

- 1 Although classified in the Table above, it is recommended that this particular layer be removed from below all foundations and surface beds. As this is generally a relatively thin, surface layer, this stipulation is not considered onerous.
- 2 Assuming that the exposed shale or mudstone is not left for long periods to degrade excessively prior to the casting of foundations.

Table 9 below summarises the anticipated site class for each of the test pit excavations based on 'shallow' foundations. The information given assumes that the foundation level will be established around 0.5m to 0.6m below the current ground level. It is recommended that the surface layer of transported soils mantling the site be removed from below all foundations and surface beds.

Deeper foundation levels (in excess of 0.5m to 0.6m deep as qualified above), may encroach onto materials with a different foundation characteristic.

Table 9: Residential site classes according to test pit excavations

Site class	Applicable test pit numbers
R	2-1; 2-12; 2-13; 2-22; 2-24; 2-25; 2-26; 2-28; 2-29; 2-30; 2-32; 2-33; 2-34; 2-35; 2-37; 2-38; 2-40; 2-41; 2-42; 2-45; 2-48
H1	2-2; 2-3; 2-4; 2-5; 2-6; 2-7; 2-8; 2-9; 2-10; 2-11; 2-14; 2-15; 2-16; 2-17; 2-18; 2-19; 2-20; 2-21; 2-23; 2-27; 2-31; 2-36; 2-39; 2-43; 2-44; 2-46; 2-47;

The information contained in Table 9 is graphically illustrated in the site classes drawing contained in Appendix C.

7. RECOMMENDATIONS

7.1. Foundations for one to two storey structures

The recommended founding arrangements for one to two storey structures are based on the guidelines given in SAICE and IstructE (1995) for the various site classes that were identified.

7.1.1. Site class H1

Preparatory work:

- Remove the upper surface layer of transported soils from below all foundations and covering surface beds.
- Avoid dissimilar foundation conditions, i.e. ensure foundations are underlain by similar materials.
- Undertake appropriate compaction along the bases of the foundation excavations.
- Do not allow the exposed foundation soils to dry out prior to casting of foundation concrete. If required, artificially wet to moisture content as close as possible to optimum.

Recommended foundation system:

- 'Modified normal' construction consisting of:
 - Lightly reinforced strip footings,
 - Articulation joints at all internal/external doors and openings,
 - Light reinforcement in masonry,
 - Adequate site drainage and service/plumbing precautions.

7.1.2. Site class R

Preparatory work:

- Remove the upper surface layer of transported soils from below all foundations and covering surface beds.
- Excavate foundations onto at least very soft rock shale or dolerite.
- Avoid dissimilar foundation conditions, i.e. ensure foundations are underlain by similar materials.
- Thoroughly clean foundation excavations prior to the casting of concrete.

- Cast foundation concrete as soon as possible after completion of excavations.

Recommended foundation system:

- 'Normal' construction consisting of:
 - Unreinforced strip, or slab-on-the-ground type foundations,
 - Adequate site drainage and service/plumbing precautions.

7.2. Allowable bearing capacities

All structures must be designed so as not to exceed the following, allowable bearing capacities:

(Applicable to 600mm wide strip footings at least 500mm deep).

- Upper surface layer of transported soils: **NOT** to be used as a founding layer.
- Calcareous residual shale/mudstone: 100kPa
- Very soft rock shale¹: 200kPa
- Soft rock or harder dolerite²: 650kPa

1 One third of 'average' UCS for very soft rock (0.7 to 3.0MPa), with factor of safety of 3.0.

2 One third of 'average' UCS for soft rock (3.0 to 10.0MPa), with factor of safety of 3.0.

7.3. Construction of surface beds and fills

7.3.1. Site class 'H1' area

It will be required to remove the upper, surface layer of transported soils over the entire footprint areas to be covered by surface beds and fills. The in-situ soils at this reduced level must be ripped to at least 150mm deep and re-compacted, at a moisture content close to optimum (OMC) and a minimum density of 90% Mod. AASHTO. The compacted base must NOT be allowed to dry out prior to the placement of fill and if required, must be artificially wetted. Fill must be placed in thin layers (typically 150mm thick), and each layer compacted to at least 93% Mod. AASHTO at OMC.

7.3.2. Site class 'R' area

It will be required to remove the upper, surface layer of transported soils over the entire footprint areas to be covered by surface beds and fills. The base must be established on at least very soft rock shale or dolerite. If required the top of the rockhead must be manually cleaned prior to the placement of fill. To prevent excessive degradation of the rockhead, especially in the case of shale, fill must be placed as soon as possible. Fill must be placed in thin layers (typically 150mm thick), and each layer compacted to at least 93% Mod. AASHTO at OMC.

7.4. Pavement layerworks

The following generic steps are recommended in the construction of the access roads.

- Remove all vegetation over the entire footprint area of the road to stockpile for later use.
- Remove the upper, surface layer of transported soils over the entire road footprint area.
- If the base of the resultant undercut excavation is situated within at least very soft rock or harder material, thoroughly clean the surface of the rockhead and place road layerworks directly onto rockhead. Avoid any traffic driving directly on the rockhead level as this may break-down the very soft rock structure into a fine, powdery material, especially in the case of shale and/or mudstone. The shale/mudstone rockhead must be covered as soon as possible after exposing to the atmosphere as this material is prone to 'slaking'.
- If the base of the undercut excavation is situated within soil, rip the exposed, in-situ subgrade to a minimum depth of 150mm and re-compact to a density of at least 90% Mod AASHTO at a moisture content close to optimum.
- Subsequent layerworks must be placed on a moist (and not dry), compacted soil surface. If required the exposed surface must be artificially wetted to a moisture content near optimum.
- The following tentative foundation layering system can be considered but the final layout will be dependent on the type, speed and frequency of traffic that will use the access roads:
 - Place and compact a minimum 150mm thick layer of G9 material to form the **lower selected subgrade** layer. A minimum compaction specification of 93% Mod AASHTO density is recommended.

- Place and compact a minimum 150mm thick layer of G7 material to form the **upper selected subgrade** layer. A minimum compaction specification of 95% Mod AASHTO density is recommended.
- Place and compact the remainder of the road layerworks (subbase, base and surfacing), based on an analysis of the type and frequency of traffic that will use the road.
- The following surfacing options are recommended:
 - An asphalt application or concrete slab on a stabilised subbase layer.
 - A layer of sand on top of a stabilised subbase layer followed by the placement of interlocking paving blocks, contained between kerbs or other non-movable structures.

7.5. Sources of construction materials

Construction materials for use within roads and parking area layerworks, fill below surface beds and general fills can be chosen based on the information given in Section 5.6 above (strength and compaction characteristics). The following summarised recommendations are given:

- Very soft rock mudstone and its weathering products should NOT be used as a construction material.
- Very soft rock or harder shale formations are generally expected to comply with G6 to G7 quality and is deemed potentially suitable for use within lower and upper selected, subgrade layers as well as general fill material. Careful selection of material will be required to ensure that shale is in fact sourced and not mudstone, which is closely associated with shale. It may be considered to stabilise or treat shale material with a suitable stabilising agent in order to produce a stabilised subbase (C4) material. This operation must be assessed during the construction phase with appropriate laboratory testing.
- Soft rock or harder dolerite formations are expected to generally comply with G6 quality and hence can have varied applications as a construction material, both within road layerworks as well as fills. The primary problem foreseen with the use of this source is the excavability of the material, partly due to soft rock or harder formations that will be encountered near surface and/or the presence of abundant hard rock dolerite boulders.

8. REERENCES

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Van der Merwe D.H. (1964) The Prediction of Heave from the Plasticity Index and Percentage Clay fraction of Soils. *The Civil Engineer in South Africa* 1964.

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APPENDIX A

SOIL PROFILES

TEST PIT NO. 2-1Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *23 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027641 X3172892*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS		Not encountered
0.2		Dry, reddish brown, MEDIUM DENSE, intact, clayey SAND		
0.3				
0.4		VERY SOFT ROCK SHALE	Bulk	
0.5		Dry, light grey stained dark orange along bedding planes, highly weathered, fine-grained, bedded, very highly fractured, very soft rock		
0.6				
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Not yet refusal*Groundwater conditions: *Not encountered*General remarks 2: *Slow rate of excavation at base*Base of test pit: *2.7m - excavation stopped*

General remarks 3:

TEST PIT NO. 2-10Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *23 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0028001 X3173066*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, orange brown, FIRM to STIFF, cracked, sandy to silty CLAY		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6		CALCAREOUS RESIDUAL SHALE Slightly moist, light orange brown blotched white, LOOSE, slightly open-structured, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel.		
0.7				
0.8				
0.9				
1.0				
1.1		RESIDUAL SHALE Light grey blotched dark grey and stained dark orange along bedding planes, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale		
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Slow rate of excavation at base*Groundwater conditions: *Not encountered*

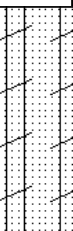
General remarks 2:

Base of test pit: *2.0m - near refusal*

General remarks 3:

TEST PIT NO. 2-11Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *23 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0028147 X3173150*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Dry, light brown, FIRM to STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6	CALCAREOUS RESIDUAL SHALE Dry, light orange brown blotched white and dark grey, MEDIUM DENSE TO DENSE, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel and angular fragments of dark grey, highly weathered mudstone.	Disturbed		
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Not yet refusal*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.7m - excavation stopped*

General remarks 3:

TEST PIT NO. 2-12Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *23 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027992 X3173237*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, dark reddish brown, MEDIUM DENSE, clayey SAND		Not encountered
0.2				
0.3				
0.4				
0.5		SOFT ROCK DOLERITE Dry, dark grey speckled black and interlaced white, moderately to highly weathered, medium grained, massive, highly fractured, soft rock dolerite		
0.6				
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Refuse on soft rock or harder dolerite*Groundwater conditions: *Not encountered*


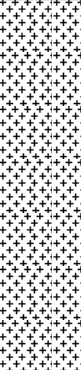
General remarks 2:

Base of test pit: *0.5m - refusal reached*

General remarks 3:

TEST PIT NO. 2-13Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *23 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027945 X3173368*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1	 	TRANSPORTED SOILS Slightly moist, dark reddish brown, MEDIUM DENSE, clayey SAND		Not encountered
0.2		SOFT ROCK DOLERITE Dry, dark grey speckled black and interlaced white, moderately to highly weathered, medium grained, massive, highly fractured, soft rock dolerite	Bulk	
0.3				
0.4				
0.5				
0.6				
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Refuse on soft rock or harder dolerite*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *1.2m - refusal reached*

General remarks 3:

TEST PIT NO. 2-14Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *23 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0028060 X3173462*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL	
0.0		Current NGL			
0.1		TRANSPORTED SOILS Dry, light brown, FIRM to STIFF, cracked, silty to sandy CLAY		Not encountered	
0.2					
0.3		CALCAREOUS RESIDUAL SHALE Dry, orange brown blotched white and dark grey, MEDIUM DENSE TO DENSE, silty to clayey SAND containing minor 'lenses' of white calcareous gravel and dark grey, highly weathered mudstone.			
0.4					
0.5					
0.6					
0.7					
0.8					
0.9					
1.0					
1.1			Disturbed		
1.2					
1.3					
1.4					
1.5					
1.6					
1.7		RESIDUAL SHALE Slightly moist, dark orange blotched grey and white, STIFF, clayey SILT grading into highly fractured, highly weathered, very-fine grained shale			
1.8					
1.9					
2.0					
2.1					
2.2					
2.3					
2.4					
2.5					
2.6					
2.7					
2.8					
2.9					
3.0					
3.1					

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Maximum reach; not yet refusal*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.7m - excavation stopped*

General remarks 3:

TEST PIT NO. 2-15Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *23 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0028136 X3173307*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Dry, light brown, FIRM to STIFF, cracked, silty to sandy CLAY		Not encountered
0.2				
0.3				
0.4				
0.5		CALCAREOUS RESIDUAL SHALE Dry, orange brown blotched white and dark grey, MEDIUM DENSE TO DENSE, silty to clayey SAND containing minor 'lenses' of white calcareous gravel and dark grey, highly weathered mudstone.		
0.6				
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4		RESIDUAL SHALE Slightly moist, dark orange blotched grey and white, STIFF, clayey SILT grading into highly fractured, highly weathered, very-fine grained shale		
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Maximum reach; not yet refusal*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.7m - excavation stopped*

General remarks 3:

TEST PIT NO. 2-16Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0028279 X3173220*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1	[Pattern]	TRANSPORTED SOILS Dry, brown, FIRM to STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.2			Disturbed	
0.3	[Pattern]	CALCAREOUS RESIDUAL SHALE Dry, light orange brown blotched white and dark grey, DENSE to VERY DENSE, silty to clayey SAND containing minor 'lenses' of white calcareous gravel and dark grey, highly weathered shale/mudstone.		
0.4			Disturbed	
0.5	[Pattern]			
0.6				
0.7	[Pattern]			
0.8				
0.9	[Pattern]			
1.0				
1.1	[Pattern]			
1.2				
1.3	[Pattern]			
1.4				
1.5	[Pattern]			
1.6				
1.7	[Pattern]			
1.8				
1.9	[Pattern]			
2.0				
2.1	[Pattern]			
2.2				
2.3	[Pattern]			
2.4				
2.5	[Pattern]			
2.6				
2.7	[Pattern]			
2.8				
2.9	[Pattern]			
3.0				
3.1	[Pattern]			

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Slow rate of excavation*Groundwater conditions: *Not encountered* General remarks 2:Base of test pit: *2.4m - stopped; near refusal* General remarks 3:

TEST PIT NO. 2-17Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0028412 X3173286*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Dry, brown, FIRM to STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6		CALCAREOUS RESIDUAL SHALE Dry, light orange brown blotched white and dark grey, DENSE to VERY DENSE, silty to clayey SAND containing minor 'lenses' of white calcareous gravel and dark grey, highly weathered shale/mudstone.		
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Slow rate of excavation*Groundwater conditions: *Not encountered* General remarks 2:Base of test pit: *2.4m - stopped; near refusal* General remarks 3:

TEST PIT NO. 2-18Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0028247 X3173377*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Dry, light brown, STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.2				
0.3				
0.4				
0.5			Disturbed	
0.6		CALCAREOUS RESIDUAL SHALE Dry, light orange brown blotched white and dark grey, MEDIUM DENSE to DENSE, silty to clayey SAND containing minor 'lenses' of white calcareous gravel and dark grey, highly weathered shale/mudstone.		
0.7				
0.8				
0.9				
1.0			Bulk	
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1:Groundwater conditions: *Not encountered* General remarks 2:Base of test pit: *2.7m - stopped; maximum reach* General remarks 3:

TEST PIT NO. 2-19Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0028292 X3173517*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Dry, light brown, STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6		CALCAREOUS RESIDUAL SHALE Dry, light orange brown blotched white and dark grey, MEDIUM DENSE to DENSE, silty to clayey SAND containing minor 'lenses' of white calcareous gravel and dark grey, highly weathered shale/mudstone.		
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1:Groundwater conditions: *Not encountered* General remarks 2:Base of test pit: *2.7m - stopped; maximum reach* General remarks 3:

TEST PIT NO. 2-2Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *23 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027592 X3172995*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Dry to slightly moist, light brown, MEDIUM DENSE, slightly cracked, clayey SAND to sandy CLAY.		Not encountered
0.2				
0.3				
0.4				
0.5			Disturbed	
0.6		CALCAREOUS RESIDUAL SHALE/MUDSTONE Dry, light brown blotched white and dark grey, MEDIUM DENSE, intact, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel and minor 'lenses' of dark grey, highly to completely weathered, angular fragments of shale/mudstone		
0.7				
0.8				
0.9			Disturbed	
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Not yet refusal*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.7m - excavation stopped*

General remarks 3:

TEST PIT NO. 2-20Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0028218 X3173660*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Dry, light brown, STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6		CALCAREOUS RESIDUAL SHALE Dry, light orange brown and white, MEDIUM DENSE, silty SAND containing abundant white calcareous gravel.	Disturbed	
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6	RESIDUAL SHALE Same as above but containing minor 'pockets' of dark grey, highly weathered, highly fractured, shale/mudstone.			
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1:Groundwater conditions: *Not encountered* General remarks 2:Base of test pit: *2.7m - stopped; maximum reach* General remarks 3:

TEST PIT NO. 2-21Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0028105 X3173566*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Dry, light brown, STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.2				
0.3				
0.4				
0.5			Disturbed	
0.6		CALCAREOUS RESIDUAL SHALE Dry, light orange brown and white, MEDIUM DENSE, silty SAND containing abundant white calcareous gravel.		
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6		RESIDUAL SHALE Same as above but containing minor 'pockets' of dark grey, highly weathered, highly fractured, shale/mudstone.		
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1:Groundwater conditions: *Not encountered* General remarks 2:Base of test pit: *2.7m - stopped; maximum reach* General remarks 3:

TEST PIT NO. 2-22Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027910 X3173585*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Dry, light brown, FIRM to STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.2		VERY SOFT ROCK SHALE Dry, light and dark grey, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale. Excavates as fine, angular shale fragments.		
0.3				
0.4				
0.5				
0.6				
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Slow rate of excavation*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.1m - near refusal*

General remarks 3:

TEST PIT NO. 2-23Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027991 X3173691*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL		
0.0		Current NGL				
0.1		TRANSPORTED SOILS Slightly moist, brown, FIRM to STIFF, cracked, sandy CLAY to clayey SAND	<div>Not encountered</div>			
0.2						
0.3						
0.4						
0.5						
0.6					CALCAREOUS RESIDUAL SHALE/MUDSTONE Dry, light orange brown blotched white and dark grey, MEDIUM DENSE TO DENSE, slightly cracked, clayey silt to silty CLAY with 'lenses' of white, calcareous gravel and pockets of dark grey, weathered mudstone.	Disturbed
0.7						
0.8						
0.9						
1.0						
1.1						
1.2						
1.3						
1.4						
1.5						
1.6						
1.7						
1.8						
1.9						
2.0		VERY SOFT ROCK SHALE Dry, dark grey blotched dark orange, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale/mudstone.				
2.1						
2.2						
2.3						
2.4						
2.5						
2.6						
2.7						
2.8						
2.9						
3.0						
3.1						

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Maximum reach*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.7m - stopped*

General remarks 3:

TEST PIT NO. 2-24Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0028171 X3173761*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, dark reddish brown, FIRM to STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.2				
0.3				
0.4				
0.5			Disturbed	
0.6		VERY SOFT ROCK SHALE Dry, dark grey, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale		
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Refuse on very soft rock shale*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *1.2m - refusal reached*

General remarks 3:

TEST PIT NO. 2-25Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0028098 X3173902*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, dark reddish brown, FIRM to STIFF, cracked, sandy CLAY to clayey SAND		
0.2		VERY SOFT ROCK SHALE Dry, dark grey, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale		
0.3				
0.4				
0.5				
0.6				
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Refuse on very soft rock shale*Groundwater conditions: *Not encountered*


General remarks 2:

Base of test pit: *1.1m - refusal reached*

General remarks 3:

TEST PIT NO. 2-26Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0028014 X3173803*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, dark reddish brown, LOOSE, intact, slightly clayey SAND		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6				
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Slow rate of excavation*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *1.5m - near refusal*

General remarks 3:

TEST PIT NO. 2-27Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027817 X3173770*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, dark brown, FIRM to STIFF, cracked, sandy to silty CLAY		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6				
0.7				
0.8			Disturbed	
0.9		CALCAREOUS RESIDUAL SHALE Dry, orange brown blotched white, DENSE, intact, silty to clayey SAND with 'lenses' of white, calcareous gravel.		
1.0				
1.1				
1.2			Disturbed	
1.3		VERY SOFT ROCK SHALE Light grey stained dark orange along bedding planes, completely to highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale with 'pockets' of white calcareous gravel. Excavates as fine angular 'chips' of shale.		
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Maximum reach; not yet refusal*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.7m - stopped*

General remarks 3:

TEST PIT NO. 2-28Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027740 X3173894*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, dark brown, FIRM to STIFF, slightly cracked, sandy CLAY to clayey SAND		Not encountered
0.2				
0.3		VERY SOFT ROCK SHALE Light grey stained dark orange along bedding planes, completely to highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale. Excavates as fine, angular 'chips' of shale.	Bulk	Not encountered
0.4				
0.5				
0.6				
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Slow rate of excavation*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *1.6m - near refusal reached*

General remarks 3:

TEST PIT NO. 2-29Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027898 X3173914*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, dark reddish brown, LOOSE, slightly clayey SAND		Not encountered
0.2		WEATHERED DOLERITE Slightly moist, dark grey speckled black and blotched white, highly weathered, highly fractured, soft rock dolerite interlaced with white, hard calcrete.		
0.3				
0.4				
0.5				
0.6				
0.7				
0.8				
0.9				
1.0				
1.1		VERY SOFT ROCK SHALE Dark grey stained dark orange along bedding planes, completely to highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale. Excavates as 'plates' of shale.		
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Slow rate of excavation*Groundwater conditions: *Not encountered*General remarks 2: *Isolated dolerite boulders at surface.*Base of test pit: *1.6m - near refusal reached*

General remarks 3:

TEST PIT NO. 2-3Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *23 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027632 X3173085*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL		
0.0		Current NGL				
0.1		TRANSPORTED SOILS Dry, light brown, MEDIUM DENSE, cracked, clayey SAND to sandy CLAY.		Not encountered		
0.2						
0.3						
0.4						
0.5						
0.6						
0.7						
0.8	CALCAREOUS RESIDUAL SHALE Dry, light brown blotched white and dark grey, MEDIUM DENSE TO DENSE, intact, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel and minor 'lenses' of dark grey, highly to completely weathered, angular fragments of shale/mudstone.	Disturbed				
0.9						
1.0						
1.1						
1.2						
1.3						
1.4						
1.5						
1.6						
1.7	RESIDUAL SHALE Dry, dark orange blotched dark grey, STIFF, clayey SILT containing abundant 'pockets' of angular, highly weathered, shale fragments.					
1.8						
1.9						
2.0						
2.1						
2.2						
2.3						
2.4						
2.5						
2.6						
2.7						
2.8						
2.9						
3.0						
3.1						

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Not yet refusal*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.7m - excavation stopped*

General remarks 3:

TEST PIT NO. 2-30Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0028033 X3174016*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, dark reddish brown, LOOSE, slightly cracked, slightly clayey SAND VERY SOFT ROCK SHALE Dark grey stained dark orange along bedding planes, completely to highly weathered, very-fine grained, bedded, highly fractured, very soft rock to soft rock shale. Excavates as 'plates' of shale.		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6				
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Slow rate of excavation*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *1.0m - near refusal reached*

General remarks 3:

TEST PIT NO. 2-31Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027994 X3174141*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Moist, dark brown, FIRM TO STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6		CALCAREOUS RESIDUAL SHALE Slightly moist, light orange brown blotched white and dark grey, MEDIUM DENSE TO DENSE, silty to clayey SAND with 'lenses' of soft, white, calcareous gravel and completely to highly weathered shale/mudstone.		
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9	VERY SOFT ROCK SHALE Dark grey stained dark orange along bedding planes, completely to highly weathered, very-fine grained, bedded, highly fractured, very soft rock to soft rock shale. Excavates as 'plates' of shale.			
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1:Groundwater conditions: *Not encountered* General remarks 2:Base of test pit: *2.6m - stopped; maximum reach* General remarks 3:

TEST PIT NO. 2-32Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027840 X3174034*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS		Not encountered
0.2		Slightly moist, dark orange brown, FIRM, slightly cracked, clayey SAND to sandy CLAY		
0.3		VERY SOFT ROCK SHALE		
0.4		Dark grey stained dark orange along bedding planes, completely to highly weathered, very-fine grained, bedded, highly fractured, very soft rock to soft rock shale. Excavates as 'plates' of shale.		
0.5				
0.6				
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Slow rate of excavation*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *1.5m - near refusal*

General remarks 3:

TEST PIT NO. 2-33Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027681 X3173998*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1	[Pattern: Diagonal lines]	TRANSPORTED SOILS Slightly moist, dark orange brown, FIRM, slightly cracked, clayey SAND to sandy CLAY		Not encountered
0.2				
0.3	[Pattern: Horizontal lines]	VERY SOFT ROCK SHALE Dark grey stained dark orange along bedding planes, completely to highly weathered, very-fine grained, bedded, highly fractured, very soft rock to soft rock shale. Excavates as fine 'chips' of dark grey shale.		
0.4				
0.5				
0.6				
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Slow rate of excavation*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *1.8m - near refusal*

General remarks 3:

TEST PIT NO. 2-34Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027608 X3174143*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Dry, dark reddish brown, FIRM, slightly cracked, clayey SAND to sandy CLAY		Not encountered
0.2				
0.3				
0.4		MEDIUM HARD ROCK OR HARDER DOLERITE Dark grey speckled black and blotched white, highly weathered, medium to coarse grained, highly fractured, medium hard rock or harder dolerite interlaced with hard calcrete.		
0.5				
0.6				
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Refuse on soft rock dolerite*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *0.4m - refusal reached*

General remarks 3:

TEST PIT NO. 2-35Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027785 X3174146*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS		Not encountered
0.2		Dry, dark reddish brown, FIRM, slightly cracked, clayey SAND to sandy CLAY		
0.3		VERY SOFT ROCK OR HARDER SHALE		
0.4		Dark grey stained dark orange along bedding planes, highly		
0.5		weathered, very-fine grained, bedded, highly fractured, very soft rock		
0.6		shale.		
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Slow rate of excavation*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *1.9m - near refusal reached*

General remarks 3:

TEST PIT NO. 2-36Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *23 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027899 X3174278*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, dark brown, FIRM, cracked, silty to sandy CLAY		Not encountered
0.2				
0.3				
0.4				
0.5			Disturbed	
0.6		CALCAREOUS RESIDUAL SHALE Slightly moist, orange brown blotched white and dark grey, MEDIUM DENSE, silty to clayey SAND containing minor 'lenses' of white calcareous gravel and dark grey, highly weathered mudstone.		
0.7				
0.8				
0.9				
1.0				
1.1			Disturbed	
1.2				
1.3				
1.4				
1.5				
1.6		RESIDUAL SHALE Slightly moist, dark orange blotched grey and white, STIFF, clayey SILT with 'pockets' of white, calcareous gravel grading into highly fractured, highly weathered, very-fine grained shale.		
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Maximum reach; not yet refusal*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.7m - excavation stopped*

General remarks 3:

TEST PIT NO. 2-37Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027712 X3174248*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, dark brown, FIRM, slightly cracked, clayey SAND to sandy CLAY		Not encountered
0.2				
0.3		MEDIUM HARD ROCK OR HARDER DOLERITE Dark grey speckled black and blotched white, highly weathered, medium to coarse grained, highly fractured, medium hard rock or harder dolerite interlaced with hard calcrete.		
0.4				
0.5				
0.6				
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Refuse on soft rock dolerite*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *0.5m - refusal reached*

General remarks 3:

TEST PIT NO. 2-38Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027539 X3174258*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS		Not encountered
0.2		Slightly moist, dark brown, FIRM, slightly cracked, clayey SAND to sandy CLAY		
0.3		VERY SOFT ROCK SHALE		
0.4		Dark grey stained dark orange along bedding planes, highly		
0.5		weathered, very-fine grained, bedded, highly fractured, very soft rock		
0.6		shale/mudstone with occasional 'pockets' of white, calcareous gravel.		
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Slow rate of excavation*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.2m - near refusal*

General remarks 3:

TEST PIT NO. 2-39Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027633 X3174346*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL						
0.0		Current NGL								
0.1		TRANSPORTED SOILS Slightly moist, dark brown, FIRM, slightly cracked, clayey SAND to sandy CLAY		Not encountered						
0.2										
0.3										
0.4										
0.5			Disturbed							
0.6		CALCAREOUS RESIDUAL SHALE/MUDSTONE Slightly moist, orange brown blotched white, MEDIUM DENSE, silty to clayey SAND with 'pockets' of white calcareous gravel.								
0.7										
0.8										
0.9										
1.0										
1.1										
1.2										
1.3										
1.4		VERY SOFT ROCK SHALE Dark grey stained dark orange along bedding planes, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale.								
1.5										
1.6										
1.7										
1.8										
1.9										
2.0										
2.1										
2.2										
2.3										
2.4										
2.5										
2.6										
2.7										
2.8										
2.9										
3.0										
3.1										

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Not yet refusal*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.7m - stopped*

General remarks 3:

TEST PIT NO. 2-4Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *23 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027729 X3172974*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL	
0.0		Current NGL			
0.1		TRANSPORTED SOILS Dry, brown, STIFF, cracked, sandy CLAY to clayey SAND		Not encountered	
0.2					
0.3					
0.4					
0.5		CALCAREOUS RESIDUAL SHALE Dry, light brown blotched white, DENSE, intact, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel.	Disturbed		
0.6					
0.7					
0.8					
0.9					
1.0					
1.1					
1.2					
1.3					
1.4		RESIDUAL SHALE Slightly moist, dark orange blotched dark grey, STIFF, clayey SILT containing abundant, angular fragments of highly weathered shale/mudstone.	Bulk		
1.5					
1.6					
1.7					
1.8					
1.9					
2.0					
2.1					
2.2					
2.3					
2.4					
2.5					
2.6					
2.7					
2.8					
2.9					
3.0					
3.1					

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Not yet refusal*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.7m - excavation stopped*

General remarks 3:

TEST PIT NO. 2-40Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027810 X3174379*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, dark reddish brown, FIRM, cracked, clayey SAND to sandy CLAY		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6		VERY SOFT ROCK SHALE Light grey stained dark orange along bedding planes, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale. Excavates as flat 'plates'.	Bulk	
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Slow rate of excavation*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.5m - near refusal*

General remarks 3:

TEST PIT NO. 2-41Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027797 X3174511*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, dark reddish brown, FIRM, cracked, clayey SAND to sandy CLAY		Not encountered
0.2				
0.3		SOFT ROCK OR HARDER DOLERITE Dark grey speckled black and blotched white, moderately weathered, medium to coarse grained, massive, highly fractured, soft rock or harder dolerite interlaced with hard calcrete.		
0.4				
0.5				
0.6				
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1:Groundwater conditions: *Not encountered* General remarks 2:Base of test pit: *0.6m - refusal reached* General remarks 3:

TEST PIT NO. 2-42Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027676 X3174437*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, dark reddish brown, FIRM, cracked, clayey SAND to sandy CLAY		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6				
0.7		VERY SOFT ROCK SHALE Light grey stained dark orange along bedding planes, highly weathered, very-fine grained, bedded, highly fractured, very soft rock shale. Excavates as flat 'plates'.		
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Slow rate of excavation*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.5m - near refusal*

General remarks 3:

TEST PIT NO. 2-43Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027493 X3174429*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, dark reddish brown, FIRM to STIFF, cracked, clayey SAND to sandy CLAY		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6				
0.7		CALCAREOUS RESIDUAL SHALE Slightly moist, light orange brown, DENSE TO VERY DENSE, silty to clayey SAND with minor 'pockets' of soft, white, calcareous gravel.	Disturbed	
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6		RESIDUAL SHALE Slightly moist, dark orange blotched grey and white, STIFF, clayey SILT with 'pockets' of white, calcareous gravel grading into highly fractured, highly weathered, very-fine grained shale.		
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Maximum reach; Not yet refusal*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.6m - excavation stopped*

General remarks 3:

TEST PIT NO. 2-44Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027551 X3174504*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, dark reddish brown, FIRM to STIFF, cracked, clayey SAND to sandy CLAY		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6			Disturbed	
0.7		CALCAREOUS RESIDUAL SHALE Slightly moist, light orange brown, DENSE TO VERY DENSE, silty to clayey SAND with minor 'pockets' of soft, white, calcareous gravel.		
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6		RESIDUAL SHALE Slightly moist, dark orange blotched grey and white, STIFF, clayey SILT with 'pockets' of white, calcareous gravel grading into highly fractured, highly weathered, very-fine grained shale.		
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Maximum reach; Not yet refusal*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.6m - excavation stopped*

General remarks 3:

TEST PIT NO. 2-45Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027684 X3174542*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Dry, brown, FIRM TO STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.2				
0.3		VERY SOFT ROCK SHALE Light grey stained dark orange along bedding planes, completely to highly weathered, very-fine grained, bedded, highly fractured, very soft rock to soft rock shale. Excavates as angular shale fragments.	Bulk	Not encountered
0.4				
0.5				
0.6				
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Refuse on soft rock or harder shale*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *1.1m - refusal reached*

General remarks 3:

TEST PIT NO. 2-46Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027587 X3174614*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, dark brown, STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6			Disturbed	
0.7		CALCAREOUS RESIDUAL SHALE Slightly moist, light orange brown, DENSE, intact, silty to clayey SAND with minor 'pockets' of soft, white, calcareous gravel.		
0.8				
0.9				
1.0				
1.1				
1.2				
1.3		RESIDUAL SHALE Slightly moist, dark grey slightly blotched white and dark orange, STIFF, clayey SILT with 'pockets' of white, calcareous gravel grading into highly fractured, highly weathered, very-fine grained shale.		
1.4				
1.5				
1.6			Disturbed	
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Maximum reach; Not yet refusal*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.7m - excavation stopped*

General remarks 3:

TEST PIT NO. 2-47Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027452 X3174574*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, dark brown, STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6			Disturbed	
0.7		CALCAREOUS RESIDUAL SHALE Slightly moist, light orange brown, DENSE, intact, silty to clayey SAND with minor 'pockets' of soft, white, calcareous gravel.		
0.8				
0.9				
1.0				
1.1				
1.2				
1.3		RESIDUAL SHALE Slightly moist, dark grey blotched white and dark orange, STIFF, clayey SILT with 'pockets' of white, calcareous gravel grading into highly fractured, highly weathered, very-fine grained shale.	Disturbed	
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Maximum reach; Not yet refusal*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.6m - excavation stopped*

General remarks 3:

TEST PIT NO. 2-48Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *24 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027655 X3174611*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, reddish brown, LOOSE, clayey SAND to sandy CLAY		Not encountered
0.2				
0.3		SOFT ROCK OR HARDER DOLERITE Dark grey speckled black and blotched white, highly to moderately weathered, massive, medium to coarse grained, highly fractured, soft rock or harder dolerite interlaced with hard calcrete.	Bulk	Not encountered
0.4				
0.5				
0.6				
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Refuse on soft rock or harder dolerite*Groundwater conditions: *Not encountered*General remarks 2: *Surface boulders of hard rock dolerite*Base of test pit: *0.4m - refusal reached*General remarks 3: *in area.*

TEST PIT NO. 2-5Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *23 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027874 X3172995*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Slightly moist, brown, STIFF, cracked, sandy CLAY to clayey SAND		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6		CALCAREOUS RESIDUAL SHALE Dry, light brown blotched white, DENSE, intact, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel.	Disturbed	
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4				
1.5		RESIDUAL SHALE Slightly moist, dark orange blotched dark grey, STIFF, clayey SILT containing abundant, angular fragments of highly weathered shale/mudstone.		
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Not yet refusal*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.7m - excavation stopped*

General remarks 3:

TEST PIT NO. 2-6Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *23 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027767 X3173070*

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0075
Tel: 012 430 2081

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Dry, brown, STIFF, cracked, sandy to silty CLAY		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6		CALCAREOUS RESIDUAL SHALE Dry, light orange brown blotched white and dark grey, DENSE TO VERY DENSE, intact, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel and dark grey, angular fragments of mudstone.		
0.7				
0.8				
0.9				
1.0				
1.1	Disturbed			
1.2				
1.3				
1.4				
1.5	RESIDUAL SHALE Slightly moist, dark orange blotched dark grey, STIFF TO VERY STIFF, clayey SILT containing abundant, angular fragments of highly weathered shale/mudstone.			
1.6				
1.7				
1.8				
1.9				
2.0				
2.1		Disturbed		
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Not yet refusal*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.7m - excavation stopped*

General remarks 3:

TEST PIT NO. 2-7Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *23 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027712 X3173169*

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Tel: 012 430 2081

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Dry, brown, STIFF, cracked, sandy to silty CLAY		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6		CALCAREOUS RESIDUAL SHALE Dry, light orange brown blotched white and dark grey, DENSE TO VERY DENSE, intact, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel and dark grey, angular fragments of mudstone.	Disturbed	
0.7				
0.8				
0.9				
1.0				
1.1				
1.2				
1.3				
1.4		RESIDUAL SHALE Slightly moist, dark orange blotched dark grey, STIFF TO VERY STIFF, clayey SILT containing abundant, angular fragments of highly weathered shale/mudstone.		
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Not yet refusal*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.7m - excavation stopped*

General remarks 3:

TEST PIT NO. 2-8Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *23 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027786 X3173273*

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Tel: 012 430 2081

Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Dry, brown, STIFF, cracked, sandy to silty CLAY		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6		CALCAREOUS RESIDUAL SHALE Dry, light orange brown blotched white and dark grey, DENSE TO VERY DENSE, intact, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel and dark grey, angular fragments of mudstone.		
0.7				
0.8				
0.9				
1.0				
1.1		RESIDUAL SHALE Slightly moist, dark orange blotched dark grey and white, STIFF TO VERY STIFF, clayey SILT containing abundant, angular fragments of highly weathered shale/mudstone.		
1.2			Disturbed	
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2			Disturbed	
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Not yet refusal*Groundwater conditions: *Not encountered*

General remarks 2:

Base of test pit: *2.7m - excavation stopped*

General remarks 3:

TEST PIT NO. 2-9Logged by: *PH Oosthuizen*Project: *Lerato Park Phase 2*Date logged: *23 June 2009*Client: *Bigen Africa Services*Coordinates: *25 Y0027879 X3173159*

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Depth (m)	LEGEND	DESCRIPTION	SAMPLING	GROUND WATER LEVEL
0.0		Current NGL		
0.1		TRANSPORTED SOILS Dry, brown, STIFF, cracked, sandy to silty CLAY		Not encountered
0.2				
0.3				
0.4				
0.5				
0.6				
0.7		CALCAREOUS RESIDUAL SHALE Dry, light orange brown blotched white and dark grey, DENSE TO VERY DENSE, intact, silty to clayey SAND containing minor 'lenses' of soft, white, calcareous gravel and dark grey, angular fragments of mudstone.		
0.8				
0.9				
1.0				
1.1				
1.2				
1.3		RESIDUAL SHALE Slightly moist, dark orange blotched dark grey and white, STIFF TO VERY STIFF, clayey SILT containing abundant, angular fragments of highly weathered shale/mudstone.	Bulk	
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				

Excavation method: *Test pit with Terex 820 TLB* General remarks 1: *Not yet refusal*Groundwater conditions: *Not encountered*

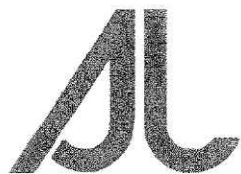
General remarks 2:

Base of test pit: *2.7m - excavation stopped*

General remarks 3:

APPENDIX B

LABORATORY TEST RESULTS



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CLIENT : Southern Geotechnical Engineering
P.O. Box 1687
Brooklyn Square
0075

DATE : 2009-08-13
REFERENCE : SLN139
DOCUMENT No.: 09/0848 - 0851
ORDER No.:
NUMBER OF PAGES : 2

ATTENTION : Pieter Oosthuizen
PROJECT : Lerato Park Phase 2

TEST REPORT

SAMPLE RECEIVED : Client
SAMPLE TESTED : 01/07/2009
SAMPLE TESTED BY : S.TELEKELO
SAMPLE REPORTED BY : S. Malan
SAMPLE METHOD : BY CLIENT
DATE SAMPLED : UNKNOWN
LOCATION SAMPLED : Lerato Park Phase 2
SAMPLE No. : 09/0848 - 0851
CLIENT REFERENCE : Lerato Park Phase 2
TEST METHODS : TMH1:A1,A2,A3,A5,A7 & A8

REMARKS : SAMPLES BROUGHT IN BY CLIENT

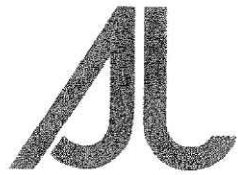
NOTE : REPORT CONTINUES ON NEXT PAGE
SEE ATTACHED TABLE

(Technician / Technologist)

for : SIMLAB (PTY) LTD.

(Divisional Director)

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***PAGE CONTINUES FROM PAGE 1

DOCUMENT No.: 09/0848 - 0851

Page 2 of 2

CLIENT & PROJECT:		Southern Geotechnical Engineering / Lerato Park Phase 2				
HOLE No. / KM		2-1	2-4	2-6	2-9	
MATERIAL DEPTH (mm)		0.5-2.7	1.4-2.7	0.6-1.5	1.5-2.6	
SAMPLE / LAB. No.		09/0848	09/0849	09/0850	09/0851	
MATERIAL DESCRIPTION						
IN SITU FIELD MOISTURE (%)		11.8%	12.6%	8.7%	11.9%	
AASHTO CLASSIFICATION		A-2-7	A-7-5	A-7-6	A-7-6	
UNIFIED SOIL CLASSIFICATION		GP/GC	SC	CL	CH	
TRH14* COLTO CLASSIFICATION		G6	>G10	>G10	>G10	
SIEVE ANALYSIS, PERCENTAGE OF MATERIAL PASSING 0.075MM SIEVE (TMH 1, Method A1 (a), A5 - % PASSING)						
SIEVE ANALYSIS	63.0 mm	100				
	53.0 mm	95				
	37.5 mm	91				
	26.5 mm	86	100		100	
	19.0 mm	84	97		99	
	13.2 mm	71	96	100	99	
	4.75 mm	42	95	98	95	
	2.00 mm	25	92	95	90	
	0.425 mm	12	83	88	81	
	0.075 mm	7	45	59	50	
SOIL MORTAR	0.002 mm	1	4	4	3	
	COARSE SAND	51	10	7	10	
	FINE SAND	19	41	31	34	
	MATERIAL <0.075 MM	30	49	62	56	
GRADING MODULUS (GM)		2.55	0.79	0.58	2.55	
Ph / CONDUCTIVITY Sm ⁻¹						
ATTERBERG LIMITS ANALYSIS (TMH 1, Method A2, A3 & A4)						
ATTERBERG LIMITS PASSING SIEVE (mm) >0.425		L.L	44	55	46	56
		P.I. / L.S.	17 / 9.18	25 / 13.25	25 / 13.2	28 / 13.17
POTENTIAL EXPANSIVENESS (mm)						
MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT, CALIFORNIA BEARING RATIO ANALYSIS (TMH 1, Method A7 & A8)						
UNCONFINED COMPRESSIVE STRENGTH & INDIRECT TENSILE STRENGTH OF STABILISED MATERIAL (TMH 1, Method A13T, A14 & A16T)						
CBR / UCS / ITS DETERMINATION	MOD AASHTO	MAX DRY DENSITY (kg/m ³)	1651	1813	1814	1872
		OPT MOISTURE (%)	21.9	13.2	13.1	13.5
		COMP MOISTURE (%)	21.8	13.5	13	15.2
		DRY DENSITY (kg/m ³)	1644	1803	1810	1872
		CBR (%) / *UCS/ITS (Kpa)	49	2	3	4
		SWELL (%)	0.0	2.8	2.4	2.1
	NRB	DRY DENSITY (kg/m ³)	1594	1725	1753	1814
		CBR (%) / *UCS/ITS (Kpa)	42	1	1	2
	PROC-TOR	MAX DRY DENSITY (kg/m ³)	1481	1578	1607	1642
		OPT MOISTURE (%)				
		CBR (%)	27	1	1	1
	CBR / UCS / ITS	100%		50	2	3
98%		45	2	2	3	
95%		38	1	1	2	
93%		33	1	1	1	
90%		28	1	1	1	

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CLIENT : **Southern Geotechnical Engineering**
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Brooklyn Square
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DATE : 2009-08-13
REFERENCE : SLN139
DOCUMENT No.: 09/0852 - 0855
ORDER No.:
NUMBER OF PAGES : 2

ATTENTION : Pieter Oosthuizen
PROJECT : Lerato Park Phase 2

TEST REPORT

SAMPLE RECEIVED : Client
SAMPLE TESTED : 01/07/2009
SAMPLE TESTED BY : S.TELEKELO
SAMPLE REPORTED BY : S. Malan
SAMPLE METHOD : BY CLIENT
DATE SAMPLED : UNKNOWN
LOCATION SAMPLED : Lerato Park Phase 2
SAMPLE No. : 09/0852 - 0855
CLIENT REFERENCE : Lerato Park Phase 2
TEST METHODS : TMH1:A1,A2,A3,A5,A7 & A8

REMARKS : SAMPLES BROUGHT IN BY CLIENT

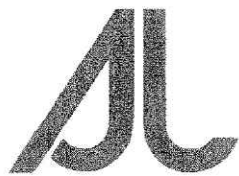
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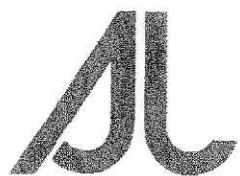
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DOCUMENT No.: 09/0852 - 0855

Page 2 of 2

CLIENT & PROJECT:		Southern Geotechnical Engineering / Lerato Park Phase 2				
HOLE No. / KM		2-13	2-18	2-22	2-25	
MATERIAL DEPTH (mm)		0.2-1.2	0.5-1.5	0.2-2.1	0.2-1.1	
SAMPLE / LAB. No.		09/0852	09/0853	09/0854	09/0855	
MATERIAL DESCRIPTION						
IN SITU FIELD MOISTURE (%)		3.5%	9.0%	7.7%	8.8%	
AASHTO CLASSIFICATION		A-2-6	A-7-6	A-2-7	A-2-4	
UNIFIED SOIL CLASSIFICATION		sp/sc	SC	SC	GP/GC	
TRH14/* COLTO CLASSIFICATION		G6	>G10	G8	G7	
SIEVE ANALYSIS. PERCENTAGE OF MATERIAL PASSING 0.075MM SIEVE (TMH 1, Method A1 (a), A5 - % PASSING)						
SIEVE ANALYSIS	63.0 mm				100	
	53.0 mm	100		100	93	
	37.5 mm	99		98	84	
	26.5 mm	95		95	78	
	19.0 mm	88		89	74	
	13.2 mm	78		87	64	
	4.75 mm	57	100	58	41	
	2.00 mm	38	98	41	29	
	0.425 mm	15	93	26	17	
	0.075 mm	8	43	15	11	
SOIL MORTAR	0.002 mm	1	8	2	1	
	COARSE SAND	59	5	35	41	
	FINE SAND	20	51	27	20	
	MATERIAL <0.075 MM	21	44	37	38	
GRADING MODULUS (GM)		2.39	0.66	2.17	2.39	
Ph / CONDUCTIVITY Sm ⁻¹						
ATTERBERG LIMITS ANALYSIS (TMH 1, Method A2, A3 & A4)						
ATTERBER LIMITS PASSING SIEVE (mm) >0.425		L.L	33	46	52	36
		P.I. / L.S.	14 / 1.45	23 / 12.32	22 / 11.9	10 / 4.01
POTENTIAL EXPANSIVENESS (mm)						
MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT, CALIFORNIA BEARING RATIO ANALYSIS (TMH 1, Method A7 & A8)						
UNCONFINED COMPRESSIVE STRENGTH & INDIRECT TENSILE STRENGTH OF STABILISED MATERIAL (TMH 1, Method A13T, A14 & A16T)						
CBR / UCS / ITS DETERMINATION	MOD AASHTO	MAX DRY DENSITY (kg/m ³)	2059	1841	1925	1777
		OPT MOISTURE (%)	9.9	13.8	12.6	14.5
		COMP MOISTURE (%)	10	13.8	12.9	14.7
		DRY DENSITY (kg/m ³)	2012	1854	1921	1782
		CBR (%) / *UCS/ITS (Kpa)	104	4	26	52
		SWELL (%)	0.0	2.0	0.3	0.2
	NRB	DRY DENSITY (kg/m ³)	1925	1755	1891	1687
		CBR (%) / *UCS/ITS (Kpa)	53	3	26	34
	PROC-TOR	MAX DRY DENSITY (kg/m ³)	1825	1644	1795	1549
		OPT MOISTURE (%)				
CBR / UCS / ITS		20	1	18	15	
	100%	150	4	26	51	
	98%	109	3	26	43	
	95%	67	3	20	34	
	93%	48	2	18	28	
	90%	26	1	14	20	

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CLIENT : Southern Geotechnical Engineering
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Brooklyn Square
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DATE : 2009-08-13
REFERENCE : SLN139
DOCUMENT No.: 09/0856 - 0859
ORDER No.:
NUMBER OF PAGES : 2

ATTENTION : Pieter Oosthuisen
PROJECT : Lerato Park Phase 2

TEST REPORT

SAMPLE RECEIVED : Client
SAMPLE TESTED : 01/07/2009
SAMPLE TESTED BY : S.TELEKELO
SAMPLE REPORTED BY : S Malan
SAMPLE METHOD : BY CLIENT
DATE SAMPLED : UNKNOWN
LOCATION SAMPLED : Lerato Park Phase 2
SAMPLE No. : 09/0856 - 0859
CLIENT REFERENCE : Lerato Park Phase 2
TEST METHODS : TMH1:A1,A2,A3,A5,A7 & A8

REMARKS : SAMPLES BROUGHT IN BY CLIENT

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(Technician / Technologist)

for : SIMLAB (PTY) LTD.

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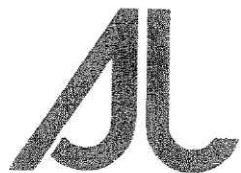
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DOCUMENT No.: 09/0856 - 0859

Page 2 of 2

CLIENT & PROJECT:		Southern Geotechnical Engineering / Lerato Park Phase 2			
HOLE No. / KM		2-28	2-31	2-35	2-40
MATERIAL DEPTH (mm)		0.3-1.6	1.8-2.6	0.3-1.9	0.5-2.5
SAMPLE / LAB. No.		09/0856	09/0857	09/0858	09/0859
MATERIAL DESCRIPTION					
IN SITU FIELD MOISTURE (%)		8.6%	11.8%	11.5%	10.9%
AASHTO CLASSIFICATION		A-2-6	A-2-7	A-2-6	A-2-6
UNIFIED SOIL CLASSIFICATION		GP/GC	sw/sc	sp/sc	sp/sc
TRH14/ COLTO CLASSIFICATION		G7	G7	G7	G6
SIEVE ANALYSIS. PERCENTAGE OF MATERIAL PASSING 0.075MM SIEVE (TMH 1, Method A1 (a), A5 - % PASSING)					
SIEVE ANALYSIS	63.0 mm				
	53.0 mm				
	37.5 mm	100		100	100
	26.5 mm	96	100	98	94
	19.0 mm	86	97	87	85
	13.2 mm	86	96	87	83
	4.75 mm	48	64	68	52
	2.00 mm	27	38	45	31
	0.425 mm	14	9	22	14
	0.075 mm	6	6	12	7
SOIL MORTAR	0.002 mm	1	0	1	1
	COARSE SAND	47	75	52	55
	FINE SAND	30	10	22	21
	MATERIAL <0.075 MM	22	15	26	24
GRADING MODULUS (GM)		2.52	2.47	2.21	2.52
Ph / CONDUCTIVITY Sm ⁻¹					
ATTERBERG LIMITS ANALYSIS (TMH 1, Method A2, A3 & A4)					
ATTERBERG LIMITS PASSING SIEVE (mm) >0.425		L.L.	39	52	39
		P.L. / L.S.	14 / 7.97	17 / 8.15	16 / 6.21
POTENTIAL EXPANSIVENESS (mm)					
MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT, CALIFORNIA BEARING RATIO ANALYSIS (TMH 1, Method A7 & A8)					
UNCONFINED COMPRESSIVE STRENGTH & INDIRECT TENSILE STRENGTH OF STABILISED MATERIAL (TMH 1, Method A13T, A14 & A16T)					
CBR / UCS / ITS DETERMINATION	MOD AASHTO	MAX DRY DENSITY (kg/m ³)	1871	1713	1719
		OPT MOISTURE (%)	13.5	18.6	17
		COMP MOISTURE (%)	13.8	18.7	17.3
		DRY DENSITY (kg/m ³)	1896	1690	1759
		CBR (%) / *UCS/ITS (Kpa)	26	40	40
		SWELL (%)	0.2	0.1	0.1
	NRB	DRY DENSITY (kg/m ³)	1882	1606	1679
		CBR (%) / *UCS/ITS (Kpa)	30	30	32
	PROC-TOR	MAX DRY DENSITY (kg/m ³)	1801	1542	1590
		CBR (%)	22	22	18
CBR / UCS / ITS	100%		29	43	36
	98%		25	38	33
	95%		20	32	24
	93%		17	28	19
	90%		14	22	14

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CLIENT : Southern Geotechnical Engineering
P.O. Box 1687
Brooklyn Square
0075

DATE : 2009-08-11

REFERENCE : SLN139

DOCUMENT No.: 09/0860 - 0861

ORDER No.:

NUMBER OF PAGES : 2

ATTENTION : Pieter Oosthuizen
PROJECT : Lerato Park Phase 2

TEST REPORT

SAMPLE RECEIVED : Client
SAMPLE TESTED : 01/07/2009
SAMPLE TESTED BY : S. TELEKELO
SAMPLE REPORTED BY : S. Malan
SAMPLE METHOD : BY CLIENT
DATE SAMPLED : UNKNOWN
LOCATION SAMPLED : Lerato Park Phase 2
SAMPLE No. : 09/0860 - 0861
CLIENT REFERENCE : Lerato Park Phase 2
TEST METHODS : TMH1:A1,A2,A3,A5,A7 & A8

REMARKS : SAMPLES BROUGHT IN BY CLIENT

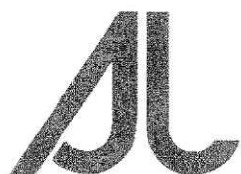
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SEE ATTACHED TABLE

(Technician / Technologist)

for : SIMLAB (PTY) LTD.

(Divisional Director)

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***PAGE CONTINUES FROM PAGE 1

DOCUMENT No.: 09/0860 - 0861

Page 2 of 2

CLIENT & PROJECT:		Southern Geotechnical Engineering / Lerato Park Phase 2			
HOLE No. / KM		2-45	2-48		
MATERIAL DEPTH (mm)		0.3-1.1	0.3-0.4		
SAMPLE / LAB. No.		09/0860	09/0861		
MATERIAL DESCRIPTION					
IN SITU FIELD MOISTURE (%)		7.4%	8.1%		
AASHTO CLASSIFICATION		A-2-6	A-2-6		
UNIFIED SOIL CLASSIFICATION		GW/GC	GP/GC		
TRH14* COLTO CLASSIFICATION		G6	G6		
SIEVE ANALYSIS. PERCENTAGE OF MATERIAL PASSING 0.075MM SIEVE (TMH 1. Method A1 (a), A5 - % PASSING)					
SIEVE ANALYSIS	63.0 mm	100			
	53.0 mm	99	100		
	37.5 mm	96	94		
	26.5 mm	94	86		
	19.0 mm	90	79		
	13.2 mm	73	67		
	4.75 mm	46	44		
	2.00 mm	28	33		
	0.425 mm	10	25		
	0.075 mm	5	12		
	0.002 mm	0	1		
SOIL MORTAR	COARSE SAND	66	25		
	FINE SAND	15	39		
	MATERIAL <0.075 MM	20	35		
	GRADING MODULUS (GM)	2.57	2.30		
	Ph / CONDUCTIVITY Sm ⁻¹				
ATTERBERG LIMITS ANALYSIS (TMH 1. Method A2, A3 & A4)					
ATTERBERG LIMITS PASSING SIEVE (mm) >0.425		L.L.	36	32	
		P.I. / L.S.	13 / 5.62	12 / 7.12	
POTENTIAL EXPANSIVENESS (mm)					
MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT, CALIFORNIA BEARING RATIO ANALYSIS (TMH 1. Method A7 & A8)					
UNCONFINED COMPRESSIVE STRENGTH & INDIRECT TENSILE STRENGTH OF STABILISED MATERIAL (TMH 1. Method A13T, A14 & A16T)					
CBR / UCS / ITS DETERMINATION	MOD AASHTO	MAX DRY DENSITY (kg/m ³)	1871	2037	
		OPT MOISTURE (%)	14.3	10.6	
		COMP MOISTURE (%)	14.5	10.6	
		DRY DENSITY (kg/m ³)	1878	2017	
		CBR (%) / *UCS/ITS (Kpa)	60	73	
		SWELL (%)	0.0	0.1	
	NRB	DRY DENSITY (kg/m ³)	1803	1955	
		CBR (%) / *UCS/ITS (Kpa)	59	81	
	PROC-TOR	MAX DRY DENSITY (kg/m ³)	1732	1871	
		OPT MOISTURE (%)			
		CBR (%)	44	50	
CBR / UCS / ITS		100%	60	71	
		98%	59	76	
		95%	53	72	
		93%	45	57	
		90%	36	40	

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CLIENT : Southern Geotechnical Engineering
P.O. Box 1687
Brooklyn Square
0075

DATE : 2009-08-13
REFERENCE : SLN139
DOCUMENT No.: 09/0862-09/0865
ORDER No.:
NUMBER OF PAGES : 2

ATTENTION : Pieter Oosthuizen
PROJECT : Lerato Park Phase 2

TEST REPORT

SAMPLE RECEIVED : Client
SAMPLE TESTED : 2009/07/01
SAMPLE TESTED BY : S.TELEKELO
SAMPLE REPORTED BY : F.FONTERNEL
SAMPLE METHOD : BY CLIENT
DATE SAMPLED : UNKNOWN
LOCATION SAMPLED : Lerato Park Phase 2
SAMPLE No. : 09/0862-09/0865
CLIENT REFERENCE : Lerato Park Phase 2
TEST METHODS : TMH1:A1,A2,A3,A5,A7 & A8

REMARKS : SAMPLES BROUGHT IN BY CLIENT

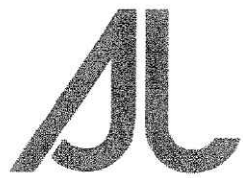
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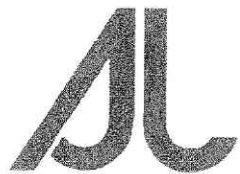
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DOCUMENT No.: 09/0862-09/0865

Page 2 of 2

CLIENT & PROJECT:		Southern Geotechnical Engineering / Lerato Park Phase 2			
HOLE No. / KM		2 - 2	2 - 2	2 - 3	2 - 4
MATERIAL DEPTH (mm)		0.5	0.8	0.7	0.7
SAMPLE / LAB. No.		09/0862	09/0863	09/0864	09/0865
MATERIAL DESCRIPTION					
IN SITU FIELD MOISTURE (%)		10.4%	10.3%	11.2%	10.4%
AASHTO CLASSIFICATION		A-6	A-6	A-6	A-6
UNIFIED SOIL CLASSIFICATION		SC	SC	CL	CL
TRH14* COLTO CLASSIFICATION					
SIEVE ANALYSIS. PERCENTAGE OF MATERIAL PASSING 0.075MM SIEVE (TMH 1, Method A1 (a), A5 - % PASSING)					
SIEVE ANALYSIS	63.0 mm				
	53.0 mm				
	37.5 mm				
	26.5 mm		100		
	19.0 mm		99		
	13.2 mm		99		100
	4.75 mm	100	96	100	98
	2.00 mm	98	94	99	96
	0.425 mm	91	85	92	84
	0.075 mm	46	47	56	54
	0.002 mm	5	8	8	9
SOIL MORTAR	COARSE SAND	7	10	7	12
	FINE SAND	46	41	36	32
	MATERIAL <0.075 MM	46	50	57	56
GRADING MODULUS (GM)		0.65	0.74	0.53	0.65
Ph / CONDUCTIVITY Sm ⁻¹		8.1 / 0.0054	8.13 / 0.0037	8.24 / 0.0053	8.17 / 0.0042
ATTERBERG LIMITS ANALYSIS (TMH 1, Method A2, A3 & A4)					
ATTERBERG LIMITS PASSING SIEVE (mm) >0.425	L.L.	34	35	34	36
	P.I. / L.S.	14 / 7.74	15 / 8.94	18 / 10.1	19 / 10.11
POTENTIAL EXPANSIVENESS (mm)					
MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT. CALIFORNIA BEARING RATIO ANALYSIS (TMH 1, Method A7 & A8)					
UNCONFINED COMPRESSIVE STRENGTH & INDIRECT TENSILE STRENGTH OF STABILISED MATERIAL (TMH 1, Method A13T, A14 & A16T)					
CBR / UCS / ITS DETERMINATION	MOD AASHTO	MAX DRY DENSITY (kg/m ³)			
		OPT MOISTURE (%)			
		COMP MOISTURE (%)			
		DRY DENSITY (kg/m ³)			
		CBR (%) / *UCS/ITS (Kpa)			
	NRB	SWELL (%)			
		DRY DENSITY (kg/m ³)			
		CBR (%) / *UCS/ITS (Kpa)			
	PROC-TOR	MAX DRY DENSITY (kg/m ³)			
		OPT MOISTURE (%)			
CBR / UCS / ITS	CBR (%)				
	100%				
	98%				
	95%				
	93%				

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CLIENT : Southern Geotechnical Engineering
P.O. Box 1687
Brooklyn Square
0075

DATE : 2009-08-13
REFERENCE : SLN139
DOCUMENT No.: 09/0866-09/0870
ORDER No.:
NUMBER OF PAGES : 2

ATTENTION : Pieter Oosthuizen
PROJECT : Lerato Park Phase 2

TEST REPORT

SAMPLE RECEIVED : Client
SAMPLE TESTED : 2009/07/01
SAMPLE TESTED BY : S.TELEKELO
SAMPLE REPORTED BY : F.FONTERNEL
SAMPLE METHOD : BY CLIENT
DATE SAMPLED : UNKNOWN
LOCATION SAMPLED : Lerato Park Phase 2
SAMPLE No. : 09/0866-09/0870
CLIENT REFERENCE : Lerato Park Phase 2
TEST METHODS : TMH1:A1,A2,A3,A5,A7 & A8

REMARKS : SAMPLES BROUGHT IN BY CLIENT

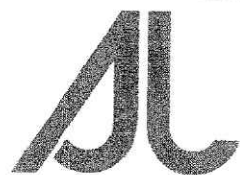
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(Technician / Technologist)

for : SIMLAB (PTY) LTD.

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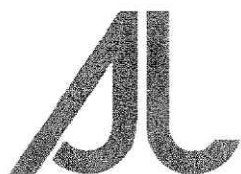
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DOCUMENT No.: 09/0866-09/0870

Page 2 of 2

CLIENT & PROJECT:		Southern Geotechnical Engineering / Lerato Park Phase 2			
HOLE No. / KM		2 - 5	2 - 6	2 - 7	2 - 8
MATERIAL DEPTH (mm)		0.5	2.0	0.5	0.2
SAMPLE / LAB. No.		09/0866	09/0868	09/0869	09/0870
MATERIAL DESCRIPTION					
IN SITU FIELD MOISTURE (%)		15.6%	11.2%	11.5%	10.0%
AASHTO CLASSIFICATION		A-7-6	A-7-6	A-7-6	A-7-6
UNIFIED SOIL CLASSIFICATION		CL	CL	CL	SC
TRH14/ COLTO CLASSIFICATION					
SIEVE ANALYSIS, PERCENTAGE OF MATERIAL PASSING 0.075MM SIEVE (TMH 1, Method A1 (a), A5 - % PASSING)					
SIEVE ANALYSIS	63.0 mm				
	53.0 mm				
	37.5 mm				
	26.5 mm				100
	19.0 mm				99
	13.2 mm	100	100		98
	4.75 mm	99	98	100	93
	2.00 mm	97	94	99	82
	0.425 mm	87	76	95	60
	0.075 mm	54	67	70	44
SOIL MORTAR	0.002 mm	9	4	7	5
	COARSE SAND	10	18	4	27
	FINE SAND	34	11	26	19
	MATERIAL <0.075 MM	56	71	70	54
GRADING MODULUS (GM)		0.62	0.63	0.36	0.62
Ph / CONDUCTIVITY Sm ⁻¹		8.23 / 0.0085	8.05 / 0.027	7.75 / 0.0121	8.19 / 0.0134
ATTERBERG LIMITS ANALYSIS (TMH 1, Method A2, A3 & A4)					
ATTERBERG LIMITS PASSING SIEVE (mm) >0.425	L.L.	43	47	44	43
	P.I. / L.S.	21 / 13.07	22 / 10.45	22 / 10.85	20 / 10.39
POTENTIAL EXPANSIVENESS (mm)					
MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT, CALIFORNIA BEARING RATIO ANALYSIS (TMH 1, Method A7 & A8)					
UNCONFINED COMPRESSIVE STRENGTH & INDIRECT TENSILE STRENGTH OF STABILISED MATERIAL (TMH 1, Method A13T, A14 & A16T)					
CBR / UCS / ITS DETERMINATION	MOD AASHTO	MAX DRY DENSITY (kg/m ³)			
		OPT MOISTURE (%)			
		COMP MOISTURE (%)			
		DRY DENSITY (kg/m ³)			
		CBR (%) / *UCS/ITS (Kpa)			
		SWELL (%)			
	NRB	DRY DENSITY (kg/m ³)			
		CBR (%) / *UCS/ITS (Kpa)			
	PROC-TOR	MAX DRY DENSITY (kg/m ³)			
		OPT MOISTURE (%)			
CBR / UCS / ITS	CBR (%)				
	100%				
	98%				
	95%				
	93%				

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CLIENT : Southern Geotechnical Engineering
P.O. Box 1687
Brooklyn Square
0075

DATE : 2009-08-13
REFERENCE : SLN139
DOCUMENT No.: 09/0871-09/0874
ORDER No.:
NUMBER OF PAGES : 2

ATTENTION : Pieter Oosthuizen
PROJECT : Lerato Park Phase 2

TEST REPORT

SAMPLE RECEIVED : Client
SAMPLE TESTED : 2009/07/01
SAMPLE TESTED BY : S.TELEKELO
SAMPLE REPORTED BY : F.FONTERNEL
SAMPLE METHOD : BY CLIENT
DATE SAMPLED : UNKNOWN
LOCATION SAMPLED : Lerato Park Phase 2
SAMPLE No. : 09/0871-09/0874
CLIENT REFERENCE : Lerato Park Phase 2
TEST METHODS : TMH1:A1,A2,A3,A5,A7 & A8

REMARKS : SAMPLES BROUGHT IN BY CLIENT

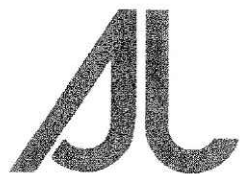
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DOCUMENT No.: 09/0871-09/0874

Page 2 of 2

CLIENT & PROJECT:		Southern Geotechnical Engineering / Lerato Park Phase 2				
HOLE No. / KM		2 - 8	2 - 14	2 - 16	2 - 16	
MATERIAL DEPTH (mm)		2.2	1.0	0.3	0.8	
SAMPLE / LAB. No.		09/0871	09/0872	09/0873	09/0874	
MATERIAL DESCRIPTION						
IN SITU FIELD MOISTURE (%)		10.4%	8.9%	7.8%	8.0%	
AASHTO CLASSIFICATION		A-7-6	A-7-6	A-6	A-6	
UNIFIED SOIL CLASSIFICATION		CL	SC	SC	CL	
TRH14/ COLTO CLASSIFICATION						
SIEVE ANALYSIS, PERCENTAGE OF MATERIAL PASSING 0.075MM SIEVE (TMH 1, Method A1 (a), A5 - % PASSING)						
SIEVE ANALYSIS	63.0 mm					
	53.0 mm					
	37.5 mm		100			
	26.5 mm		99			
	19.0 mm	100	98			
	13.2 mm	99	97		100	
	4.75 mm	91	89		98	
	2.00 mm	84	78	100	97	
	0.425 mm	60	60	99	83	
	0.075 mm	52	41	42	50	
	0.002 mm	3	5	5	7	
SOIL MORTAR	COARSE SAND	28	23	0	14	
	FINE SAND	9	24	58	34	
	MATERIAL <0.075 MM	63	52	42	51	
GRADING MODULUS (GM)		1.04	1.21	0.59	1.04	
Ph / CONDUCTIVITY Sm ⁻¹		8.06 / 0.027	8.35 / 0.0049	8.65 / 0.0044	8.07 / 0.0066	
ATTERBERG LIMITS ANALYSIS (TMH 1, Method A2, A3 & A4)						
ATTERBERG LIMITS PASSING SIEVE (mm) >0.425		L.L.	44	44	32	36
		P.I. / L.S.	21 / 9.91	19 / 9.02	14 / 7.59	17 / 7.81
POTENTIAL EXPANSIVENESS (mm)						
MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT, CALIFORNIA BEARING RATIO ANALYSIS (TMH 1, Method A7 & A8)						
UNCONFINED COMPRESSIVE STRENGTH & INDIRECT TENSILE STRENGTH OF STABILISED MATERIAL (TMH 1, Method A13T, A14 & A16T)						
CBR / UCS / ITS DETERMINATION	MOD AASHTO	MAX DRY DENSITY (kg/m ³)				
		OPT MOISTURE (%)				
		COMP MOISTURE (%)				
		DRY DENSITY (kg/m ³)				
		CBR (%) / *UCS/ITS (Kpa)				
		SWELL (%)				
	NRB	DRY DENSITY (kg/m ³)				
		CBR (%) / *UCS/ITS (Kpa)				
		MAX DRY DENSITY (kg/m ³)				
	PROC-TOR	OPT MOISTURE (%)				
		CBR (%)				
CBR / UCS / ITS		100%				
		98%				
		95%				
		93%				
		90%				

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