JOHANN van der MERWE (Pty) Ltd
CONSULTING APPLIED EARTH AND ENVIRONMENTAL SCIENTISTS

289 Polaris Avenue
Waterkloof Ridge 0181
Pretoria, GAUTENG
SOUTH AFRICA

TEL: 012 : 347 8467
MOBILE : 082 570 2222
FAX: 012 : 347 9064
Email : jovdm@iafrica.com

P.O. Box 95562
WATERKLOOF 0145
Pretoria, GAUTENG
SOUTH AFRICA

PROJECT No: M11/3207 **29 July 2011**

KBK ENGINEERS (Pty) Ltd
Consulting Civil Engineers
P. O. Box 74786
LYNNWOOD RIDGE 0040

Attention: Mr. Johan van Rensburg

Dear Sir,

REPORT ON A PHASE 1 GEOTECHNICAL INVESTIGATION CARRIED OUT FOR THE PROPOSED: *RESIDENTIAL TOWNSHIP DEVELOPMENT ON: THE REMAINDER OF THE FARM BOSCH HOEK 3345-HS*, NEWCASTLE, KWAZULU-NATAL PROVINCE

1. INTRODUCTION

This report covers the findings of a detailed which was carried out at the request of Mr. Johan van Rensburg of KBK Engineers, who is acting on behalf of his client, Mr. Willoughby St Leger Denny of Fontis Developments, who intends developing the farm portion into a residential development on the property. The Phase 1 geotechnical investigation consisted of a detailed geotechnical investigation during which time a number of test pits were excavated by backactor across the site, combined with soil sampling and testing and visual observations of soil and rock exposures over the development area.

2. TERMS OF REFERENCE

The objectives of the investigation were to: -

- Determine the engineering properties of the site soils and bedrock including potentially expansive material, low bearing capacity soils, areas difficult to excavate, shallow ground water conditions and the quality of the in situ soils in terms of road construction.

- Present appropriate recommendations for residential design and precautionary measures in accordance with the requirements of the National Home Builders Registration Council's guidelines.

Written confirmation to carry out the investigation was obtained from Mr. Nico Grobler in his electronic mail dated 21 September 2007.

3. INFORMATION CONSULTED

The following information was available and was consulted: -

- The 1: 50 000 scale Topographical Series Map Sheet Number 2729DD Newcastle.

- The 1: 125 000 scale Geological Series Map Sheet 2729D Newcastle.

- A copy of a township layout plan showing surface contours at 0,5m intervals and showing the boundaries of the site to a scale of 1: 3 500 that was prepared by the Town Planning Studio, Town and Regional Planners.

- A copy of an annotated aerial photograph indicating ecologically sensitive areas, prepared to a scale of 1: 2 000 by the wetlands expert, Prof. Bredenkamp.

- The publication "National Home Builders Registration Council's Standards and Guidelines, February 1999", 1st Revision.

- "Veld Types of South Africa" by J.P.H. Acocks. Third Edition 1988. Memoirs of the Botanical Survey of South Africa, No. 57.

- An aerial photograph of the site was obtained from Google Earth via the Internet.

4. SITE DESCRIPTION

The proposed development covers a surface area of 130 hectares and is located on the Remainder of the farm Bosch Hoek 3345-HS, Kwazulu-Natal Province and is located adjacent and to the south-west of Newcastle as shown on the attached 1: 50 000 scale "Locality Map" at the back of the report. The proposed development will comprise of a number of residential entities with a combined surface area of some 14 hectares. The property is bounded to the west by Normandien Road (Route P39-1), to the north by extensions of Newcastle informal township and on the remaining sides by open veld. A number of residential structures and appurtenant buildings are located in the northern and southern parts of the property.

The surface topography of the site is characterized as being gently undulating landscape over the central and western parts of the site and to roughly undulating landscape across the eastern part of the site that is characterized by a number of rugged and rocky ridges. The study area is located at an elevation ranging from 1 220m to 1 290m above sea level with several slopes steeper than 15% occurring in the eastern part of the study area.

The surface cover over the central and western parts of the site consists of veld grass and scattered Acacia *karoo* trees whereas the rocky ridges that occupy the higher-lying eastern portion, is densely vegetated by indigenous flora. The most abundant species that were observed are Acacia *karoo*; Acokanthera *oppositifolia*; Cussonia *paniculata*; Maytenus *heterophylla*; Grewia *flava*; Euclea *crispa* Rhus *dentata*; Rhus *pyroides* and Ziziphus *mucronata*. The site is bisected by two prominent northerly flowing drainage features and surface drainage takes place via sheetwash towards these features at gradients ranging from 3% to 10% respectively.

5. SITE INVESTIGATION

Thirty-three test pits were excavated across the site by New Holland LB90B backactor supplied by Flam Engineering from Newcastle. The test pits were entered and described by the undersigned, a registered professional engineering geologist in terms of the methods advocated by Jennings *et al* (1973) namely, moisture condition, colour, soil consistency, soil structure, soil type and origin (MCCSSO).

During the investigation, disturbed and undisturbed soil samples were taken for analysis in Messrs Geoplan's commercial soil laboratory in Johannesburg. Soil gradings, Atterberg limit determinations, compaction tests, pH and conductivity tests were carried out on the disturbed soil samples, whilst collapse potential tests were carried out on the undisturbed soil samples.

The detailed descriptions of the test pit profiles and laboratory test results are attached at the back of the report whilst the location of all exploratory works is shown on the attached "Geotechnical Map", Drawing Number M11/3207 in the pocket at the back of the report.

6. SITE SOILS AND GEOLOGY

The entire study area is underlain by transported silty, clayey and gravelly soils that are underlain by residual soils developed over weathered and unweathered dolerite bedrock belonging to a Post Karoo intrusive sill. The site has been apportioned into four prominent material zones, Soil Zones "A" to "D" as shown on the attached "Geotechnical Map".

Soil Zone "A" covers the major portion of the site, probably some 60% of the surface area and is characterized by outcrop and sub-outcrop of hard rock dolerite and a very generalized description of the typical soil profile, that may be encountered here, is as follows: -

0,0 - 0,3: Slightly moist, reddish dark brown, very stiff, shattered, sandy CLAY containing tree roots and numerous small and medium-sized, hard rock corestones (small boulders); colluvium.
0,3 - 0,7: Moist, dark red, stiff, voided, sandy SILT containing fine roots; colluvium.
0,7+: Abundant medium and large (up to 0,5m in diameter), hard rock DOLERITE BOULDERS, clast supported in a matrix of dry, dark yellow mottled orange, clayey SILT; residual dolerite. Overall consistency is very dense. Grades to dark olive, moderately weathered, widely jointed, hard rock DOLERITE, especially over the western portion of this zone. This soil zone forms prominent rugged, topographical features covered by indigenous flora in the central and eastern parts of the site.

Soil Zone "B" occupies the area between dolerite outcrop across the remainder of the site and a very generalized description of the typical soil profile, that may be encountered here, is as follows: -

0,0 - 0,3: Slightly moist, dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.
0,3 - 0,5: Moist, dark red, stiff, voided, sandy SILT containing scattered GRAVELS and CORESTONES at the base; colluvium with basal pebble marker.
0,5 - 1,5: Moist, dark red, stiff to very stiff, shattered, sandy CLAY containing FERRICRETE NODULES and scattered, hard rock DOLERITE CORESTONES; residual dolerite.
1,5 - 2,5: Moist, orange speckled white and yellow, stiff becoming firm, voided and relict jointed, sandy SILT containing scattered, hard rock DOLERITE CORESTONES; residual dolerite.

Zone "C" occupies the two major northerly flowing perennial drainage features that bisect the site in the eastern and central portions.

Soil Zone "D" represents a number of disturbed areas where gravel had been removed in the past in the south-western corner of the site, resulting in large, open and uneven hollows surrounded by mounds of soil and rock.

Abrupt refusal of the backactor was experienced from 0,2m to 1,2m below surface in hard rock dolerite and in large dolerite boulders across Soil Zone "A" whereas refusal of the machine was encountered from 0,4m to more than 2,2m below sur5face across Soil Zone "B". The water table, whether perched or permanent, was not encountered in any test pit during the investigation that was carried out during the beginning of the dry season.

7. GEOTECHNICAL CONSIDERATIONS

7.1 Expansive Soils

The clayey residual diabase soils blanketing Soil Zone "B" are potentially "medium" in the degree of expansiveness, based on the foundation indicator laboratory test results and according to the Van der Merwe (1964) method. A total surface heave value ranging from 15mm to possibly >30mm is predicted across this soil zone, depending on the locality and should the moisture condition of the soils change from a desiccated to saturated condition.

7.2 Collapsible and Compressible Soils

A number of undisturbed soil samples, representative of the colluvial silty soils and the residual silty dolerite that were tested to determine the collapse potential of the material according to the method advocated by Jennings (1974). A summary of the results of the laboratory tests appears below in Table 7.1.

TABLE 7.1: COLLAPSE POTENTIAL TEST RESULTS

HOLE NUMBER	DEPTH (m)	DRY DENSITY (kg/m³)	COLLAPSE POTENTIAL (%)	COMPRESSI-BILITY (%)	TROUBLE RATING
BH/5	2,00	1 112	0,80	4,35	No Trouble
BH/8	0,80	1 356	2,10	4,78	Moderate Trouble
BH/18	1,80	1 246	1,50	5,83	Moderate Trouble
BH/21	0,60	1 348	1,20	7,79	Moderate Trouble

An analysis of the above results indicate that the silty colluvial and residual dolerite soils that occupy Soil Zone "B", are potentially slightly to moderately collapsible and compressible with a collapse rating of "no trouble" to "moderate trouble" in terms of collapse settlement, according to Jennings.

7.3 Foundations

Soil Zone "A"

This portion of the site classifies as a Class "S/C/R" according to the guidelines of the NHBRC Standards and Guidelines of 1999 and in view of the shallow dolerite bedrock that characterizes this area, conventional spread or strip footings are envisaged for proposed rigid, single-storey residential structures, founded onto the dolerite bedrock at depths ranging from near surface occurrences down to an isolated maximum depth of 0,8m below surface and adopting a safe allowable bearing pressure of at least 300 kPa.

Provision will have to be made in the design of structures to withstand about 5mm of differential settlement due to variations in the soil profile or where dissimilar foundation conditions prevail in the same trench. Where the rock is too hard to remove from foundation trenches and in order not to disturb the surrounding foundation materials unduly, it is recommended that the rock be left in place and that the foundation concrete be reinforced with steel in order to counter any differential movements that may take place. Construction joints and lightly reinforced foundations should be considered in the structure in areas where dissimilar foundation conditions prevail.

Soil Zone "B"

This portion of the site tentatively classifies as a Site Class "S1/C1/H2-H3" according to the guidelines of the National Home Builders Registration Council's (NHBRC) Standards and Guidelines of 1999 and in view of the potentially compressible and moderately expansive nature of the colluvial and residual soils that are present here, one of the following foundation systems may be considered for proposed rigid, masonry, single storey, residential structures: -

Soil Raft

- Remove all or part of the expansive horizon to 1m beyond the perimeter of the structure and replace with inert backfill compacted to 93% Mod AASHTO density at -1% to +2% of optimum moisture content.
- Normal construction with lightly reinforced strip footings and light reinforcement in masonry if residual movements are <7,5mm or construction type appropriate to residual movement.
- Site drainage and plumbing/service precautions to be taken.

Split construction

- Combination of reinforced brickwork/ blockwork and full movement joints;
- Suspended floors or fabric reinforced ground slabs acting independently from the structure;
- Site drainage and plumbing/service precautions to be taken.

Piled construction

- Piled foundations with suspended floor slabs with or without ground beams.
- Site drainage and plumbing/service precautions to be taken.

Stiffened or cellular raft

- Stiffened or cellular raft of articulated lightly reinforced masonry.
- Site drainage and plumbing/service precautions to be taken.

Soil Zones "C" and "D"

These soil zones classify as a Site Class "P" according to the guidelines of the NHBRC Standards and Guidelines of 1999 due to the fact that these soil zones occupy areas that may be affected by seasonal flooding and disturbed ground conditions and respectively and it is recommended that these areas be excluded from development. It is also recommended that the flood line be determined accurately and that those portions of the site that may be affected by these adverse conditions, be excluded from the development.

The design and construction of raft foundations (whether soil or concrete) should be done in accordance with and under supervision of a civil or structural engineer. The NHBRC soil classes on the site are tentative and should be verified during construction by a competent person. The design of heavier structures such as double- and triple-storey structures should take cognisance of the potentially problematic soil conditions. Areas of disturbed ground conditions caused by past agricultural and other activities (old borrow pits, septic tanks, test pits etc.) should be identified and carefully reinstated during the construction of township services.

Cognizance should be taken of the ecologically sensitive areas on the site, the results of this investigation did not incorporate zones that cannot be developed due to ecological constraints.

7.4 Ground Water and Soil Chemistry

In assessing the susceptibility of the area to a perched water table, cognizance must be taken of the fact that the investigation was undertaken during the dry season. Thus, despite the absence of groundwater seepage in test pits, it is not improbable that portions of the site may carry a perched water table after periods of prolonged precipitation. Besides being sound engineering practice, it is recommended that damp proofing measures be included beneath all structures.

The major portion of the site is underlain by clayey soils that are not free-draining and the upper soils may tend to become soggy after prolonged precipitation causing disruption to vehicles, pedestrians and animals across these areas. Problems may therefore be experienced with sidewall collapse and water seepages into trenches during the installation of underground services during the wet season in these areas.

The site soils are expected to be potentially chemically aggressive with regards to underground ferrous metal pipes (pH values ranging from 6,7 to 8,1 and electrical conductivity values ranging from 0,0084 to 0,1079 S/m) and the use of non-ferrous metal pipes or plastic pipes are recommended for wet services, the foundation soils should be treated with an environmentally friendly insecticide to combat termites.

7.5 Earthworks

A summary of the anticipated compaction characteristics of the upper 1,0m of the site soils, based on an empirical method determined by the Plasticity Index and the Grading Modulus of the soil (the so-called Kleyn's CBR which is comparable with the 90% Proctor CBR) appears below in Table 7.2: -

TABLE 7.2: SUMMARY OF ANTICIPATED COMPACTION CHARACTERISTICS

HOLE NO	DEPTH (m)	SOIL TYPE	PI	GM	KLEYN'S CBR*
BH/1	0,0 – 0,4	Sandy CLAY	11	0,63	14
BH/8	0,3 – 1,0	Sandy SILT	15	0,35	9
BH/19	0,2 – 0,5	FERRICRETE GRAVELS	5	1,65	38
BH/20	0,0 – 0,4	Sandy gravelly SILT	8	1,22	25
BH/21	0,3– 0,9	Sandy SILT	15	0,44	10
BH/23	0,0 – 0,3	Sandy CLAY	9	0,90	20

Note : PI = Plasticity Index
GM = Grading Modulus
CBR* = California Bearing Ration at 90% Proctor compaction

Based on an analysis of the above table, it is evident that the transported sandy silt and sandy clay that blankets most of the site, are not considered suitable for use as fill underneath surface beds or for use in the construction of parking areas and roadways. Chemical stabilization will probably drastically increase the strength of this material. Subbase and basecourse quality materials will have to be imported for construction purposes. The design of roads should take the potentially compressible and expansive nature of the site soils into consideration.

7.6 Excavation Characteristics

Very hard excavation using a more powerful machine than the one used during this investigation and jackhammer work and blasting will be required to remove the dolerite bedrock from below shallow depth across Soil Zone "A". The transported and residual soils occurring across Soil Zone "B" may be removed by conventional earth moving equipment although the presence of dolerite boulders may hamper construction.

Huge dolerite boulders of up to 1,0m and more in diameter will be encountered within the upper soil horizons in both soil zones during the installation of wet services and will require to be broken up by jackhammer work and blasting for removal. Large-scale surface disturbance will probably result from the removal of these large boulders and will result in a large amount of overbreak of trenches as well as a huge surplus of unusable rocky material. Consideration may be given to the establishment of a mobile crusher unit on site during the construction phase in order to crush the boulders for re-use in the construction of roads and backfill underneath surface beds.

8. GENERAL

While every effort has been made to ensure that representative test pitting and sampling has been undertaken to probe the soils on-site, guaranteeing that isolated zones of either poor foundation material or hard rock excavation have not been identified, is impossible under the constraints of an investigation of this nature. The investigation has sought to highlight general areas of potential foundation and excavation problems, and to provide early warning to the design engineers and town planners.

This investigation serves as a Phase 1 geotechnical investigation in terms of the National Department of Housing's Generic Specification GFSH-2 that specifies that a Phase 2 investigation should also be carried out. The Phase 2 investigation comprises the appointment of a competent person by the developer during the installation of township services. Such an investigation comprises observations and in some instances, additional investigations after the township has been pegged, to confirm the site class designation of individual erven in accordance with the NHBRC requirements for enrolment of top structures in the Warranty Scheme under the provisions of the Housing Consumer Protection Measures Act. 1998 (Act No 95 of 1998) and the Joint Structural Division of the South African Institution of Civil Engineering and Institution of Structural Engineers' code of practice for foundations and superstructures for single storey residential buildings of masonry construction.

In view of the above observations and recommendations, it is concluded that the **Remainder of the farm Bosch Hoek 3345-HS** is suitable for the proposed *Residential Township Development*, provided that due cognizance is taken of the geotechnical factors mentioned in Section 7 of the report.

We trust that the above information will meet with your immediate requirements, please do not hesitate to call for any further information.

Yours faithfully,

JOHANN VAN DER MERWE (Pr. Sci. Nat.)
Engineering Geologist

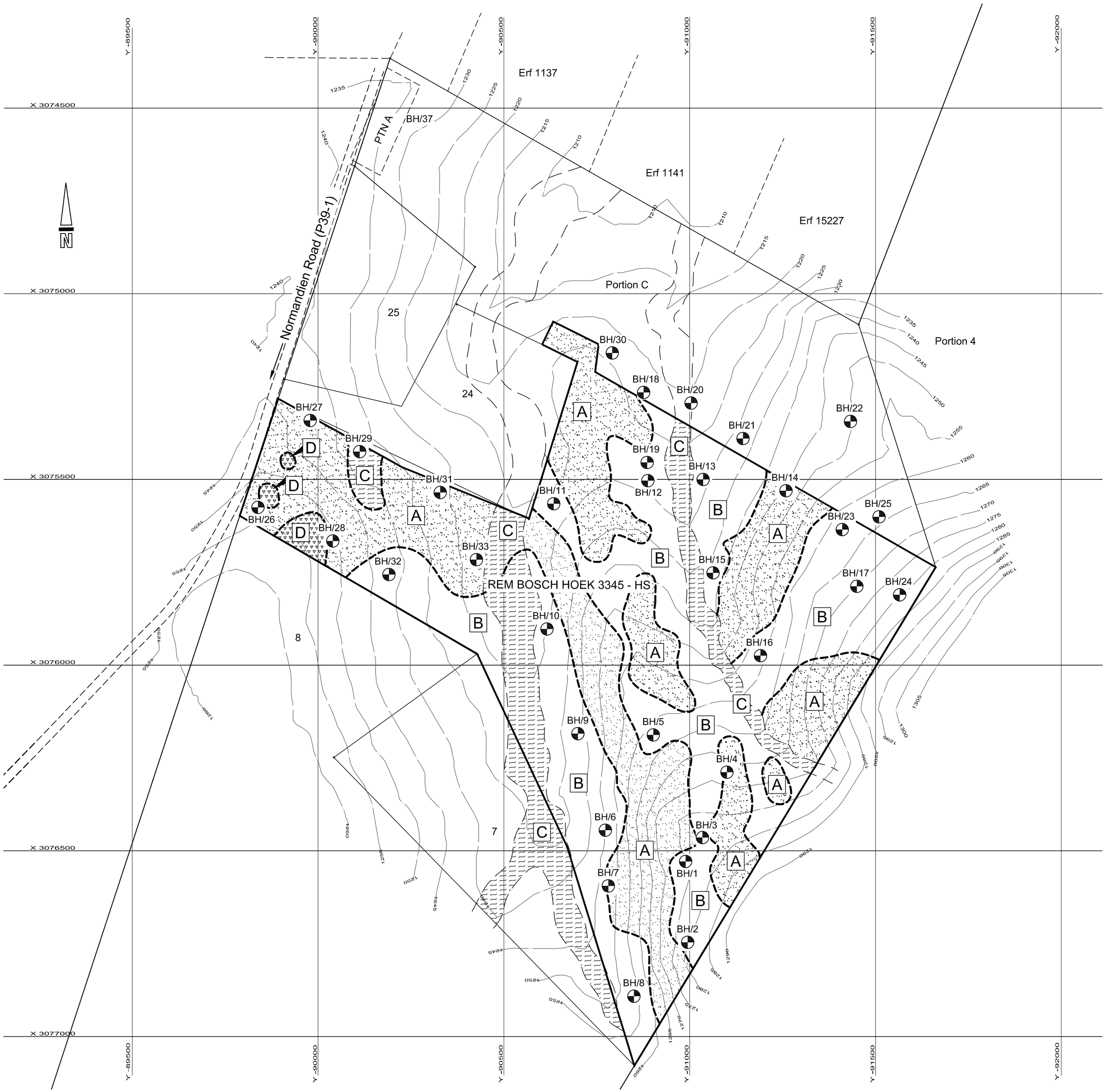
9. APPENDICES

Test Pit Profiles

Laboratory Test Results

Locality Map

Geotechnical Map



LEGEND:

BH/1 TEST PIT BY BACKACTOR, APPROXIMATE POSITION AND NUMBER

INFERRED MATERIAL BOUNDARY

SOIL ZONE	MATERIAL DESCRIPTION & GEOTECHNICAL CONSIDERATIONS	NHBRC* SITE CLASS
A	Prominent outcrop of *hard rock* DOLERITE and areas occupied by abundant large DOLERITE BOULDERS forming densely vegetated topographical features. ⇨ *Large-scale blasting can be expected for installation of services.* ⇨ *Highly uneven and undulating foundation conditions prevail.*	S/C/R
B	Dark brown, *very stiff*, sandy CLAY over dark red, *stiff*, voided, sandy SILT over a poorly developed PEBBLE MARKER over dark red, *stiff* to *very stiff*, shattered sandy CLAY and dark yellowish brown and orange, *stiff*, voided, sandy SILT from residual dolerite. Numerous medium- and large-sized DOLERITE BOULDERS present within the transported and residual soil horizons. ⇨ *Upper soil horizons are potentially compressible and mildly expansive.* ⇨ *Dark red, sandy CLAY from residual dolerite is potentially expansive.* ⇨ *Very hard excavation in large boulders can be expected in places.*	S1/C/H2-H3
C	Low-lying features occupied by perennial and non-perennial drainage features. ⇨ *Seasonal saturated soil conditions prevail during periods of excessive precipitation.*	P
D	Disturbed ground conditions, old borrow pits, mounds of soil etc. ⇨ *Highly uneven ground conditions prevail*	P

NOTE :

* = *National Home Builders Registration Council. Classification should be verified during construction by a competent person.*

** = *Soil boundaries are approximate and should be considered as a gradual change from one soil zone to the next, to be determined more accurately during construction of service trenches. Areas of disturbed ground are present on the site, these areas should be identified and carefully reinstated during the installation of underground services.*

This map is representative of geotechnical parameters only, reference should be made to the report by the environmental consultant for ecologically sensitive areas that should be excluded from the development.

JOHANN VAN DER MERWE (PTY) LTD
INGENIEURSGEOLOOG / ENGINEERING GEOLOGIST

POSBUS 95562 WATERKLOOF 0145
P O BOX 95562 WATERKLOOF 0145
TEL : (012) 347 8467
FAX : (012) 347 9064

TITLE / TITLE	TEK / DRG NO
GEOTECHNICAL MAP	M13/3207
LIGGING / LOCALITY REMAINDER OF THE FARM BOSCH HOEK 3345 - HS	DATUM / DATE JULY 2011
KLIËNT / CLIENT KBK CONSULTING ENGINEERS	SKAAL / SCALE 1 : 750 ON A2

GEOPLAN LABORATORIES [NORTH] (PTY) LTD / (EDMS) BPK

Reg. No 1978/000337/07

CLIENT : JOHANN VAN DER MERWE (Pty) Ltd.
PROJECT : BOSCHHOEK [Job 3207]
PRJ. No : JM08
DATE 14-Jun-11

CONDUCTIVITY/pH SUMMARY

Sample No	Sample Reference	Depth (m)	pH	Conductivity Sm^{-1}	Grading Modulus
0001	BH/1	0-0.4	7.4	0.0135	0.63
0002	BH/1	0.9-1.8	8.0	0.1035	0.61
0003	BH/5	0.4-1.6	7.6	0.1079	0.08
0004	BH/5	2.0	7.4	0.0161	0.13
0005	BH/8	0.8	6.7	0.0238	0.35
0006	BH/11	0.9-2.0	8.1	0.0125	0.77
0007	BH/12	0.7-1.1	7.5	0.0084	0.87
0008	BH/18	1.8	7.5	0.0201	0.20
0009	BH/19	0.2-0.5	7.8	0.0580	1.65
0010	BH/19	0.5-1.7	8.1	0.0780	0.78
0011	BH/20	0-0.4	7.0	0.0717	1.22
0012	BH/21	0.6	7.9	0.0557	0.44
0013	BH/21	0.9-2.0	8.0	0.0825	0.55
0014	BH/23	0-0.3	7.0	0.0135	0.90
0015	BH/28	0.6-1.1	6.7	0.0191	0.59

14/6

NOTES: Condutivity tests were done on material <6.7mm in accordance with TMH1 method A21T
pH determinations done in accordance with TMH1method A20

Consolidation Test / Konsolidasie Toets

Client : **JOHANN VAN DER MERWE (Pty) Ltd.**
Project : **BOSCHHOEK [Job 3207]**
Prj. No. : **JM08** **Sample No. 0008**
14-Jun-11 **Test Pit BH/18** **Depth : 1.8m**

Sample Parameters

Machine	WF/B	Mass of Ring + wet sample (start of test)	204.0 g
Ring No	W1	Mass of Ring + dry sample	170.1 g
Ring Ht	18.92 mm	Mass of Ring + wet sample (end of test)	197.8 g
Ring Diam.	69.52 mm	Mass of ring	80.6 g
Ring Vol.	71.82 mm^3	Dry Density	1.246
M/C at Start	37.9 %	M/C at End of Test	30.9 %
Sat. at Start	87.38 %	Sat. at End	103.4 %
Initial Voids Ratio	1.175	S.G.	2.711
Initial Ht. of Voids	10.22 mm	Ht. Of Solids	8.70 mm

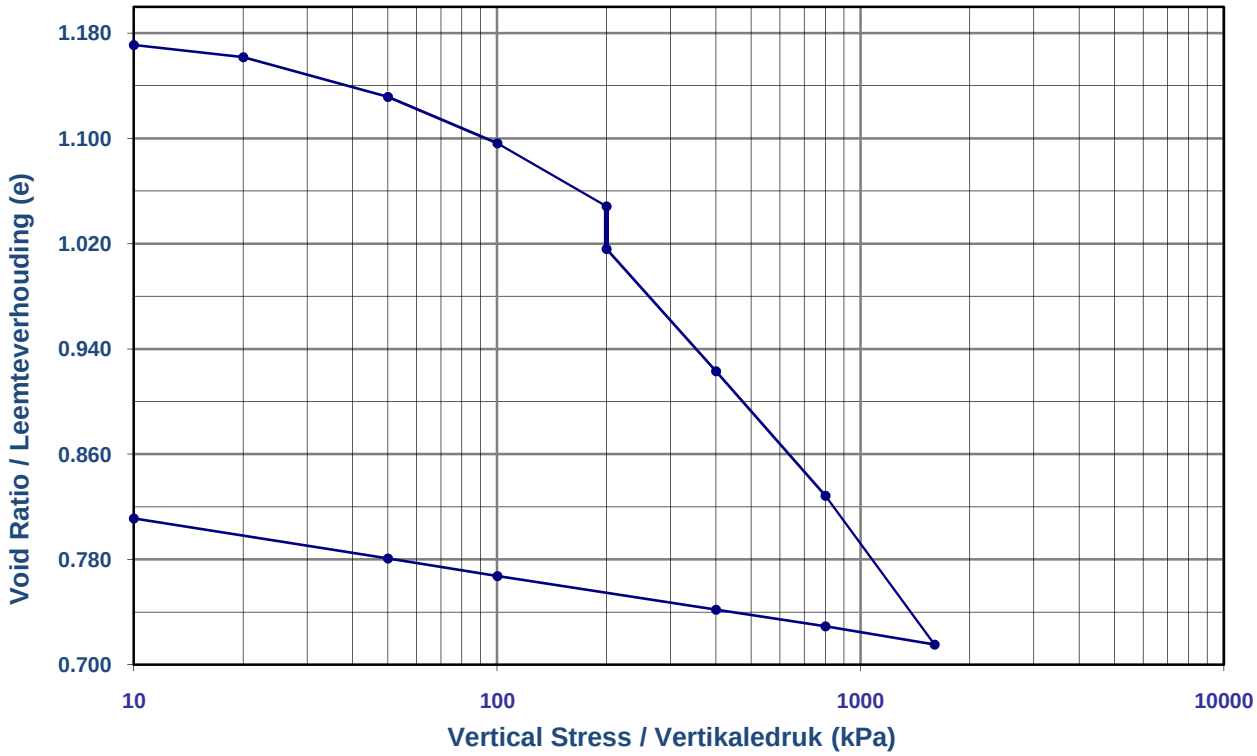
TEST WAS DONE ON A SPECIMEN PREPARED FROM AN UNDISTURBED SAMPLE AND SATURATED @ 200 kPa

Test Parameters

V.Strs (kPa)	1	10	20	50	100	200	200	400	800	1600	800	400	100	50	10
Dial (u)	10000	9966	9886	9622	9316	8900	8618	7810	6986	6002	6124	6233	6456	6572	6836
Strain (%)		0.18	0.60	2.00	3.62	5.81	7.30	11.58	15.93	21.13	20.49	19.91	18.73	18.12	16.72
Void Ratio	1.175	1.171	1.162	1.131	1.096	1.048	1.016	0.923	0.828	0.715	0.729	0.742	0.768	0.781	0.811
Cc		0.004	0.031	0.076	0.117	0.159		0.309	0.315	0.376	0.047	0.042	0.043	0.044	0.043
Mv (1/Mpa)		0.200	0.423	0.465	0.323	0.220		0.214	0.109	0.065	0.008	0.014	0.039	0.123	0.349

Collapse Potential **1.5 %**

14/6



GEOPLAN LABORATORIES [NORTH] (PTY) LTD / (EDMS) BPK
Registration No 1978/000337/07
11 RICHARD RD. INDUSTRIA NORTH P O Box 552 FLORIDA 1710 Tel. (011) 477-1045/6 Fax (011) 673-0715

Consolidation Test / Konsolidasie Toets

Client : **JOHANN VAN DER MERWE (Pty) Ltd.**
Project : **BOSCHHOEK [Job 3207]**
Prj. No. : **JM08** **Sample No. 0005**
14-Jun-11 **Test Pit BH/8** **Depth : 0.8m**

Sample Parameters

Machine	WF/D	Mass of Ring + wet sample (start of test)	205.8 g
Ring No	W2	Mass of Ring + dry sample	180.9 g
Ring Ht	18.86 mm	Mass of Ring + wet sample (end of test)	206.6 g
Ring Diam.	69.71 mm	Mass of ring	83.3 g
Ring Vol.	71.98 mm^3	Dry Density	1.356
M/C at Start	25.5 %	M/C at End of Test	26.3 %
Sat. at Start	69.00 %	Sat. at End	103.1 %
Initial Voids Ratio	1.005	S.G.	2.719
Initial Ht. of Voids	9.45 mm	Ht. Of Solids	9.41 mm

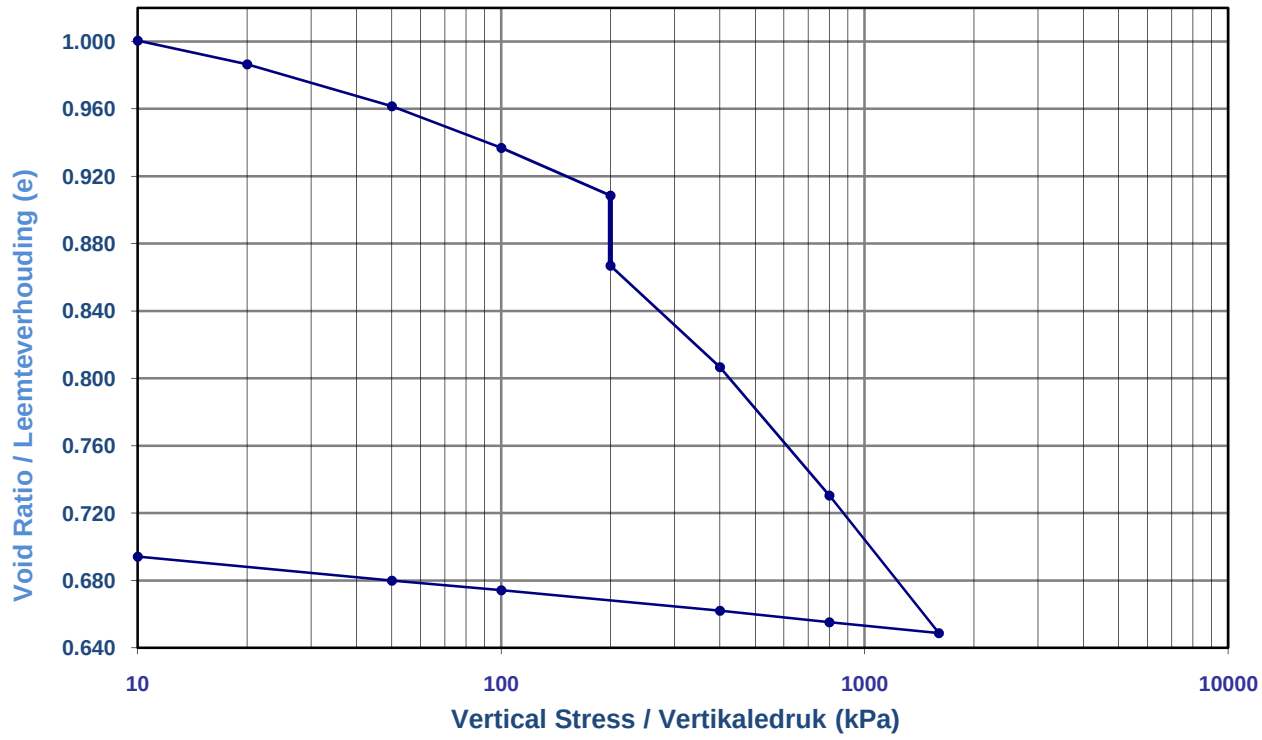
TEST WAS DONE ON A SPECIMEN PREPARED FROM AN UNDISTURBED SAMPLE AND SATURATED @ 200 kPa

Test Parameters

V.Strs (kPa)	1	10	20	50	100	200	200	400	800	1600	800	400	100	50	10
Dial (u)	10000	9956	9822	9588	9356	9090	8698	8132	7416	6646	6708	6771	6886	6940	7074
Strain (%)		0.23	0.94	2.18	3.41	4.83	6.90	9.90	13.70	17.78	17.45	17.12	16.51	16.22	15.51
Void Ratio	1.005	1.001	0.986	0.962	0.937	0.909	0.867	0.807	0.731	0.649	0.655	0.662	0.674	0.680	0.694
Cc		0.005	0.047	0.063	0.082	0.094		0.200	0.253	0.272	0.022	0.022	0.020	0.019	0.020
Mv (1/Mpa)		0.259	0.710	0.414	0.246	0.141		0.150	0.095	0.051	0.004	0.008	0.020	0.057	0.178

Collapse Potential **2.1 %**

14/6



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Registration No 1978/000337/07
11 RICHARD RD. INDUSTRIA NORTH P O Box 552 FLORIDA 1710 Tel. (011) 477-1045/6 Fax (011) 673-0715

Consolidation Test / Konsolidasie Toets

Client : **JOHANN VAN DER MERWE (Pty) Ltd.**
Project : **BOSCHHOEK [Job 3207]**
Prj. No. : **JM08** **Sample No. 0004**
14-Jun-11 **Test Pit BH/5** **Depth : 2.0m**

Sample Parameters

Machine	WF/F	Mass of Ring + wet sample (start of test)	206.1 g
Ring No	W20	Mass of Ring + dry sample	165.9 g
Ring Ht	18.62 mm	Mass of Ring + wet sample (end of test)	201.0 g
Ring Diam.	69.70 mm	Mass of ring	86.9 g
Ring Vol.	71.05 mm^3	Dry Density	1.112
M/C at Start	50.9 %	M/C at End of Test	44.4 %
Sat. at Start	95.99 %	Sat. at End	103.4 %
Initial Voids Ratio	1.436	S.G.	2.708
Initial Ht. of Voids	10.98 mm	Ht. Of Solids	7.64 mm

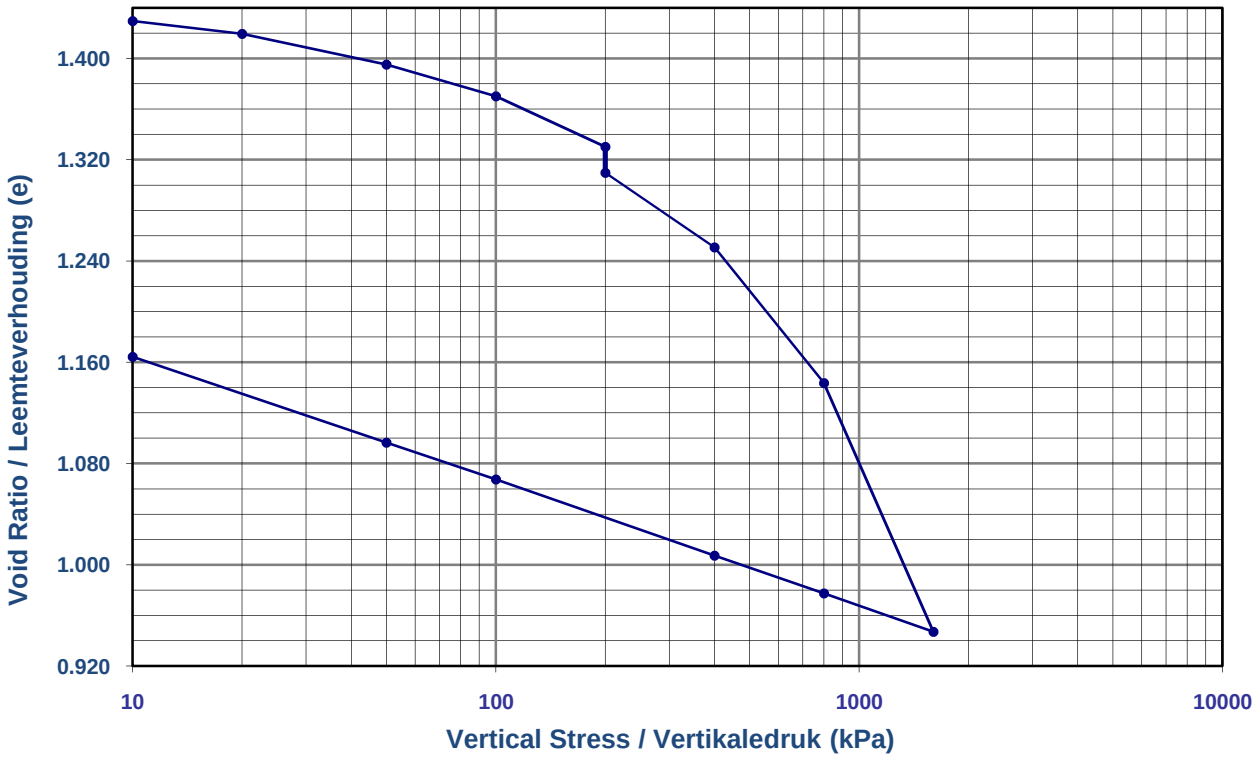
TEST WAS DONE ON A SPECIMEN PREPARED FROM AN UNDISTURBED SAMPLE AND SATURATED @ 200 kPa

Test Parameters

V.Strs (kPa)	1	10	20	50	100	200	200	400	800	1600	800	400	100	50	10
Dial (u)	10000	9952	9874	9688	9496	9192	9034	8584	7764	6264	6496	6723	7184	7406	7924
Strain (%)		0.26	0.68	1.68	2.71	4.34	5.19	7.60	12.01	20.06	18.82	17.60	15.12	13.93	11.15
Void Ratio	1.436	1.430	1.419	1.395	1.370	1.330	1.310	1.251	1.143	0.947	0.978	1.007	1.068	1.097	1.164
Cc		0.006	0.034	0.061	0.083	0.132		0.196	0.356	0.652	0.101	0.099	0.100	0.096	0.097
Mv (1/Mpa)		0.286	0.419	0.333	0.206	0.163		0.121	0.110	0.101	0.016	0.030	0.083	0.238	0.695

Collapse Potential **0.8 %**

14/6



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Consolidation Test / Konsolidasie Toets

Client : **JOHANN VAN DER MERWE (Pty) Ltd.**
Project : **BOSCHHOEK [Job 3207]**
Prj. No. : **JM08** **Sample No. 0012**
14-Jun-11 **Test Pit BH/21** **Depth : 0.6m**

Sample Parameters

Machine	WF/E	Mass of Ring + wet sample (start of test)	260.1 g
Ring No	2	Mass of Ring + dry sample	226.8 g
Ring Ht	18.82 mm	Mass of Ring + wet sample (end of test)	251.0 g
Ring Diam.	74.72 mm	Mass of ring	115.6 g
Ring Vol.	82.52 mm^3	Dry Density	1.348
M/C at Start	29.9 %	M/C at End of Test	21.8 %
Sat. at Start	80.18 %	Sat. at End	103.4 %
Initial Voids Ratio	1.013	S.G.	2.713
Initial Ht. of Voids	9.47 mm	Ht. Of Solids	9.35 mm

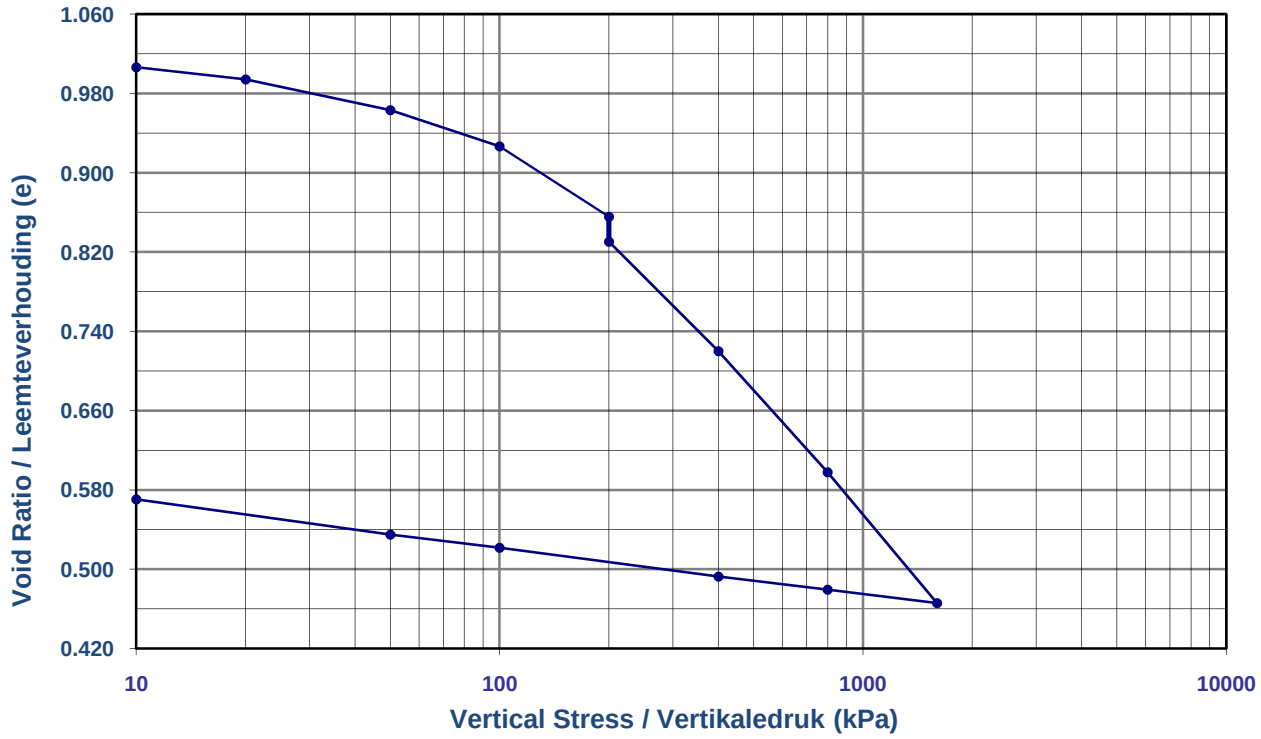
TEST WAS DONE ON A SPECIMEN PREPARED FROM AN UNDISTURBED SAMPLE AND SATURATED @ 200 kPa

Test Parameters

V.Strs (kPa)	1	10	20	50	100	200	200	400	800	1600	800	400	100	50	10
Dial (u)	10000	9940	9824	9536	9192	8528	8294	7260	6120	4884	5012	5135	5406	5532	5864
Strain (%)		0.32	0.94	2.47	4.29	7.82	9.06	14.56	20.62	27.18	26.50	25.85	24.41	23.74	21.98
Void Ratio	1.013	1.007	0.994	0.963	0.927	0.856	0.831	0.720	0.598	0.466	0.480	0.493	0.522	0.535	0.571
Cc		0.006	0.041	0.077	0.122	0.236		0.367	0.405	0.439	0.045	0.044	0.048	0.045	0.051
Mv (1/Mpa)		0.354	0.616	0.510	0.366	0.353		0.275	0.151	0.082	0.009	0.016	0.048	0.134	0.441

Collapse Potential **1.2 %**

14/6



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FOUNDATION INDICATOR REPORT SHEET

CLIENT : JOHANN VAN DER MERWE (PTY)LTD DATE : 11/06/09

PROJECT : BOSCHHOEK (Job 3207) PROJECT No. : JM08

SAMPLE DETAILS

SAMPLE No.	CODES	TRIAL PIT No.	DEPTH	DESCRIPTION
0011	+ ———	BH/20	0-0,4m	
0012	□ ----------	BH/21	0,6m	

PARTICLE SIZE ANALYSIS: PERCENTAGE PASS BY MASS

	BY SIEVING										BY HYDROMETER				
SIZE (mm)	75.0	37.5	19.0	9.5	4.75	2.00	0.425	0.300	0.150	0.075	60	20	6	2	DIAM (um)
% PASS +			100	99	90	71	60	57	52	47	45	29	20	14	% PASS +
% PASS □					100	96	88	85	80	72	69	49	29	19	% PASS □

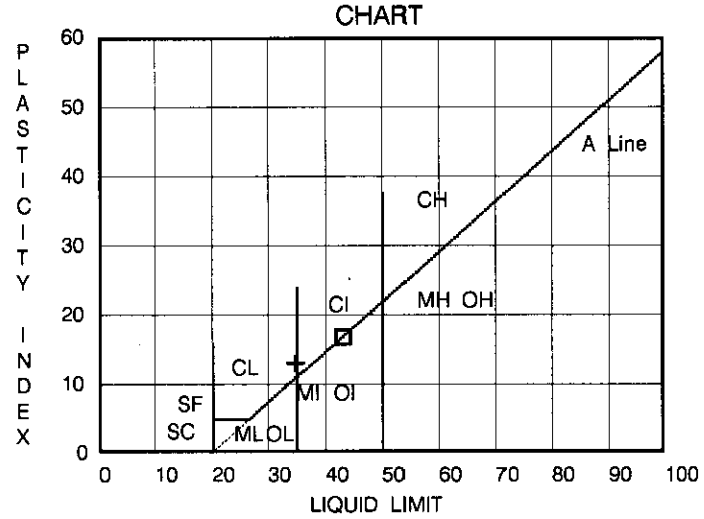
DISTURBED SOIL PARAMETERS

ATTERBERG LIMITS				SG	
LL (%)	PI (%)	LS (%)	WEIGHTED PI (%)		
35	13	5,5	8	2,650	+
43	17	7,5	15	2,650	□

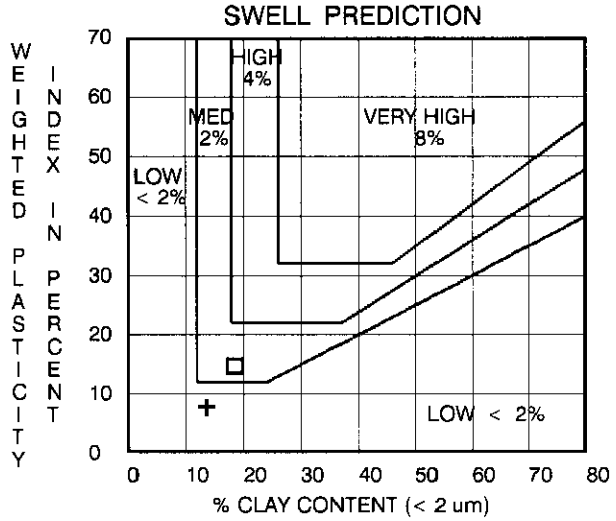
UNDISTURBED SOIL PARAMETERS

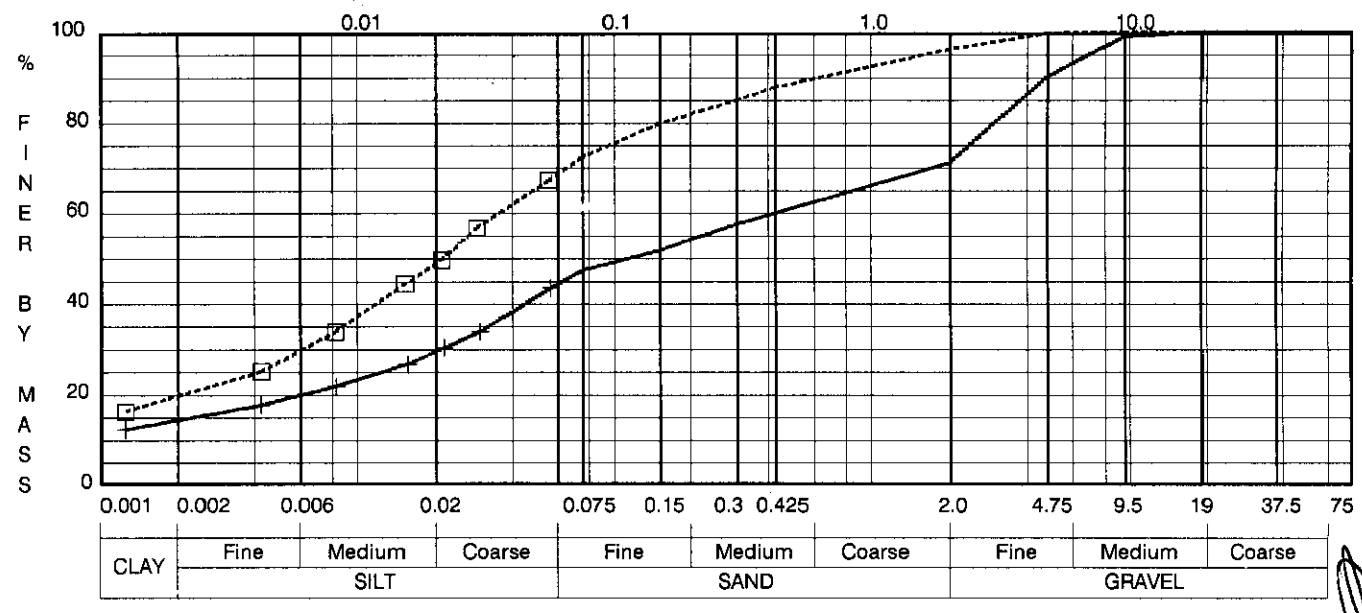
VOIDS RATIO	SATURATION (%)	Dry Dens. (kg/m3)	NMC (%)

CASAGRANDE PLASTICITY CLASSIFICATION CHART



MODIFIED VAN DER MERWE SWELL PREDICTION





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FOUNDATION INDICATOR REPORT SHEET

CLIENT : JOHANN VAN DER MERWE (PTY)LTD DATE : 11/06/09

PROJECT : BOSCHHOEK (Job 3207) PROJECT No. : JM08

SAMPLE DETAILS

SAMPLE No.	CODES	TRIAL PIT No.	DEPTH	DESCRIPTION
0009	+ ———	BH/19	0,2-0,5m	
0010	□ ----------	BH/19	0,5-1,7m	

PARTICLE SIZE ANALYSIS: PERCENTAGE PASS BY MASS

	BY SIEVING										BY HYDROMETER				
SIZE (mm)	75.0	37.5	19.0	9.5	4.75	2.00	0.425	0.300	0.150	0.075	60	20	6	2	DIAM (um)
% PASS +				100	91	64	43	40	34	28	26	15	9	6	% PASS +
% PASS □				100	99	91	75	72	64	56	52	34	22	16	% PASS □

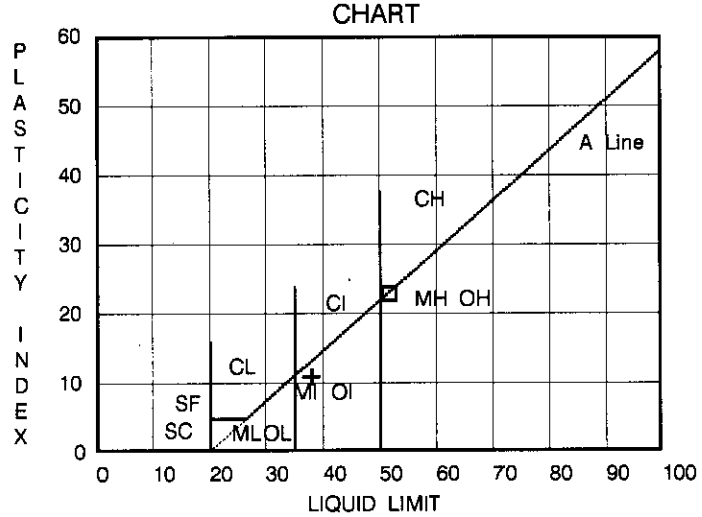
DISTURBED SOIL PARAMETERS

ATTERBERG LIMITS				SG	
LL (%)	PI (%)	LS (%)	WEIGHTED PI (%)		
38	11	4,5	5	2,650	+
52	23	10,0	17	2,650	□

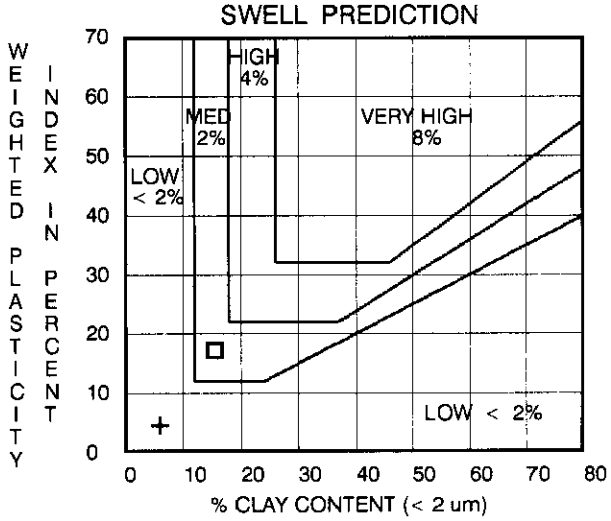
UNDISTURBED SOIL PARAMETERS

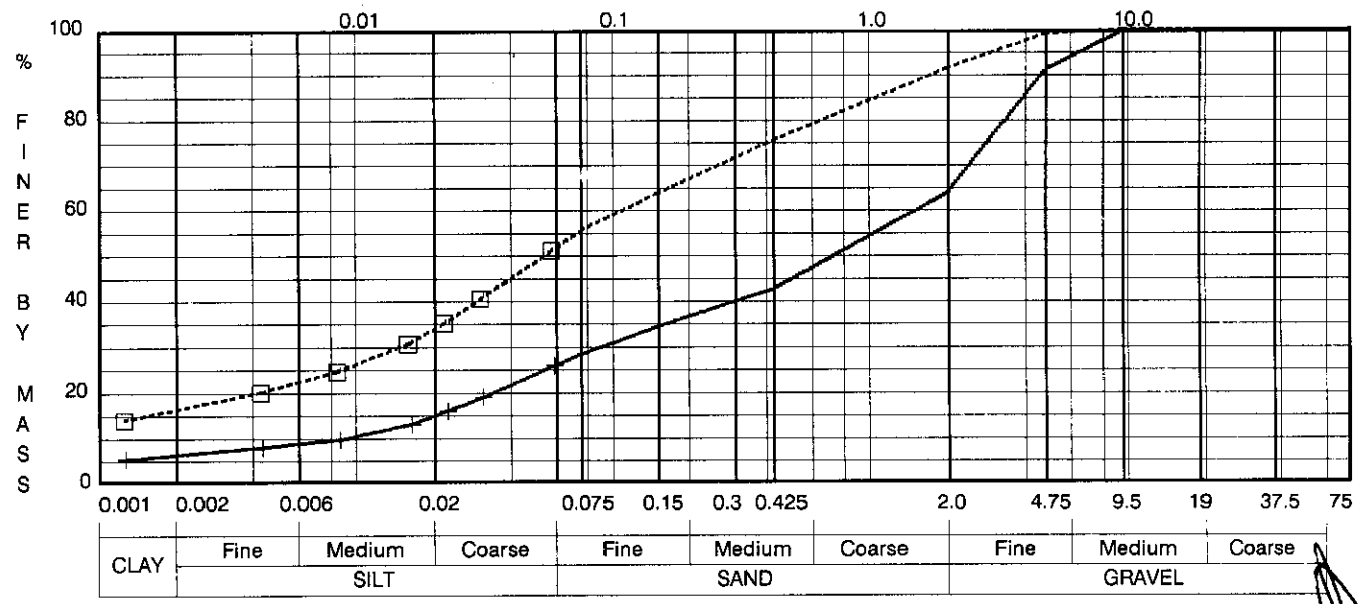
	VOIDS RATIO	SATURATION (%)	Dry Dens. (kg/m3)	NMC (%)
+				
□				

CASAGRANDE PLASTICITY CLASSIFICATION CHART



MODIFIED VAN DER MERWE SWELL PREDICTION





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FOUNDATION INDICATOR REPORT SHEET

CLIENT : JOHANN VAN DER MERWE (PTY)LTD

PROJECT : BOSCHHOEK (Job 3207)

DATE : 11/06/06

PROJECT No. : JM08

SAMPLE DETAILS

SAMPLE No.	CODES	TRIAL PIT No.	DEPTH	DESCRIPTION
0007	+ ———	BH/12	0,7-1,1m	
0008	□ ----------	BH/18	1,8m	

PARTICLE SIZE ANALYSIS: PERCENTAGE PASS BY MASS

	BY SIEVING										BY HYDROMETER				
SIZE (mm)	75.0	37.5	19.0	9.5	4.75	2.00	0.425	0.300	0.150	0.075	60	20	6	2	DIAM (um)
% PASS +				100	96	85	70	68	63	58	53	33	19	10	% PASS +
% PASS □					100	99	96	94	90	85	83	65	47	40	% PASS □

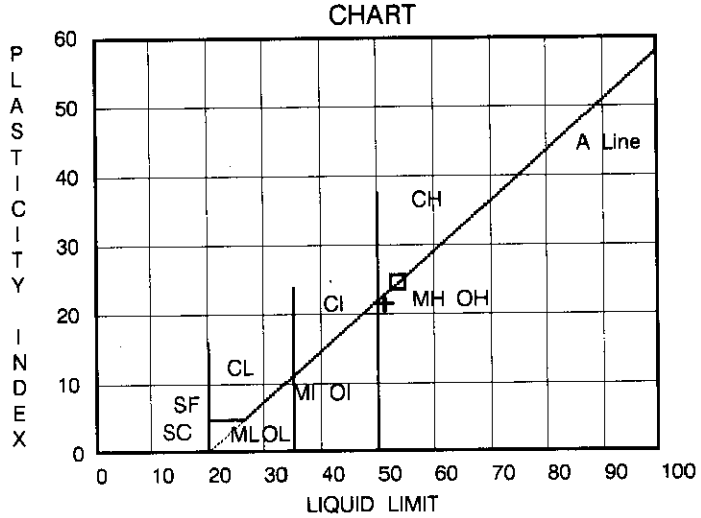
DISTURBED SOIL PARAMETERS

ATTERBERG LIMITS				SG	
LL (%)	PI (%)	LS (%)	WEIGHTED PI (%)		
51	22	9,0	15	2,650	+
54	25	10,5	24	2,650	□

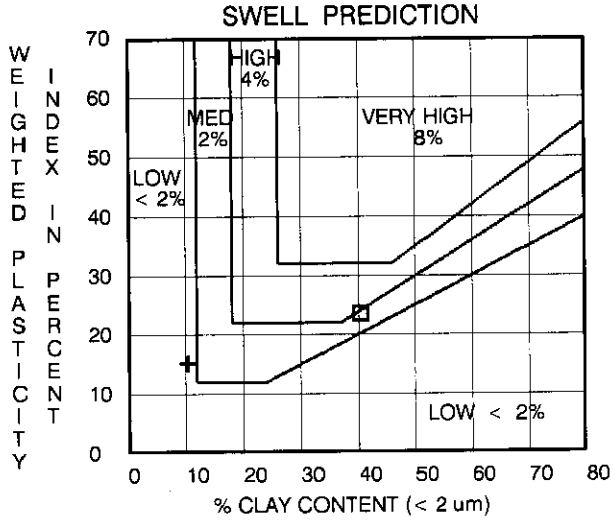
UNDISTURBED SOIL PARAMETERS

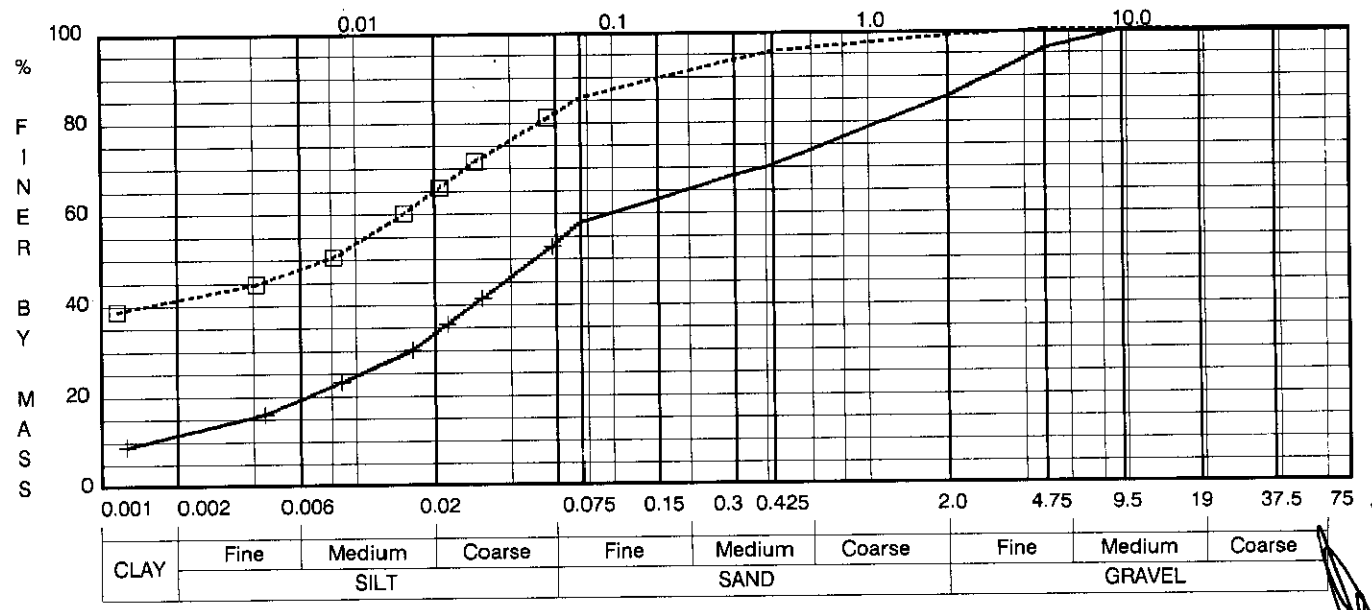
VOIDS RATIO	SATURATION (%)	Dry Dens. (kg/m3)	NMC (%)

CASAGRANDE PLASTICITY CLASSIFICATION CHART



MODIFIED VAN DER MERWE SWELL PREDICTION





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FOUNDATION INDICATOR REPORT SHEET

CLIENT : JOHANN VAN DER MERWE (PTY)LTD DATE : 11/06/06

PROJECT : BOSCHHOEK (Job 3207) PROJECT No. : JM08

SAMPLE DETAILS

SAMPLE No.	CODES	TRIAL PIT No.	DEPTH	DESCRIPTION
0005	+ ———	BH/8	0,8m	
0006	□ ----------	B11/11	0,9-2,0m	

PARTICLE SIZE ANALYSIS: PERCENTAGE PASS BY MASS

	BY SIEVING										BY HYDROMETER				
SIZE (mm)	75.0	37.5	19.0	9.5	4.75	2.00	0.425	0.300	0.150	0.075	60	20	6	2	DIAM (um)
% PASS +					100	99	89	87	82	77	75	48	26	17	% PASS +
% PASS □				100	99	90	74	71	65	59	56	35	21	14	% PASS □

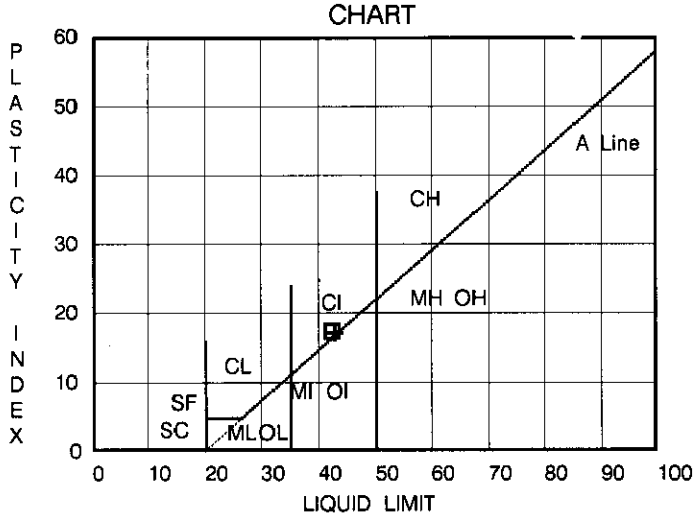
DISTURBED SOIL PARAMETERS

ATTERBERG LIMITS				SG	
LL (%)	PI (%)	LS (%)	WEIGHTED PI (%)		
43	17	7,0	15	2,650	+
42	17	7,0	13	2,650	□

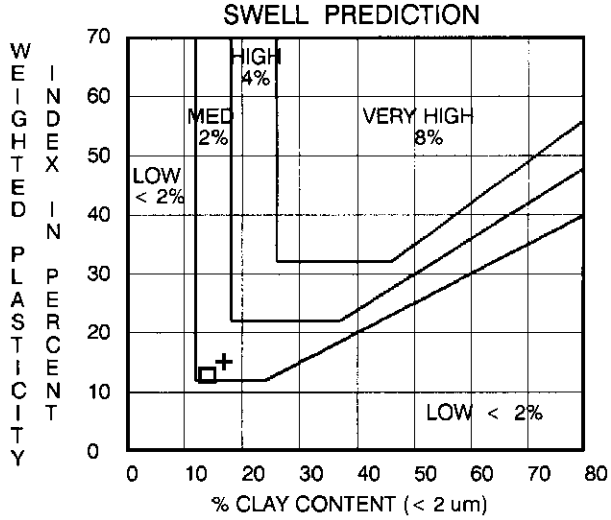
UNDISTURBED SOIL PARAMETERS

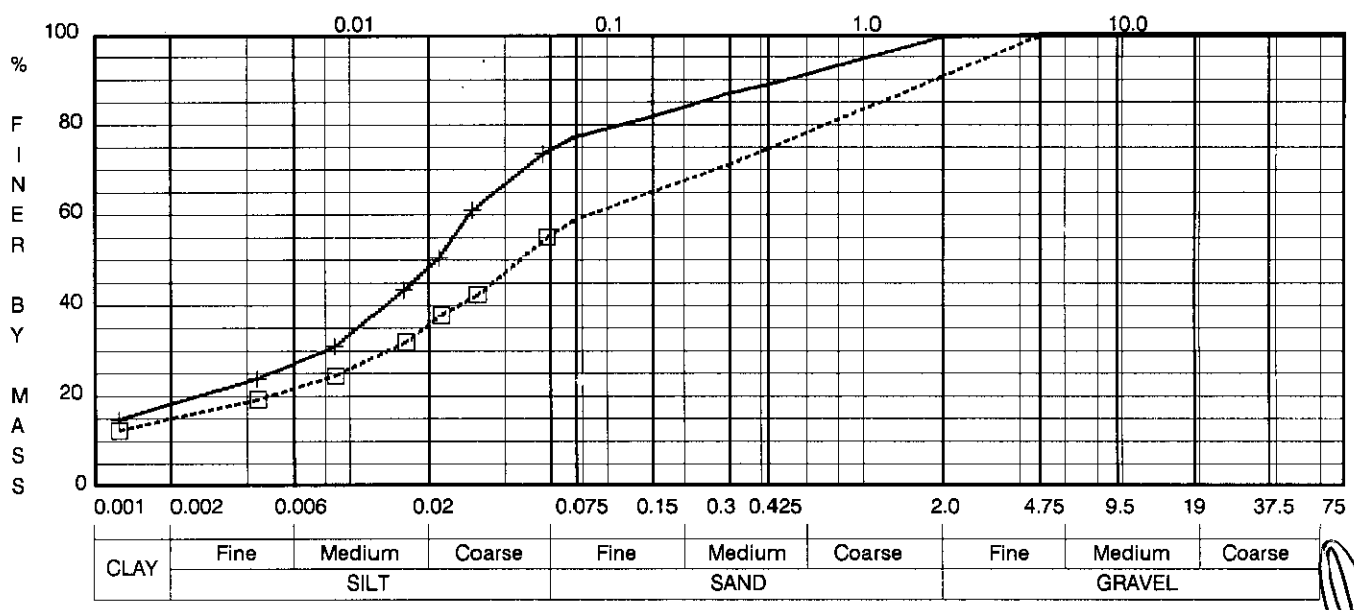
VOIDS RATIO	SATURATION (%)	Dry Dens. (kg/m3)	NMC (%)

CASAGRANDE PLASTICITY CLASSIFICATION CHART



MODIFIED VAN DER MERWE SWELL PREDICTION





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FOUNDATION INDICATOR REPORT SHEET

CLIENT : JOHANN VAN DER MERWE (PTY)LTD DATE : 11/06/06

PROJECT : BOSCHHOEK (Job 3207) PROJECT No. : JM08

SAMPLE DETAILS

SAMPLE No.	CODES	TRIAL PIT No.	DEPTH	DESCRIPTION
0003	+ ———	BH/5	0,4-1,6m	
0004	□ ----------	BH/5	2,0m	

PARTICLE SIZE ANALYSIS: PERCENTAGE PASS BY MASS

	BY SIEVING										BY HYDROMETER				
SIZE (mm)	75.0	37.5	19.0	9.5	4.75	2.00	0.425	0.300	0.150	0.075	60	20	6	2	DIAM (um)
% PASS +						100	99	97	95	93	91	76	61	45	% PASS +
% PASS □						100	98	97	94	89	87	73	55	34	% PASS □

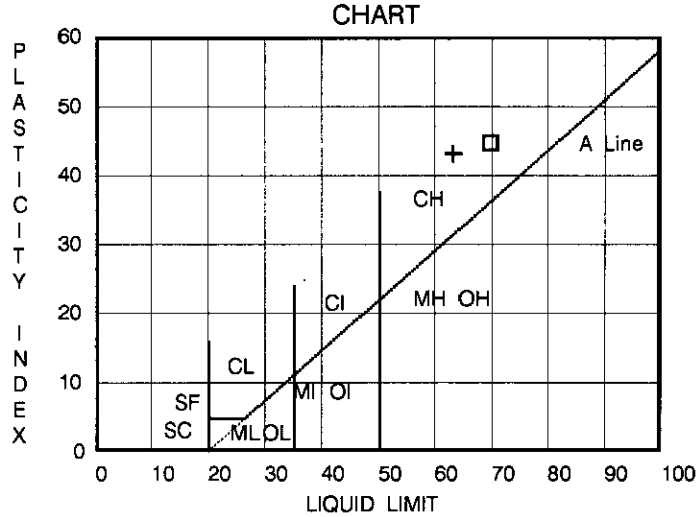
DISTURBED SOIL PARAMETERS

ATTERBERG LIMITS				SG	
LL (%)	PI (%)	LS (%)	WEIGHTED PI (%)		
63	43	18,0	43	2,650	+
70	45	19,0	44	2,650	□

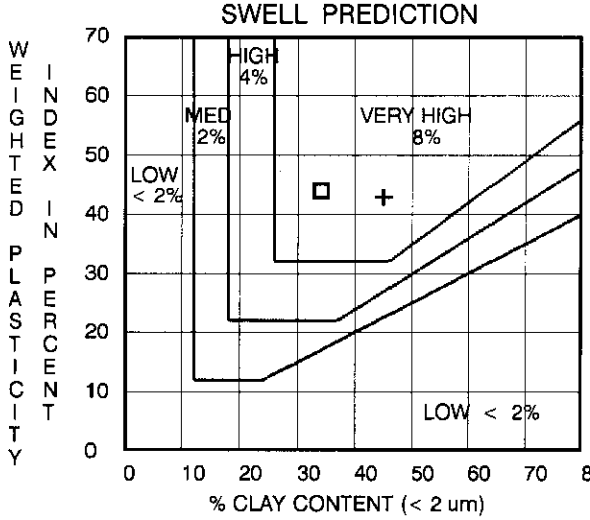
UNDISTURBED SOIL PARAMETERS

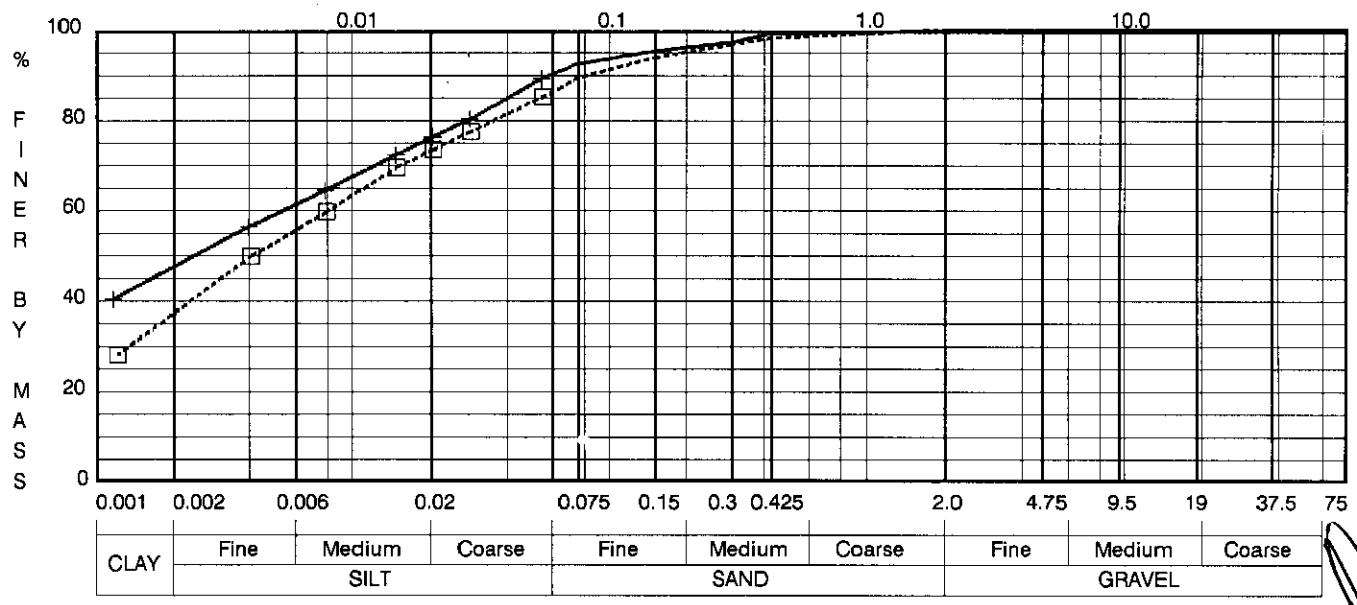
VOIDS RATIO	SATURATION (%)	Dry Dens. (kg/m3)	NMC (%)

CASAGRANDE PLASTICITY CLASSIFICATION CHART



MODIFIED VAN DER MERWE SWELL PREDICTION





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FOUNDATION INDICATOR REPORT SHEET

CLIENT : JOHANN VAN DER MERWE (PTY)LTD DATE : 11/06/06

PROJECT : BOSCHHOEK (Job 3207) PROJECT No. : JM08

SAMPLE DETAILS

SAMPLE No.	CODES	TRIAL PIT No.	DEPTH	DESCRIPTION
0001	+ ———	BH/1	0-0,4m	
0002	□ ----------	BH/1	0,9-1,8m	

PARTICLE SIZE ANALYSIS: PERCENTAGE PASS BY MASS

	BY SIEVING										BY HYDROMETER				
SIZE (mm)	75.0	37.5	19.0	9.5	4.75	2.00	0.425	0.300	0.150	0.075	60	20	6	2	DIAM (um)
% PASS +					100	97	77	74	68	63	61	35	19	10	% PASS +
% PASS □					100	98	75	74	69	66	64	42	27	19	% PASS □

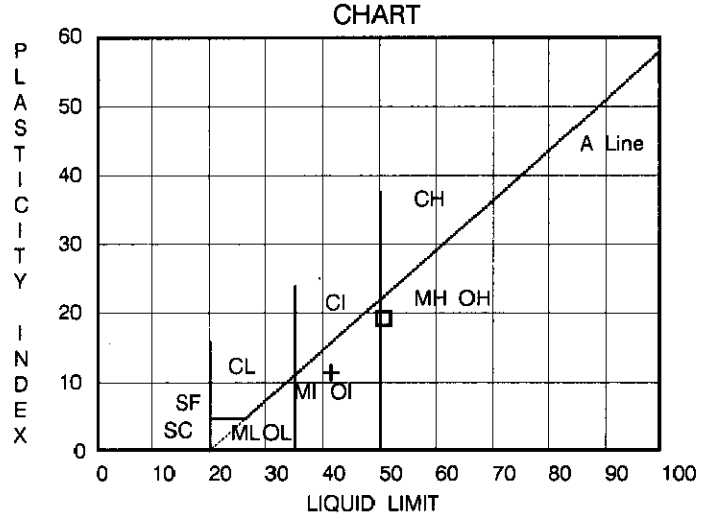
DISTURBED SOIL PARAMETERS

ATTERBERG LIMITS				SG	
LL (%)	PI (%)	LS (%)	WEIGHTED PI (%)		
42	11	4,5	9	2,650	+
51	19	7,5	14	2,650	□

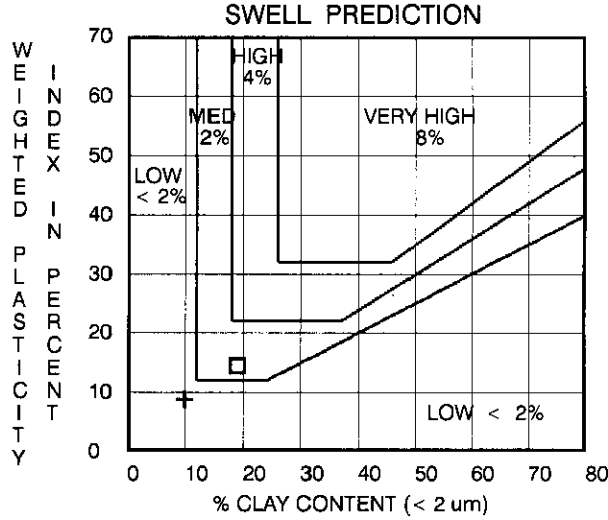
UNDISTURBED SOIL PARAMETERS

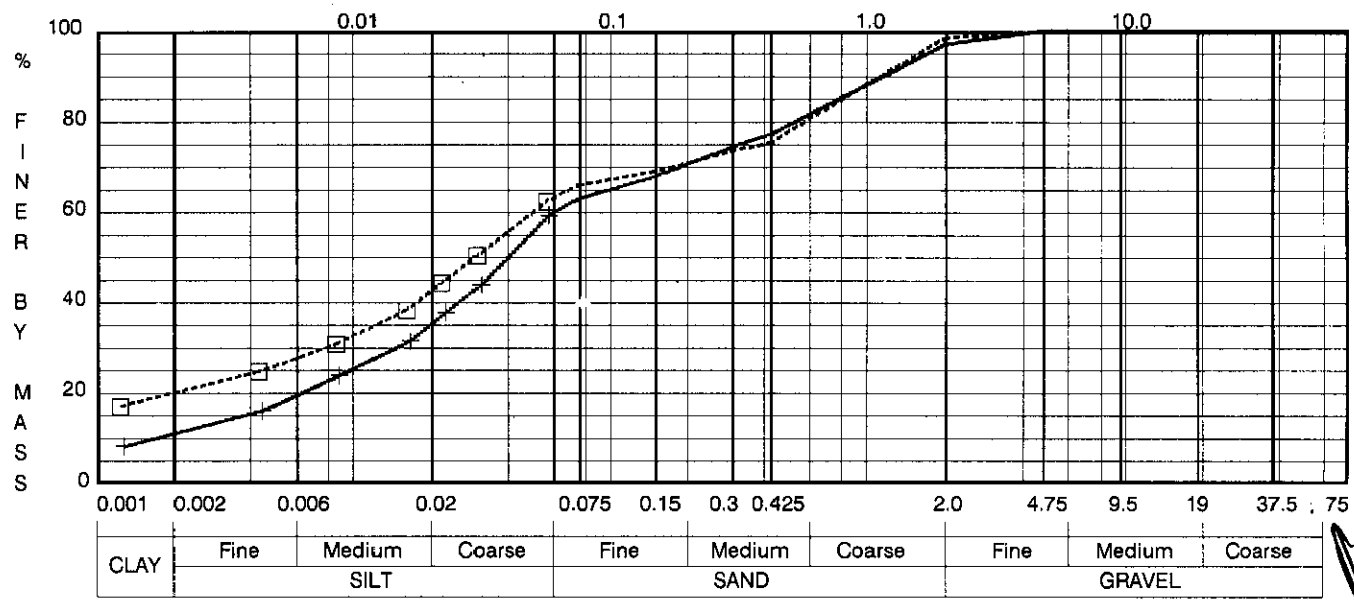
VOIDS RATIO	SATURATION (%)	Dry Dens. (kg/m3)	NMC (%)
1,00			

CASAGRANDE PLASTICITY CLASSIFICATION CHART



MODIFIED VAN DER MERWE SWELL PREDICTION





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INDUSTRIA NORTH BOX 552, FLORIDA 1710

FOUNDATION INDICATOR REPORT SHEET

CLIENT : JOHANN VAN DER MERWE (PTY)LTD DATE : 11/06/09

PROJECT : BOSCHHOEK (Job 3207) PROJECT No. : JM08

SAMPLE DETAILS

SAMPLE No.	CODES	TRIAL PIT No.	DEPTH	DESCRIPTION
0013	+ ———	BH/21	0,9-2,0m	
0014	□ ----------	BH/23	0-0,3m	

PARTICLE SIZE ANALYSIS: PERCENTAGE PASS BY MASS

	BY SIEVING										BY HYDROMETER				
SIZE (mm)	75.0	37.5	19.0	9.5	4.75	2.00	0.425	0.300	0.150	0.075	60	20	6	2	DIAM (um)
% PASS +					100	96	85	81	74	64	59	42	26	19	% PASS +
% PASS □					100	94	68	65	56	48	43	26	15	8	% PASS □

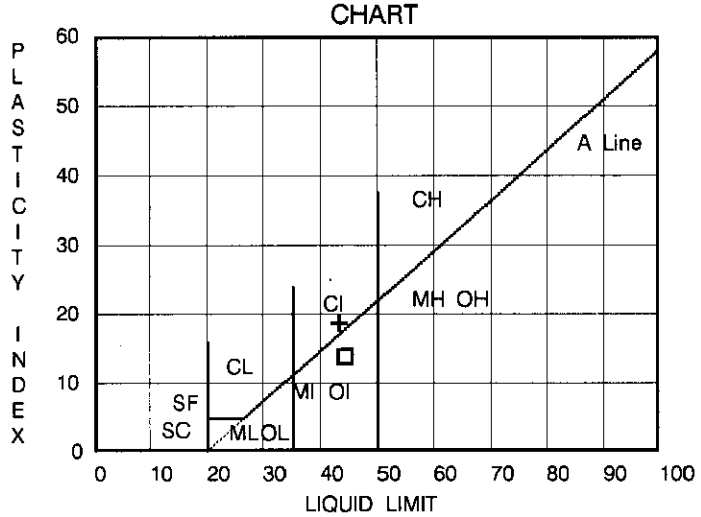
DISTURBED SOIL PARAMETERS

ATTERBERG LIMITS				SG	
LL (%)	PI (%)	LS (%)	WEIGHTED PI (%)		
43	19	8,0	16	2,650	+
44	14	6,5	9	2,650	□

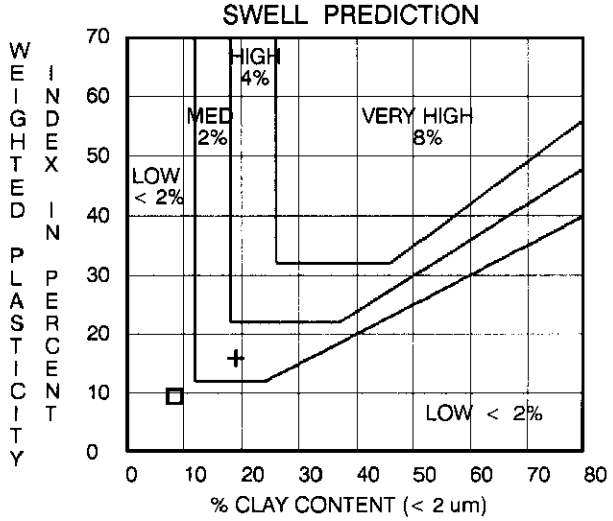
UNDISTURBED SOIL PARAMETERS

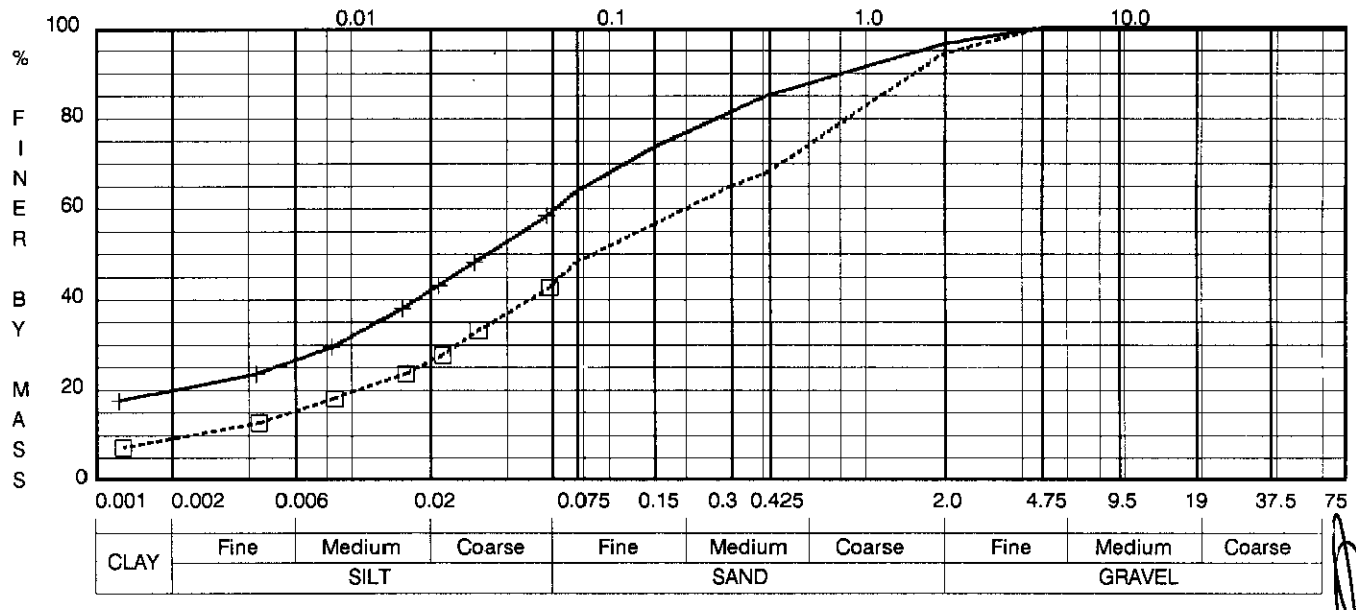
VOIDS RATIO	SATURATION (%)	Dry Dens. (kg/m3)	NMC (%)

CASAGRANDE PLASTICITY CLASSIFICATION CHART



MODIFIED VAN DER MERWE SWELL PREDICTION





GEOPLAN LABORATORIES (Pty) Ltd

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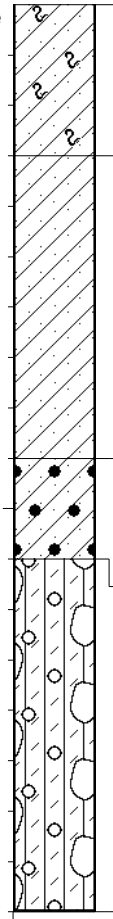
INDUSTRIA NORTH BOX 552, FLORIDA 1710

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/32*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 — *Slightly moist, dark grey, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.30 — *Moist, dark olive, very stiff, shattered, sandy CLAY; colluvium.*

0.90 — *Abundant coarse, hard, rounded NODULAR FERRICRETE, clast supported in a matrix as above; ferruginised colluvium.*
Overall consistency is dense.

1.10 — *Moist, light yellowish brown blotched black and orange, stiff, intact, gravelly clayey SILT; residual dolerite.*
Contains medium and large-sized, hard rock CORESTONES from 0,3m to the base of the pit.

1.80

NOTES

1) Partial refusal of backactor from below 0,3m on western side of pit in large dolerite boulders, no refusal elsewhere.

2) No water seepage encountered.

3) Scattered boulder outcrop in vicinity of pit.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

DATE : 30/07/11 22:26
TEXT : ..\DOTPLOT\ARCHIVE\3207.TXT

ELEVATION :
X-COORD :
Y-COORD :

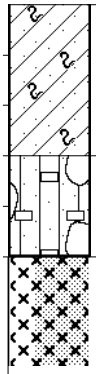
HOLE No: *BH/32*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/31*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 *Slightly moist, dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.30 *Dry, dark yellow, stiff, sandy SILT containing abundant coarse rock fragments and small to medium-sized CORESTONES; residual dolerite.*

0.50 *Dark olive speckled white and green, moderately weathered, widely jointed, hard rock DOLERITE.*

NOTES

1) Abrupt refusal of backactor at 0,5m in dolerite bedrock.

2) No water seepage encountered.

3) Abundant massive outcrops of hard rock dolerite in vicinity of pit.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

DATE : 30/07/11 22:26
TEXT : ..\DOTPLOT\ARCHIVE\3207.TXT

ELEVATION :
X-COORD :
Y-COORD :

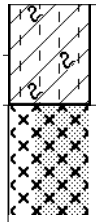
HOLE No: *BH/31*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/29*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 — *Moist, black, very stiff, shattered, silty CLAY containing roots; colluvium.*

0.20 — *Dark olive speckled white and green, moderately weathered, widely jointed, hard rock DOLERITE.*

NOTES

1) Abrupt refusal of backactor at 0,2m in dolerite bedrock.

2) No water seepage encountered.

3) Massive outcrops of hard rock dolerite in vicinity of pit.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

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ELEVATION :
X-COORD :
Y-COORD :

HOLE No: *BH/29*

KBK CONSULTING ENGINEERS
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GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

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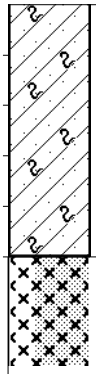
Scale 1:15



0.00 *Slightly moist, dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.50 *Dark olive speckled white and green, moderately weathered, widely jointed, hard rock DOLERITE.*

NOTES

1) Abrupt refusal of backactor at 0,5m in dolerite bedrock.

2) No water seepage encountered.

3) Scattered boulder outcrop in vicinity of pit.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
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ELEVATION :
X-COORD :
Y-COORD :

HOLE No: *BH/28*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

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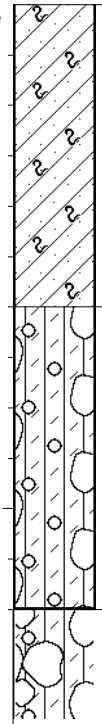

0.00 *Slightly moist, dark grey, very stiff, shattered, sandy CLAY containing roots; colluvium.*

0.60 *Moist, dark yellow blotched speckled black, very stiff, relict jointed, clayey gravelly SILT containing numerous medium and large (0,2m to 0,5m in diameter) hard rock DOLERITE CORESTONES; residual dolerite.*

1.20 *As above and containing abundant, medium and large, hard rock DOLERITE BOULDERS.*

NOTES

1) Gradual refusal from below 1,0m in large dolerite corestones.

2) No water seepage ecnountered.

3) Abundant boulder outcrop and massive sheets of hard rock dolerite in vicinity of pit and towards the west.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
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DATE : *19 & 20/05/2011*

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ELEVATION :
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HOLE No: *BH/27*

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PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

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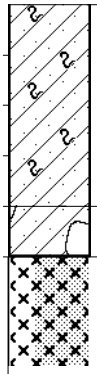

0.00 *Slightly moist, dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.40 *Slightly moist, dark brown, very stiff shattered sandy CLAY containing hard rock CORESTONES; colluvium.*

0.50 *Dark olive speckled white and green, moderately weathered, widely jointed, hard rock DOLERITE.*

NOTES

1) Abrupt refusal of backactor at 0,5m in dolerite bedrock.

2) No water seepage encountered.

3) Scattered boulder outcrop in vicinity of pit.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

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ELEVATION :
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Y-COORD :

HOLE No: *BH/26*

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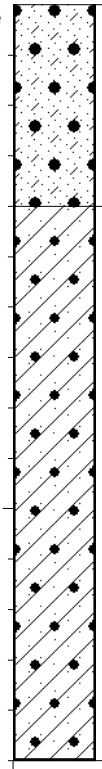

0.00 — *Abundant coarse, hard, black NODULAR FERRICRETE and occasional lumps of hardpan, clast supported in a matrix of slightly moist, dark grey, clayey SAND; ferruginised colluvium.*

0.40 — *Slightly moist, orange reddish brown, blotched grey and black, very stiff, shattered, sandy CLAY containing scattered FERRICRETE NODULES; ferruginised residual dolerite.*

1.50

NOTES

1) Very slow excavation of backactor from below 1,2m in very stiff material.

2) No water seepage encountered.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
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PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

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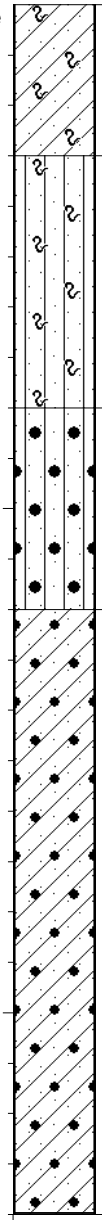

0.00 *Slightly moist, dark grey, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.30 *Moist, dark yellow firm, voided, sandy SILT containing fine roots; colluvium.*

0.80 *Abundant coarse, hard FERRICRETE NODULES, clast supported in a matrix of moist, reddish dark brown, sandy SILT; ferruginised colluvium.*
Overall consistency is loose.

1.20 *Moist, orange reddish brown, blotched grey and black, stiff, shattered, sandy CLAY containing scattered FERRICRETE NODULES containing medium-sized doelrite corestones from below 2,0m; ferruginised residual dolerite.*

2.40

NOTES

1) No refusal of backactor at 2,4m.

2) No water seepage encountered.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
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ELEVATION :
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Y-COORD :

HOLE No: *BH/24*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
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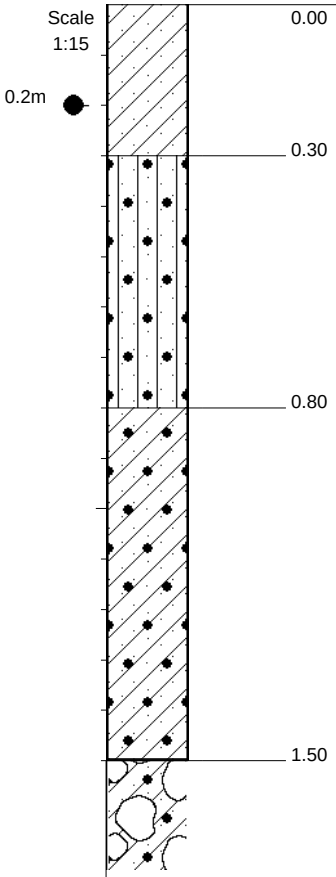

Slightly moist, dark brown, very stiff shattered sandy CLAY containing tree roots and small corestones at the base; colluvium.

Abundant coarse, hard FERRICRETE NODULES, clast supported in a matrix of moist, reddish dark brown, sandy SILT; ferruginised colluvium.
Overall consistency is loose.

Moist, orange reddish brown, blotched grey and black, very stiff, shattered, sandy CLAY containing scattered FERRICRETE NODULES; ferruginised residual dolerite.

As above and containing abundant, medium and large, hard rock DOLERITE BOULDERS.

NOTES

1) Gradual refusal of backactor from below 1,5m in dolerite boulders.

2) No water seepage encountered.

3) Abundant boulder outcrop to the west of the pit, scattered boulder outcrop to the east of the pit.

4) Disturbed soil sample taken at 0,2m.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
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KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
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HOLE No: *BH/22*
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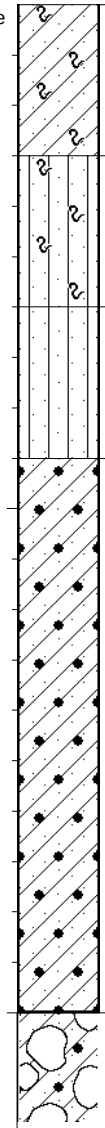
Scale 1:15



0.00 — *Slightly moist, dark grey, very stiff shattered sandy CLAY containing tree roots; colluvium.*

0.30 — *Moist, dark yellow, firm, voided, sandy SILT containing fine roots; colluvium.*

0.60 — *Abundant coarse, hard FERRICRETE NODULES, clast supported in a matrix of moist, reddish dark brown, sandy SILT; ferruginised colluvium.*
Overall consistency is loose.

0.90 — *Moist, orange reddish brown, blotched grey and black, very stiff, shattered, sandy CLAY containing scattered FERRICRETE NODULES; ferruginised residual dolerite.*

2.00 — *As above and containing abundant medium and large-sized, dark grey, hard rock DOLERITE BOULDERS.*

NOTES

1) Gradual refusal of backactor from below 2,0m in dolerite corestones.

2) No water seepage encountered.

3) Contains small and medium sized hard rock corestones from 0,6m to 0,7m on northern sidewall of pit.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

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HOLE No: *BH/22*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/21*
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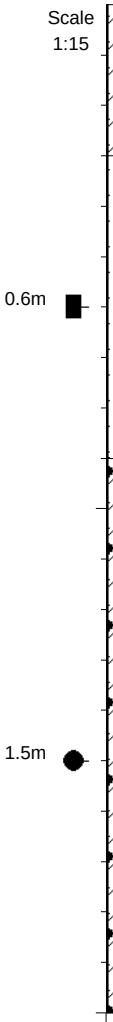

0.00 — *Slightly moist, dark grey, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.30 — *Moist, dark yellow, firm, voided, sandy SILT containing fine roots; colluvium.*

0.90 — *Moist, orange reddish brown, blotched grey and black, very stiff, shattered, sandy CLAY containing scattered FERRICRETE NODULES; ferruginised residual dolerite.*

2.00

NOTES

1) No refusal of backactor at 2,0m.

2) No water seepage encountered.

3) Undisturbed soil sample taken at 0,6m.

4) Disturbed soil sample taken at 1,5m.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
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ELEVATION :
X-COORD :
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HOLE No: *BH/21*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
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PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

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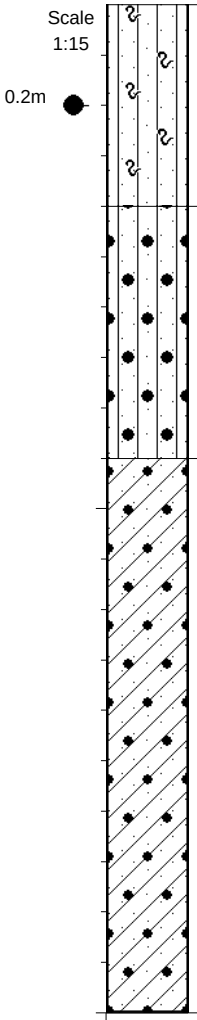

0.00 — *Slightly moist, dark brown becoming reddish dark brown, very stiff, shattered, sandy SILT containing roots and scatterd FERRICRETE NODULES; colluvium.*

0.40 — *Abundant coarse, hard NODULAR FERRICRETE, clast supported in a matrix of slightly moist, dry brown sandy SILT; ferruginised colluvium. Overall consistency is loose.*

0.90 — *Moist, dry yellowish brown blotched red, brown and black, very stiff becoming stiff shattered, sandy CLAY containing abundant FERRICRETE NODULES; ferruginised residual dolerite.*

2.00

NOTES

1) No refusal of backactor at 2,0m.

2) No water seepage encountered.

3) Disturbed soil sample taken at 0,2m.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

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HOLE No: *BH/20*

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Remainder of the farm Bosch Hoek 3345-HS, Newcastle
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HOLE No: *BH/19*
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JOB NUMBER: *M11/3207*

0.00 — *Slightly moist, dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.30 — *Abundant coarse, hard NODULAR FERRICRETE, clast supported in a matrix of slightly moist, dry brown sandy SILT; ferruginised colluvium. Overall consistency is medium dense.*

0.50 — *Slightly moist, reddish dark brown blotched yellow, black and red, very stiff shattered and very weakly ferruginised sandy CLAY containing scattered soft FERRUGINOUS CONCRETIONS; ferruginised residual dolerite.*
Contains large, (up to 0,6m in diameter) hard rock BOULDERS.

1.70

NOTES

1) Partial refusal from below 0,6m on large dolerite boulders.

2) No water seepage encountered.

3) Numerous outcrops of large (up to 0,8m in diameter) hard rock spheroids on surface in vicinity of pit.

4) Disturbed soil samples taken at 0,4m and 1,3m.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

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HOLE No: *BH/19*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
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PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

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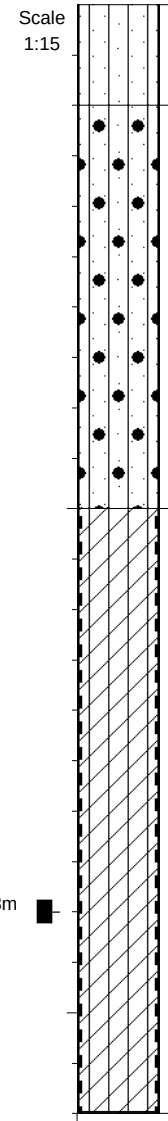

0.00 — *Dry, dark red, stiff, sandy SILT; colluvium.*

0.20 — *Abundant coarse, hard NODULAR FERRICRETE, clast supported in a matrix of slightly moist, dry brown sandy SILT; ferruginised colluvium. Overall consistency is medium dense.*

1.00 — *Slightly moist becoming moist, reddish brown blotched yellow and black, very stiff, shattered and partially ferruginised CLAY SILT becoming stiff towards the base; residual dolerite.*

2.20

NOTES

1) No refusal of backactor at 2,2m.

2) No water seepage encountered.

3) Undisturbed soil sample taken at 1,8m.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

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HOLE No: *BH/18*

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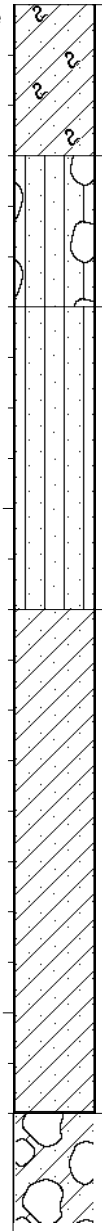
JOB NUMBER: *M11/3207*

Scale 1:15



0.00 — *Slightly moist, reddish dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.30 — *Abundant, small and medium-sized hard rock DOLERITE CORESTONES, clast supported in a matrix of dark red, sandy SILT; colluvium.*
Overall consistency is dense.

0.60 — *Moist, dark red, stiff, voided, sandy SILT containing scattered GRAVELS at the base; colluvium with basal pebble marker.*

1.20 — *Moist, dark red blotched black, stiff, shattered, sandy CLAY containing scattered FERRICRETE NODULES; residual dolerite.*

2.20 — *As above and containing abundant medium and large-sized, dark grey, hard rock DOLERITE BOULDERS.*

NOTES

1) No refusal of backactor at 2,2m.

2) No water seepage encountered.

3) Scattered corestones in vicinity measuring up to 2.0m in diameter.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

DATE : 30/07/11 22:26
TEXT : ..\DOTPLOT\ARCHIVE\3207.TXT

ELEVATION :
X-COORD :
Y-COORD :

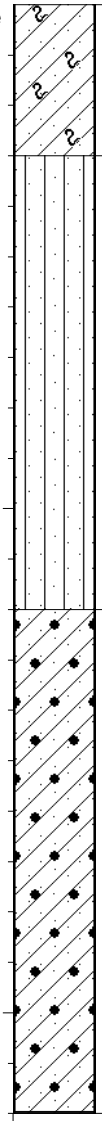
HOLE No: *BH/17*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/16*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 *Slightly moist, reddish dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.30 *Slightly moist, dark red, very stiff, voided, sandy SILT containing scattered GRAVELS at the base; colluvium with basal pebble marker.*

1.20 *Slightly moist, dark red blotched black, very stiff, shattered, sandy CLAY containing scattered FERRICRETE NODULES; residual dolerite.*

2.20

NOTES

1) No refusal of backactor at 2,2m.

2) No water seepage encountered.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

DATE : 30/07/11 22:26
TEXT : ..\DOTPLOT\ARCHIVE\3207.TXT

ELEVATION :
X-COORD :
Y-COORD :

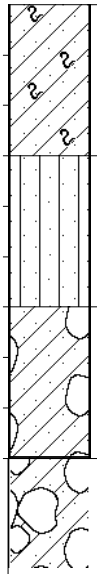
HOLE No: *BH/16*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/15*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 *Slightly moist, reddish dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.30 *Moist, dark red, stiff, voided, sandy SILT containing shattered GRAVELS at the base; colluvium with basal pebble marker.*

0.60 *Moist, dark red blotched black, stiff, shattered, sandy CLAY containing large CORESTONES; residual dolerite.*

0.90 *As above and containing abundant medium and large-sized, dark grey, hard rock DOLERITE BOULDERS.*

NOTES

1) Abrupt refusal of backactor at 0,9m in dolerite boulders.

2) No water seepage encountered.

3) Scattered large corestone at surface.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

DATE : 30/07/11 22:26
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ELEVATION :
X-COORD :
Y-COORD :

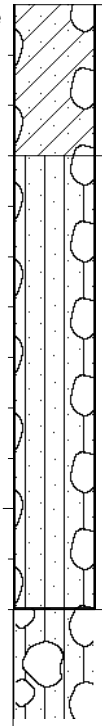
HOLE No: *BH/15*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/14*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 *Slightly moist, dark brown, very stiff, shattered, sandy CLAY containing abundant small, hard rock corestones; colluvium.*

0.30 *Abundant small and medium-sized (up to 0,3m in diameter) hard rock DOLERITE CORESTONES, clast supported in a matrix of moist, dark red, sandy SILT; residual dolerite.*
Overall consistency is dense.

1.20 *Abundant medium and large, hard rock DOLERITE BOULDERS, clast supported in a matrix of dark red, sandy SILT; residual dolerite.*
Overall consistency is dense.

NOTES

1) Abrupt refusal of backactor at 1,2m in dolerite boulders.

2) No water seepage encountered.

3) Ground surface in vicinity of pit covered by medium and large dolerite boulders.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

DATE : 30/07/11 22:26
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ELEVATION :
X-COORD :
Y-COORD :

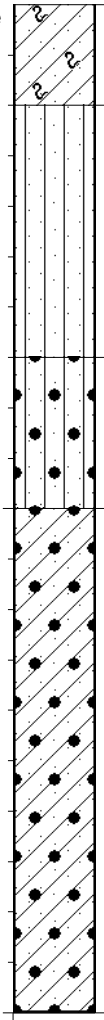
HOLE No: *BH/14*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/13*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 — *Slightly moist, dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.20 — *Moist, dark red, stiff, voided, sandy SILT containing shattered GRAVELS at the base; colluvium with basal pebble marker.*

0.70 — *Abundant coarse, hard NODULAR FERRICRETE, clast supported in matrix of slightly moist, dark yellowish brown, sandy SILT; ferruginised colluvium.*
Overall consistency is dense.

1.00 — *Abundant coarse hard NODULAR FERRICRETE, clast supported in a matrix of moist dark yellowish brown, sandy CLAY; ferruginised residual dolerite.*
Overall consistency is dense.

2.00

NOTES

1) No refusal of backactor at 2,0m.

2) No water seepage encountered.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

DATE : 30/07/11 22:26
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ELEVATION :
X-COORD :
Y-COORD :

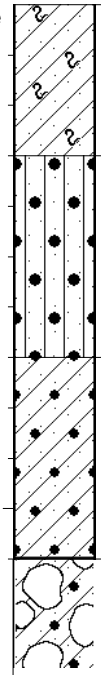
HOLE No: *BH/13*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/12*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 — *Slightly moist, reddish dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.30 — *Abundant coarse, hard NODULAR FERRICRETE, clast supported in matrix of slightly moist, dark yellowish brown, sandy SILT; ferruginised colluvium.*
Overall consistency is dense.

0.70 — *Slightly moist, dark yellowish brown blotched black and brown, very stiff, shattered, sandy CLAY containing black, ferruginous concretions; ferruginised residual dolerite.*

1.10 — *As above and containing numerous large, dark grey, hard rock DOLERITE BOULDERS.*

NOTES

1) Abrupt refusal of backactor at 1,1m in dolerite boulders.

2) No water seepage encountered.

3) Large boulders outcroppping in vicinity of pit.

4) Disturbed soil sample taken at 0,9m.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

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ELEVATION :
X-COORD :
Y-COORD :

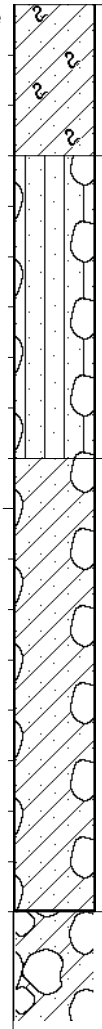
HOLE No: *BH/12*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/11*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 *Slightly moist, reddish dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.30 *Moist, dark red, stiff, voided, sandy SILT containing shattered GRAVELS and medium sized CORESTONES at the base; colluvium with basal pebble marker.*

0.90 *Moist, dark red blotched black, stiff, shattered sandy CLAY containing medium and large, hard rock CORESTONES; residual dolerite.*

1.80 *As above and containing abundant dark grey, hard rock DOLERITE BOULDERS.*

NOTES

1) Abrupt refusal of backactor from below 1,5m in dolerite boulders.

2) No water seepage encountered.

3) Abundant, overall consistency in immediate vicinity of pit.

4) Disturbed soil sample taken at 1,5m.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

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ELEVATION :
X-COORD :
Y-COORD :

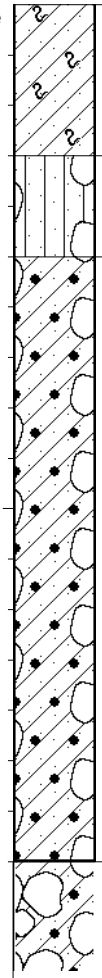
HOLE No: *BH/11*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/10*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 *Slightly moist, reddish dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.30 *Moist, dark red, stiff, voided, sandy SILT containing shattered GRAVELS and CORESTONES at the base; colluvium with basal pebble marker.*

0.50 *Moist, dark red blotched black, stiff shattered sandy CLAY containing FERRICRETE NODULES and scattered, hard rock CORESTONES; residual dolerite.*

1.70 *As above and containing abundant, medium and large, hard rock DOLERITE BOULDERS.*

NOTES

1) Abrupt refusal of backactor at 1,7m in dolerite boulders.

2) No water seepage encountered.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

DATE : 30/07/11 22:26
TEXT : ..\DOTPLOT\ARCHIVE\3207.TXT

ELEVATION :
X-COORD :
Y-COORD :

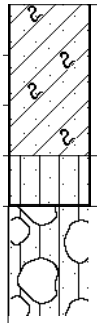
HOLE No: *BH/10*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/9*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 *Slightly moist, reddish dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.30 *Moist, dark red, stiff, voided, sandy SILT containing shattered GRAVELS at the base; colluvium with basal pebble marker.*

0.40 *As above and containing abundant, medium and large (up to 0,6m in diameter), hard rock DOLERITE BOULDERS.*

NOTES

1) Abrupt refusal of backactor at 0,4m in dolerite boulders.

2) No water seepage encountered.

3) Isolated to scattered boulder outcrop in vicinity of test pit.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

DATE : 30/07/11 22:26
TEXT : ..\DOTPLOT\ARCHIVE\3207.TXT

ELEVATION :
X-COORD :
Y-COORD :

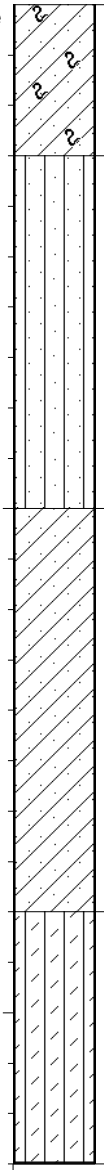
HOLE No: *BH/9*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/8*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 — *Slightly moist, reddish dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.30 — *Moist, dark red, stiff, voided, sandy SILT containing scattered small angular CORESTONES at the base; colluvium with basal pebble marker.*

1.00 — *Moist, dark red blotched black, stiff shattered sandy CLAY containing scattered FERRICRETE NODULES; residual dolerite.*

1.80 — *Moist, orange blotched yellow and brown and speckled black, stiff becoming firm, voided clayey SILT; residual dolerite.*

2.30

NOTES

1) No refusal of backactor at 2,3m.

2) No water seepage encountered.

3) Undisturbed soil sample taken at 0,8m.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

DATE : 30/07/11 22:26
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ELEVATION :
X-COORD :
Y-COORD :

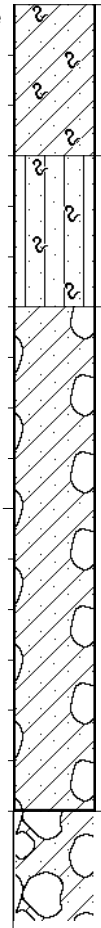
HOLE No: *BH/8*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/7*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 *Slightly moist, dark greyish brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.30 *Moist, dark red, stiff, voided, sandy SILT containing fine roots; colluvium.*

0.60 *Moist, dark red blotched black, stiff shattered sandy CLAY containing numerous medium and large (up to 0,5m in diameter) hard rock CORESTONES; residual dolerite.*

1.60 *As above and containing abundant, medium and large, hard rock DOLERITE BOULDERS.*

NOTES

1) Gradual refusal of backactor at 1,6m in dolerite boulders.

2) No water seepage encountered.

3) Massive outcrops of hard rock dolerite to the south of pit.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

DATE : 30/07/11 22:25
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ELEVATION :
X-COORD :
Y-COORD :

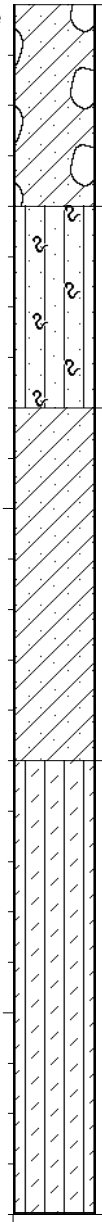
HOLE No: *BH/7*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/6*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 — *Slightly moist, reddish dark brown, very stiff, shattered, sandy CLAY containing scattered small to large (0,25m to 0,5m in diameter), hard rock corestones; colluvium.*

0.40 — *Moist, dark red, stiff, voided, sandy SILT containing fine roots; colluvium.*

0.80 — *Moist, dark red blotched black, stiff shattered sandy CLAY containing scattered FERRICRETE NODULES; residual dolerite.*

1.50 — *Moist, orange blotched yellow and brown and speckled black, stiff becoming firm, voided clayey SILT; residual dolerite.*

2.40

NOTES

1) No refusal of backactor at 2,4m.

2) No water seepage encountered.

3) Scattered outcrop of medium to large (>1,5m in diameter) of hard rock dolerite boulders in vicinity of pit.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

DATE : 30/07/11 22:25
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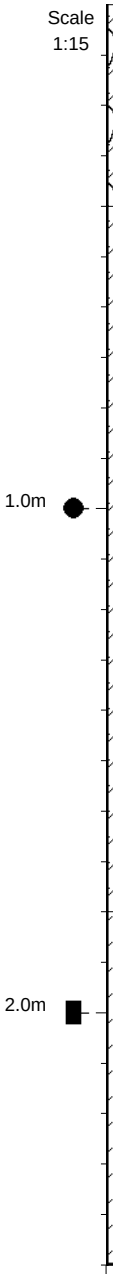
ELEVATION :
X-COORD :
Y-COORD :

HOLE No: *BH/6*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/5*
Sheet 1 of 1

JOB NUMBER: *M11/3207*



0.00 — *Slightly moist, dark greyish brown, very stiff, shattered, sandy CLAY containing scattered medium-sized (0,25m in diameter), hard rock corestone; colluvium.*

0.40 — *Moist, dark red blotched black, stiff, shattered, sandy CLAY containing scattered FERRICRETE NODULES; residual dolerite.*

1.80 — *Moist, orange blotched yellow and brown speckled black, stiff becoming firm, voided, clayey SILT; residual dolerite.*

2.50

NOTES

1) No refusal of backactor at 2,5m.

2) No water seepage encountered.

3) Isolated small corestones at surface in vicinity of pit.

4) Disturbed soil sample taken at 1,0m.

5) Undisturbed soil sample taken at 2,0m.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

DATE : 30/07/11 22:25
TEXT : ..\DOTPLOT\ARCHIVE\3207.TXT

ELEVATION :
X-COORD :
Y-COORD :

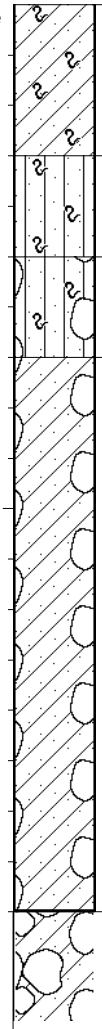
HOLE No: *BH/5*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/4*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 — *Slightly moist, reddish dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.30 — *Moist, dark red, stiff, voided, sandy SILT containing fine roots; colluvium.*

0.50 — *As above and containing numerous small corestones; pebble marker.*

0.70 — *Moist, dark red blotched black, stiff, shattered, sandy CLAY containing scattered small and medium-sized, hard rock DOLERITE CORESTONES; residual dolerite.*

1.80 — *As above and containing abundant, medium and large, hard rock DOLERITE BOULDERS.*

NOTES

1) Abrupt refusal of backactor at 1,8m in dolerite boulders.

2) No water seepage encountered.

3) Abundant medium and large (1,5m by 1,0m by 1,0m) hard rock DOLERITE BOULDERS in immediate vicinity of pit.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

DATE : 30/07/11 22:25
TEXT : ..\DOTPLOT\ARCHIVE\3207.TXT

ELEVATION :
X-COORD :
Y-COORD :

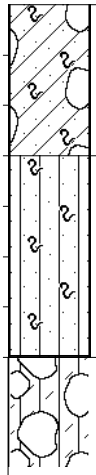
HOLE No: *BH/4*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/3*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 *Slightly moist, reddish dark brown, very stiff, shattered, sandy CLAY containing tree roots and numerous small and medium-sized hard rock corestones; colluvium.*

0.30 *Moist, dark red, stiff, voided, sandy SILT containing fine roots; colluvium.*

0.70 *Abundant medium and large (up to 0,5m in diameter) hard rock DOLERITE BOULDERS in a matrix of dry, dark yellow mottled orange, clayey SILT; residual dolerite.*

NOTES

1) Abrupt refusal of backactor at 0,7m in dolerite boulders.

2) No water seepage encountered.

3) Massive outcrops of hard rock dolerite on either side of pit.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

DATE : 30/07/11 22:25
TEXT : ..\DOTPLOT\ARCHIVE\3207.TXT

ELEVATION :
X-COORD :
Y-COORD :

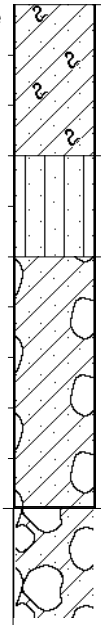
HOLE No: *BH/3*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/2*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 *Slightly moist, reddish dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.30 *Moist, dark red, stiff, voided, sandy SILT containing shattered GRAVELS at the base; colluvium with basal pebble marker.*

0.50 *Moist, dark red blotched black, stiff, shattered, sandy CLAY containing scattered FERRICRETE NODULES and numerous medium-sized CORESTONES; residual dolerite.*

1.00 *As above and containing abundant, medium and large, hard rock DOLERITE BOULDERS.*

NOTES

1) Abrupt refusal of backactor at 1,0m in dolerite boulders.

2) No water seepage encountered.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

DATE : 30/07/11 22:25
TEXT : ..\DOTPLOT\ARCHIVE\3207.TXT

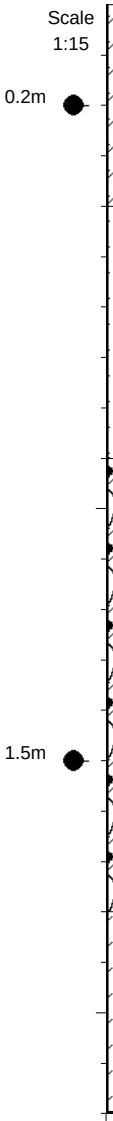
ELEVATION :
X-COORD :
Y-COORD :

HOLE No: *BH/2*

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/1*
Sheet 1 of 1

JOB NUMBER: *M11/3207*



0.00 — *Slightly moist, reddish dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.40 — *Moist, dark red, stiff, voided, sandy SILT containing shattered GRAVELS at the base; colluvium with basal pebble marker.*

0.90 — *Moist, dark red blotched black, stiff, shattered, sandy CLAY containing scattered FERRICRETE NODULES and numerous medium and large CORESTONES; residual dolerite.*

1.80 — *Moist, dark yellowish brown blotched black, brown and orange, stiff, shattered, clayey SILT; residual dolerite.*

2.20

NOTES

1) No refusal of backactor at 2,2m.

2) No water seepage encountered.

3) Numerous medium and large (up to 0,6m in diameter) hard rock dolerite corestones present from below 0,3m.

4) Disturbed soil samples taken at 0,2m and 1,5m.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

INCLINATION : *Vertical*
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

ELEVATION :
X-COORD :
Y-COORD :

HOLE No: *BH/1*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

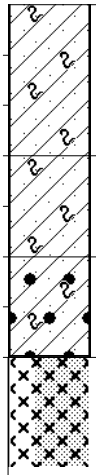
DATE : 30/07/11 22:25
TEXT : ..\DOTPLOT\ARCHIVE\3207.TXT

KBK CONSULTING ENGINEERS
Remainder of the farm Bosch Hoek 3345-HS, Newcastle
GEOTECHNICAL INVESTIGATION CARRIED OUT FOR:
PROPOSED NEW RESIDENTIAL TOWNSHIP DEVELOPMENT

HOLE No: *BH/33*
Sheet 1 of 1

JOB NUMBER: *M11/3207*

Scale 1:15



0.00 *Slightly moist, dark brown, very stiff, shattered, sandy CLAY containing tree roots; colluvium.*

0.30 *Slightly moist, dark olive, very stiff shattered sandy CLAY containing tree roots; colluvium.*

0.50 *Abundant coarse, hard, rounded NODULAR FERRICRETE, clast supported in a matrix as above; ferruginised colluvium. Overall consistency is dense.*

0.70 *Dark olive speckled white and green, moderately weathered, widely jointed, hard rock DOLERITE.*

NOTES

1) Abrupt refusal of backactor at 0,7m in dolerite bedrock.

2) No water seepage encountered.

3) Massive rock outcrops immediately to the west of the pit.

4) Contains scattered boulders in upper part of profile.

CONTRACTOR : *Flam Plant Hire*
MACHINE : *New Holland LB90B*
DRILLED BY : *Petros*
PROFILED BY : *jvdm*

INCLINATION :
DIAM : *Trench*
DATE : *19 & 20/05/2011*
DATE : *19 & 20/05/2011*

ELEVATION :
X-COORD :
Y-COORD :

HOLE No: *BH/33*

TYPE SET BY : jovdm
SETUP FILE : STANDARD.SET

DATE : 30/07/11 22:26
TEXT : ..\DOTPLOT\ARCHIVE\3207.TXT