | 4.35             |           |            |                 | 0.95     | M3/M5       | 2                    | 3-4              | 1. Clayey Silt.<br>2. Clayey Silt.<br>3. Clayey Silt. |             |             |       |                         |             |             |                    |                  |  |
| 19.60             | 1.15     | 1.02  | 89    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                       |             |             |       |                         |             |             |                    |                  |  |
| 21.14             | 1.54     | 1.22  | 79    | 0.12 | 40 |                  |           |            |                 |          |             |                      |                  |                                                       |             |             |       |                         |             |             |                    |                  |  |
| 21.44             | 0.30     | 0.27  | 90    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                                                       |             |             |       |                         |             |             |                    |                  |  |

**HARDNESS (MPa)**  
 1.VERY SOFT (0-5)  
 2.SOFT (5-25)  
 3.HARD (25-45)  
 4.VERY HARD (45-105)  
 5.EXTREMELY HARD (105+)

**WEATHERING**  
 1.UNWEATHERED  
 2.SLIGHTLY  
 3.MODERATELY  
 4.HIGHLY  
 5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
 1.STRAIGHT  
 2.SLIGHT UNDULATION  
 3.CURVED  
 4.UNI DIRECTIONAL WAVY  
 5.MULTI DIRECTIONAL WAVY

**MICRO**  
 1.POLISHED  
 2.SMOOTH PLANAR  
 3.ROUGH PLANAR  
 4.SLICKENSIDED  
 5.SMOOTH UNDULATING  
 6.ROUGH UNDULATING  
 7.SLICKENSIDED STEPPED  
 8.SMOOTH STEPPED  
 9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
 1.GOUGE t. > Amplit. of IRREG.  
 2.GOUGE t. < Amplit. of IRREG.  
 Soft sheared material, e.g. Talc  
 3.FINE  
 4.MEDIUM  
 5.COARSE  
 Non-softening sheared material  
 6.FINE  
 7.MEDIUM  
 8.COARSE  
 9.STAINING  
 10.NONE

**JOINT WALL ALT.**  
 1.WALL = ROCK HARDNESS  
 2.WALL > ROCK HARDNESS  
 3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
 M1. FAULTS  
 M2. SHEARS  
 M3. INTENSE JOINTING  
 M4. INTENSE MINERALISATION  
 M5. DEFORMABLE MATERIAL  
 M6. INTENSE DRILLING FRACTURES



**SRK Consulting**  
Engineers and Scientists

HOLE NO: KB 34  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.14m

ELEVATION: 7.621mamsl  
CO-ORDS: X = 3726541.48  
Y = 53249.274

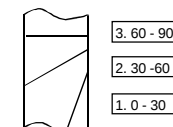
PAGE: 2 OF 2  
DATE: 29-04-2010  
LOGGED BY: JB

[illegible]

| HARDNESS (MPa)          |  |
|-------------------------|--|
| 1.VERY SOFT (0-5)       |  |
| 2.SOFT (5-25)           |  |
| 3.HARD (25-45)          |  |
| 4.VERY HARD (45-105)    |  |
| 5.EXTREMELY HARD (105+) |  |

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



### JOINT CONDITION

## MACRO

1. STRAIGHT
2. SLIGHT UNDULATION
3. CURVED
4. UNI DIRECTIONAL WAVY
5. MULTI DIRECTIONAL WAVY

**MICRO**

- 1.POLISHED
- 2.SMOOTH PLANAR
- 3.ROUGH PLANAR
- 4.SLICKENSIDED  
UNDULATING
- 5.SMOOTH  
UNDULATING
- 6.ROUGH UNDULATING
- 7.SLICKENSIDED  
STEPPED
- 8.SMOOTH STEPPED
- 9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**

1. GOUGE t. > Amplit. of IRREG.  
2. GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3. FINE  
4. MEDIUM  
5. COARSE  
Non-softening sheared material  
6. FINE  
7. MEDIUM  
8. COARSE  
9. STAINING  
10. NONE

## JOINT WALL ALT.

- 1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**

- MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNEFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 36  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.04m

ELEVATION: 10.125mamsl  
CO-ORDS: X = 3726939.14  
Y = 53080.390

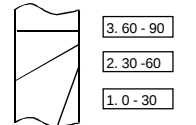
PAGE: 1 OF 2  
DATE: 29-04-2010  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution     |             |             |       | Joint Surface Condition |             |             |                    |                  |    |
|-------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|------------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|----|
|                   | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1 0° - 30°             | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |    |
| 0.00              |          |       |       |      |    | 15.00            | HORNFEELS | 0          | 0.55            |          |             | 3                    | 2                | 3                      | 6           | 0           | 9     | 1                       | 1           | 2           | 9                  | 1                |    |
| 0.08              | 0.08     | 0.08  | 100   | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                        |             |             |       | 2                       | 1           | 2           | 9                  | 1                |    |
| 1.50              | 1.42     | 0.85  | 60    | 0.00 | 0  | 15.55            |           |            |                 |          |             |                      |                  |                        |             |             |       | 3                       | 0           | 0           | 0                  | 0                |    |
| 1.95              | 0.45     | 0.39  | 87    | 0.00 | 0  | 0.55             |           |            |                 | 0        | 0           | 0                    | 0                | Yellow oxide stained.  |             |             |       |                         |             |             |                    |                  |    |
| 3.04              | 1.09     | 0.32  | 29    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |
| 3.49              | 0.45     | 0.45  | 100   | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |
| 4.54              | 1.05     | 0.39  | 37    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |
| 4.99              | 0.45     | 0.40  | 89    | 0.00 | 0  | 15.55            | HORNFEELS | 27         | 5.49            |          |             | 4                    | 1                | 15                     | 25          | 10          | 50    | 1                       | 1           | 2           | 3/6                | 1                |    |
| 6.04              | 1.05     | 0.30  | 29    | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                        |             |             |       | 2                       | 1           | 2           | 10                 | 1                |    |
| 6.49              | 0.45     | 0.39  | 87    | 0.00 | 0  | 21.04            |           |            |                 |          |             |                      |                  |                        |             |             |       | 3                       | 1           | 2           | 10                 | 1                |    |
| 7.54              | 1.05     | 0.42  | 40    | 0.00 | 0  | 5.49             |           |            |                 | 0        | 0           | 0                    | 0                | 1. Powder and Calcite. |             |             |       |                         |             |             |                    |                  |    |
| 7.99              | 0.45     | 0.26  | 58    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |
| 9.04              | 1.05     | 0.52  | 50    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |
| 9.49              | 0.45     | 0.44  | 98    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |
| 10.54             | 1.05     | 0.75  | 71    | 0.00 | 0  | 21.04            | HORNFEELS | 51         | 5.72            |          |             | 4                    | 1                | 11                     | 13          | 0           | 24    | 1                       | 1           | 2           | 10                 | 1                |    |
| 10.99             | 0.45     | 0.45  | 100   | 0.00 | 0  | ↓                |           |            |                 |          |             |                      |                  |                        |             |             |       | 2                       | 1           | 2           | 10                 | 1                |    |
| 12.04             | 1.05     | 0.61  | 58    | 0.00 | 0  | 26.76            |           |            |                 |          |             |                      |                  |                        |             |             |       | 3                       | 0           | 0           | 0                  | 0                |    |
| 12.49             | 0.45     | 0.45  | 100   | 0.00 | 0  | 5.72             |           |            |                 | 0        | 0           | 0                    | 0                |                        |             |             |       |                         |             |             |                    |                  |    |
| 13.54             | 1.05     | 0.29  | 28    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |
| 13.99             | 0.45     | 0.32  | 71    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |
| 15.04             | 1.05     | 0.70  | 67    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |
| 16.54             | 1.50     | 1.42  | 95    | 0.66 | 44 | 26.76            | HORNFEELS | 0          | 0.00            |          |             | 3                    | 1                | 2                      | 0           | 0           | 2     | 1                       | 2           | 6           | 10                 | 1                |    |
| 18.04             | 1.50     | 1.53  | 102   | 0.14 | 9  | ↓                |           |            |                 |          |             |                      |                  |                        |             |             |       | 2                       | 0           | 0           | 0                  | 0                |    |
| 19.54             | 1.50     | 1.51  | 101   | 0.29 | 19 | 27.04            |           |            |                 |          |             |                      |                  |                        |             |             |       | 3                       | 0           | 0           | 0                  | 0                |    |
| 21.04             | 1.50     | 1.41  | 94    | 0.41 | 27 | 0.28             |           |            |                 | m2       | 3           | 1                    |                  |                        |             |             |       |                         |             |             |                    |                  |    |
| 22.54             | 1.50     | 1.61  | 107   | 0.65 | 43 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |
| 24.04             | 1.50     | 1.48  | 99    | 0.96 | 64 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  |    |
| 25.54             | 1.50     | 1.40  | 93    | 0.83 | 55 |                  |           |            |                 |          |             |                      |                  |                        |             |             |       |                         |             |             |                    |                  | G4 |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
UNDULATING  
5.SMOOTH  
UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED  
STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**  
1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 36  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.04m

ELEVATION: 10.125mamsl  
CO-ORDS: X = 3726939.14  
Y = 53080.390

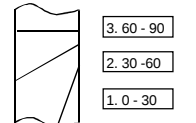
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DATE: 29-04-2010  
LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval    | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness<br>1 - 5<br>(MPa) | Weathering<br>1 - 5 | Joint Distribution |                |                |       | Joint Surface Condition |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------|----------|-------|-------|------|----|---------------------|-----------|------------|-----------------|----------|-------------|----------------------------|---------------------|--------------------|----------------|----------------|-------|-------------------------|----------------|----------------|--------------------------|------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                     |           |            | Solid m         | Matrix m | Matrix Type |                            |                     | 1<br>0° - 30°      | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro<br>1 - 5 | Micro<br>1 - 9 | Infill<br>Type<br>1 - 10 | Wall<br>Alter<br>1 - 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 25.54                            |          |       |       |      |    | 27.04<br>↓<br>30.04 | HORNFELS  | 19         | 3.00            |          |             | 4                          | 1                   | 6                  | 16             | 5              | 27    | 1                       | 2              | 5              | 10                       | 1                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 27.04                            | 1.50     | 1.29  | 86    | 0.50 | 33 |                     |           |            |                 |          |             |                            |                     |                    |                |                |       | 2                       | 1              | 2              | 6                        | 1                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 28.54                            | 1.50     | 1.41  | 94    | 0.47 | 31 |                     |           |            |                 |          |             |                            |                     |                    |                |                |       | 3                       | 5              | 8              | 10                       | 1                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 30.04                            | 1.50     | 1.43  | 95    | 0.12 | 8  |                     |           |            |                 |          |             |                            |                     |                    |                |                |       | 1. Calc <1mm.           |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| END OF HOLE - FINAL DEPTH 30.04m |          |       |       |      |    | 3.00                |           |            |                 | 0        | 0           | 0                          | 0                   |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    | G5                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                  |          |       |       |      |    |                     |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t > Amplit. of IRREG.  
2.GOUGE t < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 37  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.17m

ELEVATION: 11.173mamsl  
CO-ORDS: X = 3727139.66  
Y = 52987.447

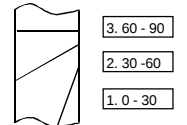
PAGE: 1 OF 2  
DATE: 03-05-2008  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD  |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution |                |                |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|------|---|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------|----------------|----------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m    | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1<br>0° - 30°      | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 0.00              |          |       |       |      |   | 19.50            | SILTSTONE | 6          |                 |          |             | 3-4                | 1              |                    |                |                |       | 1                       | 3           | 5           | 10                 | 1                |
| 1.50              | 1.50     | 0.90  | 60    | 0.00 | 0 | ↓                |           |            | 3.19            |          |             |                    |                | 3                  | 10             | 5              | 18    | 2                       | 1           | 2           | 10                 | 1                |
| 1.95              | 0.45     | 0.35  | 78    | 0.00 | 0 | 23.55            |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 1           | 2           | 10                 | 1                |
| 3.00              | 1.05     | 0.82  | 78    | 0.00 | 0 | 4.05             |           |            |                 |          |             | 3-4                | 1              |                    |                |                |       |                         |             |             |                    |                  |
| 3.45              | 0.45     | 0.28  | 62    | 0.00 | 0 |                  |           |            |                 | 0.86     | M3/M6       |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 4.50              | 1.05     | 1.00  | 95    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 4.95              | 0.45     | 0.20  | 44    | 0.00 | 0 | G1               |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 6.00              | 1.05     | 0.83  | 79    | 0.00 | 0 | 23.55            | SILTSTONE | 31         |                 |          |             | 3                  | 1              |                    |                |                |       | 1                       | 1           | 2           | 10                 | 1                |
| 6.45              | 0.45     | 0.45  | 100   | 0.00 | 0 | ↓                |           |            | 2.12            |          |             |                    |                | 7                  | 7              | 2              | 16    | 2                       | 1           | 2           | 10                 | 1                |
| 7.50              | 1.05     | 0.85  | 81    | 0.00 | 0 | 25.67            |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 1           | 2           | 10                 | 1                |
| 7.95              | 0.45     | 0.45  | 100   | 0.00 | 0 | 2.12             |           |            |                 |          |             | 0                  | 0              |                    |                |                |       |                         |             |             |                    |                  |
| 9.00              | 1.05     | 0.81  | 77    | 0.00 | 0 |                  |           |            |                 | 0        | 0           |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 9.45              | 0.45     | 0.45  | 100   | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 10.50             | 1.05     | 0.56  | 53    | 0.00 | 0 | G2               |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 10.95             | 0.45     | 0.19  | 42    | 0.00 | 0 | 25.67            | SILTSTONE | 42         |                 |          |             | 3                  | 1              |                    |                |                |       | 1                       | 1           | 2           | 10                 | 1                |
| 12.00             | 1.05     | 0.55  | 52    | 0.00 | 0 | ↓                |           |            | 0.78            |          |             |                    |                | 3                  | 0              | 4              | 7     | 2                       | 0           | 0           | 0                  | 0                |
| 12.45             | 0.45     | 0.23  | 51    | 0.00 | 0 | 26.70            |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 1           | 2           | 10                 | 1                |
| 13.50             | 1.05     | 0.55  | 52    | 0.00 | 0 | 1.03             |           |            |                 |          |             | 3                  | 1              |                    |                |                |       |                         |             |             |                    |                  |
| 13.95             | 0.45     | 0.24  | 53    | 0.00 | 0 |                  |           |            |                 | 0.25     | M3/M5       |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 15.00             | 1.05     | 0.47  | 45    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 15.45             | 0.45     | 0.25  | 56    | 0.00 | 0 | G3               |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 16.50             | 1.05     | 0.56  | 53    | 0.00 | 0 | 26.70            | SILTSTONE | 49         |                 |          |             | 3-4                | 1              |                    |                |                |       | 1                       | 1           | 2           | 10                 | 1                |
| 16.95             | 0.45     | 0.33  | 73    | 0.00 | 0 | ↓                |           |            | 3.39            |          |             |                    |                | 7                  | 5              | 3              | 15    | 2                       | 2           | 5           | 10                 | 1                |
| 18.00             | 1.05     | 1.00  | 95    | 0.00 | 0 | 30.17            |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 2           | 5           | 10                 | 1                |
| 18.45             | 0.45     | 0.27  | 60    | 0.00 | 0 | 3.47             |           |            |                 |          |             | 3-4                | 1              |                    |                |                |       |                         |             |             |                    |                  |
| 19.50             | 1.05     | 0.91  | 87    | 0.00 | 0 |                  |           |            |                 | 0.08     | M3/M6       |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 20.08             | 0.58     | 0.24  | 41    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 21.58             | 1.50     | 1.03  | 69    | 0.00 | 0 | G4               |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES



**SRK Consulting**  
Engineers and Scientists

HOLE NO: KB 37  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.17m

ELEVATION: 11.173mamsl  
CO-ORDS: X = 3727139.66  
Y = 52987.447

PAGE: 2 OF 2  
DATE: 03-05-2008  
LOGGED BY: JB

[illegible]

| HARDNESS (MPa)          |  |
|-------------------------|--|
| 1.VERY SOFT (0-5)       |  |
| 2.SOFT (5-25)           |  |
| 3.HARD (25-45)          |  |
| 4.VERY HARD (45-105)    |  |
| 5.EXTREMELY HARD (105+) |  |

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMPLETLY

1.0 - 30

## MACRO

- MACRO
1. STRAIGHT
  2. SLIGHT UNDULATION
  3. CURVED
  4. UNI DIRECTIONAL WAVY
  5. MULTI DIRECTIONAL WAVY

## MICRO

- 1.POLISHED
- 2.SMOOTH PLANAR
- 3.ROUGH PLANAR
- 4.SLICKENSIDED  
UNDULATING
- 5.SMOOTH  
UNDULATING
- 6.ROUGH UNDULATING
- 7.SLICKENSIDED  
STEPPED
- 8.SMOOTH STEPPED
- 9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**

1. GOUGE t. > Amplit. of IRREG.  
2. GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3. FINE  
4. MEDIUM  
5. COARSE  
Non-softening sheared material  
6. FINE  
7. MEDIUM  
8. COARSE  
9. STAINING  
10. NONE

## JOINT WALL ALT.

- JOINT WALL ALT.
- 1.WALL = ROCK HARDNESS
  - 2.WALL > ROCK HARDNESS
  - 3.WALL < ROCK HARDNESS

**MATRIX TYPE**

- MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNEFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 38  
INCLINATION: VERTICAL  
FINAL DEPTH: 25.56m

ELEVATION: 14.016mamsl  
CO-ORDS: X = 3727093.42  
Y = 52876.429

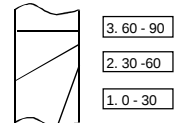
PAGE: 1 OF 2  
DATE: 30-04-2010  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD  |   | Geotech Interval     | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution            |             |             |       | Joint Surface Condition |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
|-------------------|----------|-------|-------|------|---|----------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|-------------------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|---|----|--|--|--|--|--|--|--|
|                   | m Drill  | m Rec | % Rec | m    | % |                      |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°                    | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |   |    |  |  |  |  |  |  |  |
| 0.00              |          |       |       |      |   | 19.80<br>↓           | GREYWACKE | 0          | 0.37            |          |             | 4                  | 1              | 1                             | 1           | 0           | 2     | 1                       | 2           | 5           | 10                 | 1                |   |    |  |  |  |  |  |  |  |
| 1.50              | 1.50     | 0.54  | 36    | 0.00 | 0 | 2                    |           |            |                 |          |             |                    |                |                               |             |             |       | 3                       | 5           | 10          | 1                  |                  |   |    |  |  |  |  |  |  |  |
| 1.95              | 0.45     | 0.34  | 76    | 0.00 | 0 | 3                    |           |            |                 |          |             |                    |                |                               |             |             |       | 0                       | 0           | 0           | 0                  |                  |   |    |  |  |  |  |  |  |  |
| 3.00              | 1.05     | 0.39  | 37    | 0.00 | 0 | 1.26                 |           |            |                 | 0.89     | M5/M6       | 4                  | 1              | Depth of rock could be wrong? |             |             |       |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
| 3.45              | 0.45     | 0.24  | 53    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             |       |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
| 4.50              | 1.05     | 0.67  | 64    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             |       |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
| 4.95              | 0.45     | 0.31  | 69    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             |       |                         |             |             |                    |                  |   | G1 |  |  |  |  |  |  |  |
| 6.00              | 1.05     | 0.53  | 50    | 0.00 | 0 | SILTSTONE / MUDSTONE | 6         | 1.67       |                 |          | 3           | 1-2                | 12             | 8                             | 1           | 21          | 1     | 2                       | 5           | 10          | 1                  |                  |   |    |  |  |  |  |  |  |  |
| 6.45              | 0.45     | 0.27  | 60    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             | 2     | 1                       | 2           | 10          | 1                  |                  |   |    |  |  |  |  |  |  |  |
| 7.50              | 1.05     | 0.50  | 48    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             | 3     | 5                       | 9           | 10          | 1                  |                  |   |    |  |  |  |  |  |  |  |
| 7.95              | 0.45     | 0.26  | 58    | 0.00 | 0 |                      |           | 4.50       |                 | 2.83     | M3/M6       | 3                  | 1-2            |                               |             |             |       |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
| 9.00              | 1.05     | 0.95  | 90    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             |       |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
| 9.45              | 0.45     | 0.25  | 56    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             |       |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
| 10.50             | 1.05     | 0.72  | 69    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             |       |                         |             |             |                    |                  |   | G2 |  |  |  |  |  |  |  |
| 10.95             | 0.45     | 0.25  | 56    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             | 1     |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
| 12.00             | 1.05     | 0.46  | 44    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             | 2     |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
| 12.45             | 0.45     | 0.25  | 56    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             | 3     |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
| 13.50             | 1.05     | 0.55  | 52    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             |       |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
| 13.95             | 0.45     | 0.26  | 58    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             |       |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
| 15.00             | 1.05     | 0.71  | 68    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             |       |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
| 15.45             | 0.45     | 0.30  | 67    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             |       |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
| 16.50             | 1.05     | 0.37  | 35    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             |       |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
| 16.95             | 0.45     | 0.23  | 51    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             |       |                         |             |             |                    |                  | 1 |    |  |  |  |  |  |  |  |
| 18.00             | 1.05     | 0.68  | 65    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             |       |                         |             |             |                    |                  | 2 |    |  |  |  |  |  |  |  |
| 18.45             | 0.45     | 0.32  | 71    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             |       |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
| 19.50             | 1.05     | 0.74  | 70    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             |       |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
| 19.80             | 0.30     | 0.23  | 77    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             |       |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |
| 21.06             | 1.26     | 0.44  | 35    | 0.00 | 0 |                      |           |            |                 |          |             |                    |                |                               |             |             |       |                         |             |             |                    |                  |   |    |  |  |  |  |  |  |  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
UNDULATING  
5.SMOOTH  
UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED  
STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**  
1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES



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LOGGED BY: JB

| HARDNESS (MPa)          |  |
|-------------------------|--|
| 1.VERY SOFT (0-5)       |  |
| 2.SOFT (5-25)           |  |
| 3.HARD (25-45)          |  |
| 4.VERY HARD (45-105)    |  |
| 5.EXTREMELY HARD (105+) |  |

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMPLETLY

1.0 - 30

MACRO

1. STRAIGHT
2. SLIGHT UNDULATION
3. CURVED
4. UNI DIRECTIONAL WAVY
5. MULTI DIRECTIONAL WAVY

- 1.POLISHED
- 2.SMOOTH PLANAR
- 3.ROUGH PLANAR
- 4.SLICKENSIDED  
UNDULATING
- 5.SMOOTH  
UNDULATING
- 6.ROUGH UNDULATING
- 7.SLICKENSIDED  
STEPPED
- 8.SMOOTH STEPPED
- 9.ROUGH STEPPED /  
IRREGULAR

1. GOUGE t. > Amplit. of IRREG.  
2. GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3. FINE  
4. MEDIUM  
5. COARSE  
Non-softening sheared material  
6. FINE  
7. MEDIUM  
8. COARSE  
9. STAINING  
10. NONE

1. WALL = ROCK HARDNESS  
2. WALL > ROCK HARDNESS  
3. WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

[illegible]

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNESFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 40  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.00m

ELEVATION: 6.654mamsl  
CO-ORDS: X = 3727398.61  
Y = 53065.497

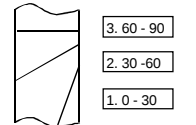
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DATE: 30-04-2010  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD  |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution               |             |             |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|------|---|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|----------------------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m    | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°                       | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 0.00              |          |       |       |      |   | 19.95<br>↓       | GREYWACKE | 16         | 2.30            |          |             | 3                  | 2-3            |                                  |             |             | 0     | 1                       | 3           | 5           | 9                  | 1                |
| 1.50              | 1.50     | 0.60  | 40    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       | 2                       | 2           | 5           | 10                 | 1                |
| 1.95              | 0.45     | 0.23  | 51    | 0.00 | 0 | 22.50            |           |            |                 |          |             |                    |                |                                  |             |             |       | 3                       | 3           | 5           | 10                 | 1                |
| 3.00              | 1.05     | 0.42  | 40    | 0.00 | 0 | 2.55             |           |            |                 |          |             |                    |                | 2. Clayey Silt / Yellow Stained. |             |             |       |                         |             |             |                    |                  |
| 3.45              | 0.45     | 0.23  | 51    | 0.00 | 0 |                  |           |            |                 | 0.25     | M3/M5       | 2-3                | 3-4            |                                  |             |             |       |                         |             |             |                    |                  |
| 4.50              | 1.05     | 0.47  | 45    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       |                         |             |             |                    |                  |
| 4.95              | 0.45     | 0.23  | 51    | 0.00 | 0 | G1               |           |            |                 |          |             |                    |                |                                  |             |             |       |                         |             |             |                    |                  |
| 6.00              | 1.05     | 0.49  | 47    | 0.00 | 0 | 22.50<br>↓       | SHALE     | 6          | 5.87            |          |             | 2-3                | 2              | 31                               | 9           | 10          | 50    | 1                       | 1           | 2           | 10                 | 1                |
| 6.45              | 0.45     | 0.24  | 53    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       | 2                       | 3           | 5           | 10                 | 1                |
| 7.50              | 1.05     | 0.47  | 45    | 0.00 | 0 | 30.00            |           |            |                 |          |             |                    |                |                                  |             |             |       | 3                       | 1           | 2           | 10                 | 1                |
| 7.95              | 0.45     | 0.22  | 49    | 0.00 | 0 | 7.50             |           |            |                 |          |             |                    |                |                                  |             |             |       |                         |             |             |                    |                  |
| 9.00              | 1.05     | 0.42  | 40    | 0.00 | 0 |                  |           |            |                 | 1.63     | M2/M3       | 2-3                | 2              |                                  |             |             |       |                         |             |             |                    |                  |
| 9.45              | 0.45     | 0.21  | 47    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       |                         |             |             |                    |                  |
| 10.50             | 1.05     | 0.35  | 33    | 0.00 | 0 | G2               |           |            |                 |          |             |                    |                |                                  |             |             |       |                         |             |             |                    |                  |
| 10.95             | 0.45     | 0.31  | 69    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       | 1                       |             |             |                    |                  |
| 12.00             | 1.05     | 0.42  | 40    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       | 2                       |             |             |                    |                  |
| 12.45             | 0.45     | 0.24  | 53    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       | 3                       |             |             |                    |                  |
| 13.50             | 1.05     | 0.52  | 50    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       |                         |             |             |                    |                  |
| 13.95             | 0.45     | 0.23  | 51    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       |                         |             |             |                    |                  |
| 15.00             | 1.05     | 0.39  | 37    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       |                         |             |             |                    |                  |
| 15.45             | 0.45     | 0.21  | 47    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       |                         |             |             |                    |                  |
| 16.50             | 1.05     | 0.42  | 40    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       | 1                       |             |             |                    |                  |
| 16.95             | 0.45     | 0.29  | 64    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       | 2                       |             |             |                    |                  |
| 18.00             | 1.05     | 0.49  | 47    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       | 3                       |             |             |                    |                  |
| 18.45             | 0.45     | 0.22  | 49    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       |                         |             |             |                    |                  |
| 19.50             | 1.05     | 0.49  | 47    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       |                         |             |             |                    |                  |
| 19.95             | 0.45     | 0.21  | 47    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       |                         |             |             |                    |                  |
| 21.00             | 1.05     | 1.07  | 102   | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                                  |             |             |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES



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PAGE: 2 OF 2  
DATE: 30-04-2010  
LOGGED BY: JB

**MATRIX TYPE**

M1. FAULTS

M2. SHEARS

M3. INTENSE JOINTING

M4. INTENSE MINERALISATION

M5. DEFORMABLE MATERIAL

M6. INTENSE DRILLING

**FRACTURES**

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |  |  |  |  |
|----------------------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|--|--|--|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |  |  |  |
| 21.00                            |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       | 1                       |             |             |                    |                  |  |  |  |  |
| 22.50                            | 1.50     | 1.24  | 83    | 0.41 | 27 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    | 2                |  |  |  |  |
| 24.00                            | 1.50     | 1.42  | 95    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    | 3                |  |  |  |  |
| 25.50                            | 1.50     | 1.43  | 95    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |  |  |
| 27.00                            | 1.50     | 1.35  | 90    | 0.17 | 11 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |  |  |
| 28.50                            | 1.50     | 1.32  | 88    | 0.16 | 11 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |  |  |
| 30.00                            | 1.50     | 1.33  | 89    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |  |  |
| END OF HOLE - FINAL DEPTH 30.00m |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       | 1                       |             |             |                    |                  |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    | 2                |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    | 3                |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       | 1                       |             |             |                    |                  |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    | 2                |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    | 3                |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       | 1                       |             |             |                    |                  |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    | 2                |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    | 3                |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |  |  |

# GEOTECHNICAL BOREHOLE LOG



**PROJECT: ESKOM GEOTECH INVEST**  
**SITE: DUYNEFONTEIN**  
**PROJECT No: 385908/42C**

**HOLE NO: KB 41**  
**INCLINATION: VERTICAL**  
**FINAL DEPTH: 23.75m**

**ELEVATION: 9.952mamsl**  
**CO-ORDS: X = 3726491.50**  
**Y = 53158.993**

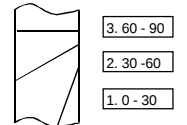
**PAGE: 1 OF 2**  
**DATE: 28-04-2010**  
**LOGGED BY: JB**

| Drilling Interval | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution                  |                |                |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|-------------------------------------|----------------|----------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1<br>0° - 30°                       | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 0.00              |          |       |       |      |    | 18.75<br>↓       | GREYWACKE | 0          | 0.76            |          |             | 2                  | 3              | 5                                   | 7              | 2              | 14    | 1                       | 1           | 2-3         | 9                  | 1                |
| 1.50              | 1.50     | 0.48  | 32    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                                     |                |                |       | 2                       | 3           | 5           | 10                 | 1                |
| 1.95              | 0.45     | 0.23  | 51    | 0.00 | 0  | 19.60            |           |            |                 |          |             |                    |                |                                     |                |                |       | 3                       | 2           | 6           | 10                 | 1                |
| 3.00              | 1.05     | 0.42  | 40    | 0.00 | 0  | 0.85             |           |            |                 |          |             |                    |                | 1. Clayey infill.                   |                |                |       |                         |             |             |                    |                  |
| 3.45              | 0.45     | 0.24  | 53    | 0.00 | 0  |                  |           |            |                 | 0.09     | M3/M6       | 1-2                | 3-4            |                                     |                |                |       |                         |             |             |                    |                  |
| 4.50              | 1.05     | 0.41  | 39    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                                     |                |                |       |                         |             |             |                    |                  |
| 4.95              | 0.45     | 0.23  | 51    | 0.00 | 0  | G1               |           |            |                 |          |             |                    |                |                                     |                |                |       |                         |             |             |                    |                  |
| 6.00              | 1.05     | 0.46  | 44    | 0.00 | 0  | 19.60<br>↓       | GREYWACKE | 38         | 0.00            |          |             | 3-4                | 1-2            | 8                                   | 23             | 4              | 35    | 1                       | 1           | 2           | 10                 | 1                |
| 6.45              | 0.45     | 0.22  | 49    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                                     |                |                |       | 2                       | 1           | 2           | 10                 | 1                |
| 7.50              | 1.05     | 0.51  | 49    | 0.00 | 0  | 23.75            |           |            |                 |          |             |                    |                |                                     |                |                |       | 3                       | 1           | 2           | 10                 | 1                |
| 7.95              | 0.45     | 0.29  | 64    | 0.00 | 0  | 4.15             |           |            |                 |          |             |                    |                | 1. Iron-stained occasionally oxide. |                |                |       |                         |             |             |                    |                  |
| 9.00              | 1.05     | 0.47  | 45    | 0.00 | 0  |                  |           |            |                 | 4        | 0.15        | 0                  | 0              |                                     |                |                |       |                         |             |             |                    |                  |
| 9.45              | 0.45     | 0.19  | 42    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                                     |                |                |       |                         |             |             |                    |                  |
| 10.50             | 1.05     | 0.48  | 46    | 0.00 | 0  | G2               |           |            |                 |          |             |                    |                |                                     |                |                |       |                         |             |             |                    |                  |
| 10.95             | 0.45     | 0.18  | 40    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                                     |                |                |       | 1                       |             |             |                    |                  |
| 12.00             | 1.05     | 0.44  | 42    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                                     |                |                |       | 2                       |             |             |                    |                  |
| 12.45             | 0.45     | 0.20  | 44    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                                     |                |                |       | 3                       |             |             |                    |                  |
| 13.50             | 1.05     | 0.45  | 43    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                                     |                |                |       |                         |             |             |                    |                  |
| 13.95             | 0.45     | 0.20  | 44    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                                     |                |                |       |                         |             |             |                    |                  |
| 15.00             | 1.05     | 0.53  | 50    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                                     |                |                |       |                         |             |             |                    |                  |
| 15.45             | 0.45     | 0.26  | 58    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                                     |                |                |       |                         |             |             |                    |                  |
| 16.50             | 1.05     | 0.46  | 44    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                                     |                |                |       | 1                       |             |             |                    |                  |
| 16.95             | 0.45     | 0.25  | 56    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                                     |                |                |       | 2                       |             |             |                    |                  |
| 18.00             | 1.05     | 0.54  | 51    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                                     |                |                |       | 3                       |             |             |                    |                  |
| 18.45             | 0.45     | 0.24  | 53    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                                     |                |                |       |                         |             |             |                    |                  |
| 19.50             | 1.05     | 0.71  | 68    | 0.00 | 0  |                  |           |            |                 |          |             |                    |                |                                     |                |                |       |                         |             |             |                    |                  |
| 20.75             | 1.25     | 1.22  | 98    | 0.73 | 58 |                  |           |            |                 |          |             |                    |                |                                     |                |                |       |                         |             |             |                    |                  |
| 22.25             | 1.50     | 1.26  | 84    | 0.41 | 27 |                  |           |            |                 |          |             |                    |                |                                     |                |                |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
 1.VERY SOFT (0-5)  
 2.SOFT (5-25)  
 3.HARD (25-45)  
 4.VERY HARD (45-105)  
 5.EXTREMELY HARD (105+)

**WEATHERING**  
 1.UNWEATHERED  
 2.SLIGHTLY  
 3.MODERATELY  
 4.HIGHLY  
 5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
 1.STRAIGHT  
 2.SLIGHT UNDULATION  
 3.CURVED  
 4.UNI DIRECTIONAL WAVY  
 5.MULTI DIRECTIONAL WAVY

**MICRO**  
 1.POLISHED  
 2.SMOOTH PLANAR  
 3.ROUGH PLANAR  
 4.SLICKSIDED  
 5.SMOOTH  
 6.ROUGH UNDULATING  
 7.SLICKSIDED  
 8.SMOOTH STEPPED  
 9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
 1.GOUGE t. > Amplit. of IRREG.  
 2.GOUGE t. < Amplit. of IRREG.  
 Soft sheared material, e.g. Talc  
 3.FINE  
 4.MEDIUM  
 5.COARSE  
 Non-softening sheared material  
 6.FINE  
 7.MEDIUM  
 8.COARSE  
 9.STAINING  
 10.NONE

**JOINT WALL ALT.**  
 1.WALL = ROCK HARDNESS  
 2.WALL > ROCK HARDNESS  
 3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
 M1. FAULTS  
 M2. SHEARS  
 M3. INTENSE JOINTING  
 M4. INTENSE MINERALISATION  
 M5. DEFORMABLE MATERIAL  
 M6. INTENSE DRILLING  
 FRACTURES



**SRK Consulting**  
Engineers and Scientists

HOLE NO: KB 41  
INCLINATION: VERTICAL  
FINAL DEPTH: 23.75m

ELEVATION: 9.952mamsl  
CO-ORDS: X = 3726491.50  
Y = 53158.993

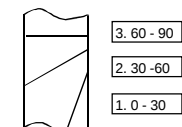
PAGE: 2 OF 2  
DATE: 28-04-2010  
LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness<br>1 - 5<br>(MPa) | Weathering<br>1 - 5 | Joint Distribution |                |                |       | Joint Surface Condition |                |                |                          |                        |  |  |
|----------------------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|----------------------------|---------------------|--------------------|----------------|----------------|-------|-------------------------|----------------|----------------|--------------------------|------------------------|--|--|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                            |                     | 1<br>0° - 30°      | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro<br>1 - 5 | Micro<br>1 - 9 | Infill<br>Type<br>1 - 10 | Wall<br>Alter<br>1 - 3 |  |  |
| 22.25                            |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                | 1     |                         |                |                |                          |                        |  |  |
| 23.75                            | 1.50     | 1.47  | 98    | 0.44 | 29 |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                | 2              |                          |                        |  |  |
| END OF HOLE - FINAL DEPTH 23.75m |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                | 3              |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                | 1     |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                | 2              |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                | 3              |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                | 1     |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                | 2              |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                | 3              |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                | 1     |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                | 2              |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                | 3              |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                            |                     |                    |                |                |       |                         |                |                |                          |                        |  |  |

| HARDNESS (MPa)          |  |
|-------------------------|--|
| 1.VERY SOFT (0-5)       |  |
| 2.SOFT (5-25)           |  |
| 3.HARD (25-45)          |  |
| 4.VERY HARD (45-105)    |  |
| 5.EXTREMELY HARD (105+) |  |

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



### JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**

- 1.POLISHED
- 2.SMOOTH PLANAR
- 3.ROUGH PLANAR
- 4.SLICKENSIDED  
UNDULATING
- 5.SMOOTH  
UNDULATING
- 6.ROUGH UNDULATING
- 7.SLICKENSIDED  
STEPPED
- 8.SMOOTH STEPPED
- 9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**

1. GOUGE t. > Amplit. of IRREG.  
2. GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3. FINE  
4. MEDIUM  
5. COARSE  
Non-softening sheared material  
6. FINE  
7. MEDIUM  
8. COARSE  
9. STAINING  
10. NONE

JOINT WALL ALT.

1. WALL = ROCK HARDNESS  
2. WALL > ROCK HARDNESS  
3. WALL < ROCK HARDNESS

**MATRIX TYPE**

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



**PROJECT: ESKOM GEOTECH INVEST**  
**SITE: DUYNFONTEIN**  
**PROJECT No: 385908/42C**

**HOLE NO: KB 42**  
**INCLINATION: VERTICAL**  
**FINAL DEPTH: 30.04m**

**ELEVATION: 17.674mamsl**  
**CO-ORDS: X = 3726452.93**  
**Y = 53041.468**

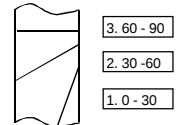
**PAGE: 1 OF 2**  
**DATE: 28-04-2010**  
**LOGGED BY: JB**

| Drilling Interval | Recovery |       |       | RQD  |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution |                |                |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|------|---|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------|----------------|----------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m    | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1<br>0° - 30°      | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 0.00              |          |       |       |      |   | 27.07<br>↓       | GREYWACKE | 47         | 2.97            |          |             | 2-3                | 1              | 5                  | 2              | 1              | 8     | 1                       | 1           | 2           | 10                 | 1                |
| 1.50              | 1.50     | 0.61  | 41    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 2                       | 5           | 8           | 10                 | 1                |
| 1.95              | 0.45     | 0.26  | 58    | 0.00 | 0 | 30.04            |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 2           | 6           | 10                 | 1                |
| 3.00              | 1.05     | 0.37  | 35    | 0.00 | 0 | 2.97             |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 3.45              | 0.45     | 0.41  | 91    | 0.00 | 0 |                  |           |            |                 | 0        | 0           | 0                  | 0              |                    |                |                |       |                         |             |             |                    |                  |
| 4.50              | 1.05     | 0.45  | 43    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 4.95              | 0.45     | 0.39  | 87    | 0.00 | 0 | G1               |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 6.00              | 1.05     | 0.95  | 90    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 1                       |             |             |                    |                  |
| 6.45              | 0.45     | 0.30  | 67    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 2                       |             |             |                    |                  |
| 7.50              | 1.05     | 0.65  | 62    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       |             |             |                    |                  |
| 7.95              | 0.45     | 0.23  | 51    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 9.00              | 1.05     | 0.46  | 44    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 9.45              | 0.45     | 0.25  | 56    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 10.50             | 1.05     | 0.60  | 57    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 10.95             | 0.45     | 0.17  | 38    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 1                       |             |             |                    |                  |
| 12.00             | 1.05     | 0.42  | 40    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 2                       |             |             |                    |                  |
| 12.45             | 0.45     | 0.39  | 87    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       |             |             |                    |                  |
| 13.50             | 1.05     | 0.49  | 47    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 13.95             | 0.45     | 0.29  | 64    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 15.00             | 1.05     | 0.73  | 70    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 15.45             | 0.45     | 0.24  | 53    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 16.50             | 1.05     | 0.76  | 72    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 1                       |             |             |                    |                  |
| 16.95             | 0.45     | 0.45  | 100   | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 2                       |             |             |                    |                  |
| 18.00             | 1.05     | 0.82  | 78    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       | 3                       |             |             |                    |                  |
| 18.45             | 0.45     | 0.54  | 120   | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 19.50             | 1.05     | 0.74  | 70    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 19.95             | 0.45     | 0.45  | 100   | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 21.00             | 1.05     | 0.76  | 72    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
 1.VERY SOFT (0-5)  
 2.SOFT (5-25)  
 3.HARD (25-45)  
 4.VERY HARD (45-105)  
 5.EXTREMELY HARD (105+)

**WEATHERING**  
 1.UNWEATHERED  
 2.SLIGHTLY  
 3.MODERATELY  
 4.HIGHLY  
 5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
 1.STRAIGHT  
 2.SLIGHT UNDULATION  
 3.CURVED  
 4.UNI DIRECTIONAL WAVY  
 5.MULTI DIRECTIONAL WAVY

**MICRO**  
 1.POLISHED  
 2.SMOOTH PLANAR  
 3.ROUGH PLANAR  
 4.SLICKENSIDED  
 5.SMOOTH UNDULATING  
 6.ROUGH UNDULATING  
 7.SLICKENSIDED STEPPED  
 8.SMOOTH STEPPED  
 9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
 1.GOUGE t > Amplit. of IRREG.  
 2.GOUGE t < Amplit. of IRREG.  
 Soft sheared material, e.g. Talc  
 3.FINE  
 4.MEDIUM  
 5.COARSE  
 Non-softening sheared material  
 6.FINE  
 7.MEDIUM  
 8.COARSE  
 9.STAINING  
 10.NONE

**JOINT WALL ALT.**  
 1.WALL = ROCK HARDNESS  
 2.WALL > ROCK HARDNESS  
 3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
 M1. FAULTS  
 M2. SHEARS  
 M3. INTENSE JOINTING  
 M4. INTENSE MINERALISATION  
 M5. DEFORMABLE MATERIAL  
 M6. INTENSE DRILLING FRACTURES



**SRK Consulting**  
Engineers and Scientists

HOLE NO: KB 42  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.04m

ELEVATION: 17.674mamsl  
CO-ORDS: X = 3726452.93  
Y = 53041.468

PAGE: 2 OF 2  
DATE: 28-04-2010  
LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |  |  |
|----------------------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|--|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |  |
| 21.00                            |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             | 1     |                         |             |             |                    |                  |  |  |
| 21.30                            | 0.30     | 0.37  | 123   | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 2           |                    |                  |  |  |
| 22.50                            | 1.20     | 1.00  | 83    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 3           |                    |                  |  |  |
| 22.80                            | 0.30     | 0.27  | 90    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
| 24.04                            | 1.24     | 0.19  | 15    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
| 25.54                            | 1.50     | 0.19  | 13    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
| 27.04                            | 1.50     | 0.50  | 33    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
| 28.54                            | 1.50     | 1.22  | 81    | 0.91 | 61 |                  |           |            |                 |          |             |                      |                  |                    |             |             | 1     |                         |             |             |                    |                  |  |  |
| 28.54                            | 0.00     | 0.00  | 0     | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         | 2           |             |                    |                  |  |  |
| 30.04                            | 1.50     | 0.74  | 49    | 0.48 | 32 |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         | 3           |             |                    |                  |  |  |
| END OF HOLE - FINAL DEPTH 30.04m |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       | 1                       |             |             |                    |                  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 2           |                    |                  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 3           |                    |                  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       | 1                       |             |             |                    |                  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 2           |                    |                  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 3           |                    |                  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |

| HARDNESS (MPa)          |  |
|-------------------------|--|
| 1.VERY SOFT (0-5)       |  |
| 2.SOFT (5-25)           |  |
| 3.HARD (25-45)          |  |
| 4.VERY HARD (45-105)    |  |
| 5.EXTREMELY HARD (105+) |  |

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMPLETLY



1.0 - 30

## MACRO

MACRO

1. STRAIGHT
2. SLIGHT UNDULATION
3. CURVED
4. UNI DIRECTIONAL WAVY
5. MULTI DIRECTIONAL WAVY

## MICRO

1. POLISHED
2. SMOOTH PLANAR
3. ROUGH PLANAR
4. SLICK SIDED  
UNDULATING
5. SMOOTH  
UNDULATING
6. ROUGH UNDULATING
7. SLICK SIDED  
STEPPED
8. SMOOTH STEPPED
9. ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**

1. GOUGE t. > Amplit. of IRREG.  
2. GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3. FINE  
4. MEDIUM  
5. COARSE  
Non-softening sheared material  
6. FINE  
7. MEDIUM  
8. COARSE  
9. STAINING  
10. NONE

## JOINT WALL ALT.

1. WALL = ROCK HARDNESS  
2. WALL > ROCK HARDNESS  
3. WALL < ROCK HARDNESS

**MATRIX TYPE**

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNESFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 43  
INCLINATION: VERTICAL  
FINAL DEPTH: 31.46m

ELEVATION: 12.264mamsl  
CO-ORDS: X = 3727317.80  
Y = 52844.077

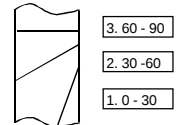
PAGE: 1 OF 3  
DATE: 17-07-2008  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD  |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|------|---|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m    | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 0.00              |          |       |       |      |   | ↓                |           |            | 0.00            |          |             | 0                  | 0              |                    |             |             | 0     | 1                       |             |             |                    |                  |
| 1.50              | 1.50     | 0.59  | 39    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             | 0     | 2                       |             |             |                    |                  |
| 1.65              | 0.15     | 0.11  | 73    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             | 0     | 3                       |             |             |                    |                  |
| 3.00              | 1.35     | 0.58  | 43    | 0.00 | 0 | 0.00             |           | 0          |                 | 0.00     | 0           | 0                  | 0              |                    |             |             |       |                         |             |             |                    |                  |
| 3.45              | 0.45     | 0.21  | 47    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 4.50              | 1.05     | 0.59  | 56    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 4.95              | 0.45     | 0.45  | 100   | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 6.00              | 1.05     | 0.86  | 82    | 0.00 | 0 | ↓                |           |            | 0.00            |          |             | 0                  | 0              |                    |             |             | 0     | 1                       |             |             |                    |                  |
| 6.45              | 0.45     | 0.42  | 93    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             | 0     | 2                       |             |             |                    |                  |
| 7.50              | 1.05     | 0.90  | 86    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             | 0     | 3                       |             |             |                    |                  |
| 7.95              | 0.45     | 0.45  | 100   | 0.00 | 0 | 0.00             |           | 0          |                 | 0.00     | 0           | 0                  | 0              |                    |             |             |       |                         |             |             |                    |                  |
| 9.00              | 1.05     | 0.87  | 83    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 9.45              | 0.45     | 0.42  | 93    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 10.50             | 1.05     | 0.84  | 80    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 10.95             | 0.45     | 0.24  | 53    | 0.00 | 0 | ↓                |           |            | 0.00            |          |             | 0                  | 0              |                    |             |             | 0     | 1                       |             |             |                    |                  |
| 12.00             | 1.05     | 0.76  | 72    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             | 0     | 2                       |             |             |                    |                  |
| 12.45             | 0.45     | 0.45  | 100   | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             | 0     | 3                       |             |             |                    |                  |
| 13.50             | 1.05     | 0.96  | 91    | 0.00 | 0 | 0.00             |           | 0          |                 | 0.00     | 0           | 0                  | 0              |                    |             |             |       |                         |             |             |                    |                  |
| 13.95             | 0.45     | 0.34  | 76    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 15.00             | 1.05     | 1.03  | 98    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 15.45             | 0.45     | 0.33  | 73    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 16.50             | 1.05     | 1.04  | 99    | 0.00 | 0 | ↓                |           |            | 0.00            |          |             | 0                  | 0              |                    |             |             | 0     | 1                       |             |             |                    |                  |
| 16.95             | 0.45     | 0.26  | 58    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             | 0     | 2                       |             |             |                    |                  |
| 18.00             | 1.05     | 0.96  | 91    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             | 0     | 3                       |             |             |                    |                  |
| 18.45             | 0.45     | 0.39  | 87    | 0.00 | 0 | 0.00             |           | 0          |                 | 0.00     | 0           | 0                  | 0              |                    |             |             |       |                         |             |             |                    |                  |
| 19.50             | 1.05     | 0.90  | 86    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 19.95             | 0.45     | 0.34  | 76    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |
| 21.00             | 1.05     | 1.03  | 98    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |             |             |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNEFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 43  
INCLINATION: VERTICAL  
FINAL DEPTH: 31.46m

ELEVATION: 12.264mamsl  
CO-ORDS: X = 3727317.80  
Y = 52844.077

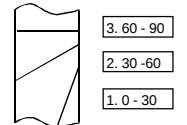
PAGE: 2 OF 3  
DATE: 17-07-2008  
LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |  |
|----------------------------------|----------|-------|-------|------|----|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |
| 21.00                            |          |       |       |      |    | ↓                |           |            | 0.00            |          |             | 0                    | 0                |                    |             |             | 0     | 1                       |             |             |                    |                  |  |
| 21.45                            | 0.45     | 0.28  | 62    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             | 2     |                         |             |             |                    |                  |  |
| 22.50                            | 1.05     | 0.85  | 81    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             | 3     |                         |             |             |                    |                  |  |
| 22.95                            | 0.45     | 0.34  | 76    | 0.00 | 0  | 0.00             |           |            |                 |          |             |                      | 0                | 0                  |             |             |       |                         |             |             |                    |                  |  |
| 23.96                            | 1.01     | 0.48  | 48    | 0.00 | 0  |                  |           |            |                 | 0.00     | 0           | 0                    | 0                |                    |             |             |       |                         |             |             |                    |                  |  |
| 25.46                            | 1.50     | 0.76  | 51    | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 26.96                            | 1.50     | 1.40  | 93    | 0.16 | 11 |                  |           |            | G5              |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
| 28.46                            | 1.50     | 1.45  | 97    | 0.28 | 19 | ↓                |           |            | 0.00            |          |             | 0                    | 0                |                    |             |             | 0     | 1                       |             |             |                    |                  |  |
| 28.46                            | 0.00     | 0.00  | 0     | 0.00 | 0  |                  |           |            |                 |          |             |                      |                  |                    |             |             | 2     |                         |             |             |                    |                  |  |
| 29.96                            | 1.50     | 1.32  | 88    | 0.35 | 23 |                  |           |            |                 |          |             |                      |                  |                    |             |             | 3     |                         |             |             |                    |                  |  |
| 31.46                            | 1.50     | 1.36  | 91    | 0.70 | 47 | 0.00             |           |            |                 |          |             |                      | 0                | 0                  |             |             |       |                         |             |             |                    |                  |  |
| END OF HOLE - FINAL DEPTH 31.46m |          |       |       |      |    |                  |           |            | G6              |          | 0.00        | 0                    | 0                | 0                  |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    | ↓                |           |            | 0.00            |          |             | 0                    | 0                |                    |             |             | 0     | 1                       |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 2           |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 3           |                    |                  |  |
|                                  |          |       |       |      |    | 0.00             |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 | 0        | 0           | 0                    | 0                |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            | G7              |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    | ↓                |           |            | 0.00            |          |             | 0                    | 0                |                    |             |             | 0     | 1                       |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 2           |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 3           |                    |                  |  |
|                                  |          |       |       |      |    | 0.00             |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 | 0        | 0           | 0                    | 0                |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |
|                                  |          |       |       |      |    |                  |           |            | G8              |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
5.SMOOTH UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNEFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 43  
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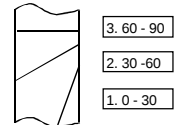
PAGE: 3 OF 3  
DATE: 17-07-2008  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1 - 5 (MPa) | Weathering 1 - 5 | Joint Distribution |             |             |       | Joint Surface Condition |             |             |                    |                  |  |  |
|-------------------|----------|-------|-------|-----|---|------------------|-----------|------------|-----------------|----------|-------------|----------------------|------------------|--------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|--|--|
|                   | m Drill  | m Rec | % Rec | m   | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                      |                  | 1 0° - 30°         | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |  |  |
|                   |          |       |       |     |   | ↓                |           |            | 0.00            |          |             | 0                    | 0                |                    |             |             | 0     | 1                       |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 2           |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 3           |                    |                  |  |  |
|                   |          |       |       |     |   | 0.00             |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   | G9               |           |            |                 | 0        | 0           | 0                    | 0                |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   | ↓                |           |            | 0.00            |          |             | 0                    | 0                |                    |             |             | 0     | 1                       |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 2           |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 3           |                    |                  |  |  |
|                   |          |       |       |     |   | 0.00             |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   | G10              |           |            |                 | 0        | 0           | 0                    | 0                |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   | ↓                |           |            | 0.00            |          |             | 0                    | 0                |                    |             |             | 0     | 1                       |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 2           |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 3           |                    |                  |  |  |
|                   |          |       |       |     |   | 0.00             |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   | G11              |           |            |                 | 0        | 0           | 0                    | 0                |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   | ↓                |           |            | 0.00            |          |             | 0                    | 0                |                    |             |             | 0     | 1                       |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 2           |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             | 3           |                    |                  |  |  |
|                   |          |       |       |     |   | 0.00             |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   | G12              |           |            |                 | 0        | 0           | 0                    | 0                |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |
|                   |          |       |       |     |   |                  |           |            |                 |          |             |                      |                  |                    |             |             |       |                         |             |             |                    |                  |  |  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
UNDULATING  
5.SMOOTH  
UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED  
STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**  
1.GOUGE t. > Amplit. of IRREG.  
2.GOUGE t. < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



**PROJECT: ESKOM GEOTECH INVEST**  
**SITE: DUYNFONTEIN**  
**PROJECT No: 385908/42C**

**HOLE NO: KB 44**  
**INCLINATION: VERTICAL**  
**FINAL DEPTH: 54.78m**

**ELEVATION: 17.109mamsl**  
**CO-ORDS: X = 3726855.62**  
**Y = 52868.65**

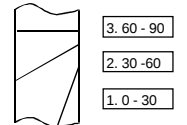
**PAGE: 1 OF 2**  
**DATE: 29-04-2010**  
**LOGGED BY: JB**

| Drilling Interval | Recovery |       |       | RQD  |   | Geotech Interval | Rock Type  | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution |                |                |       | Joint Surface Condition |             |             |                    |                  |
|-------------------|----------|-------|-------|------|---|------------------|------------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------|----------------|----------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                   | m Drill  | m Rec | % Rec | m    | % |                  |            |            | Solid m         | Matrix m | Matrix Type |                    |                | 1<br>0° - 30°      | 2<br>30° - 60° | 3<br>60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 0.00              |          |       |       |      |   | 19.95<br>↓       | GREYWACKE  | 19         | 2.86            |          |             | 3                  | 2              | 10                 | 3              | 0              | 13    | 1                       | 2           | 5           | 10                 | 1                |
| 1.50              | 1.50     | 0.70  | 47    | 0.00 | 0 |                  |            |            |                 |          |             |                    |                |                    |                |                |       | 2                       | 5           | 9           | 10                 | 1                |
| 1.95              | 0.45     | 0.36  | 80    | 0.00 | 0 | 23.10            |            |            |                 |          |             |                    |                |                    |                |                |       | 3                       |             |             |                    |                  |
| 3.00              | 1.05     | 0.78  | 74    | 0.00 | 0 | 3.15             |            |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 3.45              | 0.45     | 0.42  | 93    | 0.00 | 0 |                  |            |            |                 | 0.29     | M3/M6       | 3                  | 2              |                    |                |                |       |                         |             |             |                    |                  |
| 4.50              | 1.05     | 0.87  | 83    | 0.00 | 0 |                  |            |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 4.95              | 0.45     | 0.44  | 98    | 0.00 | 0 | G1               |            |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 6.00              | 1.05     | 0.95  | 90    | 0.00 | 0 | 23.10<br>↓       | SHEAR ZONE | 0          | 0.21            |          |             | 3-4                | 1              | 0                  | 0              | 0              | 0     | 1                       | 0           | 0           | 0                  | 0                |
| 6.45              | 0.45     | 0.39  | 87    | 0.00 | 0 |                  |            |            |                 |          |             |                    |                |                    |                |                |       | 2                       | 0           | 0           | 0                  | 0                |
| 7.50              | 1.05     | 0.87  | 83    | 0.00 | 0 | 23.60            |            |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 0           | 0           | 0                  | 0                |
| 7.95              | 0.45     | 0.44  | 98    | 0.00 | 0 | 0.50             |            |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 9.00              | 1.05     | 0.87  | 83    | 0.00 | 0 |                  |            |            |                 | 0.29     | M2          | 3-4                | 1              |                    |                |                |       |                         |             |             |                    |                  |
| 9.45              | 0.45     | 0.43  | 96    | 0.00 | 0 |                  |            |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 10.50             | 1.05     | 0.93  | 89    | 0.00 | 0 | G2               |            |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 10.95             | 0.45     | 0.38  | 84    | 0.00 | 0 | 23.60<br>↓       | GREYWACKE  | 39         | 11.08           |          |             | 3-4                | 1              | 13                 | 21             | 34             | 68    | 1                       | 2           | 6           | 6                  | 1                |
| 12.00             | 1.05     | 0.94  | 90    | 0.00 | 0 |                  |            |            |                 |          |             |                    |                |                    |                |                |       | 2                       | 1           | 2           | 6                  | 1                |
| 12.45             | 0.45     | 0.41  | 91    | 0.00 | 0 | 35.01            |            |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 1           | 3           | 10                 | 1                |
| 13.50             | 1.05     | 0.91  | 87    | 0.00 | 0 | 11.41            |            |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 13.95             | 0.45     | 0.40  | 89    | 0.00 | 0 |                  |            |            |                 | 0.33     | M6          | 3-4                | 1              |                    |                |                |       |                         |             |             |                    |                  |
| 15.00             | 1.05     | 0.88  | 84    | 0.00 | 0 |                  |            |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 15.45             | 0.45     | 0.41  | 91    | 0.00 | 0 | G3               |            |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 16.50             | 1.05     | 0.90  | 86    | 0.00 | 0 | 35.01<br>↓       | GREYWACKE  | 0          | 0.90            |          |             | 3                  | 1-2            | 3                  | 2              | 3              | 8     | 1                       | 5           | 9           | 6                  | 1                |
| 16.95             | 0.45     | 0.41  | 91    | 0.00 | 0 |                  |            |            |                 |          |             |                    |                |                    |                |                |       | 2                       | 1           | 2           | 10                 | 1                |
| 18.00             | 1.05     | 0.94  | 90    | 0.00 | 0 | 35.91            |            |            |                 |          |             |                    |                |                    |                |                |       | 3                       | 1           | 2           | 10                 | 1                |
| 18.45             | 0.45     | 0.38  | 84    | 0.00 | 0 | 0.90             |            |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 19.50             | 1.05     | 0.95  | 90    | 0.00 | 0 |                  |            |            |                 | 0        | 0           | 0                  | 0              |                    |                |                |       |                         |             |             |                    |                  |
| 19.95             | 0.45     | 0.36  | 80    | 0.00 | 0 |                  |            |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |
| 21.00             | 1.05     | 0.56  | 53    | 0.00 | 0 | G4               |            |            |                 |          |             |                    |                |                    |                |                |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
 1.VERY SOFT (0-5)  
 2.SOFT (5-25)  
 3.HARD (25-45)  
 4.VERY HARD (45-105)  
 5.EXTREMELY HARD (105+)

**WEATHERING**  
 1.UNWEATHERED  
 2.SLIGHTLY  
 3.MODERATELY  
 4.HIGHLY  
 5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
 1.STRAIGHT  
 2.SLIGHT UNDULATION  
 3.CURVED  
 4.UNI DIRECTIONAL WAVY  
 5.MULTI DIRECTIONAL WAVY

**MICRO**  
 1.POLISHED  
 2.SMOOTH PLANAR  
 3.ROUGH PLANAR  
 4.SLICKENSIDED  
 5.SMOOTH  
 6.ROUGH UNDULATING  
 7.SLICKENSIDED  
 8.SMOOTH STEPPED  
 9.ROUGH STEPPED / IRREGULAR

**INFILL TYPE**  
 1.GOUGE t > Amplit. of IRREG.  
 2.GOUGE t < Amplit. of IRREG.  
 Soft sheared material, e.g. Talc  
 3.FINE  
 4.MEDIUM  
 5.COARSE  
 Non-softening sheared material  
 6.FINE  
 7.MEDIUM  
 8.COARSE  
 9.STAINING  
 10.NONE

**JOINT WALL ALT.**  
 1.WALL = ROCK HARDNESS  
 2.WALL > ROCK HARDNESS  
 3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
 M1. FAULTS  
 M2. SHEARS  
 M3. INTENSE JOINTING  
 M4. INTENSE MINERALISATION  
 M5. DEFORMABLE MATERIAL  
 M6. INTENSE DRILLING  
 FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNEFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 44  
INCLINATION: VERTICAL  
FINAL DEPTH: 54.78m

ELEVATION: 17.109mamsl  
CO-ORDS: X = 3726855.62  
Y = 52868.65

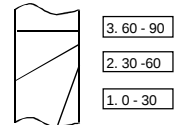
PAGE: 2 OF 2  
DATE: 29-04-2010  
LOGGED BY: JB

| Drilling Interval                | Recovery |       |       | RQD  |    | Geotech Interval | Rock Type        | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution                                                   |             |             |       | Joint Surface Condition |             |             |                    |                  |
|----------------------------------|----------|-------|-------|------|----|------------------|------------------|------------|-----------------|----------|-------------|--------------------|----------------|----------------------------------------------------------------------|-------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|
|                                  | m Drill  | m Rec | % Rec | m    | %  |                  |                  |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°                                                           | 2 30° - 60° | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |
| 21.00                            |          |       |       |      |    | 35.91            | GREYWACKE        | 58         |                 |          |             | 4                  | 1              |                                                                      |             |             |       | 1                       | 5           | 8           | 6                  | 1                |
| 22.50                            | 1.50     | 1.39  | 93    | 0.47 | 31 | ↓                |                  |            | 4.40            |          |             |                    |                | 3                                                                    | 4           | 13          | 20    | 2                       | 3           | 6           | 9                  | 1                |
| 24.00                            | 1.50     | 1.57  | 105   | 0.40 | 27 | 40.31            |                  |            |                 |          |             |                    |                |                                                                      |             |             |       | 3                       | 2           | 6           | 10                 | 1                |
| 25.55                            | 1.55     | 1.56  | 101   | 1.04 | 67 | 4.40             |                  |            |                 |          |             |                    |                | 1. Calc <1mm.<br>2. Yellow stained.                                  |             |             |       |                         |             |             |                    |                  |
| 27.05                            | 1.50     | 1.16  | 77    | 0.28 | 19 |                  |                  |            |                 | 0        | 0           |                    |                |                                                                      |             |             |       |                         |             |             |                    |                  |
| 28.30                            | 1.25     | 1.20  | 96    | 0.67 | 54 |                  |                  |            |                 |          |             |                    |                |                                                                      |             |             |       |                         |             |             |                    |                  |
| 29.15                            | 0.85     | 0.83  | 98    | 0.20 | 24 | G5               |                  |            |                 |          |             |                    |                |                                                                      |             |             |       |                         |             |             |                    |                  |
| 30.65                            | 1.50     | 1.43  | 95    | 0.66 | 44 | 40.31            | META - GREYWACKE | 69         |                 |          |             | 3-4                | 1              |                                                                      |             |             |       | 1                       | 5           | 9           | 6                  | 1                |
| 31.95                            | 1.30     | 1.33  | 102   | 0.22 | 17 | ↓                |                  |            | 8.67            |          |             |                    |                | 1                                                                    | 7           | 18          | 26    | 2                       | 2           | 5           | 6                  | 1                |
| 33.06                            | 1.11     | 1.05  | 95    | 0.23 | 21 | 49.05            |                  |            |                 |          |             |                    |                |                                                                      |             |             |       | 3                       | 1           | 2           | 9                  | 1                |
| 34.46                            | 1.40     | 1.31  | 94    | 0.87 | 62 | 8.74             |                  |            |                 |          |             |                    |                | 1. Quartz crystals.<br>2. Calc <1mm.<br>3. Iron-staining and Pyrite. |             |             |       |                         |             |             |                    |                  |
| 35.01                            | 0.55     | 0.58  | 105   | 0.00 | 0  |                  |                  |            |                 | 0.07     | M6          |                    |                |                                                                      |             |             |       |                         |             |             |                    |                  |
| 36.61                            | 1.60     | 1.58  | 99    | 0.00 | 0  |                  |                  |            |                 |          |             |                    |                |                                                                      |             |             |       |                         |             |             |                    |                  |
| 38.11                            | 1.50     | 1.54  | 103   | 1.24 | 83 | G6               |                  |            |                 |          |             |                    |                |                                                                      |             |             |       |                         |             |             |                    |                  |
| 39.11                            | 1.00     | 1.00  | 100   | 0.31 | 31 | 49.05            | META - SHALE     | 30         |                 |          |             | 3                  | 1-2            |                                                                      |             |             |       | 1                       | 1           | 2           | 6                  | 1                |
| 40.31                            | 1.20     | 1.21  | 101   | 1.00 | 83 | ↓                |                  |            | 4.80            |          |             |                    |                | 3                                                                    | 8           | 24          | 35    | 2                       | 2           | 5           | 6                  | 1                |
| 40.92                            | 0.61     | 0.61  | 100   | 0.34 | 56 | 54.79            |                  |            |                 |          |             |                    |                |                                                                      |             |             |       | 3                       | 1           | 2           | 10                 | 1                |
| 42.52                            | 1.60     | 1.60  | 100   | 1.20 | 75 | 5.74             |                  |            |                 |          |             |                    |                | 1. Brown staining and Calc 1mm.<br>2. Calc <1mm.                     |             |             |       |                         |             |             |                    |                  |
| 43.29                            | 0.77     | 0.76  | 99    | 0.42 | 55 |                  |                  |            |                 | 0.93     | M3/M6       |                    |                |                                                                      |             |             |       |                         |             |             |                    |                  |
| 44.75                            | 1.46     | 1.43  | 98    | 1.36 | 93 |                  |                  |            |                 |          |             |                    |                |                                                                      |             |             |       |                         |             |             |                    |                  |
| 45.58                            | 0.83     | 0.80  | 96    | 0.67 | 81 | G7               |                  |            |                 |          |             |                    |                |                                                                      |             |             |       |                         |             |             |                    |                  |
| 47.18                            | 1.60     | 1.56  | 97    | 0.92 | 58 |                  |                  |            |                 |          |             |                    |                |                                                                      |             |             |       | 1                       |             |             |                    |                  |
| 48.78                            | 1.60     | 1.63  | 102   | 1.04 | 65 |                  |                  |            |                 |          |             |                    |                |                                                                      |             |             |       | 2                       |             |             |                    |                  |
| 50.28                            | 1.50     | 1.37  | 91    | 0.45 | 30 |                  |                  |            |                 |          |             |                    |                |                                                                      |             |             |       | 3                       |             |             |                    |                  |
| 51.88                            | 1.60     | 1.57  | 98    | 0.31 | 19 |                  |                  |            |                 |          |             |                    |                |                                                                      |             |             |       |                         |             |             |                    |                  |
| 53.48                            | 1.60     | 1.62  | 101   | 0.38 | 24 |                  |                  |            |                 |          |             |                    |                |                                                                      |             |             |       |                         |             |             |                    |                  |
| 54.78                            | 1.30     | 1.30  | 100   | 0.70 | 54 |                  |                  |            |                 |          |             |                    |                |                                                                      |             |             |       |                         |             |             |                    |                  |
| END OF HOLE - FINAL DEPTH 54.78m |          |       |       |      |    |                  |                  |            |                 |          |             |                    |                |                                                                      |             |             |       |                         |             |             |                    |                  |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
1.STRAIGHT  
2.SLIGHT UNDULATION  
3.CURVED  
4.UNI DIRECTIONAL WAVY  
5.MULTI DIRECTIONAL WAVY

**MICRO**  
1.POLISHED  
2.SMOOTH PLANAR  
3.ROUGH PLANAR  
4.SLICKENSIDED  
UNDULATING  
5.SMOOTH  
UNDULATING  
6.ROUGH UNDULATING  
7.SLICKENSIDED  
STEPPED  
8.SMOOTH STEPPED  
9.ROUGH STEPPED /  
IRREGULAR

**INFILL TYPE**  
1.GOUGE t > Amplit. of IRREG.  
2.GOUGE t < Amplit. of IRREG.  
Soft sheared material, e.g. Talc  
3.FINE  
4.MEDIUM  
5.COARSE  
Non-softening sheared material  
6.FINE  
7.MEDIUM  
8.COARSE  
9.STAINING  
10.NONE

**JOINT WALL ALT.**  
1.WALL = ROCK HARDNESS  
2.WALL > ROCK HARDNESS  
3.WALL < ROCK HARDNESS

**MATRIX TYPE**  
M1. FAULTS  
M2. SHEARS  
M3. INTENSE JOINTING  
M4. INTENSE MINERALISATION  
M5. DEFORMABLE MATERIAL  
M6. INTENSE DRILLING  
FRACTURES

# GEOTECHNICAL BOREHOLE LOG



PROJECT: ESKOM GEOTECH INVEST  
SITE: DUYNFONTEIN  
PROJECT No: 385908/42C

HOLE NO: KB 45  
INCLINATION: VERTICAL  
FINAL DEPTH: 30.06m

ELEVATION: 13.798mamsl  
CO-ORDS: X = 3727058.86  
Y = 52777.735

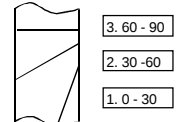
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DATE: 30-04-2010  
LOGGED BY: JB

| Drilling Interval | Recovery |       |       | RQD  |   | Geotech Interval | Rock Type | Int. RQD % | Rock Competence |          |             | Hardness 1-5 (MPa) | Weathering 1-5 | Joint Distribution |                                |             |       | Joint Surface Condition |             |             |                    |                  |     |
|-------------------|----------|-------|-------|------|---|------------------|-----------|------------|-----------------|----------|-------------|--------------------|----------------|--------------------|--------------------------------|-------------|-------|-------------------------|-------------|-------------|--------------------|------------------|-----|
|                   | m Drill  | m Rec | % Rec | m    | % |                  |           |            | Solid m         | Matrix m | Matrix Type |                    |                | 1 0° - 30°         | 2 30° - 60°                    | 3 60° - 90° | Total | Jt                      | Macro 1 - 5 | Micro 1 - 9 | Infill Type 1 - 10 | Wall Alter 1 - 3 |     |
| 0.00              |          |       |       |      |   | 20.98<br>↓       | GREYWACKE | 8          | 1.98            |          |             | 2-3                | 3-4            | 1                  | 7                              | 12          | 20    | 1                       | 5           | 9           | 10                 | 1                |     |
| 1.50              | 1.50     | 0.56  | 37    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                                |             |       |                         | 2           | 2           | 5                  | 9                | 1   |
| 1.95              | 0.45     | 0.29  | 64    | 0.00 | 0 | 23.06            |           |            |                 |          |             |                    |                |                    |                                |             |       |                         | 3           | 1           | 3                  | 10               | 1   |
| 3.00              | 1.05     | 0.50  | 48    | 0.00 | 0 | 2.08             |           |            |                 |          |             |                    |                |                    | 2. Clayey Silt Infill.         |             |       |                         |             |             |                    |                  |     |
| 3.45              | 0.45     | 0.42  | 93    | 0.00 | 0 |                  |           |            |                 |          | 0.10        | M5/M6              | 2-3            | 3-4                |                                |             |       |                         |             |             |                    |                  |     |
| 4.50              | 1.05     | 0.93  | 89    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                                |             |       |                         |             |             |                    |                  |     |
| 4.95              | 0.45     | 0.43  | 96    | 0.00 | 0 | G1               |           |            |                 |          |             |                    |                |                    |                                |             |       |                         |             |             |                    |                  |     |
| 6.00              | 1.05     | 0.94  | 90    | 0.00 | 0 | 23.06<br>↓       | GREYWACKE | 60         | 1.45            |          |             | 3                  | 2              | 0                  | 1                              | 9           | 10    | 1                       | 0           | 0           | 0                  | 0                |     |
| 6.45              | 0.45     | 0.37  | 82    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                                |             |       |                         | 2           | 1           | 3                  | 10               | 1   |
| 7.50              | 1.05     | 1.00  | 95    | 0.00 | 0 | 24.51            |           |            |                 |          |             |                    |                |                    |                                |             |       |                         | 3           | 2           | 6                  | 10               | 1   |
| 7.95              | 0.45     | 0.38  | 84    | 0.00 | 0 | 1.45             |           |            |                 |          |             |                    |                |                    |                                |             |       |                         |             |             |                    |                  |     |
| 9.00              | 1.05     | 1.00  | 95    | 0.00 | 0 |                  |           |            |                 |          | 0           | 0                  | 0              | 0                  |                                |             |       |                         |             |             |                    |                  |     |
| 9.45              | 0.45     | 0.37  | 82    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                                |             |       |                         |             |             |                    |                  |     |
| 10.50             | 1.05     | 0.93  | 89    | 0.00 | 0 | G2               |           |            |                 |          |             |                    |                |                    |                                |             |       |                         |             |             |                    |                  |     |
| 10.95             | 0.45     | 0.39  | 87    | 0.00 | 0 | 24.51<br>↓       | GREYWACKE | 33         | 2.57            |          |             | 4                  | 2              | 0                  | 13                             | 13          | 26    | 1                       | 0           | 0           | 0                  | 0                |     |
| 12.00             | 1.05     | 0.92  | 88    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                                |             |       |                         | 2           | 3           | 6                  | 6                | 1/2 |
| 12.45             | 0.45     | 0.31  | 69    | 0.00 | 0 | 27.31            |           |            |                 |          |             |                    |                |                    |                                |             |       |                         | 3           | 1           | 2                  | 10               | 1   |
| 13.50             | 1.05     | 1.02  | 97    | 0.00 | 0 | 2.80             |           |            |                 |          |             |                    |                |                    | 2. Quartz Crystals / Calc 2mm. |             |       |                         |             |             |                    |                  |     |
| 13.95             | 0.45     | 0.36  | 80    | 0.00 | 0 |                  |           |            |                 |          | 0.23        | M6                 | 4              | 2                  |                                |             |       |                         |             |             |                    |                  |     |
| 15.00             | 1.05     | 1.01  | 96    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                                |             |       |                         |             |             |                    |                  |     |
| 15.45             | 0.45     | 0.32  | 71    | 0.00 | 0 | G3               |           |            |                 |          |             |                    |                |                    |                                |             |       |                         |             |             |                    |                  |     |
| 16.50             | 1.05     | 1.05  | 100   | 0.00 | 0 | 27.31<br>↓       | GREYWACKE | 44         | 2.65            |          |             | 4-5                | 1              | 6                  | 10                             | 5           | 21    | 1                       | 1           | 2           | 10                 | 1                |     |
| 16.95             | 0.45     | 0.31  | 69    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                                |             |       |                         | 2           | 1           | 2                  | 10               | 1   |
| 18.00             | 1.05     | 0.92  | 88    | 0.00 | 0 | 30.06            |           |            |                 |          |             |                    |                |                    |                                |             |       |                         | 3           | 2           | 5                  | 10               | 1   |
| 18.45             | 0.45     | 0.35  | 78    | 0.00 | 0 | 2.75             |           |            |                 |          |             |                    |                |                    |                                |             |       |                         |             |             |                    |                  |     |
| 19.50             | 1.05     | 0.95  | 90    | 0.00 | 0 |                  |           |            |                 |          | 0.10        | M6                 | 4-5            | 1                  |                                |             |       |                         |             |             |                    |                  |     |
| 19.95             | 0.45     | 0.36  | 80    | 0.00 | 0 |                  |           |            |                 |          |             |                    |                |                    |                                |             |       |                         |             |             |                    |                  |     |
| 21.06             | 1.11     | 0.57  | 51    | 0.00 | 0 | G4               |           |            |                 |          |             |                    |                |                    |                                |             |       |                         |             |             |                    |                  |     |

**HARDNESS (MPa)**  
1.VERY SOFT (0-5)  
2.SOFT (5-25)  
3.HARD (25-45)  
4.VERY HARD (45-105)  
5.EXTREMELY HARD (105+)

**WEATHERING**  
1.UNWEATHERED  
2.SLIGHTLY  
3.MODERATELY  
4.HIGHLY  
5.COMpletely

## JOINT DISTRIBUTION



## JOINT CONDITION

**MACRO**  
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**SRK Consulting**  
Engineers and Scientists

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**MATRIX TYPE**  
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